DRAFT TERMS OF REFERENCE FOR CONSTRUCTION MANAGEMENT CONSULTANT (CMC) FOR CONSTRUCTION PROJECT

1. Background

1.1. Country & sector context

India is one of the world's largest and most dynamic emerging markets with vast economic potential. The objective of the Government of India's, 12th Five-Year Plan (FY2013–17) is to return to Gross Domestic Product (GDP) growth rates in excess of 8 percent, with a strong emphasis placed on the manufacturing sector. Manufacturing has long been recognized as an essential driver of economic development for most countries, as it has an important economic and employment multiplier effect. The manufacturing sector will have to play an important role in taking the Indian economy to a high growth rate trajectory and achieving the planned objectives.

Despite a strong potential, India's manufacturing performance has not been encouraging. The share of manufacturing in India's GDP has stagnated at around 16 percent[1], compared to more than 30 percent (and growing) in some of the other Asian countries. India's manufacturing sector has had to face other challenges, such as low value addition, low productivity, and less-than-desirable up scaling. However, there also exist world-class production units that compete in the international market, as observed in the automotive sector.

To realize this potential, the Government of India has set the objective of enhancing the share of manufacturing in India's GDP from its current level of 16 to 25 percent within a decade and creating 100 million additional jobs in the National Manufacturing Policy 2011.

The major constraints to the growth and competitiveness of India's manufacturing sector are well known and some of these are: difficulties accessing markets (including within India), difficulties accessing finance (especially for MSMEs), infrastructure deficiencies and difficulties for MSMEs to access technology and lack of skilled manpower. These constraints impact the competitiveness of MSMEs operating in both upstream and downstream manufacturing industries.

Upstream industries, such as the tooling industry, that consists of developing and manufacturing dies, moulds, casts, as well as testing and prototyping, serves as the interface between product design and product manufacturing. The right tools help increase throughputs, reduce material waste, improve product quality, time to market and thus improve competitiveness. The importance of the tooling industry increases with accelerating technological developments, product sophistication/ innovation/ customization and decreasing time to market. Despite this tooling is a local industry (more than 60 percent of tools in the world are locally produced and consumed – including in India) dominated by MSMEs (more than 80% of firms in India, Europe, US and Japan). As in other countries, the private tooling industry in India has grown hand in hand with the manufacturing industry. The turnover of the Indian tooling industry is approximately US$3 billion, with more than a thousand firms employing over 120,000 workers (TAGMA 2011). The constraints to the growth and competitiveness of the Indian tooling industry mirror the ones affecting manufacturing as a whole, as articulated above. The scarcity of skilled workers and problems related to their retention, as well as the lack of access to a high-quality design and prototyping facility, has hurt growth.

[1] The Manufacturing Plan - Strategies for Accelerating Growth of Manufacturing in India in the 12th Five Year Plan and Beyond

In the downstream industries, such as automotive, electronics, fragrance and flavours, glass, leather, toys etc. also, there is a shortage of skilled labour and limited access to advanced technologies. These industries include large numbers of MSMEs, often working as part of supplier networks of larger enterprises and subject to increase in international competition.

Demographic Challenges

While India stands to benefit from an immense demographic dividend, with the largest youth population in the world (around 66 percent of the total population is under the age of 35), it has an overall employment rate of 4.7 percent (under usual principal status approach) and an overall labour force participation rate of 50.9 percent[2]. For the country to gain from this demographic dividend, skilling and up-skilling its youth are key priorities for the Government of India (GoI).

Out of the 470 million labour force in India, less than 10 percent has received any kind of skills training, either through formal or informal means[3]. About 13 million young people enter the labour force annually. Despite the huge expansion of skills training provision during the 11th Five-Year Plan, the country's skills development system requires massive up scaling. In its 11th and 12th Five-Year Plans, India recognized that skills development is critical to achieving faster, sustainable, and inclusive growth, on the one hand, and to providing decent employment opportunities to the growing young population, on the other. According to the National Skill Development Policy published in March 2009, India has set a target of skilling 500 million people by 2022[4].

Global experience shows that a workforce with higher schooling and skill levels leads to higher productivity and personal income. A 2011 study showed that students who attended three-year vocational training courses at the Industrial Training Institutes (ITI) earned 25 percent more than two-year course students, who earned 14 percent more than those who completed the one-year course[5]. These results confirmed a 2007 study showing that the returns on vocational training in India have been found to be 8 percent. The same study showed that, increased educational attainment by one year is associated with 5.8 percent higher firm-level productivity in India[6].

Against this backdrop, the Technology Centre Systems Program seeks to develop the technological and skill base of MSMEs in selected manufacturing industries, via upgraded and new Technology Centres (earlier called Tool Rooms [TR] and Technology Development Centres) has been envisaged.

1.2. Institutional context

The MSME Ministry, through the Office of the Development Commissioner (O/o DC, MSME), currently operates eighteen Technology Centres (hereafter referred to as TCs): ten for the tooling industry and eight for other industries such as ESDM (electronics system design and manufacturing), glass, footwear & leather, and fragrance & flavour etc. The list of the existing TCs is given below:

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[2] According to the Report on the Third-Annual Employment & Unemployment Survey (2012 – 2013) of the Ministry of Labor, Government of India.
[3] 11th and 12th Five Year Plan
[4] http://labour.nic.in/upload/uploadfiles/files/Policies/NationalSkillDevelopmentPolicyMar09.pdf
[5] Vocational Training in the Private Sector (Goyal 2011)
[6] The Knowledge Economy and Education and Training in South Asia (world Bank 2007)

Existing Technology Centres of the Office of the DC, MoMSME

S.No.	Name	Focus sectors and services offered
1	Central Tool Room & Training Centre (CTTC), Bhubaneswar (Odisha)	Tooling (specializing in precision manufacturing) and Training
2	Indo Danish Tool Room (IDTR), Jamshedpur (Jharkhand)	Tooling (specialization in Automotive) & Training
3	Central Tool Room & Training Centre (CTTC), Kolkata (West Bengal)	Tooling (specializing in precision manufacturing and foundry & forging) & Training
4	Tool Room & Training Centre (TRTC), Guwahati (Assam)	Tooling & Training
5	Indo German Tool Room (IGTR), Aurangabad (Maharashtra)	Tooling (specialization in Automotive) & Training
6	Indo German Tool Room (IGTR), Indore (Madhya Pradesh)	Tooling (specialization in Automotive and Plastics) & Training
7	Indo German Tool Room (IGTR), Ahmedabad (Gujarat)	Tooling (specialization in Automotive and Plastics) & Training
8	Central Tool Room (CTR), Ludhiana (Punjab)	Tooling & Training
9	Central Institute of Hand Tools (CIHT), Jalandhar (Punjab)	Tooling (specialization in hand tools, foundry & forging and agricultural implants)
10	Central Institute of Tool Design (CITD), Hyderabad, (Telangana)	Tooling, ESDM, Advance Welding & Training
11	Institute for Design of Electrical Measuring Instruments (IDEMI), Mumbai, (Maharashtra)	ESDM, Tooling and Training
12	Electronics Service & Training Centre (ESTC), Ramnagar (Uttarakhand)	ESDM and Training
13	Process and Product Development Centre (PPDC), Agra (Uttar Pradesh)	Foundry & Forging and Training
14	Process cum Product Development Centre (PPDC), Meerut (Uttar Pradesh)	General Engineering (specializing in Sports Goods) and Training
15	Central Footwear Training Institute (CFTI), Agra (Uttar Pradesh)	Leather Footwear & Training
16	Central Footwear Training Institute (CFTI), Chennai (Tamil Nadu)	Leather Footwear & Training
17	Fragrance & Flavour Development Centre (FFDC), Kannauj (Uttar Pradesh)	Fragrance & Flavours, Agro & Allied Industries and Training
18	Centre for Development of Glass Industries (CDGI), Firozabad (Uttar Pradesh)	Designer and Decorative Glass and Training

Several of these were set up through support from German and Danish Government under bilateral agreements as well as with the United Nations Industrial Development Organization (UNIDO). These Technology Centres are largely self-sustaining entities that have been providing technical and vocational training programs to more than 1,00,000 trainees annually. Some of these include training programs certified by the All India Council for Technical Education (AICTE) and National Council for Vocational Training (NCVT). They also provide design and manufacturing support to entrepreneurs alongside technical consultancies.

The existing TC's, were set up between 1967 and 1999, primarily focus on improving access to technologies and providing technical advisory support for entrepreneurs in the given industry cluster

they serve. These TCs also serve workers and youth by offering opportunities for hands-on technical training and skill development in varied trades with a view to improve employability and livelihood opportunities.

Additional 15 TCs spread across the country will be established as the project progresses.

The key services offered by the existing TCs mainly include:

i. Design & Manufacturing
   - Design & manufacturing of tools, dies, moulds and precision tools
   - Process development
   - Product development

ii. Skill Development
   - Long & short term training programs
   - Areas include CAD, CAM, CNC, automation, RPT, mechatronics etc.
   - International, modular and customised programs
   - Student profile varies from HSC/SSC/10th passed outs, ITI passed outs to diploma holders and graduate engineers

iii. Consultancy
   - Inspection & calibration facilities
   - Turnkey assignments
   - Course curriculum developments

All services are offered on fee basis at market/cost rates. In addition, the Government of India offers various schemes/programs to subsidize the cost of services offered by the TCs to MSMEs.

2. About the Technology Centre Systems Program (TCSP)

The Program intends to upgrade and expand the network of Technology Centres, which have as their mission to improve the competitiveness of MSMEs in key manufacturing industries across India– with a special emphasis on Low Income States. The Program will increase the capacity and incentives of TCs to support private sector actors (as opposed to competing with them).

Technology Centres provide an integrated suite of services to MSMEs on a fee basis, ranging from technical and management advisory to technical training of workers. The Proposed Program will reinforce the technical capability of the Technology Centres as well as their governance, by further increasing the participation of the private sector in key decisions at both the national and local levels. In particular:

a. The proposed Program seeks to establish 15 new TCs and upgrade technology capabilities of existing TCs and develop linkages with Indian and international research institutes, leading manufacturers. The Program will connect leading practices that will contribute to innovation advanced technology, knowledge and innovation that can be transferred to MSMEs served by each TC, thereby creating an ecosystem that fosters manufacturing competitiveness through a national system of technology centres across the country.

Additionally the program will also

b. Build on the strengths of current TCs, complement and reinforce hundreds of public and private providers of vocational training (e.g. the ITIs, the Polytechnics and the ATIs), helping them to improve their curricula and training their trainers by placing more emphasis on learning and problem solving skills, and being more practical and adapted to local conditions and needs. To that end the proposed program will develop linkages between the TCs and the Training Institutes being set up by other ministries. The development of such synergies and linkages will also be supported by existing World Bank programs aimed at improving vocational training in India.

c. Leverage and complement other programs supporting MSMEs and manufacturing clusters being implemented by various organizations in public and private sector.

The program will be partly financed through an IBRD Loan and State Governments will contribute land for setting up new TCs. The proposed program will include the following components:

Component 1: Technical assistance to the existing and new Technology Centres

The objective of this component is to ensure that TCs (selected existing as well as new) have access to technical assistance that will help them serve their cluster of MSMEs better. This will be achieved through internationally competitively recruited Technology Partners (TPs), Cluster Network Managers (CNMs) and an IT Platform service provider.

Sub Component 1.1: Technology Partner

The Technology Partners (TPs) for each system of TC will specialize on specific industries/technologies and provide inputs to the TC on leading practices and techniques in proven and latest manufacturing technologies that can be adapted to the Indian MSME context. It is expected that the TPs will work closely with the TCs in engaging with the cluster(s) of MSME the TCs serve including OEMs and large manufacturing enterprises, in shaping future technology road map. The TP in conjunction with other stakeholders of the TCSP identify and define globally competitive

technological capability (which are also locally adaptable and sustainable) required in the cluster and assist the TC in building this capability by planning and handholding this roll out over a six year period. The TP will support in identifying equipment, machinery and technical requirements to upgrade the existing TCs and in fitting out the 15 new TCs. It is expected that the TP with its international experience shall help the TC augment its service portfolio keeping in view the identified/focused technologies including updating existing offerings for training, skill development, production, equipment utilization and technical advisory. The TP will also support TCs increase efficiency and competitiveness through planned initiatives.

Subcomponent 1.2: Cluster Network Manager

Cluster Network Managers (CNMs) for each System (or sub System) of TCs will specialize on specific geographic cluster(s)/ industry(s). The Cluster Network Manager (CNM) will build capacity of the TC to enhance economic development cooperation amongst key stakeholders to improve the competitiveness of the cluster. This will include strengthening market linkages of the TCs with the entire MSME ecosystem i.e. the MSMEs in the cluster it serves, trade and industry associations, academia, educational institutions, applied research institutions, service providers, other government support institutions, workers and skill seekers.

The CNM would seek to increase competitiveness of supply chains of large firms by enhancing quality, reliability and productivity of MSME suppliers by offering services of the TC, thus also helping in meeting revenue targets of the TC. The CNM will enhance the competitiveness of the cluster business environment by establishing a network of service providers which will address the needs of the MSMEs not served by the TC e.g. access to a network of financial services etc. The CNM will also facilitate closer cooperation between the TC and MSMEs with key innovation stakeholders such as applied research institutes, autonomous institutions such as IISC, CSIR, academia, skill seekers, students etc. to enhance product and process innovation. TC's capacity will be further enhanced through closer cooperation amongst skills development and labour market stakeholders to increase the number of workers/ trainees from TCs finding long term employment to improve their livelihood.

Subcomponent 1.3: Information Technology Service Provider

This component will support a National Portal (NP) for MSMEs, with the vision of "creating a vibrant, interactive, self-sustainable technology platform for the needs of stakeholders of MSME for collaboration, information dissemination, and transactions". The platform will act as a common platform for information dissemination, services and support across many aspects of business that will be required by an MSME from the start of their business, to successful operations and growth e.g. access to regulatory services for entrepreneurs, assistance for financing, access to list of suppliers etc. Through the National Portal, users will also be able to access (virtually) to most of the technical information and training services provided by the TCs. This platform will extend the reach of the program to beneficiaries well beyond the TCs' physical location through access to e-learning solutions, B2B service & product market place, e-recruitment portal and e-governance services (grievance reddresal forum). In addition the National Platform will also include the Monitoring and Evaluation Platform for the TCSP program.

Component 2: Investments to develop new and upgrade existing Technology Centres

The Program will finance the development of 15 new TCs and upgrade the 18 existing TCs under the responsibility of the MSME Ministry. The development of new TCs will be phased with the first new TC development likely to commence in 2014 and construction of all new TCs likely to complete by 2018. The investments in upgrading and building new would be based on the DPR prepared by the Program

Management Unit on behalf of the O/o DC, MSME in consultation with stakeholders including the Technology Partners and Cluster Network Managers. The DPR will be approved by the PSC and will be informed to the World Bank by updating the procurement plan.

The land for the new centres will be provided by the State Governments and many State Governments have already responded positively to this program.

Sub-component 2.1: Buildings/ other infrastructure

The physical facilities of the TCs will be upgraded and developed with the following objectives in mind:

- Eco-friendly design (Keeping in mind all the components of green building design)
- Cost optimization
- Flexibility with respect to usage and future expansion/contraction
- Ensure a healthy and safe environment and user-friendly buildings for the people who work or get trained

The construction is expected to start in the second year and likely to complete by the fourth year of program implementation. A typical new TC for general manufacturing may have the following pattern:

- Main institute building (including manufacturing, training, administration and other facilities): 15,000 sqm
- Hostel and residential facility (for around 600-700 students): 5,000 sqm

Sub-component 2.2: Equipment/Software

The equipment required to upgrade the existing TCs and develop the new ones will be purchased based on the DPRs prepared by the Program Management Unit in consultation with the Technology Partner and Cluster Network Manager as and when appointed and also inputs of concerned sector Joint Working Groups. The advice/vetting of the Technical Partners and Cluster Network Managers will be taken once they are on board/contracted. One of the key considerations would be to identify equipment and software that is in line with the technology roadmap the TC plans to embark to support its cluster. Adequate attention needs to be provided to upgrade and build technology capabilities for the future but should be proven and fit the context of the cluster and its geography at the same time.

Sub-component 2.3: Operating costs of new Technology Centres

The Government of India (through TCs and the MoMSME) will finance 100% of the operating costs of the 15 new TCs to make them fully operational and financially self-sustainable expected within four to five years of their launch, depending on the location and sector of the TC.

Component 3: Technical assistance to the MSME Ministry for Program implementation and Monitoring and Evaluation

Sub-component 3.1: Project Management Unit

The program will be implemented with a support of a dedicated Project Management Unit

Sub-component 3.2: Small dedicated program management team

A dedicated team consisting of the National Program Manager, a Procurement Expert, and a Financial Management Expert will be appointed during the program implementation phase. Based on the suggestions of the PMU, it has also been agreed that an Information Technology Expert will be

part of this team that supports the National Program Manager. This team will report into the Program Coordinator of the O/o DC, MSME and will act as the interface between the Program Management Unit and the Program Coordinator. The Program Coordinator, the PMU and the National Program Manager and his team will form the Program Implementation Unit (PIU).

Sub-component 3.3: Other technical assistance to the Office of DC-MSME and the MSME Ministry

This will include capacity building and change management for the O/o DC, MSME and support to carry out in-depth impact evaluation studies, by O/o DC, MSME in consultation with the World Bank. Other technical assistance for the program, as and when required, will be provided under this sub-component.

The M&E system will include in particular independent surveys of customers and stakeholders (including potential private competitors to the TCs) to conduct the impact evaluation and assess the transformative impact of the program as well as to ensure there is no significant crowding-out of the private sector.

The governance structure for the program is illustrated in Figure 1. Three tiers serve the different roles of: Strategic inputs, Implementation and Execution.

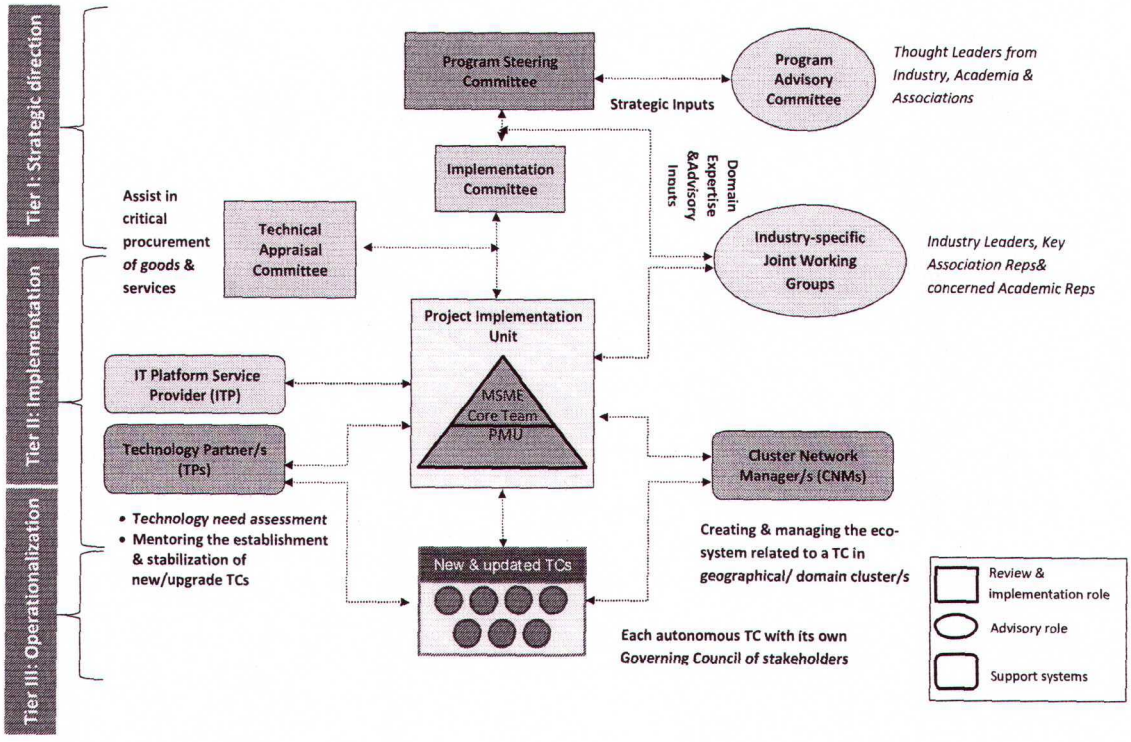

Figure 1: Technology Centre Systems Program: Governance Framework

3. Terms of Reference for Construction Management Consultant (CMC) for Construction Project

The following Terms of Reference are a draft version and may undergo changes. The final Terms of Reference will be issued as a part of the Request for Proposal to the shortlisted consultants after EOI stage.

The scope of work for the CMC is to provide construction management service for the construction of 15 new Technology Centre and renovation of existing 18 Technology Centre (TCs) from inception to final closure of the construction.

Technology Centre is an institutional setup to support MSMEs access technology, skilled human resources and business advisory services. The TCSP project aims at upgrading the physical infrastructure at existing TCs and setting up of new TCs. These TCs have facilities typically like class rooms, production and training workshops, conference hall, labs, hostel and residential facilities.

The construction work for various TCs shall be taken up under TCSP which shall be implemented over a period of six years. CMC under the TCSP shall be technical experts for managing construction works, hired competitively through National competitive bid. The CMC shall carry out the complete engineering services related to the project, including design, construction supervision and contract management. The following activities shall be undertaken by the CMC:

a. *Site evaluation and design concepts* – Study of the site and existing similar facility and develop at least 3 alternative design concepts for the new or existing TC and get approval from the respective authority. Each of the alternate designs should include elements of Green building concept, (such as water recycling and reuse, use of renewable energy, adequate choice of building material etc., based on the Griha Ratings) and shall clearly identify and reflect the benefits and payback of the investment. This will also include that sites for construction are available free of any encumbrances, claims for settlement and that the Social Screening for the sites reflect the reality.
b. *Prepare detailed drawings, specifications, BOQ and cost estimates* – After approval of final concept design, preparation of all necessary drawing, technical specification, BOQ and cost estimates in detail.
c. *Develop scope of work and all technical documents*- Develop the scope of work and all technical documents and support the PMU in the bid process management to appoint Construction Works Contractor (CWC)/Turnkey Construction Agency (TCA), who shall execute all the construction works.
d. *Joint review and comment on drawing and specification – Joint review and comment by CMC on observation raised by CWC/TCA on issue related to drawing and specification*
e. *Monitoring and supervision*-Monitoring & supervision of the construction schedule and the implementation of the Environment Management Plan (EMP) including development of web based M&E framework for real time monitoring and remedial measures.
f. *Approvals and certificates*- Preparation of time schedule for submission of all statutory approvals and certificates. Monitoring progress of the schedule including environmental guidelines.
g. *Certification of bills*- Review of bills submitted by the CWC/TCA(s) and certification of the same for payment.
h. *Completion certification and handing over*- Assess the completeness of the works claimed by the CWC/TCA(s) and certify completion of the construction project including coordination of handing over of building through PIU. Detailed inspection shall be carry out by the CMC during defect liability period after handing over.

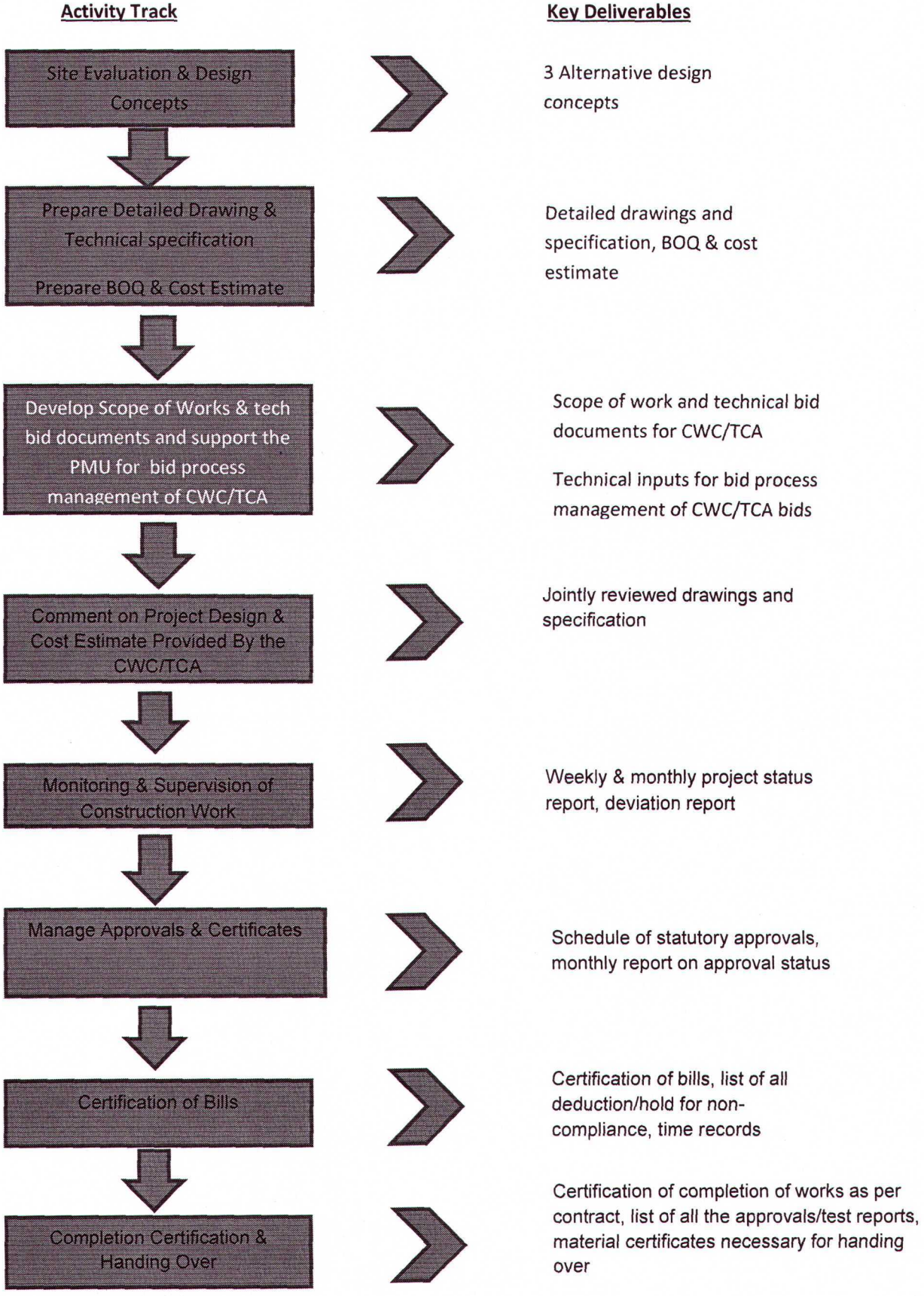
Activity Track
Key Deliverables
Site Evaluation & Design Concepts
3 Alternative design concepts
Prepare Detailed Drawing & Technical specification
Prepare BOQ & Cost Estimate
Detailed drawings and specification, BOQ & cost estimate
Develop Scope of Works & tech bid documents and support the PMU for bid process management of CWC/TCA
Scope of work and technical bid documents for CWC/TCA
Technical inputs for bid process management of CWC/TCA bids
Comment on Project Design & Cost Estimate Provided By the CWC/TCA
Jointly reviewed drawings and specification
Monitoring & Supervision of Construction Work
Weekly & monthly project status report, deviation report
Manage Approvals & Certificates
Schedule of statutory approvals, monthly report on approval status
Certification of Bills
Certification of bills, list of all deduction/hold for non-compliance, time records
Completion Certification & Handing Over
Certification of completion of works as per contract, list of all the approvals/test reports, material certificates necessary for handing over

Figure 3: Work flow chart

3.1. Detailed Scope of Work

As discussed in the above section, the scope of work of the CMC has been divided under seven tracks. The detailed activities under each of the tracks are listed below:

3.1.1. Track 1: Site Evaluation and Design Concepts

This track involves pre-construction activities related to site evaluation, collection and review of site plan, and preparation of engineering brief. The CMC is expected to keep the following objectives in mind while preparing the concept design:

a. World class facility to facilitate delivery of the proposed services
b. Eco-friendly to minimise the adverse environmental and social impact (water harvesting, solid waste and water effluent management, renewable energy, use of eco-friendly material, etc.)
c. Energy efficient design
d. Economical to reduce the total cost of ownership
e. Flexible with respect to usage and expansion/contracting in the future
f. Vernacular architecture
g. Friendly for disabled and/or physically challenged people

The track consists of following activities.

Activity 1: Site evaluation

The CMC shall identify the requirements of the Technology Centre keeping above mentioned points in mind. It will involve site evaluation, analysis and impact of existing and/or proposed site development on its immediate environment and local community in the vicinity. The CMC shall be responsible for collection of site plan and carrying out the topography survey and soil testing and other geotechnical analysis at the site.

Key deliverables-Site evaluation report, site survey report including reconfirmation of Social Screening & geotechnical analysis report

Activity 2: Identification of requirements, benchmarking and concept design

The CMC shall conduct workshop with existing Technology Centre occupiers having similar operations (in consultation with the PMU and O/o DC, MSME) to understand limitations of the existing facilities and spaces if any. The benchmarking of the specifications will be carried out based on the analysis by the CMC.

Based on the above study and consultation with client and Project Implementation Unit (PIU), the CMC will prepare 3 alternative design concepts for the site in terms of functional requirement. The designs shall include elements of Green building design.

Key deliverables-Facility benchmarking report, 3 alternative design concepts

3.1.2.Track 2: Detailed drawings, specifications, BOQ and cost

Activity 1: Preparation of Detailed Drawing and Specification

The 3 alternative design concepts shall be reviewed by the Project Implementation Unit (PIU) and after approval of final design concept, the CMC shall prepare all detailed drawings, specifications, BOQ, cost estimates and savings and / or benefits of the green building elements.

(I) Architectural, structural design and technical specifications

a) Class rooms, workshops, other facilities including flooring, roof, wall, doors, windows
b) Landscape architecture
c) Sanitary, plumbing, drainage, water supply and sewerage design
d) Utilities requirements and specifications (elevators, escalators etc.)
e) Interior architecture
f) Graphic design and signage
g) Domestic and industrial water supply point
h) External aesthetic specifications
i) Public health and safety requirements with specifications under National Building code 2005
j) Accessibility requirements and specifications
k) Retrofitting as applicable
l) Man and material flow diagrams
m) Load calculation and design for structural sections foundation, beam, column and slab, etc.
n) Material selection

(II) Detailed mechanical drawing and technical specification

a) Heating, ventilation and air conditioning design (HVAC) and other mechanical systems
b) Fire detection, fire protection and security systems etc.
c) Compressed air
d) Chilled and hot water, steam
e) Solvents and other chemical feeds
f) Fuel points, if applicable
g) Gases as oxygen, LPG etc. supply points
h) Fire alarm and firefighting system

(III) Detailed electrical drawing and technical specification

a) Electrical single line diagram
b) Electrical load list
c) Specification of transformer, capacitor bank, UPS, generator etc.
d) Cable trunks, recesses, raceways, conduits layout
e) ELV system drawings
f) Earthing scheme
g) Power supply points and capacity and rating
h) Lighting layouts for adequacy of illumination and required lux level

(IV) Preparation of area statements and phase wise development and implementation plan on milestone level

Key deliverables- All detailed structural, architectural, mechanical and electrical drawings and technical specifications, project plan on milestone level

Activity 2: Preparation of bill of quantities

The consultant shall prepare a detailed bill of material (with item wise quantity and rate) as per the above engineering brief and concept design. The BOQ prepared by the CMC must be vendor neutral.

Key Deliverable - Bill of quantities

Activity 3: Detailed Cost Estimation

The CMC will be required to prepare the cost estimate based on the engineering brief and concept design and seek approval of the same from the O/o DC, MSME. Cost estimate should be good enough to be used for budget authorization and must have suitable contingency for the program.

Key deliverables- Detailed cost estimates

Activity 4: Risk identification and mitigation

The consultant shall identify the key risks for each facility related to execution of the project. The CMC shall analyse each of the risks and will suggest mitigation plan for it.

Key deliverables: Report on risk identification and its mitigation

3.1.3.Track 3: Scope of Works

Activity 1: Prepare Scope of Works for Construction Works Contractor (CWC)/ Turnkey Construction Agency(TCA)

In order to appoint a CWC/TCA for setting up new Technology Centre and for upgrading the existing ones, the CMC will prepare scope of works based on the master plan.

Key deliverables: Scope of Works for CWC/TCA

Activity 2: Supporting technical documents for CWC/TCA

The ownership for the bid process management for the CWC/TCA will lie with the PMU. But the CMC will provide inputs to the O/o DC, MSME and PMU on the technical bidding documents for the appointment of the CWC/TCA(s) for the project. These include technical inputs for service level agreement, procurement and payment milestone, penalties, review mechanisms and other contract management clauses that will govern the deliverables of the CWC/TCA(s).

Key deliverables: Technical inputs for technical bid documents e.g. service level agreement, procurement plan, payment milestone, penalties, general and specific conditions contract, other clauses for contract etc.

Activity 3: Support in bid process management

While the bid process management for the CWC/TCA will be managed by the PMU, the CMC will support the PMU by providing technical inputs during the bid process management e.g. response to queries, evaluation of technical approach, work schedule etc.

Key deliverables: Technical inputs during the bid process management e.g. response to queries, evaluation of technical approach, work schedule etc.

3.1.4.Track 4: Joint review and comment on drawing and specification

After awarding the contract to CWC/TCA, if the CWC/TCA has any observation on the drawing/specification which was not covered in pre-bid meeting both CMC and CWC/TCA shall review it and shall provide their comments. This review shall not affect the original cost estimate.

Activity 1: Comment on Architectural, structural, mechanical and electrical design and specification

In order to clarify any observation on Architectural/structural/mechanical/electrical drawing and specification raised by CWC/TCA, comment shall be provided by CMC after reviewing the drawing and specification jointly. This activity shall comprise of the following

a) Joint review of drawing and specifications as per the Engineering Brief
b) Compliance of design to the statutory and local by laws.
c) Review alternative structural schemes prepared by the CWC/TCA(s) if any
d) General arrangement drawings for each facility.
e) Issue of "good for construction" structural drawings
f) Review and comment on coordination of services with the structure
g) Review routing of services, pipes and distribution network

Key deliverables- Jointly reviewed and agreed Architectural/structural/mechanical/electrical design and specification

Activity 2: Comment on HVAC design, Fire Alarm and Fire Fighting and Environmental Engineering & Design

Joint review shall comprise of the following

a) Review Piping & Instrumentation Diagram, and selection of technology for HVAC
b) Review sizing of equipment as Air Handling Units, Chiller, Indoor/ Outdoor units etc.
c) Review air flow and heat load calculations
d) Review ducting layouts, equipment positions and provisions
e) Review considerations for fresh air, humidity and quality of air as per applicable standards
f) Review P&I Diagrams for various systems
g) Review selection of technology with respect to the Engineering Brief and room specifications
h) Review sizing of equipment as Main hydrant/ sprinkler pump, jockey pump etc.
i) Review Fire Alarm System with reference to the Engineering brief and room specifications and in line with statutory requirements
j) Review and comment on fire water storage capacity, fire partitions, exits, etc. as per the applicable regulations
k) Review selection of technology with respect to the Engineering Brief and applicable regulations, local standards and amenities
l) Review sizing/ capacity of systems with respect to available data and the requirements provided in Engineering Brief

Key deliverables- Jointly reviewed and agreed HVAC design, Fire Alarm and Fire Fighting and Environmental Engineering & Design

Activity 3: Review of Office Interior work design, landscaping design and Building Management System Design

Joint Review of office interior work design, landscaping design and Building Management System Design shall comprise of the following

a) Review P&I Diagrams for various systems
b) Review selection of technology with respect to the Engineering Brief and applicable regulations, local standards and amenities
c) Review sizing/ capacity of system components like windows, door, floor etc. with respect to available data and the requirements provided in Engineering Brief
d) Review sizing/ capacity of system with respect to available data and the requirements provided in Engineering Brief

Key deliverables- Jointly reviewed and agreed Office Interior work design, landscaping design and Building Management System Design

3.1.5.Track 5: Monitoring and supervision

The CMC Consultant shall be responsible for monitoring/ supervising the construction works carried out by the CWC/TCA(s) and shall update the client with the status on a weekly basis. The following activities are expected:

Activity 1: Supervision of the construction works

a. Ensure day to day site supervision by deploying full time resident site engineer at each works location
b. Tracking the agreed time schedule and reporting planned v/s actual work completed
c. Ensure that the tests of construction works and materials like steel, concrete and surface finish etc. as per standard construction industry practice or relevant IS Codes, National Building Code and terms, conditions and specifications as per the contract; random sample checks and certain samples to be sent to accredited external testing labs. reviewing material test certificates submitted by the CWC/TCA(s)
d. Continuously check the quantities being executed and in case of any deviation due to site condition, change or modification, analyse the cost impact and bring it to the immediate notice of the client with recommended action plan
e. Ensure adequate mitigation measures are adopted for issues identified in the Environment Management Framework
f. Give notice to the CWC/TCA(s) and take necessary action on behalf of the client in case of any non-compliance if observed
g. Monitor EHS practises observed by the CWC/TCA(s) at construction site and bring any noncompliance to the notice of the client
h. Ensure that relevant and applicable Labour Standards, particularly with regard to Child Labour and the provision of Creche for working mothers/labours are applied at construction sites

Key deliverables- Project status report, certification of quality of works, and non-compliance report

Activity 2: MIS reporting

a. Develop an integrated construction schedule on MS Project (or similar widely accepted tool) with two week micro plans for activities covering all trades and monitor compliance. The plan must clearly articulate the critical path (CPM)
b. The CMC shall bring to prompt attention to the O/o DC, MSME any activity which is slipping from critical path (CPM or baseline)
c. The CMC shall conduct fortnightly reviews and recasting of schedules where necessary to make up for lost time
d. The CMC shall submit a monthly report on the progress made and hold apart from regular meetings with the CWC/TCA(s) where it shall brief the progress of the projects
e. The CMC shall use on-line secure report mechanism for each project to report progress, status update so that it can be viewed by all stakeholders including the Government, World Bank and other stakeholders

Key deliverables- Integrated construction schedule based on the critical path, critical path deviation report, fortnightly make up plan, monthly project progress and deviation report, uploading project status update report on online portal/mechanism

3.1.6.Track 6: Approvals and certificates

The CMC shall identify various approvals required and monitor compliance of the same by the CWC/TCA(s). The following approvals are envisaged and are indicative. The list of approvals would be site specific and the CMC would be required to ensure completeness in identifying the necessary approvals by engaging with local authorities, regulators etc. and then ensure that compliance is carried out by the CWC/TCA(s) in a timely manner.

- Plan Sanction – Town Planning Authority/ Local Body
- Commencement Certificate – Town Planning Authority/ Local Body
- Fire No Objection Certificate (NOC) – Provisional and Occupancy – Local Fire Authority
- Plinth Checking Certificate – Town Planning Authority/ Local Body
- Building Completion Certificate – Town Planning Authority/ Local Body
- Consent to Establish and Operate – Pollution Control Board
- MAP Approval and Factory License – Directorate of Industrial Health and Safety
- Labour License – Labour Commissioner
- Fuel Storage – Chief Controller of Explosives
- Tools, Tackles, Pressure Vessels, Hoists – Competent Engineer
- Electrical Systems – Electrical Inspector
- All other necessary approvals

The CMC shall prepare a schedule for submission of all necessary statutory approvals obtained by the CWC/TCA from the relevant authority. The CMC shall monitor the statutory approvals process by follow-ups with liaison and reporting the progress.

Key deliverables- schedule of statutory approvals, monthly report on approval status

3.1.7.Track 7: Certification of Bills

The CMC Consultant shall be responsible for reviewing and certifying the bills of work done submitted by the CWC/TCA(s). Following activities are expected

a. Checking and certifying of bills submitted by the CWC/TCA in accordance with the contract
b. Review and certify measurements as per applicable standards and the contract
c. Deduct/ hold appropriate amount from the bills in case of any non-compliance observed with respect to quality and safety, till such non-compliance is addressed by the CWC/TCA(s)
d. Review and approve rate analysis for any extra/ non-scheduled items executed by the CWC/TCA(s)
e. Review and comment any claims made by the CWC/TCA(s)
f. Assessment of cost over-runs / savings with every bill
g. Preparation of deviation statements (financial) at predetermined stages
h. Review and certify final bills of the CWC/TCA(s) to facilitate payment
i. Maintain accurate records of all dates and quantities of work carried out, all payments made to the Contractor(s), and all materials and equipment supplied to the site.

Key deliverables- certification of bills, certification of material/works with field measurement, list of all deduction/hold for non-compliance, time records of material/equipment supplied, works carried out and payment made to CWC/TCA.

3.1.8.Track 8: Completion certification and handing over

The CMC Consultant shall assess the completeness of works as per the contract and shall certify the completion, allowing the client to initiate occupying process into the premises. Following activities are expected under acceptance/ handing over

a. Visit the works completed as announced by the CWC/TCA(s) and generate list of snags and issue the same to the CWC/TCA(s) for action. The CMC shall monitor performance during defects liability period and enforcing rectification of defects
b. Document relevant material, work test reports, measurements, commissioning reports pertaining to each section of the work
c. Check for signage, markers for cables, trench covers, proper functioning of various systems
d. Review as built drawings submitted by the CWC/TCA(s)
e. Review the status of relevant statutory approvals
f. Certify the virtual completion and the final completion of works as applicable
g. Testing, commissioning and handing over the facility
h. Detailed inspection at completion of work and during defect liability period, Co-ordination with the contractors to rectify the defects during the defects liability period which shall be one year after the handing over of the site
i. Recommending release / forfeiture of securities / guarantees

Key deliverables- certification of completion of works as per contract, deviation report, list of all the approvals/test reports, material certificates necessary for handing over, reconciliation and Certification of Final bills of CWC/TCA, verification of all built drawings, project close-out report including learning, Detailed inspection and rectification report during defect liability period

4. Organization Requirements and Team composition for the CMC

4.1. Organizational Requirements

The organization must have proven track record (capability and experience) to deliver the objective of the TCSP program. Following are the minimum requirements from the consultants applying for the role of construction management consultant for the construction work

1. The Firm / Company must be a registered legal entity and should have been in existence for the last 10 years

2. The firm must have a minimum average annual turnover of INR 100 Crores over the last 3 years.

3. The Firm / Company should have rendered services pertaining to construction management & supervision for Civil, Electrical, HVAC, Interior & Mechanical works for Government / Semi Government/corporate client.

4. The firm should not have been blacklisted by any government entity or World Bank.

4.2. Key Team Composition

Following is the team structure required from CMC in order to deliver the project. This table is for guidance only. Participants are expected to present their own version of team structure and composition:

S.No.	Role
1.	Project Team Leader
2.	Architectural Engineer (with adequate knowledge of Green Building design and implementation)
3.	Structural Engineer
4.	Electrical and Mechanical Utility Expert
5.	Civil Construction Expert
6.	Quantity Surveyor & Estimator
7.	EHS Expert