

Annexure - A

Section 5. Terms of Reference

Background

National Industrial Corridor Development Corporation Ltd (NICDC) is undertaking the activities related to Preparation of Detailed Master Plan and Preliminary Design Report for Integrated Manufacturing Cluster (IMC) at Dharampuri-Salem Node in Tamil Nadu under Extension of Chennai Bengaluru Industrial Corridor (CBIC) to Kochi via Coimbatore. An area of approximately **1733 acres** has been demarcated for the development of the Integrated Manufacturing Cluster (IMC) at Dharmapuri-Salem Node in Tamil Nadu.

5.1 Aim and objectives of the assignment

5.1.1 The objectives of the assignment are:

1. To review the perspective plan/concept master plan and other available reports and apprise themselves of the theme and concept for the proposed Node which takes into account the unique value proposition, the existing physical characteristics of the site and the current and future market demand as envisaged by the perspective plan.
2. To prepare a demand assessment to establish the industry mix, the range of economic activities, projected population and employment for the identified Economic Node and prepare a detailed financial analysis that together will form the basis for the development program for the detailed master plan.
3. To prepare a detailed master plan including geo-referenced cadastral maps for the identified land area which will include urban design guidelines, plotting plan, landscape design strategy for the master plan, signage guidelines, etc. as per this TOR
4. To prepare a statutory plan for approval by the state town planning department or the relevant local authority as may be applicable
5. To review the provision of roads and highway structures, structures and all utility services for example, drainage, electricity, gas, ICT, water, sewerage etc, including treatment plants, raw water transmission mains, sewage collection, industrial water and recycled water for irrigation & flushing, as described in the notified/in principle approved maps, report and in other relevant documents. Develop strategies including sustainability (during and after construction) which will allow for phased construction in accordance with the Client's mandate
6. To prepare a baseline and best practices manual based on various benchmarking studies relevant for the project (including national and international studies).
7. To prepare preliminary engineering design and drawings for roads, highway structures and utility services for the designated area within the identified Economic Node site incorporating strategies for sustainability, value addition and value engineering. To achieve the DMIC objective of development of world class economic nodes and clusters, it is essential that the planning and design for trunk level infrastructure should meet the best international practices, specifications and standards in terms of quality and sustainability. The development of the Economic Node has been envisioned, conceptualised and planned to meet these quality standards and aspects of sustainability. To ensure that the design and the preliminary engineering is done with the

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objective of delivering world class trunk infrastructure to global size and scale, it is necessary that the same should comply with the related best international practices, methods, specifications and standards with respect to planning and designing of infrastructure by using internationally accepted standards in respect of this assignment. The consultant should first identify the best practices & then derive and adopt the international standards, specifications which are best suited for translating the vision of DMIC to reality.

8. Based on financial and technical assessment the consultant shall work out the appropriate implementation structure to be worked out in consultation with client.
9. To prepare technical schedules of tender and bidding documents for issuing contracts for entire area in package(s), if required.
10. To assist the Client in the process of selection of contractor(s), and provide technical assistance to Client during Detailed Design by the contractor(s) ensuring highest quality standards in implementation.
11. The consultant shall also provide necessary information and prepare documents as per the formats provided by NICDC for budgetary approvals and fund allocation for project implementation. Requisite Agenda/Appraisal Notes to be prepared for the Project within definite timelines as may be specified or depending on the requirements stated by the Client.
12. Financial/Market Analysis: The consultant should undertake financial analysis for the project, which will also include estimation of financial internal rate of returns IRR etc. for the project.

5.2 Broad scope of services

- 5.2.1 The consultant shall perform all works as necessary to fulfil the aim and objectives of the assignment. The indicative man months for key staff are provided. However, the consultants are free to make their own estimate of man months required for effective execution of the project.
- 5.2.2 While estimating man months it has been assumed that each expert will be assisted by an adequate number of support staff.
- 5.2.3 For all structural designs and drawings the consultant, at his own cost, shall get the proof check done by registered structural designer/engineer before submitting for the approval of the client. The cost of proof checking shall be borne by the consultant.
- 5.2.4 The consultancy assignment shall be carried out in the following parallel or overlapping parts as the case may be:

Part A:	Project Management
Part B:	Inception of the Project
Part C:	Technical Assessments, Market Survey and Demand Assessments, and Financial Feasibility Model
Part D:	Preparation of Final Base Map
Part E:	Land Suitability Analysis
Part F:	Preparation of Concept Master Plan
Part G:	Detailed master planning and Statutory Plan
Part H:	Detailed Urban Design guidelines and Preparation of Landscape and Branding Development strategy
Part I:	Drawings for Plot control sheets/ plot demarcation drawings, the development of a GIS database for the plan, and

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- Part J: Preliminary Design of roads, highway structures and utility services within the designated area in identified Economic Node/Cluster of the Industrial Corridor
- Part K: Preparation of tender documents and drawings for selection of contractor(s) and provide assistance to Client during Detailed Design stage.

The consultant shall assist the client in getting the final Master Plan notified by the State Govt. or appropriate Authority as required.

5.3 Detailed scope of services for Part A: Project Management

5.3.1 The Consultant shall perform all the Project Management activities necessary for proper planning, management and control of the Consultant's work. Below are some of the typical tasks that are required to be performed by the Consultant:

- 5.3.1.1 Participate in the project kick-off workshop with project stakeholders. The kick-off workshop shall accomplish the following objectives:
- a) common understanding of the project goals and objectives
 - b) align the vision and goals of all project participants toward cooperation and project success
 - c) define respective roles and responsibilities and
 - d) agree on the methods of communication and reporting throughout the project duration.
- 5.3.1.2 Participate in monthly progress review meetings. The Consultant shall also present a Corrective Action Plan if there are any delays or missed milestones.
- 5.3.1.3 Conduct (1) Constructability Review and (2) Value Engineering session with stakeholders, the details of which would be provided by Client at a later date. Constructability is part of the design process. Constructability reviews during preliminary design consist of (a) viability of constructing the design as proposed i.e. can it be built in a cost effective manner or are there better alternative (b) ensures incorporation of sustainability during construction (material sourcing, recycling, water usage, storage etc) (c) ensures environmental, health and safety practices as per program standards.
- 5.3.1.4 Work Schedule: The Consultant shall submit within 30 (thirty) days of Award of work, a detailed schedule for the Consultant's scope of work. The schedule should include all the deliverables and key milestones at the top of the schedule.
- a) All schedules shall be created, maintained and submitted to Client in the latest version of Oracle Primavera P6 or Microsoft Project in an electronic format.
 - b) The Consultant shall create and submit an initial Baseline Schedule that will be approved by Client. Upon approval, the copy of the Baseline will become the first Current Schedule.
 - c) The Current schedule shall be actively updated and maintained by the Consultant every month.
 - d) All schedules shall follow the Critical Path Method (CPM)/GANT chart of scheduling and

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shall have meaningful and realistic logical ties and relationships between activities.

- e) The Primavera P6 or Microsoft Project schedule file should be updated and submitted at least once a month.
- f) Activity durations should be reasonable (typically not more than 30 days duration except for project management tasks, procurement activities for long lead items or any other activity that obviously needs to be of longer duration).
- g) The Consultant shall use only zero or positive total float and lags on all activities in the baseline and all other versions of the schedule.
- h) A schedule narrative document shall accompany the electronic schedule describing work performed in the past month.
- i) List the major tasks completed to date and the planned work that will be performed in the upcoming month.

5.3.1.5 Project Management during the handholding period

5.3.2 Prepare and submit a Monthly Progress Report along with GANTT chart during the handholding period.

5.3.3 Payment Application shall be accompanied by monthly progress reports, detailed description of the work performed by the Consultant, monthly progress schedule and any other required proof or documentation that clearly validates the payment request for the work performed.

5.3.4 All payments are subject to timely submission of monthly progress report and the monthly updated electronic schedule file in the required and acceptable format.

5.3.5 Quality Assurance Plan: The Consultant should have a Quality Assurance Plan (QAP) for all design and documentation activities. The QAP should be presented as a separate section in the final report.

5.4 Detailed scope of services for Part B: Inception of the project

5.4.1 The consultant, after Team mobilization, shall prepare and submit an Inception report. The inception report shall spell out clearly the following, but not limited to:

- a) A detailed work schedule as mentioned above
- b) Details of Team mobilization including Key experts and the support team
- c) Logistics arrangements, if any
- d) Details of the survey to be conducted
- e) Identification of the data sources

5.5 Detailed scope of services for Part C: Technical Assessments, Market Survey and Demand Assessments, and Financial Feasibility Model

5.5.1 General

5.5.1.1 The Consultant will review the Perspective Plan/concept master plan/other important documents and identify the context under which the Node is proposed to be developed. In

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carrying out the review the consultant will apprise themselves of the following

- The theme and concept for the proposed Node which takes into account the unique value proposition, the existing physical characteristics of the site and the current and future market demand as envisaged by the perspective plan.
- Any proposed land use plan or master plan as part of the perspective plan shall be reviewed along with any initial observations related to demand assessments for infrastructure and utilities
- Any other related reports developed by other state or central agencies related to external connectivity or trunk infrastructure that may have an impact on the identified Economic Node.
- Any initial observations or deviations related to the above shall be highlighted by the consultant as a part of their review report.

5.5.1.2 The Consultant shall conduct an analysis of existing climatic conditions and flora of the region for inputs into the master planning and preliminary design of the demarcated area. Prior to conducting the analysis, the details which are readily and authentically available with reference to fresh scientific parameters, should be checked.

5.5.1.3 The Consultant shall integrate specific measures for the implementation of a sustainable development apart from those stipulated by government regulations. The measures shall include, but not be limited to the following- integrated water management, rain water harvesting, water reuse, integrated Solid Waste Management plan, use of renewable energy and use of sustainable materials during construction.

5.5.1.4 The Consultant shall conduct an assessment of existing infrastructure in the surrounding areas of the site and analyze the availability of water, power, transportation and other relevant services for use of the project and projected demand. Site assessment and related parameters should be checked with the existing available studies, to avoid misconceptions and at the same time, to match the vision of development.

5.5.1.5 The Consultant shall assess the existing planning regulations for ease in implementation of the project. The consultant shall ensure that the project is developed within the overall planning regulations applicable for the site.

5.5.2 Surveys and investigations

5.5.2.1 The consultant will be responsible for collecting basic information regarding the site, its surrounding and available infrastructure. The consultant shall procure the data regarding land boundaries, topography, land acquisition etc. Also, the procurement of the satellite imagery is the responsibility of the consultant. If additional data is needed, the client will support the consultant in terms of procurement of the data based on specific request by the consultants.

5.5.2.2 The consultant will also collect information on any proposed development projects in the vicinity or development policies that could have an impact on the proposed development program or the proposed master plan for this project

5.5.2.3 The Consultant shall assess all the prior site surveys at an early stage. The consultant shall validate the project boundary and demarcation of the site. The Consultant is encouraged to make themselves aware of the prior reports and studies even while submitting the proposal. The Consultant shall conduct a Material survey for materials which are traditionally/ conventionally used to identify the material sources, and sample

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tests of material properties, approximate lead for transport.

- 5.5.2.4 The Consultant will collect information related to Land use, zoning map as per adopted development plan if any, and shall also carry out reconnaissance survey of the site area to gauge an overall idea about the terrain, and build up a detailed list/ inventory of existing roads/ culverts/ structures, if any, in the project area for reference purposes. Geotechnical studies and hydraulic & hydrological data will also be available from previous studies.
- 5.5.2.5 The Consultant shall carry out a detailed physical site survey to map all relevant physical features along with a topographic survey and/or any other survey required for the site area and prepare contour maps and labels as required for the project.
- 5.5.2.6 The Consultant shall conduct traffic surveys including traffic volume count and origin-destination surveys wherever there is through traffic on the existing network. The Consultant shall assess traffic generated from the development as an input into the preliminary design for roads in the demarcated area as per details in the TOR. The ROW in the Site Survey and Finalisation of Maps report cannot be changed, however the Consultant can suggest changes to lane configurations and update the previous traffic estimates based in the latest survey.
- 5.5.2.7 The Consultant shall carry out geotechnical investigations and sub-surface explorations for proposed bridges/ highway structures over rivers and high embankments and conduct all relevant laboratory and field tests on soil as per the relevant IRC and other codes/manuals with detailed report on the geotechnical investigations.

5.5.3 Technical assessments

- 5.5.3.1 The Consultant shall assess prior proposals pertaining to the site and the surrounding region and ensure integration of proposals that have been accepted or are under implementation within the planning purview of this project.
- 5.5.3.2 The Consultant shall include analysis of information collected in the Technical Assessment Report and Design Basis Report as part of this stage of works. Previous reports and studies shall be available for scrutiny of the Applicant prior to Proposal Due Date at Client's office. A list of available reports includes "The Overall Perspective Plan for the Region".
- 5.5.3.3 The Consultant shall assess the site in terms of various parameters such as but not limited to topography, vegetation, soil conditions, drainage system, existing village settlements locally called 'Gamtal' areas and climate. The Consultant shall highlight the learning from this study and demonstrate their usefulness as an input to various stages of this assignment in the Technical Assessment Report.
- 5.5.3.4 The existing situation assessment is to done as part of the Technical assessment report shall include the following, but not limited to:
1. Review of all existing proposal, sectorial policies, strategies available
 2. Demographic Characteristics
 3. Regional Economic base assessment & Economic sector assessment
 4. Transport sector assessment
 5. Infrastructure and utilities assessment
 6. Water resource and water management assessment
 7. Geomorphological studies
 8. Coastal areas and its management

9. Environment mapping and its assessment
10. Heritage and conservation

5.5.4 Market Survey and Demand Assessment

The consultant shall review the findings of the perspective plan and information related to economic sectors and industry types to carry out a focused market survey and demand assessment specific to the proposed Economic Node. This shall include:

1. A macroeconomic review of the region to assess regional and locational strengths and constraints and analysing the investment climate with respect to existing resources and potential sectors that would influence the successful development of the proposed project;
2. Competitor analysis for similar developments in the project area and South India sub-region and Demand Assessment to analyse future development prospects, identify target sectors / markets based on the competitive and comparative advantage to enhance the pace of economic development, and ensure balanced development;
3. Developing the estimate for the likely space demand from the identified target industries for space within the project,
4. Special infrastructure requirements to market the project to targeted companies. Identify services that could help the project, such as retail, community level facilities and so on, or that could exploit location-specific resources;
5. An analysis of the regulatory and policy scenario and institutional mechanism along with the incentives offered by the Central/State Government. In addition, the consultant will identify policy incentives available as per Central and State Government policies for applicable industries;
6. Inventory of existing, on-going and proposed land use, industry and infrastructure development initiatives in the vicinity of the proposed project area;
7. Development of a product mix to be used as a basis for master planning of the project which will include among other things, a list of industries and activities with land requirements, estimate of land and building area for commercial, retail, institutional and supporting amenity developments along with an estimate of housing demand by housing type, with numbers for resident population, and employment estimates.

5.5.5 Development of a financial feasibility model

- 5.5.5.1 Develop a financial feasibility model by taking into account the proposed development mix, broad costs for development, broad project structuring, and conducting a sensitivity analysis by taking into account various factors that could impact the development including pricing, income and cost assumptions, EBIDTA cash flows over the project period, and assessment of project returns (NPV and IRR).
- 5.5.5.2 Consultant shall evolve project structuring model (EPC/PPP) for implementation through private sector funding/ public private partnership for enhancing the overall viability of the project. The consultant should provide clear recommendations after extensive stakeholder consultations with State Govt./Client/Private developers etc. various options in terms of developing and implementing trunk infrastructure components on PPP route. The

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consultant shall suggest the project structuring options by also keeping in mind all the relevant policies and guidelines of Govt. of India/State Govt. and/or any other agency issued from time to time.

5.6 Detailed Scope of Services for Part D: Preparation of Final Base Map

The consultant shall prepare the Final Base map considering the following:

- I. The High-Resolution of 0.5/0.6 M of Geo-eye/Quick Bird or latest Satellite Imagery will be procured by the consultant from NRSC as per the availability of the data. The cost for the procurement of the satellite imagery shall be borne by the consultant.
- II. Geo-referencing of Satellite image with the revenue maps and verification of the same with the Topographic survey data. Digitization of geo-referenced revenue village maps wherever required.
- III. Preparation of updated base map by superimposition of combined maps over satellite imagery.

The Final Base map shall highlight the Existing settlements in the vicinity and within the Site (if any), Existing road network within and in the vicinity of the Site, Existing physical features such as water bodies, streams, hills/hillocks, rocky areas, Forests etc., Administrative boundaries of villages that fall within the Site, Built up features such as temples/shrines etc.

5.7 Detailed Scope of Services for Part E: Land Suitability Analysis

The consultant is required to conduct Land Suitability analysis using GIS based parametric analysis. It is required to consider individual parameters such as environment, demography, economy, transport etc. along with multiple sub parameters under each sector wherever applicable.

The consultant is required to prepare a grid of appropriate scale for the same and parametric values is to be provided for each grid for various factors to arrive at a composite map.

It is required to derive a quantitative assessments for the same for evolving necessary product mix, essential physical, social and transportation networks, environment/ water network and selection of the suitability of the land for the defined product mix.

5.8 Detailed Scope of Services for Part F: Preparation of Concept Master Plan

- 5.8.1 The preparation of a Detailed Master Plan will be preceded by the formulation of key design and development principles for the Master Plan. Among other things these will include KPIs for sustainable development and smart city development. These principles and KPIs will also become the basis of evaluation for three master plan options to be developed and presented to the client for their consideration. Each of the concepts will at a minimum include the following:
 - 5.8.1.1 Overall illustrative master plan at a scale of 1:2500 illustrating general delineation of proposed land uses, building massing, vehicular and pedestrian circulation, open space relationships, and development character
 - 5.8.1.2 Circulation plan at the level of arterial, sub-arterial and collector street network, including site

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ingress/egress, vehicular circulation patterns, pedestrian circulation and vehicular parking

- 5.8.1.3 Broad location, demand, and plots identified for various infrastructure components including but not limited to water, sewerage, drainage, power, gas and telecommunication infrastructure
- 5.8.1.4 Preliminary open space plan
- 5.8.1.5 Preliminary 3D sketches for design theme and character of the development
- 5.8.1.6 Land and building area statement with ground coverage, FSI, building mass and bulk metrics on a GIS platform
- 5.8.1.7 In consultation with the client, carry out an assessment of the three concept master plans using the KPIs and assessment criteria and provide recommendation on the preferred master plan

5.9 Detailed Scope of Services for Part G: Detailed Master Plan and Statutory Plan (along with Notification of the Master Plan)

5.9.1 Develop the client approved master plan option with the following:

- 5.9.1.1 Overall illustrative master plan at a scale of 1:2500 illustrating final delineation of proposed land uses, building massing, vehicular and pedestrian circulation, open space relationships, and development character
- 5.9.1.2 Circulation plan at the level of arterial, sub-arterial and collector street network, including site ingress/egress, vehicular circulation patterns, pedestrian circulation and vehicular parking
- 5.9.1.3 Firm location and plots identified for various infrastructure components including but not limited to water, sewerage, drainage, power, gas and telecommunication infrastructure
- 5.9.1.4 Final open space plan and landscape development strategy
- 5.9.1.5 Up to 5 final high quality 3D aerial or eye-level renderings for design theme and character of the development
- 5.9.1.6 Final land and building area statement with ground coverage, FSI, building mass and bulk metrics on a GIS platform

5.9.2 Detailing of the final master plan shall include the following:

- 5.9.2.1 Land use mix and land area allocation for various uses in a form of land use map with illustrative building footprints and tabulation of land areas
- 5.9.2.2 Identification of Right-of-Way for all major utility corridors, transportation networks etc.
- 5.9.2.3 Urban Design guidelines to supplement statutory development control regulations to bring about a cohesive development pattern and design element into the development.

5.9.3 Preparation of Statutory master plan shall include the following:

- 5.9.3.1 The consultant shall prepare necessary drawings, reports, development control regulations, area statements, and other material as may be necessary for submission of the master plan to the SPA or local authority as the case may be for approval of the master plan.
- 5.9.3.2 The consultant shall provide necessary support to the Client in carrying out the due process requirements for the statutory adoption of the master plan.

5.10 Detailed Scope of Services for Part H: Detailed Urban Design Guidelines and Preparation of Landscape Development strategy

5.10.1 The preparation of design guidelines and landscape strategy shall include:

- 5.10.1.1 Preparation of development guidance in the form of an urban design and development guidebook /pattern book which will define massing, height and material (if required by client) parameters for buildings, compound walls, gates and such other features along with images, sketches to graphically explain the same.
- 5.10.1.2 Guidance for development standards for public places – paving, materials, features, characters etc.
- 5.10.1.3 Guidance for development of street and information signage according to branding guidelines and brand identity material established for the development
- 5.10.1.4 Schematic representation of key design features within the development like gateways, key nodes, junctions, plazas etc. as a guidance for development by the clients in the future
- 5.10.1.5 Open space and landscape strategy with typical details for three typologies of landscape – maintained parks and gardens with hardscape, softscape and street/park furniture; basic ground covered landscape areas with shrubs and planting; natural areas with native vegetation and managed landscapes.

5.11 Detailed Scope of Services for Part I: Drawings for Plot control sheets/ plot demarcation drawings and the development of a GIS database for the plan

General: Plot control sheets or plot demarcation plans shall be developed for each saleable plot identified within the development. This plot control sheet shall serve as a standard supplement to an allotment plan and lease agreement for each plot to be handed over to the tenant. The overall master plan shall be divided into clusters or sectors and plots shall be numbered in a systematic manner in consultation with the client. The plot control sheets shall typically be A2 or A3 or suitably sized drawings sheets containing information displayed in a clear and unambiguous manner the format for which shall be approved by the client. The plot control sheets shall include the following minimum information and other details as requested by the client:

- Cluster or Sector name and identification of the location of the said plot
- Location plan for the plot
- Scaled up plot plan showing vertices of the plots with suitable coordinates of each vertex in a latitude-longitude format or Northing Easting format as per client instructions
- Key dimensions between vertices
- Set back lines and key development regulations indicated graphically on the plot control sheet with the intent to provide a summary of regulations at a glance to the tenant.
- Key information about the development parameters for the plot like location and capacity of available utility connections, access control requirements etc. in consultation with the client.
- The consultant shall also develop a GIS database for the entire master plan operable in an ARCGIS 10.0 format. All shapefiles so generated for the master plan shall be georeferenced and correspond to the plot control coordinates and actual ground survey. The GIS database will include key information on each plot pertaining to area,

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address, land use, setback requirements, permissible and consumed FAR, and additional fields as may be necessary and indicated by the client to have an operational geo database for management of the development.

5.12 Detailed scope of services for Part J: Preliminary Design of roads and infrastructure within the designated area

5.12.1 General

5.12.1.1 The intent of this part is to prepare integrated preliminary engineering design of all roads and utility services within the designated area. The Consultant shall design services to each parcel giving provision for individual connections and metering for each parcel as defined in the Site Survey and Finalisation of Maps report. The Consultant shall refer previous studies and reports and make reasonable estimates with regards to the land use and population in each parcel and provide but not limited to typical arrangements, numbers, locations and demand for each parcel. The Preliminary Design Report shall form the basis of further works in this assignment.

5.12.1.2 The Consultant shall conduct a roads and utility infrastructure assessment of the site based on the product mix, Site Survey and Finalisation of Maps report. The assessments shall include but not be limited to demand and systems analysis of road network, drinking water, recycled water, industrial water, power, sewage, storm water, gas and telecom networks. The systems shall be designed keeping the O&M and ultimate management in perspective. The details include, but not limited to, the following:

- a) Investigate and identify existing and/or proposed traffic and transportation modes existing in the project influence area and vicinity.
- b) Investigate availability and capacity of existing utility infrastructure if any.
- c) Investigate jurisdictional agencies and their standards and requirements (i.e., central, state and local governments, environmental agencies and other relevant agencies).
- d) Obtain information on preferred local construction materials.
- e) Establish horizontal and vertical control for mass grading based on available information however, GTS benchmarks are preferred.
- f) Prepare contour information for proposed sub-grade for the total site. The level of accuracy shall not be less than that of input information.
- g) Coordinate with local telecommunications/cable companies and provide corridors to accommodate their duct bank system along with the other project support systems.
- h) Investigate the details pertaining to existing highway structures (if any) (e.g. river crossings) and identify the same.
- i) Coordinate with local gas supply companies and provide corridors to accommodate the network system along with the other project support systems.
- j) Coordinate with Power network company and provide the corridor and space to accommodate the electrical network system.
- k) Consultant shall coordinate with the stakeholders to study, analyze and if required, further strengthen the water supply scheme prepared by Client.

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5.12.1.3 The Consultant shall coordinate design coordination workshops in order to coordinate the design interface between service connections from adjoining areas. Consultant to incorporate requirements such as below but not limited to:

- a) Accommodating service alignments to treatment plants
- b) Accommodating discharge capacities in the trunk network from adjoining area
- c) Accommodating additional capacities in the treatment plants for discharges from adjoining areas
- d) Pumping infrastructure (if any)
- e) Flood management measures to be implemented
- f) Any other requirements generated during coordination meetings for seamless integration of services from adjoining areas

5.12.1.4 Interface management: The Consultant shall manage the interface of various services in the designated area and from adjoining areas to ensure seamless integration of services. The Consultant shall also manage interface of services in case implementation is carried out through multiple contractor.

5.12.1.5 The Consultant shall coordinate between various state agencies and other stakeholders in order to incorporate requirements and considerations. The Consultant shall coordinate preliminary design of roads, highway structures and infrastructure with the design of other elements being carried out by these agencies. It is the intent of the Client to carry out detailed design and execution of key infrastructure such as WTP, STP and CETP by separate agencies. The Consultant shall either leave provision for such elements or coordinate with those agencies if appointed during the tenure of this assignment.

5.12.1.6 The Consultant shall propose specific measures and engineering design to mitigate any detrimental aspect for all roads and services.

5.12.1.7 The Consultant shall study and consider the implications of such flood management measures for all roads and services in the designated area.

5.12.1.8 In consultations with the Client and other stakeholders, the Consultant shall assess limitations such as no discharge of treated water, storm water etc. The Consultant shall make/ leave specific provisions in the preliminary design of services/ utilities addressing such limitations.

5.12.1.9 The Consultants shall evolve the preliminary design using latest available software and methodologies currently prevailing in the respective sectors of roads and utility service design.

5.12.1.10 The Consultant shall provide all the relevant technical specifications as a part of the Preliminary Design Report which will act as a reference for the contractor(s) to carry out Detailed Design activities.

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5.12.1.11 The Consultant shall consider the following key aspects regarding sustainability:

- a) Use of waste and manufacturing/ process by-products in construction
- b) Use renewable energy (solar, wind, geo-thermal etc.)
- c) Use technology that require less water during the construction of infrastructure
- d) Recycle and reuse of water and waste
- e) Integrated solid waste Management and energy recovery from the solid waste.
- f) Efficient use and minimize power losses in power network

5.12.1.12 The Consultant shall prepare the necessary details to carry out site grading as per the master plan in view of the existing drainage system, HFL and other considerations. The Consultant shall use all necessary means of representation at its disposal to convey the intent of such works that shall be based on principles of sustainability.

- Site grading to suit the site condition and plan proposal
- Site grading to suit Storm Water Drainage System & flood control
- Grading Plan with Formation Levels on basis of contour survey plans
- Site Sections.

5.12.2 Design Basis Report

5.12.2.1 The Consultant shall prepare a Design Basis Report for all roads, highway structures and utility services that are part of this assignment. The Consultant shall identify necessary existing conditions, soil conditions, climatic conditions and usage requirements in considerations while formulating the design basis for roads and utility services in the designated area.

5.12.2.2 As part of the design basis, the Consultant shall assess alternatives wherever applicable incorporating aspects related to sustainability and illustrate methods that will increase efficiency of the network, potential sourcing of materials, technology available, technical parameters, phasing of infrastructure and decrease time required for implementation.

5.12.2.3 The Consultant shall ensure that their designs are value-engineered, economised and optimised as far as possible, with respect to ease of construction, construction time, construction cost and life cycle cost. The Consultant shall demonstrate this by developing technically feasible alternative design options in the design basis report, comparing the time and cost of impacts of these options and presenting the same to the client for their approval.

5.12.2.4 The Consultant shall also explore strategies to phase various roads during implementation stage in order to meet incremental traffic demands. The Consultant shall assess the road cross sections and examine the efficiency of provision of services, and suggest alternatives if required for the road cross section and position of services for efficient implementation and operations and maintenance.

5.12.2.5 In case of wet services constituting water supply, sewerage disposal, effluent disposal and drainage, the Consultant shall explore all options aiming towards a recycle-reuse-recharge policy and a zero-discharge principle. The Consultant shall propose strategies for monitoring the network for leaks and minimizing unaccounted- for-water (UFW). The Consultant shall propose methodologies for metering for various land uses and activities in the designated area.

5.12.3 Traffic Demand Assessments

- 5.12.3.1 The Consultant shall estimate traffic projection of the demarcated area by establishing possible traffic growth rates in respect of all categories of vehicles, taking into account but not limited to the past trends, annual population employment, elasticity of transport demand prevailing in the country in relation to income and estimated annual production increase and transportation or other infrastructure projects planned by the state government/central govt. in the near vicinity of the project influence area, which may affect the transport demand of the project area should also be considered. The other aspects including socio-economic development plans and the land use patterns of the region having impact on the traffic growth, should be studied. Traffic projections should be conversant to development phasing prescribed by the master plan.
- 5.12.3.2 The traffic demand estimates shall be done assuming three basic scenarios i.e. optimistic, pessimistic and most likely traffic growth. The horizon period should converge with that of the Site Survey and Finalisation of Maps report of Area, wherein the growth factors may be calculated for groups of five years each till the horizon period.
- 5.12.3.3 The forecasting methodology should arise as an outcome of running a traffic demand model with proper calibration and validation. The assumptions for the model may be substantiated at any stage. The model should be flexible to consider impact of implementation of any new project/proposal in the near vicinity of the project.
- 5.12.3.4 The overall traffic forecast and other relevant information/ data as may be required shall form the basis for the design of pavement type and other facilities.

5.12.4 Preliminary design for all roads

- 5.12.4.1 The preliminary design of roads will include but not be limited to complete layout of the proposed road network as per the agreed cross sections with all the features shown thereon new alignment including interface and other elements of the overall project.
- 5.12.4.2 Typical Road Cross Sections and Road Network layout shall be based on the Site Survey and Finalisation of Maps report recommendations; typical cross sections have been prepared. Consultants have to review, update and revise the road cross sections incorporating main carriageway, service road (if required). The road cross sections and layout should be designed with emphasis on incorporate pedestrians and non motorised transport movement, public transport and para-transits, public transport routes, segregating/ dedicating lanes for Heavy Occupancy Vehicle (HOV)/ commercial vehicle movement, freight terminals, if any. The road network layout should be designed in a flexible manner so that it can adopt future interventions.
- 5.12.4.3 Pavement Cross Sections: consultant has to design the pavement cross sections for all categories of roads based on the projected traffic of the demarcated area. The traffic will form the basis for design of pavement. Consultant has to advise on suitable pavement type depending on the site conditions and soil CBR. The pavement shall be done strictly based on the provisions of IRC and standards MORTH codes. Pavement shall be designed typically for repetition of wheel loads in terms of standard axles over a design period as per IRC standards.
- 5.12.4.4 Bridges and culverts shall be designed for IRC loading class 70 R and for seismic forces for

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appropriate zones. All activities related to field studies, preliminary design and documentation shall be done as per the latest guidelines/ circulars of MORTH and relevant publications of the Indian Roads Congress (IRC) and Bureau of Indian Standards (BIS). For aspects not covered by IRC and BIS, international standard practices, such as, British and American Standards may be adopted. The required utility services through the bridges and culvert to be considered.

- 5.12.4.5 Geometric design: Road geometry should be designed based on IRC guidelines and international codes also to be referred in case of any missing data. The preliminary design should support overall drainage of the site. Latest design software such as MX road has to be used for the same. Design analysis and any other software output has to be shared with the client.
- 5.12.4.6 Drainage design: A detailed preliminary layout of the drainage to be decided and the same has to be agreed with the client before final submission. This also has to be integrated with the existing drainage around the site if any. The drainage design should be done for all surface and sub surface drainage including junctions. The existing data on rainfall, flood history, existing stream all has to be studied in detail before preparing drainage plan.
- 5.12.4.7 Junction Design: as part of the overall preliminary engineering of road network, the intersections have to be designed based on the traffic projections. Consultants has to identify best suitable warrants for major intersections in the study area including but not limited to area traffic control systems, signalised intersections, roundabouts, grade separated interchanges, etc. Consultants have to provide preliminary designs based on projected traffic for each of the development phases. Consultant should come out with innovative traffic management techniques that help in reducing cost of construction such as state of art area level traffic signalling system that increase the traffic handling capacity of intersections.
- 5.12.4.8 The Consultant shall identify suitable locations for provision of bus bays, drop-offs and bus shelters on the proposed road network. As far as possible, bus bays shall not be located on horizontal curves, summit of vertical curves and bridges. Good visibility must be ensured. Further, the bus bays should not be too close to major intersections. The length of each such bus bay shall also be indicated.
- 5.12.4.9 Apart from the above, the consultant will also have to take up following as a part of preliminary design report.
- a) Traffic circulation plan, utility relocation plan and Layout of service road connections, acceleration/ deceleration and sheltered lanes
 - b) Planning and layout of protection works like retaining/ toe walls, pre-loading, ground treatment based on geotechnical data, slope protection, bunds, embankments, and drains
 - c) Preliminary design of structures like bridges, underpasses, flyovers, pedestrian underpasses/ crossings, ROBs, indicating the approximate sections and GAD.
 - d) Traffic management plan during construction
 - e) Road signing and marking plans, including over head and variable message signs, Pavement Markings, Safety Barriers, Railings, Delineators, Chevron Markings, Traffic Attenuators and crash barriers.
 - f) Overall Circulation and Traffic Management System for entire site.

- 5.12.4.10 The alignment design shall be verified for available sight distances as per the standard

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norms. The provision of appropriate markings and signs shall be made wherever the existing site conditions do not permit the adherence to the sight distance requirements as per the standard norms. The consultants shall make detailed analysis of traffic flow and level of service for the existing road and workout the traffic flow capacity for the improved project road. The requirement for separate climbing lanes along steep gradients for heavy trucks shall be investigated and operational analysis shall be carried out for the provision. International best practices may be referred, wherever the recommendations are not available as per the Indian codes, international codes may be referred.

- 5.12.4.11 The Consultant shall also prepare details for at-grade junctions, which may be adopted as alternative to the grade separated structures/ flyovers/ underpass which may be implemented at a later date. The geometric design of interchanges shall take into account the site conditions, turning movement characteristics, level of service, overall economy and operational safety.
- 5.12.4.12 The road network including main roads and service roads is to be developed for Industrial Township. The design of geometric elements shall, therefore, take into account the essential requirements of such developments.
- 5.12.4.13 The design for roads shall take into consideration provision of MRT/ LRT/ BRT network in the future.
- 5.12.4.14 The Consultant shall prepare the preliminary design for landscape works along all roads within the project area such that contractors can be engaged for detailed design and execution. Details of landscape works shall include the following but not limited to:
- a) Plantation scheme and plant palette in median/ green buffer/ green strip along roads/ traffic islands/ road embankment
 - b) Preliminary design and materials of footpath pavement/ cycle tracks as part of the road cross-sections
 - c) Preliminary design and specifications of street furniture including but not limited to bus stops, drop-offs, seating, street lighting, green areas (hard and soft landscape) etc.
 - d) Preliminary design and specifications of street lighting, footpath lighting etc.
 - e) Any other landscape elements/ components in relation to roads and services/ utilities.
- 5.12.4.15 The design drawings for geometric elements shall cover, but not be limited to the following major heads:
- a) Site layout showing the proposed work (project schematic)
 - b) Typical cross-sections with utility services
 - c) Geometric design drawing of city roads which will include plan and profile;
 - d) Geometric design drawing of service roads which will include plan and profile;
 - e) Preparation of junction design;
 - f) Preparation of drainage layout and typical drain details
 - g) Typical details of proposed culverts
 - h) GADs of minor and major bridges and other structures
 - i) Typical details of road protection works
 - j) Road safety design

5.12.5 Preliminary design for potable, industrial and recycled water supply network

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- 5.12.5.1 The Consultant shall review/revaluate available Site Survey and Finalisation of Maps report including norms, scheme etc in terms of regional aspects and long term and short-term validity of schemes.
- 5.12.5.2 The Consultant shall study the proposed Water Supply system, available/ proposed water resources plan and study future plans. Consultant shall also work out the norms and standards required for the services after studying relevant codes, standards, norms and state level practices in particular CPHEEO manuals.
- 5.12.5.3 The Consultant shall evaluate the quality and quantity of underground and surface water sources at the site, determine adequacy, recommend the water build-up for each year of development for industrial units, domestic use, institutional requirements, commercial requirements, fire-fighting, wastage, etc. It is anticipated that some of the industrial and irrigation water demand can be met with recycled water. The Consultant shall propose an efficient methodology and design for supplementing the water demand with recycled water. The Consultant shall also determine the water requirements for fire fighting purposes and its associated network.
- 5.12.5.4 The Consultant shall design the network required for supply of potable, recycled water and fire-fighting water for the designated area. The network shall include design and location of water storage requirements, pumping requirements, standpipes and other such components. The network shall be designed up to each parcel level. The Consultant needs to keep the potable and non-potable water supply connections to each parcel.
- 5.12.5.5 A water supply scheme has been proposed by the State Nodal Agency for the project area. Based on the proposed water supply scheme the Consultant shall design the water distribution network for the entire project area.
- 5.12.5.6 The Consultant shall propose the capacity and location of the receiving master balancing reservoirs (MBR-R) for treated industrial water inside the designated area. This reservoir will receive the treated industrial water from the Tertiary Treatment Plant (TTP). The consultant shall design the MBR in coordination with the other consultant who will design the industrial water transmission main from the TTP up to the MBR inside the designated area.
- 5.12.5.7 The Consultant shall prepare a staging plan for potable and recycled water system considering the phase-wise occupancy for the area.
- 5.12.5.8 The preliminary design for potable water network, recycled water network, including fire storage and fire fighting network shall include the following but not limited to:
- a) An index plan of the distribution system as a whole, covering the entire area of supply under the proposal with zones demarcated and location of service reservoirs indicated with relevant hydraulic data. The distribution system should indicate sizes of mains, numbers, locations and capacities of UG/ OH tanks, hydraulic level and other appurtenances proposed in the system.
 - b) Longitudinal section of conveying mains, indicating the location of sluice valves on the main, scour valves, air valves and other appurtenances
 - c) Material of pipes and diameter of pipes
 - d) Designs and general arrangement for MBR and pumping arrangement
 - e) A schematic diagram indicating the levels of the various components of the project.
 - f) Engineering calculations for Storage capacities proposed their elevation and its costs.
 - g) Distribution system with salient features e.g. intermediate OH/ UG tanks,

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pumping stations, connections, valves etc.

- h) Hydraulic calculations of distribution and conveying mains.
- i) The Consultant shall determine location and size of required intermediate lifting stations and prepare hydraulic design, pump house, wet well/ dry well details, pump capacities and power requirement, pumping machinery, suction pipes, rising main, delivery main, indicative civil hydraulic electrical mechanical details, DG sets etc.

5.12.6 Preliminary design for drainage network

5.12.6.1 The Consultant shall prepare the storm water management system for the designated area considering that the flood management system shall be in place at a future date. The Consultant shall propose flood mitigation strategies in preliminary design of roads and drainage network in the interim, before the flood management system is in place.

5.12.6.2 The Consultant shall analyse the data and prepare the preliminary design for drainage network by:

- a) Considering and freezing of design criteria for the various parameter to design drainage system
- b) Determine storm water runoff quantities by dividing the catchment into different zones.
- c) Design and preparation of schematic network

5.12.6.3 As part of the preliminary design of drainage network, the consultant shall prepare the following but not be limited to:

- a) Prepare preliminary design documents including drawings and outline specifications for required storm water facilities.
- b) Preliminary design for the storm water drainage network with pipe diameters / channel dimensions.
- c) Determine the locations and dimensions of the storm water culverts along the roads.
- d) Determine the outfall points of the storm water drainage network.
- e) Determine location and size of storm water pumping stations, sluice gates/flood control structure at outfall or at intermediate level if required
- f) Determine the interconnection with the outside storm water drainage network
- g) Harvesting of surface runoff and measures to promote ground water recharge through rainwater harvesting system
- h) Analysis of the SWD system, alignment and position of storm water drainage along the road giving the details of size of drains, invert levels of the drains, HFL and road edge level.
- i) Longitudinal Plan for main drains
- j) Typical sections of drains, channels etc.
- k) Determine proposed formation level, storm water network with internal, peripheral drain and main channel up to discharge point with table indicating High flood level (HFL), Invert level (IL), Discharge, velocity, freeboard data.
- l) The Consultant shall determine location and size of required intermediate lifting stations and prepare hydraulic design, pump house, wet well/ dry well details, pump capacities

and power requirement, pumping machinery, suction pipes, rising main, delivery main, indicative civil hydraulic electrical mechanical details, DG sets etc.

5.12.7 Preliminary design for sewerage network, Industrial effluent collection and Effluent disposal network

- 5.12.7.1 The Consultant shall prepare preliminary engineering design of sewerage, Industrial effluent collection and effluent disposal network serving the parcels up to the designated location of the treatment plant and disposal point. The network shall be designed such that recycled water can be introduced back into the network for various types of use. As per national and local norms, the Consultant shall establish treated effluent discharge requirements aiming towards Zero Discharge.
- 5.12.7.2 The Consultant shall be required to finalize and adopt the following but not limited to, design parameters
- a) Per capita sewage and effluent generation
 - b) Peak flow
 - c) Minimum and Maximum velocity of flow
 - d) Flow conditions for various size of pipes
 - e) Material of pipe
 - f) Minimum depth of sewer
 - g) Maximum depth in relation to water table
 - h) Infiltration factor
 - i) Formula for calculation for design of sewer
 - j) Coefficient of various formulas
- 5.12.7.3 The Consultant shall evaluate the pre-treatment standards for each type of industries before discharge of their effluent in to trunk collection system to common acceptable level as per national and local standards.
- 5.12.7.4 The Consultant shall determine location and size of required intermediate lifting stations and prepare hydraulic design, pump house, wet well/ dry well details, pumping machinery, suction pipes, rising main, delivery main, indicative civil hydraulic electrical mechanical details, DG sets etc.
- 5.12.7.5 The Consultant shall determine number, size, location and type of required sewage treatment plants (STP) and staging plan for construction of collection and treatment system. The Consultant shall explore various options available for sewage treatment for each type of plant. The Consultant shall prepare the preliminary design for each treatment plant determining the area requirement, technology used, phasing, discharge parameters and other aspects to be used for treatment. The Consultant shall also identify alternate sludge management technologies and options.
- 5.12.7.6 The Consultant shall design the industrial effluent collection system with discharge of the collected industrial effluent to the CETP.
- 5.12.7.7 As part of preliminary design of sewerage, industrial effluent collection and effluent disposal network, the consultant shall prepare the following but not limited to:
- a) Individual layout plan of networks from parcel to treatment/disposal point showing pumping

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- stations, sump, invert levels and other relevant information
- b) Demand/ Generation calculations and hydraulic design of the individual network with pipe diameter, pipe materials, no of manholes, depth of the manholes etc
- c) Longitudinal Plan of the main network
- d) Typical details of manholes and other ancillary structures,
- e) Outline parameters and GA drawing of treatment plants
- f) Typical plans and sections showing indicative details, materials and specifications

5.12.8 Preliminary design for power supply

- 5.12.8.1 The Consultant shall prepare the preliminary design for power supply keeping the following but not limited to in perspective such as safety to personnel, minimum fire hazards and risk, minimizing power losses, reliability of system to the extent possible, ease of maintenance, automatic protection of all electrical equipment through selective relaying system and scope for future expansion.
- 5.12.8.2 The Consultant shall study the existing planning for EHT and HT transmission network of State Transmission for the entire area and thereafter coordinate the plan for the Sub-station location. The proposed equipment and preliminary design for distribution sub-station should be prepared with reference to the load flow analysis taken up by State Transmission prior to finalisation.
- 5.12.8.3 The Consultant shall prepare a load forecast based on plot mix, type of industrial units, future expansion plans and requirements of power consuming utilities/ facilities. Consultant should clearly specify the overhead and underground transmission network arrangement with respect to voltage level and physical site and ground conditions, in consultation with relevant authorities. The Consultant shall design the network such that integration with ICT network is possible wherever required.
- 5.12.8.4 The Consultant shall plan the following aspects but not limited to:
- a) Planning of Main Receiving Sub Stations (MRSS) and source of electricity within the overall framework of Industrial Area.
 - b) Planning and layout of electricity distribution system, network and internal substations.
 - c) Develop Utility Profile including demand assessment
 - d) Design electricity distribution system, which comply with the following but not limited to relevant regulations, latest concepts such as Smart Grids, codes of practices and byelaws.
 - e) Preliminary design of the sub heads of the substations and distribution networks.
 - f) Broad construction costs of the recommended option based on preliminary design
 - g) Determine requirement for standby engine-generation power supplies within the development to support critical loads.
 - h) Prepare general layout of underground electrical high and low voltage power distribution system.
 - i) Develop standards for street lighting to be used throughout development.

- 5.12.8.5 As part of the preliminary design for power supply, the Consultant shall prepare the following

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but not limited to:

- a) Report on Design norms and Standards, forecasting power demand, network planning, specifications, systems of maintenance and operation
- b) Details related to HT/LT lines, Grid substation, MSS, ESS Transformer, LT cable, stitch yards feeder pillar etc.
- c) Illumination level proposed for particular type of road.
- d) The arrangement and type of lighting proposed (linear, one side, opposite staggered or central verge) sodium mercury, fluorescent, metal, heads etc.
- e) Lighting distribution diagram for particular type of road with arrangement proposed.
- f) Power supply distribution and control arrangement proposed.
- g) Decorative post of lanterns for garden and open areas.

5.12.9 Preparation of Waste Management Plan

5.12.9.1 The Consultant shall cover the following as part of Waste Management Plan but not limited to:

- a) Characterisation and quantification of solid waste and hazardous waste to be generated during construction stage and operation stages of the project
- b) Collection, segregation and storage systems of various types of waste generated
- c) Conveyance/ transportation system of various kinds of waste generated.
- d) Revalidate and propose the location (s) of the final storage/ treatment and recycling system.
- e) Preliminary-design of the storage facilities, as required.
- f) Identification of nearest Common Hazardous Waste Transportation, Storage and Disposal Facility (CHWTSDF) for disposal of hazardous waste
- g) Waste management plan shall be in conformance with applicable rules e.g., Municipal Solid Waste Management Rules 2000, Hazardous Waste Management Handling and Trans-boundary Movement Rules 2009, etc

5.12.10 Preliminary design for gas network corridor and telecom ducting network

5.12.10.1 The Consultant shall plan the allocation for gas corridor and telecom network in the roads cross section in the integrated infrastructure layout.

5.12.10.2 The Consultant shall abide by national norms, standards and best practices.

5.12.10.3 The ICT network shall be designed such that includes components serving requirements of roads and all infrastructure such as but not limited to intelligent transportation systems, smart metering system, SCADA, BRT, traffic signalling etc, coordinated with overall ICT master plan

5.12.10.4 Evaluate the systems for provision of Information and Communications Technology (ICT) for integrated operations along transport routes with provision of following:

- a) Required number of ducts
- b) Empower 24x7 round-the-clock service operations in public, providing information

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with user privacy and without human intervention and extending points-of-presence

- c) Enable delivery of real-time information to users for better planning
- d) Integration with Multi-modal Transport Schedules
- e) Enablement of Emergency Notifications, Security Analytics and Response measures
- f) Provision for Integrated Billing and Cash-less transactions
- g) Prepare broad cost estimates of the civil, electrical, systems, ICT requirements - both capital as well as operating costs.

5.12.11 Preparation of Cost estimates and BoQ

5.12.11.1 The cost estimates shall be prepared as per provisions of this TOR and as per below. The description of items in Bill of Quantities should be consistent with the drawings and specifications, and all should lend themselves to harmonious and unambiguous interpretation.

5.12.11.2 The Consultant shall prepare detailed estimates for quantities (considering designs of roads, highway structures and utilities as proposed) and project cost including rate analysis for the entire project (package wise), using local/ state/ applicable schedule of rates. For missing items in the local/ state/ applicable schedule of rates, any other mutually agreeable source(s) maybe used. The estimation of quantities shall be based on preliminary design of various components. The estimation of quantities and costs shall be worked out separately for each component.

5.12.11.3 The Applicant shall carry out a detailed analysis for computing the unit rates for the different items of works. The unit rate analysis shall duly take into account the various inputs and their basic rates, suggested location of plants and respective lead distances for mechanized construction. The unit rate for each item of work shall be worked out in terms of manpower, machinery and materials.

5.12.11.4 The project cost estimates so prepared are to be checked against rates for similar on-going works in the surrounding region with reference to current State PWD schedule of rates.

5.12.11.5 The Consultant shall prepare BOQ of various components with a break up of cost for each component separately. The Consultant may include provision for physical and price contingencies, interest during construction and other financing costs, pre-construction expenses etc. Cost estimates should be prepared based on item rate analysis and on prevalent market rates in the region. Consultant should perform rate analysis for all the items in all works.

5.12.11.6 The Consultant shall prepare the Cost estimates and BoQ for the purpose of assistance in tendering process for contractor(s). The Consultant shall be responsible for accuracy of the BoQ items.

5.12.12 Financial Analysis: The consultant should undertake detailed financial analysis for the project, estimation of financial IRR etc.

5.12.13 3D Model and Spatial Database

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- 5.12.13.1 All infrastructure, networks and facilities designed by the Consultant as part of this assignment shall be consolidated as part of a spatial database preferably using MS-SQL Server Spatial or Oracle Spatial. Both the 2D and 3D spatial data shall be stored in such spatial database for mapping, modelling and analysis.
- 5.12.13.2 The Consultant shall propose the required specialist modelling software to the Client for facilitating high level modelling analysis. While for transforming such modelled results into engineering layout plan the Consultant shall make use of Autodesk Civil 3D or Map 3D.
- 5.12.13.3 The Consultant shall also prepare a 3D model of all infrastructure designed as part of the assignment. The 3D model shall be developed using Autodesk Revit, Civil 3D, Map 3D and/ or Infracore. The Consultant shall represent all aspects, details, alignments, materials, thicknesses, quantities, levels and measurements as developed in preliminary design for roads and services. The Consultant shall use the 3D model to demonstrate the efficiency and cost effectiveness of the design. 3D model data files shall be submitted in 'SDF' file format. Apart from spatial information, the SDF file shall carry attribute information such as but not limited to materials & specifications, pipe diameters, flow data and invert levels.

5.13 Detailed scope of services for Part K: Preparation of tender documents and drawings for selection of contractor(s) and during Detailed Design stage

- 5.13.1 The Consultant shall formulate tender packages. These packages shall be formulated such that all roads and infrastructure are simultaneously and seamlessly executed at the site along with the works related to street lighting, street furniture and landscape. The tender documents shall be designed such that the works can be executed in a short span of time in order to meet client's expectations.

5.13.2 Preparation of Tender drawings and documents

- 5.13.2.1 The Consultant shall prepare the tender documents, drawings, specifications and schedule of quantities, code of practice covering aspects like mode of measurement, method of payments, quality control procedures on materials and work, special conditions of contract etc.
- 5.13.2.2 The Consultant's scope shall include all relevant information pertaining to preliminary design for roads & services/ utilities such as draft BOQ's, analysis of rates, technical specifications and technical data sheets.
- 5.13.2.3 The Consultant shall provide relevant documents for bidding out contracts for single/ multiple packages created for the designated area.
- 5.13.2.4 The Consultant shall provide technical assistance to the Client in selection of contractors for various packages.

5.13.3 Technical support/ handholding during Detailed Design

- 5.13.3.1 The Consultant shall provide all technical assistance in providing any further clarifications, details, designs and drawings required by the contractor(s) during the Detailed Design stage and address any queries raised by the contractor(s) for roads &

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services/ utilities. The Consultant shall act as an interface or coordination agency between Client and the contractor(s) during the handholding period for the Detailed Design stage. It is also envisaged that a Programme Manager (PMNC) will be appointed for the node and accordingly, the consultant will do all necessary coordination with the PMNC. All deliverables will be submitted to PMNC after his appointment and it is the responsibility of the PMNC to verify the deliverables and approve the same. For all practical purposes, the PMNC will be acting as the client's representative for all day-to-day activities.

5.13.3.2 The Consultant shall review and approve detailed design and GFCs prepared by the contractor(s) and ensure that all preliminary design aspects and parameters have been adhered to. The Consultant shall analyse the detailed BoQ prepared by the contractor.

5.13.4 Scope of work for Environmental Impact Assessment for the project

The Selected Consultant/s are required to prepare & complete the EIA study as per the Model ToR issued by MoEF and also obtain the additional ToR for this project.

The purpose of EIA is to give the environment its due place in the decision-making process by clearly evaluating the environmental consequences of the proposed activity before action is taken.

- Evaluation of the impact of the project shall be carried out on air environment, water environment, land use, drainage, flora and fauna, socio-economic and cultural environment on short and long term basis. The evaluation shall be carried out for pre project scenario, project implementation scenario with and without EMP. The environmental impact scenario shall be carried out for, before, during and after the implementation of project.
- The guidelines provided by MoEF and State PCB and/or any other relevant body in this regard shall be studied while conducting the EIA study. The baseline data generated from above studies shall be analyzed and compared with applicable standards for each environmental attribute so that the critical environmental areas and also attributes of concern are identified. The short term and long term impacts particularly on sensitive targets such as endangered species, plants, crops and historically important monuments shall be identified.

5.13.5 Mitigation measures & Environmental Management Plan for the existing and proposed developments

Based on the impacts identified the mitigations measures will be suggested. An impact criterion will be developed to identify major, moderate and minor impact based on which an impact matrix will be generated. The impact matrix will indicate the extent of impact with as well as without the proposed mitigation measures. Social impacts and concerns will also be identified and an outline Rehabilitation and Resettlement (R&R) Framework will be prepared.

An EMP suggesting economically feasible control technologies and procedures to minimize any impact on environment will be developed. The EMP will include:

- Pollution control measures (air, water, noise, soil etc)
- Water conservation, treatment and disposal
- Solid/hazardous waste management
- Training and Monitoring requirement for the project

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- Occupational Health and Safety Measures
- Requirements for green belt and landscaping
- Traffic Management Plan

5.13.6 Outline Risk Assessment Study

The RA study will include the following methodology:

- Identification of hazards/risks associated;
- Identification of scenarios;
- Analysis of frequency and consequences of all identified risks;
- Detailed risk analysis to assess the risk levels in relation to risk acceptance criteria; and
- Recommend risk reduction measures and identify high-risk elements to be addressed through the Disaster Management Plan (DMP)

The Consultant shall be responsible for making presentations as required from time to time before the various committees of Competent Authority/ies including Public Hearing and obtain the EIA Clearance from the MoEF and/or any other authority.

In order to facilitate the Selected Consultant in conducting the studies, NICDC shall share all the necessary data, reports and other relevant materials in relation to the project.

5.13.7 The scope of services is also inclusive of following:

- To fill-up Form- I alongwith draft TOR, to be submitted to MoEF, New Delhi for getting TOR.
- Preparation and giving presentation for TOR at various stages/to various authorities, as per requirements of MoEF and/or any other authority and providing all the necessary assistance for the same as per requirements.
- Liasioning / Expediting /Follow-up with MoEF and/or any other authority for the early receipt of TOR and with other statutory/non-statutory bodies for getting various permissions/clearances etc.
- To prepare Comprehensive detailed EIA –EMP Report as decided by NICDC which should be as per the requirements of TOR / EC and shall also cover the points referred in the “Technical EIA Guidelines Manual published by MoEF and/or any other authority and the amendments thereof with completion of all the necessary field works, monitoring, testing etc. including measurement of meteorological parameters for the respective area of project site.
- Preparation and giving presentation at various stages/to various authorities for Public Hearing and Public Consultation and providing necessary assistance for the same as per requirements and also for the compliances to the points identified during Public Hearing and Public Consultation.
- Preparation of the compliances as per requirements in TOR for further submission to MoEF and/or any other authority.
- Preparation and giving presentation at various stages/ to various authorities, for getting Environmental Clearance and providing necessary assistance for the same as per requirements.
- Expediting/Follow-up with MoEF/ other statutory bodies for the early receipt of Environmental Clearance.

Preparation of Detailed Master Plan and Preliminary Design Report for Roads & Services/ Utilities for Integrated Manufacturing Cluster (IMC) at Dharampuri-Salem Node in Tamil Nadu under Extension of Chennai Bengaluru Industrial Corridor (CBIC) to Kochi via Coimbatore

5.14 Deliverables and timeframe

5.14.1 All the deliverables as per the list below shall be in the form of 05 (five) hard copies +1 (one) soft copy in MS Word and PDF format for Reports and GIS, AUTOCAD DWG & PDF formats for drawings/ plans.

S. No	Milestone	Duration
1	Inception report and Quality Assurance Plan	D+15 days
2	Market demand analysis	D+1.5 month
3	Final Base map	D+3 months
4	Land suitability analysis and technical assessment report	D+4 months
5	Preliminary master plan report	D+5 months
6	Final Master plan report and preliminary financial model	D+8 months
7	Urban design / Landscaping / Branding guidelines	D+8 months
8	Final plot control sheets	D+9 months
9	Statutory plan	D+10 months
10	Notification of the final master plan	D+11 months
11	Design basis report	D+11 months
12	Draft preliminary design report including detailed economic analysis along with costing	D+13 months
13	Final EIA clearance	D+13 months
14	Final preliminary design report with 3D model and tender packages & BIM model	D+15 months
15	Selection of EPC/DB contractor(s)	D+20 months
16	Approval of GFC's	D+26 months
17	Hand holding and assistance to client	D+30 months
D*-Start date of assignment		