

REQUEST FOR EXPRESSIONS OF INTEREST (CONSULTING SERVICES- FIRMS SELECTION)

Loan No./Credit No./Grant No.: IDA-6243 Contract No. PK-PMDFC-228549-CS-QCBS
Assignment Title: "Hiring of An Engineering Firm for Detailed Design of infrastructure sub-projects, Sectoral Planning and Resident Supervision in 16 Cities of Punjab Province under PUNJAB CITIES PROGRAM"

The Govt of the Punjab (hereinafter called "Borrower") has received financing from the International Development Association (IDA) in the form of a "loan" (hereinafter called "loan") towards the cost of "Punjab Cities Program (PCP)". Punjab Municipal Development Fund Company (PMDFC), an implementing/executing agency of the Client, hereinafter, referred to as 'Client' intends to apply a portion of the proceeds of this loan to eligible payments under the contract for "Hiring of Engineering Firm for Detailed Design of infrastructure sub-projects, Sectoral Planning and Resident Supervision in 16 Cities of Punjab".

The consulting services ("the Services") include detailed design of infrastructure projects, sectoral planning and resident supervision in 16 cities of Punjab, which shall be divided into five (5) packages with overall objectives to design the need based, prioritized and most cost effective municipal services infrastructure sub-projects in the associated sectors for benefiting the maximum population with minimum possible investments after due deliberation and assessments from all stakeholders of the MC. Under Services, the firms will prepare the holistic sectoral plans of the associated sectors in each Program MC to serve as a true development framework in that sector in next 30 years to keep in pace with the growing trends of the cities, design infrastructure subprojects and carryout resident supervision of the projects during execution for best quality control in line with defined Terms of Reference.

The Punjab Municipal Development Fund Company (PMDFC) now invites eligible consulting firms ("Consultants") to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services as per criteria.

The Consultancy Services for 16-cities will be divided into 5-Packages of Punjab with Cities as mentioned below;

Package	Cities
I	Jhelum, Wazirabad & Daska
II	Hafizabad, Kamoke & Muridke
III	Jaranwala, Gojra, Kamalia & Jhang
IV	Bahawalnagar, Burewala & Vehari
V	Okara, Khanewal & Kot Addu

Documents to be provided by the Firms:

Description
Certificate of Company/Firm Registration/Incorporation
Requisite registration with relevant taxation authorities
Submission of undertaking that the firm is not black listed by any client/entity

The consulting firms may participate in one or more than one packages. The Shortlisting criteria are for one package and in case firms expressing interest in multiple Packages, thresholds will be accumulated.

The Shortlisting Criteria for a Package are:

1. Minimum 10 years' experience in the field of designing, planning & resident supervision of public and private sectors infrastructure sub-projects and its implementation.

1.1 Specific experience in the public sectors for detailed design of infrastructure sub-projects, sectoral planning & Resident Supervision (up to five completed sub-projects with consultancy cost of PKR 50 million in total covering in one or more type of consultancies i.e. detailed design, sectoral planning, resident supervision. Documentary evidence must be provided. (Marks: 40)

2. Work Experience in Detail Design, Sectoral Planning & Resident Supervision (Marks: 60)

2.1 Proven experience of completion of at least two of five sectoral sub-projects (mandatory including water supply, waste water treatment plant, sewerage & storm water drainage as one sector) having worth of consultancy cost PKR 30 million in preparing urban detailed design for the relevant sectors such as Water Supply, Waste Water Treatment Plant, Sewerage & Storm water drainage, urban roads & streetlight, parks & green spaces. Documentary evidence must be provided (Marks:20)

2.2 Proven experience of completion up to two sectoral sub-projects costing for PKR 100 million for sectoral planning in the relevant sectors like Water Supply, Waste Water Treatment Plant, Sewerage & Storm water drainage, urban roads & streetlight. Documentary evidence must be provided.

(Marks: 20)

2.3 Proven experience of completion up to five consultancy projects having consultancy cost of PKR 50 million in conducting resident construction supervision of infrastructure sub-projects preferably urban areas.

(Marks: 20)

3. Statement indicating Portfolio of Clientage along with details of nature of organization be attached

The detailed Terms of Reference (TOR) of the above assignment can be found at the following website: <https://pmdfc.punjab.gov.pk/>

The attention of interested Consultants is drawn to Section III, paragraphs, 3.14, 3.16, and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers" July 2016 [Revised November 2017 and August 2018] ("Procurement Regulations"), setting forth the World Bank's policy on conflict of interest. A Consultant will be selected in accordance with the Quality & Cost Based Selection method set out in the Procurement Regulations of the World Bank (2016 and amended 2017 & 2018)

Consultants may associate with other firms to enhance their qualifications, but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract if selected.

Expressions of interest must be delivered in a written form to the address below (in person, or by mail) up to May 11, 2021 by 12:00 hours. Name of the package must be mentioned on the envelope Clearly and in Bold Letters intending to be participated.

Punjab Municipal Development Fund Company (PMDFC)

Attn.: Muhammad Aamer Nazee, Managing Director, PMDFC

Building No.184 Scotch Corner, Upper Mall Scheme, Lahore - 54500 Pakistan

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Website: <https://pmdfc.punjab.gov.pk/>

(IPL-3683)



PUNJAB CITIES PROGRAM (PCP)

**TERMS OF REFERENCE
FOR**

**SHORTLISTING OF CONSULTANTS
FOR**

**“HIRING OF ENGINEERING FIRM FOR DETAILED DESIGN OF INFRASTRUCTURE
SUB-PROJECTS, SECTORAL PLANNING AND RESIDENT SUPERVISION IN 16 CITIES
OF PUNJAB”**

April 2021

Punjab Municipal Development Fund Company

184, Scotch Corner, Upper Mall, Lahore

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Website: www.pmdfc.org.pk

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TERMS OF REFERENCE

For

**“HIRING OF ENGINEERING FIRM FOR DETAILED DESIGN OF
INFRASTRUCTURE SUB-PROJECTS, SECTORAL PLANNING
AND RESIDENT SUPERVISION IN 16 CITIES OF PUNJAB”**

I. Brief Background

- ✓ A Program captioned as Punjab Cities Program (PCP), introduced as a Program for Results (P4R), funded by World Bank through soft loan of USD 200.00 million and gestation period of 5 years, is being launched in 16 MCs of Punjab. Each MC will contribute 20% of the total cost of the sub-projects being executed in its jurisdiction. The development objective of the Program is to strengthen the performance of participating Municipal Committees (MCs), focusing on urban management and improvement of municipal services infrastructure for satisfactory service delivery. The operation is financed through a hybrid of Investment Project Financing (IPF) and Program-for-Results (PforR) instruments of the World Bank.
- ✓ The PforR (Window-1) will pilot the Performance Based Grants (PBGs) to the MCs of the 16 selected cities as given below:

Northern Punjab	Central Punjab	Southern Punjab
1- Daska	1- Gojra	1- Bahawalnagar,
2- Hafizabad	2- Jaranwala,	2- Burewala
3- Jhelum	3- Jhang,	3- Khanewal,
4- Kamoke	4- Kamalia	4- Vehari,
5- Muridke	5- Okara	5- Kot Addu
6- Wazirabad		

- ✓ The IPF (Window-2) will support provincial government agencies i.e. Local Government & Community Development Department (LG&CDD), Punjab Local Government Board (PLGB), Punjab Municipal Development Fund Company (PMDFC) and PFC Unit of Finance Department (FD) in Program Management, Release of funds, Capacity building of MCs in municipal service delivery along with developing and implementing gender responsive systems for human resource management, grant management, reporting, audit and MC performance assessment.

II. Objectives of Consultancy Services

The overall objectives of hiring of the Consultancies Services are to;

- a) Design in detail the need based, prioritized, and most cost-effective municipal services infrastructure sub-projects in the sectors given in the following sections for benefiting the maximum population with optimal possible investments whereby the cost vs. benefits are considered, after due deliberation and assessments from all stake holders of the MC
- b) Prepare the holistic Sectoral Plans for the sectors given in the following sections in each Program MC to serve as a true development framework in that sector in next 30 years to keep in pace with the growing trends of the cities, for benefiting the maximum population with optimal possible investments whereby the cost vs benefits are considered instead of adhoc and piece meal development wasting time and financial resources and bringing smaller benefits (as compared to investments) to the growing population of the cities.
- c) Resident supervision of the sub-projects during execution for quality control.

- d) Develop the list of prioritized, need based and most cost-effective municipal services infrastructure sub-projects in the said sectors, over the planning horizon of the Sectoral Plans with their time frame of execution.

The intention of the process is to develop the municipal infrastructure at a pace and level where satisfactory service delivery level for the entire growing population of the cities in future is attained and the gap between the supply and demand is bridged instead of widening with passage of time.

The Consultancy Services for 16-cities will be divided into 5-Packages in 3 main regions North, Center and South of Punjab with Cities as mentioned below;

Package	Cities
I	Jhelum, Wazirabad & Daska
II	Hafizabad Kamoke & Muridke
III	Jaranwala Gojra, Kamalia & Jhang
IV	Bahawalnagar, Burewala & Vehari
V	Okara, Khanewal & Kot Addu

The responsibility matrix of doing work for design and sectoral planning is given as below:

Sector	Re-verification of Data & Gap analysis & updating of maps	Detailed Design of Priority Sub-Projects	Sectoral plans	Resident Supervision
Parks	PMDFC	Consultants	-	Consultants
Filtration plants	PMDFC	PMDFC	-	Consultants
Solid waste management	PMDFC	PMDFC	Consultants	Consultants
Roads & streetlights	Consultants	Consultants	Consultants	Consultants
Water supply	Consultants	Consultants	Consultants	Consultants
Sewerage & WW Treatment plants	Consultants	Consultants	Consultants	Consultants

Data and infrastructure gap analysis is available for Solid Waste Management (primary /secondary collection equipment & machinery), Parks, and Filtration Plants for each MC. The available data for Solid Waste management will be further updated by PMDFC as per present status of the machinery & equipment and requirement for each MC will be worked out. The available data for filtration plants will also be updated by PMDFC and further requirement in each city will be determined depending upon the needs, proposed locations, land availability, water quality at each location and its connectivity/approach.

The subprojects for Solid Waste management and Filtration Plants will be designed and prepared by MCs with the assistance of PMDFC and works and goods will be procured by each MC under the provisions of PPRA Rules.

The data and maps for Parks & green spaces will be further updated as per present status and handed over to Consultants who will commence work on the Detailed Design of priority sub-projects in this sub-sector soon after mobilization, and complete detailed design of one priority project in each MC within 2 months.

In parallel, data re-verification and surveys for roads will be completed by the Consultants and detailed design and sectoral plans of roads will be started.

Water supply, roads, sewerage systems, & wastewater treatment plants need extensive data verification and confirmation of availability of land. Sub-projects will therefore be designed after completion of these and respective sectoral plans.

Prioritization of Sectors

- a) The Detailed Designs will need to cover the projected population for next 10 years, and will be prepared for the sectors as given below;
 1. Water supply 2- Sewerage & storm water drainage
 2. Solid waste management 4- Urban roads & streetlight
 5. Parks & green spaces
- b) Resident supervision will be carried out for the sub-projects designed and executed in the above-mentioned sectors.
- c) Sectoral Plans with planning horizon up to the year 2050, will be prepared for all the sectors as given below;
 1. Water supply 2- Sewerage & storm water drainage
 3. Solid waste management 4- Urban roads & streetlight
- d) A priority list of the sub-projects required to be executed in the **first 10 years (2020 to 2030)** for each city will be prepared by MCs with the assistance of the Consultants by assessing the immediate needs and priorities of the city based on the Situation Analysis and Gap Analysis already carried out by PMDFC in 2018, and updated by the consultants for roads & streetlights, water supply, and sewerage & waste water treatment.
- e) The priority of the sub-projects in this list will be appraised and identified under the light of following parameters;
 - Urgency and severity of the present problems and issues in each sector in the city
 - Immediate needs of the city in the next 10 years
 - Technical and economic feasibility
 - Number and nature of direct and indirect beneficiaries
 - Land ownership available with MCs and its suitability for the Sub-Projects.
 - Land acquisition and resettlement requirements.
 - Inventory of individuals and groups that may be negatively affected.
 - Social and environmental impacts & possibility of their mitigation.
 - Sustainability of the sub-projects and their dovetailing with or adjustment in the Sectoral Plans being prepared with 30 years of planning horizon.

- Other parameters specific to each city witnessed at site.

The projects in the priority list will be further appraised under the light of below given criteria as per IDAMP Framework published by P&D Department (Prepared under World Bank assisted PCGIP Project including:

- Identification of the Current Level of Services being delivered by the existing assets/component.
- Ascertain the target level of service to meet the service delivery requirements.
- Assessment of the gap in the existing level of service and target level of service.
- Determine if the existing asset portfolio meets the existing service delivery requirements and is capable to meet the service delivery gap.
- In case the existing assets/components are not sufficient to meet the target service delivery requirements, asset planning shall be undertaken in respect of rehabilitation of existing assets or creation of new assets as per below given criteria;

- **Rehabilitation/Replacement of Existing Assets**

The consultants shall identify category-wise list of assets for Replacements /Rehabilitation. Existing assets having significant contribution in the service delivery shall be included in the proposed list on following basis:

- Assets have reached to their replacement year; and/ or
- Assets have condition rating “poor & failing” and/or
- Assets have High risk of failure
- There are regulatory/ statutory directions to replace the asset

- **Creation of New Assets**

The requirement of service delivery enhancement based on the growing needs of population, development intervention and extension in services in extended boundary of city requires planning for the new assets to be integrated with the existing network of assets and system.

The new asset shall be planned by the Consultants after considering the needs within the municipal limits of the cities.

- All stake holders including the concerned MC officials, local public representatives & notables of the city, social activists and community organizations will be consulted before finalization of this priority list.
- The Projects Priority List will also be approved by MC’s Administrator or the Municipal Council if active within one month of the mobilization of Consultants.

1) Proposed prioritized list of sub-projects under the Sectoral Plans (2020- 2050)

For identification and prioritization of the sub-projects to be recommended for implementation of the Sectoral Plans the Consultants will take the following steps but not limited to;

- Assess options for meeting priority needs/forecasting the implementation of the sectoral plans and develop preliminary proposal for the sub-Projects for their execution to meet needs and facilitate implementation of the Sectoral Plan.

- ii. Present the Sectoral Plans, possible sub-Projects and options for meeting priority needs to local stake holders and modify as appropriate in response to their suggestions and concerns.
- iii. Finalize the sectoral plans and list of priority sub-projects under the discussions in these forums. However, Pre-feasibility Report will be prepared by the Consultants to ensure that the sub-projects are technically feasible.
- iv. Liaise with PMDFC and relevant stakeholders to ensure that the Sectoral Plans and priority list sub-projects are formally approved and agreed by relevant MC Council.

In prioritizing sub-projects, preference will be given to city areas which are already fully populated but are either under-served or unserved. Sub-projects for areas that are proposed to be developed under the planning horizon may be taken up in later years, once the existing population of the city has been fully covered.

These sub-projects will be prioritized for execution in the chronological order as per considered needs of the city and the probable timeline of the execution of these sub-projects will be indicated.

The priority list of the sub-projects in each MC will be prepared by the Consultants duly approved by MC Council/Committee and shared with WB according to this latest data, inventories and upgraded maps.

III. Terms of Reference

The consultants will be required to carry out their activities as outlined in the objectives as given above.

A. Detailed Design

a) Re-verification of the data and maps

A gap analysis and situation analysis have already been carried out by PMDFC in the year 2017-2018. Detailed verification of data and updation of the descriptive maps and the data of the components of ***Solid Waste Management, Filtration Plants and Parks*** will be done as per site installations/status by PMDFC and the data for Parks will be provided to the Consultants on their mobilization. This will be done because:

- Degradation of the infrastructure may have taken place in the intervening period because of poor operation & maintenance of the municipal infrastructure by MCs.
- Due to rehabilitation of municipal services infrastructure works carried out by MCs, inventories prepared in the Situation and Gap analysis and the updated maps may have changed.

However, re-verification of data and maps of the following will be done by Consultants:

- ***Water supply systems,***
- ***Sewerage systems including Sewage Treatment and***
- ***Urban road network.***

b) General requirements of detailed design of the Priority Sub-Projects

The consultants will be required to undertake, but not be limited to, the following broadly categorized tasks for detailed design of the sub-projects:

- i. Holistic planning of the entire city in the sectors of municipal services given in the detailed scope of work for next 10 years (up to year 2030) and identification of the works needed for *improvement of the services in the served areas and extension of the services to the presently unserved areas* of the city.
- ii. Prepare feasibility of the sub-projects over the given horizon (up to 2030) and design of sub-projects as per priority established and within the financial envelopes agreed.
- iii. Preparation of the project Feasibility Reports, Detailed Design, Rough Cost Estimates, Bid and Detailed Drawings, PC-Is, Detailed Cost Estimates and other Project documents required therein.
- iv. Carrying out the Economic and Financial Analysis for determination of EIRR and FIRR as per requirements of the PC-Is.
- v. Sensitivity Analysis of the sub-projects and their economic, financial, and social effects.
- vi. Presentation of PC-Is to DDSC/Pre-PDWP/PDWP and finalization of PC-Is in the light of comments (if any) from DDSC/PDWP
- vii. Preparation of Bidding Documents including pre-qualification/post qualification criteria for contractors
- viii. Assist MC in preparation of Bid Evaluation Report on duly cleared format by PCP Team of PMDFC
- ix. Preparation of Revised PC-Is and detailed cost estimates of the sub-projects if required, their presentation to the competent forum and correction or modification as per requirement of the forum.
- x. The Consultants shall supervise the works being executed by the contractors, in all matters concerning quality and quantity of works, safety and care of work and report to MC Project Manager on any problem arising out in construction work during its execution.
- xi. The Consultants shall certify that construction material brought at site by the contractor for use in construction is in accordance with the specifications. The Consultants will get any material tested from any approved government laboratory in line with Contract Documents duly approved by the Client (MC).
- xii. The Consultants will be responsible for checking the quality of works, goods, machinery & equipment brought or installed by the contractors at site of work and will issue notice to the contractor for their replacement if these do not conform to the laid down specifications.
- xiii. The Consultants will verify the quantities of Work carried out by the Contractor by actual measurements at site and will verify IPCs submitted by the contractor with recommendations for payment to the relevant MC.
- xiv. Consultant will provide complete SOPs of Contract Implementation particularly, Processing of Variations / deviations in the quantities and specifications of works, Processing of Contractors IPCs, Check Request System, and Laboratory Testing etc. with

their inception report and will implement these SOPs during supervision of works and verification of IPCs.

- xv. The Consultant will monitor the approved implementation schedule and report delays if any with proper analysis of delays particularly early warning of such events to the Engineer in Charge.
- xvi. The Consultant shall submit fortnightly progress report to the concerned Project Manager and to PMDFC on monitoring of works, environmental, social, occupational health and safety management plans, pointing out the deficiencies in the works & plans and suggestions for its remedial measures.

The detailed scope of work to be carried out for each sector has been given in **Annexure-A**.

c) Documents to be prepared by the Consultants

The following documents will be prepared by the Consultants for detailed design of each sub-project;

- 1) Inception Report
- 2) Prefeasibility Report
- 3) Feasibility Report
- 4) Detailed design of the sub-project
- 5) Cost Estimates
- 6) Economic and Financial Analysis
- 7) Sensitivity Analysis
- 8) PC-Is
- 9) Bidding Documents including but not limited to;
 - Instruction to Bidders & Conditions of the Contract (COC)
 - Special Conditions of the Contract
 - Bill of Quantities (BOQ)
 - Contract Data
 - Specifications
 - Form of Agreement and detailed draft contract (general and specific conditions)
 - All other standard format used for execution of a Pakistan Engineering Council based contract
- 10) Revised PC-Is and detailed cost estimates, whenever required.

B. Sectoral Planning

a) Expected growth of the city

As stated above each Sectoral Plan to be prepared by the Consultants will be based on the approximate expected extent of future growth of each city and the main new and upgraded access routes proposed to provide access to areas expected to be developed in the planning horizon of the Sectoral plan (up to 2050). The plan will be drawn based on projected population of each city, existing and expected commercial, industrial, & residential areas and

other main requirements of the city *based on the city's economic growth potential and the main physical drivers that influence the growth of the city. Population and spatial growth projections will be taken from the Spatial Plan/Master Plan of the city. In case these are not available, or are outdated, the Sectoral Plans will only cover the city within its existing municipal boundary.*

b) Data Collection for Sectoral Planning

The Sectoral Plans will take into account, but not be limited to, the following parameters;

- Existing social and physical municipal infrastructure and quality of municipal services in various areas of the city.
- Connectivity of the city with provincial arterial roads and city arterial roads, railway stations and by pass roads.
- General topography of the city
- Availability of fresh water sources availability of fresh water sources
- Ultimate waste water disposal
- Water bodies passing through the city and their effects or impacts on the city environments
- Location of SWM collection points, transfer stations, and dumping sites/landfill sites
- Location of industrial units adversely affecting the city environment.
- Cantonments, their main approaches, and extent of use of city's municipal services.
- Corridor development on various outgoing or incoming roads adversely affecting existing service provision
- Corridor development on various outgoing or incoming roads adversely affecting existing service provision
- Industrial estates if any
- Agriculture activities in the city

The following communication corridors will be marked on the city plan within the sectoral planning boundary;

- Proposed roads or routes to be established for serving /accessing the areas to be developed within this boundary.
- Arterial roads proposed for connectivity of the expanded city with the existing arterial roads of the city.
- Proposed city roads in the areas to be developed for their connection with national or provincial arterial roads and bypasses.
- Cantonments, their main approaches, and extent of use of city's municipal services.
- Industrial estates if existing in or around the city within the municipal limits and the municipal infrastructure used by the industrial units.

c) Preparation of the Sectoral Plans

- A Sectoral Plan report for each sector will be prepared which will provide the location of the city, climatic conditions & rainfall data, connectivity, important and religious places, economic, cultural, or religious importance of the city, social infrastructure, educational facilities, government offices and administrative structure, commercial and industrial activities, culture and traditions of the area and other type of factors or

activities attributed to the city which will impact municipal infrastructure and service delivery. The report for the Plan will reflect the ultimate effects on the city environments and benefits to be accrued to the inhabitants of the city after implementation of the Sectoral Plan.

- Salient features of each sectoral plan to be developed are given in **Annexure-A**. The Consultants will include any other features which can add to the comprehensiveness and value of the Plans which will provide comprehensive data and be helpful for future planning of the sectoral infrastructure.
- Descriptive maps of each sector will be prepared showing the existing municipal infrastructure in the city in that sector and the proposed facilities as per provisions of **Annexure-A** in the planning horizon marked within the planned sectoral boundary.

d) Documents to be prepared by the Consultants for each MC:

- 1) Sectoral Plan boundary marked on the city map along with access roads and arterial roads.
- 2) Detailed sectoral planning report of each sector in each MC
- 3) Detailed Sectoral Plans in the form of descriptive maps shown on the city plans within the sectoral boundary for each sector in each MC
- 4) Sub-projects which are required to be developed from year 2030 to 2040 to cover the projected population with timeline of execution in chronological order in each MC.
- 5) Sub-projects which are required to be developed from year 2040 to 2050 to cover the projected population with timeline of execution in chronological order in each MC.
- 6) Prioritization of the inter sector and intra sector sub-projects with timeline of execution in each MC.
- 7) Final & Completion Report for each MC.

Sector Wise TORs are attached as **Annexure-A**.

C. Resident Construction Supervision

The Consultants will undertake Resident Supervision of the Sub-Projects per the following:

- (a) A Chief Resident Engineer/Team Leader will be appointed against each Package who will have overall control of the package.
- (b) One RE will be appointed against each Package who will be responsible to overall supervision duties of the sub-projects.
- (c) One Assistant Resident Engineer (Qualified Graduate Engineer Civil in the respective discipline with sufficient experience as given below) and two Inspectors (DAE Civil with experience as given below) will be stationed in each Program MC, and will be

responsible for resident supervision of the works & goods and shall perform their duties with due diligence, efficiency and in accordance with the best engineering professional and consulting standards.

- (d) Consultants will devise a progress report format and submit to the Client along the inception report for approval.
- (e) The Consultants shall supervise the works being executed by the contractors in all matters concerning safety and care of work and report to MC Project Manager on any problem arising out in construction work during its execution.
- (f) The Consultants shall certify that construction material brought at site by the contractor for use in construction, in accordance with the specifications and the material should be tested from any approved government laboratory in line with Contract Documents duly approved by the Client (MC).
- (g) The Consultants will be responsible for checking the quality of works and machinery & equipment installed by the contractors at site of work and will issue notice to the contractor for their replacement if these do not conform to the laid down specifications. One copy of this notice will be submitted to the Project Manager.
- (h) The Consultants will verify the quantities of work carried out by the Contractor at site and recommend payment to the relevant MC.
- (i) None of the substandard works, equipment and machinery will be verified for payment to the contractor by the Consultants. Similarly, no excess quantity over and above that actually measured at site by the Consultants, will be verified and paid.
- (j) Consultant will provide complete SOPs of Contract Implementation particularly, Processing of Variations / deviations in the quantities and specifications of works, Processing of Contractors IPCs, Check Request System, and Laboratory Testing etc. with their inception report.
- (k) IPCs will be verified and certified by the Chief Resident Engineer and concerned field staff. Consultant will ensure that all necessary documents are appended with the IPCs before recommendation to Project Manager under intimation to the Client. One copy of IPC will also be provided to the Client.
- (l) The test reports from nearest government laboratory (C&W, NLC, FWO, PCSIR, PITAC, UET Lahore and UET Taxila or any other Government approved laboratory etc.) will be attached with the contractors' IPCs. .
- (m) The Consultant will monitor the approved implementation schedule and report delays if any with proper analysis of delays particularly early warning of such events to MO (I), the Engineer in Charge.
- (n) The Consultants shall keep the record of daily inspection reports and hand them over to the concerned Project Manager i.e. MO (I&S) on fortnightly basis. One copy of this

record shall be retained by the consultants for record at site offices and the summary of such notes shall become part of Monthly Progress reports to be submitted to the Client. The Consultants will submit progress pictures through an android application attached with a dash board through Google map providing GPS with date and time and progress in % at site.

- (o) The Consultant will keep pictorial evidence of each and every stage of work before, during and after completion of the work. This pictorial evidence will be systematically & chronologically arranged and will be submitted to the Client on weekly basis or as required by the Client.
- (p) The required decisions shall be made at site by Assistant Resident Engineers. Decisions requiring major change in scope of work liable to change the project cost substantially, will be referred to the Team Leader who will process such cases in line with contract agreement signed between MC and the Contractor and recommend to MO (I), the Engineer for approval.
- (q) The Consultant shall submit fortnightly progress report to the concerned Project Manager and the Client on monitoring of works, environmental, social, occupational health and safety management plans, pointing out the deficiencies in the works & plans and suggestions for its remedial measures.
- (r) No payment to the Consultant will be made till submission of the certification by its Chief Resident Engineer/Team Leader that the work has been completed in accordance with Contract Documents and approved Drawings for Construction and the quality and quantities of the works have been verified.
- (s) Consultant will include MC stationed field office attendance sheet of every month in the Monthly Progress Report duly attested by the Team Leader/Chief Resident Engineer.
- (t) Due to various types of variations in quantities and specifications of the actual work required / executed in the filed with those provided in the BOQ /letter of award, the revision in the PC-I and detailed cost may be needed. In such cases the Consultants will prepare Revised Cost Estimates on the format specified by Government of Punjab and PC-Is, present these before the competent forum for Approval and subsequently prepare the detailed cost estimate and drawings for seeking Technical Sanction from the competent authority.
- (u) One month prior to the expiry of the defect liability period of the work, the Consultant shall carryout a detailed final inspection of the works along with MCs and Contractors concerned authorised staff and submit a report to the concerned Project Manager pointing out the defects if any in the works along with remedial measures mentioning specified time lines with one copy endorsed to the Client..
- (v) If subsequently, at any stage after the expiry of the defect liability period and during the service life of the work, the quality of any item of work passed by the consultant is found substandard, defective or its quantity excess over that actual quantity in field, the

consultant shall also be liable to pay the compensation to the concerned MC for the defective work. The liability shall be to the extent of two times the fee charged for consultancy.

Following is the core team of the consultants for design, sectoral planning and construction supervision is given below:

S #	Personnel	Qualification	Input
1	Team Leader (Design+Sectoral Planning+Resident Supervision)	BSc:/BE in Civil Engineering from HEC approved University with minimum 20 years' professional experience and 5 years' experience on similar assignments; or MSc; Civil Engineering/Public Health Engineering/Environmental Engineering with Bachelor in Civil Engineering with minimum 15 years' experience and 5 years' experience on similar assignments on urban planning, designing and construction supervision assignments. He must have served as head of various engineering and planning assignments at least for 10 years.	Lahore based Full Time
2	Urban Planner	Urban Planner should hold at least master's degree in Urban/Regional Planning from HEC approved University with 10 years general experience in planning and at least 5 years experiences in leading urban planning projects. He/she have requisite land use knowledge of Master/structure and spatial; planning as well as undertaken key planning and infrastructure planning projects. Requisite GIS and Punjab Land use Classification, Reclassification and Redevelopment Rules knowledge.	Lahore based Full time
3	GIS Specialist	Should hold master degree in GIS/Spatial Sciences from HEC approved University with 10 experience of GIS related projects and should had led at least three municipal mapping projects. Should have knowledge of land management systems. Base and Land Use mapping experience would be an added advantage. Should be able to develop requirements for efficient GIS database with attributes based on best international/national practice.	Lahore based Full time
4	GIS Analyst	Should hold master degree in GIS/Spatial Sciences from HEC approved University with 07 experiences of GIS related projects and should had supervised at least three municipal mapping projects. Base and Land Use mapping experience would be added advantage. Should be able to analyze requirements for efficient GIS database with attributes based on best international/national practice.	Lahore based Full time
5	Sr. Surveyor	Diploma in Surveying (2 Years) with minimum 10 years' experience in site Surveying on projects of similar nature.	Lahore based Full time
6	Field Surveyors	Diploma in Surveying (2 Years) with minimum 5 years' experience in site Surveying on projects of similar nature.	Lahore based Full time
7	Data Operator	Diploma in MS Office and good in MS Word and MS Excel with work experience of more than 1 year.	Lahore based Full time
8	Social Safe Guard Specialist	He/ She should hold the master degree in environmental management or Sciences/Social Sciences/engineering/ with 10 years' work experience in related field. Experiences on environmental issues including disaster management.	Lahore based Full time

		Experiences managing cities environmental issues would be beneficial	
9	Environmental Specialist	He/ She should hold the master degree in environmental management or Sciences/engineering/ with 10 years' work experience in related field. Experiences on environmental issues including disaster management. Experiences managing cities environmental issues would be beneficial.	Intermittent
10	Water Supply Specialist (Design)	BSc; Civil Engineer with Masters in Public Health Engineering /Environmental Engineering from HEC approved University and possessing minimum experience of 10 Years for designing water supply systems	Full Time
11	Sewerage Specialist (Design)	BSc; Civil Engineer with Masters in Public Health Engineering /Environmental Engineering from HEC approved University and possessing minimum experience of 10 Years for designing Sewerage Systems	Full Time
12	Waste Water Treatment Specialist (Design)	BSc; Civil Engineer with Masters in Public Health Engineering /Environmental Engineering from HEC approved University and possessing minimum experience of 10 Years for designing Waste Water Treatment Plants	Full Time
13	SWM Specialist (Design)	BSc; Civil Engineer with Masters in Public Health/Environmental Engineering from HEC approved University and possessing minimum experience of 05 Years for designing SWM designs	Full Time
14	Roads Specialist (Design)	BSc; Civil Engineer from HEC approved University with Masters in Highways/Transportation Engineering and possessing minimum experience of 10 Years for designing highways	Full Time
15	Procurement Specialist	BS/MS Management degree/ BSc;/B.E Engineering Degree minimum 16 Years of Education with 8 Years' experience in procurement of various projects at least 1 donor funded projects	Intermittent
16	Architect	BS; Architect with experience of planning and architectural services for various buildings, land scaping and parks projects of national and international level.	Intermittent
17	Quantity Surveyors	DAE in Civil with minimum 10 years' experience for projects of similar nature as QS.	Full time
18	CAD Operators	DAE in Civil with minimum 10 years' experience for preparation of drawings in CAD particularly civil engineering infrastructure projects.	Full Time
19	Resident Engineer	BSc/BE Civil engineering with minimum 08 years' relevant design experience or MSc Engineering/Civil/ Public Health Engineering/Environmental Engineering and 5 years on similar assignments in both cases	Region based Full Time
20	Contract Management Specialist	BSc;/BE Civil Engineering with minimum 08 Years of Experience in Contract Management and overall experience of 15 Years on Civil Engineering Projects particularly PEC/FIDIC Based Contracts. He must have knowledge of MS Project and Prim-Vera. Preference will be given having Master's degree in Project Management/Contract Management	Lahore based Full Time
21	Assistant Resident Engineers	Bachelor Degree in Civil engineering with minimum 8 years' experience in site supervision and execution for projects of similar nature.	MC Based. Full Time
22	Site Inspectors	DAE in Civil with minimum 10 years' experience in site supervision for projects of similar nature.	MCs Based. Full Time

23	Quantity Surveyor	DAE in Civil with minimum 10 years' experience for projects of similar nature as QS.	Head Office/Regional Offices
24	Support Staff	-	Head Office/Regional Offices

- ◆ Any other related staff will be quoted by the Consultant in line with the methodology submitted
- ◆ CVs will not be evaluated at the stage of EOI

IV. Time Lines

(i) Detailed Designs & Sectoral Plans

Complete Assignment is likely to be completed within 15 Months of the signing of contract agreements. The deliverables as per time line are given below:

V. Deliverables/KPIs with timeline

1) Detailed Design (Roads, SWM, Parks, Water Supply, Sewerage and Sewage Treatment)

Sr. No.	Description	Proposed Time (Calendar months from contract signing)		Hard Copies	Soft Copies
		Roads, Parks and SWM	Water Supply & Sewerage i/c Sewage Treatment		
1	Mobilization, Inception reports, All initial works as per scope of work, GIS base maps updating & preparation of subprojects priority lists	1		03	01
2	Preparation of the Detailed Design	Period starts from contract signing	Period starts from contract signing		
a	Feasibility, Design and Drawings	5	9	03	01
b	Engineer's Cost Estimates	6	10	03	01
c	Draft PC – Is	8	11	03	01
d	Final PC – I	10	12	15	01
e	Detailed Cost estimates	11	13	15	01
f	Draft Bidding Documents Including <ul style="list-style-type: none"> • BOQ • COC • Detailed Drawings • Specifications (All above documentation is a parallel activity except BOQ)	12	14	02	01
g	Final Bidding Documents including	12	15	10	01

	BOQ, COC, Detailed Drawings and Specifications				
Total time per project		12	15		
2) Sectoral Planning					
Sr. No.	Description	Proposed Timeline for document delivery (months)		Hard Copies	Soft Copies
		Roads, Parks and SWM	water supply & sewerage i/c sewage treatment		
		Period starts from zero month			
	Mobilization, inception report and all initial tasks in each MC as given in TORs	1		03	01
2	Sectoral boundary, proposed access routes and city roads within this boundary	2	3	03	01
	Total initial time period	3	4		
3	Sectoral Plans				
a	Detailed sectoral planning report of each sector in each MC	6	9	03	01
b	Detailed Sectoral Plans in the form of descriptive maps shown on the city structure plans for each sector in each MC	7	10	03	01
c	List of Priority Sub-projects for the year 2030 to 2040 and 2040 to 2050 with time line	7	12	03	01
	Total time period for one sector	7	12		
RESIDENT CONSTRUCTION SUPERVISION					
Sr. No.	Deliverables	Hard Copies		Soft Copies (MS Word/Excel/PDF)	
1	Inception Report	03		01	
2	Fortnightly Progress Report	03		01	
3	Monthly Progress Reports	03		01	
4	Mid Term Progress Report (03		01	

5	Final Report	03	01
6	Revised PC-I (when required)	14	01

Note: All **first priority sub-projects** in each MC against a package will be taken up simultaneously. For this purpose, parallel teams will be deployed by the Consultants in all MCs.

Annexure-A

Detailed scope of work of individual municipal service

The sector wise main features to be included in scope of work for various sectors for the Detailed Design of Projects and Sectoral Planning, has been given herein. The tasks to be performed will

not be limited to these parameters and the Consultants may include all other features or parameters required to make the detailed design of projects and Sectoral Plans most cost effective, workable, comprehensive, viable and sustainable.

1) Water Supply Systems

A. Detailed Design of water supply Projects

- 1) Identification of most suitable and cost effective fresh water sources for the city by investigation of the water quality of the existing water sources in and around the city and plotting them on a plan for getting true and holistic picture of the water quality of all available fresh water sources.
- 2) Inventory of the abandoned or closed water sources by MC for the existing water supply system and determination of the causes of failure of these sources.
- 3) Working out the existing service delivery level in water supply systems in the light of under mentioned parameters;
 - Total present daily water production determined by measurement of actual discharge of the sources and the pumping hours per day.
 - Per capita per day water being supplied by MC at present.
 - Cost of present water production and distribution per 1000 gallons or per cubic meter.
 - Detection of inefficient water sources components in the existing water supply system and recommendation for their future use or closure.
 - Water shortage areas and reasons thereof (plot on the map).
 - Contaminated water supply areas with reasons of water contamination (plot on the map).
 - Approximate percentage of water wastage presently occurring in the city and most probable areas of wastage.
- 4) Measures to control this water wastage and the expected results out of these methods.
- 5) Recommended most suitable method for reduction of non-revenue water.
- 6) Preparation of the design criteria for water supply system.
- 7) Rehabilitation of the existing water supply infrastructure (if not included in M&R Projects of Year-1) for gaining maximum efficiency and maximum benefits to the consumers involving but not limited to the under mentioned components;
 - Replacement of tube wells if direly needed.
 - Repair of the existing pumping machinery and its replacement if it is not repairable including repair/replacement of electrical and mechanical parts.
 - Repair of water reservoirs, repair/replacement of pumping machinery & civil structures in intermediate pumping stations.
 - Replacement of rusted, damaged and leaking pipe lines of the transmission mains and distribution system wherever these are essentially required giving problems caused by these pipelines and reasons for replacement.

- Conducting the surveys and replacement of the underground portion of the substandard/rusted up consumer connections which are leaking in the underground and adding water contamination to the system.
 - Repair or replacement of the water disinfection facilities.
- 8) Extension of water supply facilities to all unserved areas in the city including all water supply components required therein.
 - 9) Induction of consumer metering system in existing as well as proposed system.
 - 10) Main water supply pipe lines to be connected subsequently with the water supply system in the areas to be developed in future in the sectoral plan horizon
 - 11) Identification of the gaps and shortcomings in the present user charges levying, billing and recovery system, subsidies being injected and devising the methods for improving billing and recovery system of water revenue.
 - 12) Induction of consumer and bulk water metering system and devise water tariff structure with recovery mechanism.
 - 13) Carryout Environmental and Social Assessments acceptable to World Bank and EPA Punjab and recommend mitigation measures as per requirements along with Environmental and Social Management Plans (E&SMPs) during all phases of projects (Detailed Designing, Construction & Maintenance & Operation)
 - 14) Manpower presently deployed for O&M and total manpower cost effective needs after the completion and commissioning of the proposed water supply system.

B. Sectoral Planning of water supply sector

- 1) Preparation of the Design Criteria.
- 2) Per capita requirement of fresh water for the city keeping in view the city living style/culture and the available fresh water sources in or around the city.
- 3) Total demands of the population in the planning horizon, present water production from the existing sources and the proposed sources of fresh water wherefrom it can be obtained.
- 4) Possibility of the extension of existing water supply facilities in the areas to be developed in the planning horizon including all water supply components required therein.
- 5) Skeleton water supply system in the areas to be developed in future in the sectoral plan horizon including;
 - Proposed water sources according to the need of Structure Plan including their dovetailing with the existing sources if required.
 - Transmission mains including the resizing of existing mains if required and laying of new mains as per requirement of the proposed water sources and the structure plan.
 - City / intermediate pumping stations including the enhancement of ground storage and pumping capacity in the existing pumping stations if required and the new pumping stations to be developed.
 - Overhead storage to be constructed to meet the peak hour demand of the inhabitation to be developed under structure plan.
 - Main distribution grid keeping in view the requirements of the structure/physical plan developed. This may also include enhancing the capacity of the existing distribution mains by their replacement and their dovetailing with the newly proposed skeleton of main pipe lines.

- Water disinfection facilities required therein.
- An approximate cost estimate of the operation and maintenance of the water supply system in the year, 2030, 2040 and 2050

2) Sewerage Systems

A. Detailed Design of sewerage projects

- a) Preparation of the design criteria.
- b) Rehabilitation of the existing sewerage infrastructure (If not included in M&R projects in Year-1) for gaining maximum efficiency and maximum benefits to the consumers involving but not limited to the under mentioned components;
 - Repair of the existing pumping machinery and its replacement if it is not repairable including repair/replacement of electrical and other mechanical parts.
 - Repair of civil structures in the disposal/ pumping stations.
 - Repairs or replacement of rusted, damaged and leaking suction or delivery pipes of the pumping machinery along with specials and valves if required
 - Cleaning and de-silting of choked or semi choked sewers wherever possible.
 - Replacement of existing sewers (only those which are damaged or which cannot be de-silted) or under capacity sewers.
 - Construction of sewers in case some areas of the cities can be drained of by gravity without pumping.
 - Construction of any link sewers in the present system which can improve the existing system or reduce the O&M charges
 - Repair of the sullage carriers and repair/replacement of force mains
 - Repair or raising of manholes, including provision of base frames and manhole covers
 - Repair or construction of gulley grating chambers.
 - Construction of desilting chambers if needed.
 - Repair or erection of ventilating shafts (not vulnerable to theft)
 - Provision of sewer de-silting and cleaning equipment /machinery
 - Repair of generators
 - Provision of sewer safety equipment (if not available with MC)
- c) Extension of the sewerage system to unserved areas of the city with projected growth of next 10 years including all required components like sewers, disposal stations, sullage carriers or force mains and intermediate pumping stations (if unavoidable).
- d) Main sewers to be extended in the areas to be developed in future in the Sectoral Plan horizon including main and branch sewers.
- e) Design of most suitable and appropriate waste water treatment plants including the existing waste water outflow keeping in view the most cost effective solutions after comparing various options.
- f) Ultimate disposal arrangements of treated water including force mains or sullage carriers required therein.
- g) Carryout Environmental and Social Assessments acceptable to World Bank and EPA

Punjab and recommend mitigation measures as per requirements along with Environmental and Social Management Plans (E&SMPs) for all phases of subproject (Detailed Designing, Construction and O&M)

- h) Manpower presently deployed for O&M and total cost effective manpower needs after the completion and commissioning of the proposed sewerage system.
- i) Waste water tariff structure (if levied), present billing & recovery system, subsidies being injected and proposed improvements in tariff structure and billing & recovery system to reduce the subsidies.

B. Sectoral Planning of sewerage sector

- a) Total waste water production in the planning horizon, quantity of waste water presently being disposed-off at various points and in various water bodies and methods of its treatment.
- b) Total remaining waste water quantity to be disposed-off in future in the planning horizon of the city, the methods and point of its disposal.
- c) Extension of the existing sewerage system if possible to the proposed inhabitation under Sectoral Plan including all required components like sewers, disposal stations, sullage carriers or force mains and intermediate pumping stations (if unavoidable) along with their proposed location.
- d) Location, capacity and sizes of skeleton sewerage system in the areas to be developed in future in the Sectoral Plan horizon including main, branch and outfall sewers, intermediate pumping stations (if required), outfall disposal stations and force mains /sullage carriers and other structure required therein.
- e) Capacity and proposed location of waste water treatment plants and ultimate disposal arrangements of treated water including force mains or sullage carriers or any other structures required therein for the presently disposed-off untreated water and the waste water from the proposed systems.
- f) Storm water drainage on the existing main roads and the areas to be planned for future and its ultimate disposal preferably by gravity. Separate storm water drainage should be planned only in the form of larger sized drains. It should be assumed that the present drainage or sewerage system will take some of the storm water from streets and narrow roads and remaining will flow in the form of surface runoff to be taken by larger drains to be planned and constructed.
- g) An approximate cost estimate of the operation and maintenance of the sewerage and drainage system in the year, 2030, 2040 and 2050.

3) Urban Road & Street Light

A. Detailed Design of Road Projects

- a) Detailed survey and field investigations for roads which should include but not limited to collection of all available data about the existing roads including traffic loads and intensity.
- b) Details of existing utilities or services on the roads
- c) Details of existing road longitudinal and cross drainage

- d) Preparation of detailed design of the roads to be improved or new roads to be constructed in the presently populated areas or the areas proposed to be developed in the design horizon of the Project which should include:
 - Design Criteria for roads
 - Geometric design of roads
 - Road structures design
 - Road longitudinal profile and cross sections at required locations
 - Road longitudinal and cross drainage profiles and plans
 - Any other parameter required for detailed design and construction of roads.
- e) Possible extension of the roads so designed to the areas to be developed in the Sectoral Plan horizon.
- f) Design of the quality monitoring system of road works.

B. Sectoral Planning of Road Network

- a) Road network required to be planned for serving the population growth proposed under the Sectoral Planning horizon, will be as follows but not limited to this;
 - Access roads for the proposed inhabited areas to be linked with the present road network of the city.
 - Main arterial city roads to be linked with the Provincial or National arterial network.
 - Roads leading to the industrial areas and commercial hubs
 - All other roads required to serve the existing or proposed settlements/colonies and social infrastructure in the planning horizon.
 - All outgoing and incoming roads.
 - Any other roads as per future needs of the city.
- b) The length and number of lanes of each proposed road or roads to be rehabilitated, will be determined depending upon estimated future traffic intensity and loads.
- c) The location, capacity, width and number of lanes of road interchanges, bypasses, flyovers, underpasses and other required structures in the existing inhabited areas and that proposed in future.
- d) Bridges and culverts required over the water bodies in the presently inhabited areas or areas to be developed in future.
- e) Longitudinal and cross storm water road drainage and its ultimate disposal preferably by gravity.

C. Detailed Design of street light Projects

- a) Inventory of the under mentioned types of existing street light including transformers, service cables, poles, arms, brackets and type & wattage of luminaries, LT Panels, energy meters and switch on & switch off devices with their functional status. The damaged, dormant & non-functional components will be listed down for their repairs or replacements during rehabilitation.

- Installed on Power Distribution Company's poles including the MC owned conductor
 - Installed on MC poles
 - Installed in secondary and tertiary streets with or without poles or mounted on walls
- b) Plotting the existing street light on city plan mentioning all above given three types in different colours
- c) Rehabilitation of the above-mentioned street light in all respects as mentioned below;
- Lights on Power Distribution Company's poles on main roads will be converted in to standard form of street light by erection of new light masts with underground cables, brackets and other allied electrical items of work. The transformers, service cables, LT panels or any other old component if usable should be utilized.
 - The dormant, damaged or non-functional components of the lights installed on MC poles including the control panels and transformers on main roads will be repaired or replaced in such a way that all street light goes functional.
 - The lights installed in secondary and tertiary streets without poles, or mounted on certain type of poles and walls but operated through MC conductors, will be renovated or rehabilitated in such a way that the installations become a permanent infrastructure to stay for ever.
 - For this purpose, poles, brackets, bracket arms, wires, cables, cross arms, anchors, stays, ordinary clamps or PG clamps or any other kind of fastenings may be used to make the installations stable and permanent. Old transformers, service cables, LT panels and energy meters will be utilized if found usable.
 - Care should be taken not to use bare conductor in such streets where it can cause damage to the public. Bare conductor should be used only in wider streets which can accommodate the LT line mounted on poles which should be erected at safe distance from the building line.
- d) Design of new street light on the roads finalized by the Client for such installations including all components, transformers and LT panels.
- e) Longitudinal Plans of such roads will be prepared showing the details of the existing features such as Power Company's high tension, 11-KV & LT lines & poles, telephone poles, water supply and sewer pipe lines, telephone underground ducts and other utilities for location of the proposed light masts and underground cables at appropriate routes.
- f) The transformers, LT panels, energy meters and switch on & off devices should be installed at safe locations not vulnerable to traffic or pedestrians and not in reach of the children. All of these installations will be placed in fenced & locked enclosures to stay away from the reach of the common man.
- g) Sensor switches will be provided with each control panel for automatic operation of the lights.
- h) The elevating platforms, folding ladders and other equipment or tools & plants considered appropriate for operation & maintenance of the street light, will be provided in the project cost along with their specifications.
- i) Efforts should be made to operate converging, diverging or connecting roads street lights

from common points to reduce the number of transformers and control points.

- j) LED luminaries of 120 watts manufactured by some approved company will be used in the street light.
- k) The poles used in the street light will be telescopic tubular, GI pipe poles not prone to rusting. Similarly, the bracket arms and brackets will be manufactured with GI piping and sheets having zinc coating of specified thickness.
- l) Carryout Environmental and social Impact assessments acceptable to World Bank and EPA Punjab after implementation of the sectoral Plan and recommended mitigation measures as per requirements along with Environmental and social Management plan.

d. Sectoral Planning of street light sector

- a) A comprehensive plan will be prepared showing;
 - The provision of new street light in the left over existing main roads and the access roads to various residential inhabitations, industrial areas and commercial hubs.
 - The provision of street light on the proposed main roads in the areas under planning horizon.

All shown as a line diagram with location of control panels and switching devices.

- b) Inventory showing type of poles, height of poles, pole structure, type and wattage of luminaries, distances between the poles for single light poles on each single road and double light poles on each dual carriage way to light the roads as per national illumination standards along with other required parameter to give complete information about the installations.
- c) Common control panels to be provided on diverging or converging roads.
- d) Energy saving plan to be made effective in all these street lights on all roads of the city with automatic switching.
- e) Street lights to be provided on all fly overs, interchanges, bridges, underpasses, bypass road junctions and important cross roads.
- f) Maintenance equipment to be part of the Plan.
- g) Rudimentary Operation and maintenance cost of the street light system in the year 2030, 2040 and 2050.

4. Solid waste Management System

A. Sectoral Planning of street light sector

- a) Assessment of the existing system of solid waste management including the primary, and secondary waste collection, road sweeping, and transportation of waste, waste dumping, waste compaction and provision of earth covers.
- b) Areas of the city which are completely served, partially served and not served by the existing system including plotting them on the city updated map.
- c) Composition of solid waste
- d) Overall waste generation, efficiency of waste collection and disposal in the city.
- e) Total present annual expenditure on the waste management on different O&M heads in

the previous three years, cost per ton of the waste and per capita annual expenditure.

- f) Equipment and machinery deployed, its functional status and condition.
- g) Present efficiency of the existing waste collection and transportation machinery & equipment and its comparison with the modern efficient machinery showing total annual financial losses to MC due to use of the existing inefficient machinery and equipment.
- h) Hazards associated with the existing system of waste collection and disposal and their proposed solutions
- i) Carryout all necessary investigations essentially required in line with the best engineering practices
- j) Design of most economical, feasible and viable solid waste management system while incorporating the existing facilities available with MCs in cost effective manner.
- k) Assessment of requirement of most cost effective and efficient machinery & equipment for efficient operation of SWM System.
- l) Assessment of the area and depth of the landfill required for next 10 years for the city.
- m) Design of transfer stations in the city if the waste is to be carried to some regional landfill provided /constructed by provincial government.
- n) Methods for reduction of the waste to be dumped in landfills, quantity and cost of possible recyclables and quantity of waste which can be used for “Waste to Energy process”
- o) Planning and design of the vehicle parking area in the city on the site to be provided by MCs.
- p) Working out the annual operation and maintenance cost of the proposed system.
- q) Assessment of the total manpower requirement for proposed waste management system including the additional manpower required to be employed.
- r) Carryout Environmental and Social Assessments acceptable to World Bank and EPA Punjab and recommend mitigation measures as per requirements along with Environmental and Social Management Plans (E&SMPs) for all phases of subproject (Detailed Designing, Construction and O&M).

B. Sectoral Planning of Solid waste management sector

- a) Total quantity of present waste generation, quantity of waste collected and disposed and adverse impacts of low efficiency of waste collection.
- b) Total expected quantity of waste generation in the planning horizon, waste collection and disposal catered for in the Project up to the year 2030 and collection and disposal of the remaining quantity of waste in the planning horizon.
- c) Effective, efficient, economical, feasible and viable system of waste collection and disposal including the quantity and number of equipment and machinery required to collect and dispose-off the entire waste generated up to the year 2050 with intervals of 5 years.
- d) Location of present waste dumping points and their effects on city environments.
- e) Location and areas of landfills already constructed and maintained by MCs, their expected life and year of expiry.
- f) Area of the landfills required from 2030 to 2050 with 5 years interval.
- g) Proposed landfills to cater the planning horizon including their location, areas, capacity and year of expiry.
- h) Regional landfills proposed or under development by Provincial Government if any,

transfer stations required to be built in the existing or proposed inhabitations to transfer this waste to regional landfills.

- i) Possibility of reduction of waste and its percentage to be disposed-off in landfills up to the year 2050 with 5 years intervals;
 - Sale to energy consuming industries and income expected to MCs.
 - Recovery of recyclables and its cost effectiveness.
 - Waste compositing, its sale prospects and its cost effectiveness.
 - Generation of energy from waste, estimate wattage which can be generated and its cost effectiveness.
- j) An approximate cost estimate of the solid waste management system from the year 2030 to 2050 with 5 years interval.

5. Detailed Design of Parks & Green Spaces Projects

- a) Complete topographic survey including spot levelling of the existing and proposed park site including the boundary wall
- b) Inventory of existing facilities in the park including their condition and possibility of future use after repairs.
- c) Location of the open spaces in the existing populated areas and the area to be developed in future proposed for construction of parks at present and in future.
- d) Design of rehabilitation of existing parks including repair or replacement of the existing components and provision of new components and facilities for improved public recreation and possible leasing out of facilities for generation of funds for O&M.
- e) Construction of new parks at feasible sites proposed by MCs.
- f) Design of the parks will include but not limited to the under mentioned components;
 - Preparation of site profile and design of landscaping in cut and fill
 - Pathways, boundary wall, podium, entrance gates.
 - Jogging track and allied services.
 - Water source for lawn watering and for water supply systems for toilets, cafeteria and for drinking purposes.
 - Toilets as per actual requirement of the visitors.
 - Lighting system including high mast lights and ornamental lights on the pathways along with LT control panel and external electrification.
 - Cafeteria (feasible for larger area parks only) including water supply, drainage and approach path.
 - Children outdoor games including swings and slides and other children playing facilities to be erected on a separate and specified area in the parks.
 - Apron for the electrically operated games along with provision of three phase electric connection points for renting the area to vendors
 - Benches & other sitting facilities, pergolas and other ornamental structures most suiting to the topography and location of the parks
 - Suggesting the most suitable plants according to the soil classifications and climatic

conditions.

- g) Design should be suggested in keeping with the storm season wherein it should not create long water stagnation periods.
- h) In case of parks on depressed sites, park storm water drainage should be accompanied with aquifer recharging facilities.
- i) Any other important and necessary item of work required to make the park most useful and provide a source of income to the MC for meeting the O&M charges.
- j) Carryout Environmental and Social Impact assessment acceptable to world bank and EPA Punjab after implementation of the sectoral Plan and recommend mitigation measures as per requirement alongwith Environmental and Social Management Plan.