ANNEXURE -I

Technical Quality Audit Parameters for Irrigation Canal and Drainage

PRE-IMPLEMENTATION STAGE

Sr. no.	Parameter	Benchmark	Reference	Indicator	Sub indicators	Max. marks	Marks Obtained	Weightage
1	Planning & Design	Technical Framework in comprehensive Planning	DPR	1.1) Demand & Resource assessment	1.1.1) Sector-Wise requirement for Irrigation, Industrial Development & seasonal variation.	5		**25 %**
					1.1.2) Available water sources & their lean period discharges	2		
					1.1.3) Discharge depletion studies	1		
					1.1.4) Flood impact assessment in Canal	3		
					1.1.5) Seepage assessment due to water logging	3		
					1.1.6) Assessment of water in existing canals/distributaries/minors/drains and their uses.	3		
					1.1.7) Assessment of existing infrastructure and its uses	2		
				1.2) Approval of STC or Competent Authority	1.2.1) Preliminary Survey	2		
					1.2.2) Land Availability, Identification of NOCs applicable for utilities	1		
					1.2.3) Preparation of Pre-Feasibility Report	2		
					1.2.4) Preparation of Rough Cost Estimate	2		
					1.2.5) Approval of Standing Technical Committee (STC) or Competent Authority	2		
				1.3) Cost Analysis, Administrative Approval, Budget planning and Timeline estimates	1.3.1) Financial implication with cost index up to implementation period and Administrative Approval	3		
					1.3.2) Identification of funding agency with annual budget allocation	2		
					1.3.3) Timeline for DPR approval	5		
				1.4) Survey & Initiate Process for Land	1.4.1) Topographic Survey	5		
					1.4.2) Land Acquisition, Forest clearance etc.	5		

				Acquisition and NOCs for utilities	1.4.3) Initiate the Process for NOC from Railways, Electricity Board, PHED, Roads and Panchayat	3		
				1.5) Selection of technology	1.5.1) Use of latest software for design and drawings	5		
				1.6) Optimum Design, and Selection of modern equipment and processes	1.6.1) Optimum design of canal, distributaries, minors, drains, and its appurtenant works/structures etc.	8		
					1.6.2) Use of modern mechanized / digital equipment such as: i) sensor paver, ii) automated gates, iii) Flow meters, iv) Laser land levelling equipment, v) Remote sensing and GIS, vi) Drip and Sprinkler irrigation, vii) soil moisture sensors, viii) automation and control system of gates, ix) weather stations	4		
					1.6.3) Provision for Horticulture Planning	2		
				1.7) Framing specifications and Technical Sanction of Estimate	1.7.1) Identification of material proposed to be used	5		
					1.7.2) Framing specifications for above materials	5		
					1.7.3) Technical Sanction of Detailed Estimate	2		
				1.8) Clearance of all requisite NOCs, Award of Work, and Project Management	1.8.1) NOCs obtained and clearance of all utilities	5		
					1.8.2) Award of Work and Contract Agreement	2		
					1.8.3) Project Management, Execution Plan, and fixing of timelines/milestones as per the contract agreement	2		
				1.89 Long term Planning	1.9.1) Future requirement projections such as land for remodeling	2		
				1.10) Reducing O&M cost	1.10.1) Provision of energy efficient machinery such BEE certified/star rating	3		
					1.10.2) Provision of solar energy	2		
					1.10.3) Provision of automation	2		
					TOTAL (PLANNING AND DESIGN)	**100**		**25 %**

IMPLEMENTATION STAGE

S.No.	Parameter	Benchmark	Reference	Indicator	Sub Indicators	Max. marks	Marks Obtained	Weightage
2	Execution, Inspection and testing	Technical Methodology for implementation and inspection & testing	Contract Agreement and test reports	2.1) Use of all construction materials	2.11) Selection of materials such as cement, aggregates, steel etc. from approved source and its testing	2		40%
					2.12) Use of batch mix plant and design mix	10		
				2.2) Procurement and Efficiency enhancement of Pumping machinery (Lift Irrigation)	2.21) Procurement of machinery from approved manufacturer	10		
					2.22) Carrying out tests for machinery at manufacture's premises before dispatch	4		
					2.23) Use of high efficiency pumps & motors specifically designed for site requirements	4		
					2.24) Life cycle cost analysis of pumping machinery	2		
				2.3) Use of modern facilities for construction	2.31) Use of advance machinery for Canal Lining.	5		
					2.32) Electric/automated operation of Pumping machinery and control gates, etc.	5		
					2.33) Use of laser land levelling equipment	2		
					2.34) Use of soil moisture sensors	2		
				2.4) Conformity to relevant standards for execution of work and ensuring safety and horticulture development	2.41) Work executed as per bid document	8		
					2.42) All Hydraulic Design Parameters ensured during the construction of canal and other structures as per approved design & drawings	5		
					2.43) Providing safety measures such as first aid & firefighting equipment, safety uniforms etc. during execution	1		
					2.4.4) Execution of Horticulture Development	2		
				2.5 Supervision by skilled manpower / Internal Vigilance Wing /TPIA	2.51) Adequate deployment of appropriately qualified personnel for supervision and conducting the inspections	1		
					2.52) Inspections conducted by Internal Vigilance Wing of the Department	1		
					2.53) Inspections conducted by Third Party Inspection Agency	2		

				2.6) Pre & Post Inspections of all materials, and Pumping Machinery	2.61) All laboratory testing of concrete and soil	10		
					2.62) Testing of machinery at manufacturer's premises	3		
					2.63) Ensure required frequency of tests during implementation	2		
				2.7) Setting up of testing laboratory at site	2.71) Setting up testing laboratories at site as per bidding document	5		
				2.8) Testing of Flow in Canal, and Pumping Machinery	2.81) Flow testing in Canal/distributaries/minors	2		
					2.82) Testing of pumping machinery to meet with the required discharge at required head	2		
					2.83) Availability of electric energy as per requirements	2		
				2.9) Rectification of Defects, and Documentation & Reporting	2.91) Preparation of site inspection and quality control registers	2		
					2.92) Checking of test results/defects/site and inspection registers by Engineer in Charge	2		
					2.93) Rectification of defects	2		
					2.94) Submission of reports and maintaining the records	2		
					TOTAL (EXECUTION, INSPECTION, TESTING)	**100**		**40 %**

COMMISSIONING AND HANDING OVER

S.No.		Benchmark	Reference	Indicators	Sub Indicator	Max. marks		Weightage
3	Commissioning and Handing over	Guidelines for commissioning and handing over	Completion report	3.1) Testing the functionality of Canal System and Pumping Machinery	3.11) System Cleaning	10		15%
					3.12) Testing of discharge under various conditions	20		
					3.13) Ensuring no leakage and minimum seepage	15		
					3.14) Ensuring required discharge at required head by pumping machinery	10		
					3.1.5) Adjustment of flow control systems	5		
					3.1.6) Handover the system to the concerned Operational Authorities	5		
				3.2) Submission of Assets management Plan and completion certificate	3.21) Submission of Assets management Plan and completion certificate	10		
				3.3) Guarantee of works in Defect Liability Period	3.31) Post commissioning Monitoring and support	10		
					3.32) Withholding security amount	5		
					3.3.3) Removal of Defects in Defect Liability Period	10		
					TOTAL (COMMISSIONING AND HANDOVER)	**100**		**15%**

SAFETY AND SECURITY

Sr. no.	Parameter	Benchmark	Reference	Indicator	Sub Indicator	Max. marks	Marks Obtained	Weightage
4	Safety and Security	Guidelines for Safety and Security	Bid Document	4.1) Adherence to safety standards	4.11) Providing of safety measures such as first aid & firefighting equipment, safety uniforms etc.	2		5%
					4.12) Monitoring and Surveillance	2		
				4.2) Safety measures for workers and users	4.21) Access control	1		
				4.3) Security measures to prevent unauthorized access	4.31) Physical Security measure	2		
					4.32) Emergency response and reporting specially in case of outbreak of canal	3		
TOTAL (SAFETY AND SECURITY)						**10**		**5%**

OPERATION AND MAINTENANCE

S.No.	Parameter	Benchmark	Reference document	Indicator	Sub Indicator	Max. marks	Marks Obtained	Weightage
5	Operation and maintenance	Procedure for effective maintenance	Assets management plan and manual on SOMP	5.1) Compliance to prescribed deliverable	5.11) Flow of Specified Design Discharge in canal/distributaries/minor up to tail end	20		100 %
					5.12) Ensuring operational parameters for pumping machinery and use of automation; and SCADA (wherever applicable)	10		
					5.13) Regular Cleaning of System	10		
					5.14) Maintenance of Horticultural Assets and Aesthetics	5		
				5.2) Effective running of Machinery /STP	5.21) Deployment of skilled staff for operation	5		
					5.22) Deployment of adequate number of staff for operation	5		
					5.23) Formation of WUA	5		
				5.3) Maintenance Process, and Emergency Response System	5.3.1) Maintenance schedule development and its compliance	5		
					5.3.2) Availability of spare parts/standby machinery if required	5		
					5.3.3) Emergency Response Planning	10		
					5.3.4) Penalties levied on electricity bills due to incorrect power factor, load, or related issues	10		
					5.3.5) Training and Capacity building	5		
					5.3.6) Grievance redressal and record-keeping	5		
					TOTAL (OPERATION AND MAINTENANCE)	**100**		**100 %**

Sr. No.	Parameter	Marking Criteria	Weightage (%)	
1	Design and Planning		25*	
2	Execution, Inspection and Testing		40*	
3	Commissioning and Handing over		15*	
4	Safety Measures		5*	
5	Project Management	Adherence to project timelines and Cost Projections	5	
6	Environmental Measures	Consideration of environmental factors like sustainability, eco-friendly construction practices	5	
7	User Feedback	Feedback from beneficiaries, stakeholders to assess their satisfaction levels	5	
		TOTAL	**100**	
1	**Operations and Maintenance**		100*****	
		TOTAL	**100**	

*The breakup of the weightage is given in the detailed framework for these parameters

* Parameters that are not applicable to a specific project will not be considered in the audit scoring. The weightage will be adjusted accordingly.