GOVERNMENT OF ASSAM
IRRIGATION DEPARTMENT::WORKS BRANCH
BLOCK-B, 2nd FLOOR, JANATA BHAWAN
DISPUR GUWAHATI-6

No.E-600987/75

To : Additional Chief Engineer
Inspection & Quality Control, Irrigation,
Assam, Chandmari, Guwahati-03

Subject: Approval and Circulation of the Quality Control Manual

Ref : Letter No:E-312166, dtd:Nil

Sir,

With reference to the letter cited above, I am directed to convey the approval on the Quality Control Manual as submitted vide your above referred letter. . You are requested to kindly upload the approved manual on the Departmental website and ensure its general circulation among all Departmental Engineers for strict adherence to the Standard Operating Procedures (SOP) outlined in the manual.

Enclo : As stated.

Yours faithfully,

Digitally signed by
GOPAL CHETRI
Date: 03-06-2025
16:42:20

Deputy Secretary(W) to the Govt of Assam,
Irrigation Department, Dispur, Guwahati-06

Memo No: 600987/75-A
Copy to:
1. The Secretary to the Govt of Assam, Irrigation Department, Dispur, Guwahati-06 for favour of his kind information.
2. The Chief Engineer, Irrigation Department, Assam, Chandmari, Guwahati-03 for favour of kind information .
3. All Addl CEs of Irrigation Department for kind information and necessary action.
4. All Superintending Engineers of Irrigation Department for kind information and necessary action.
5. All Ex Engineers of Irrigation Department for kind information and necessary action.
6. Web Information Officer,Office of Chief Engineer, Irrigation, Chandmari, Guwahti-03 for information and necessary uploading of the same.

e-signed

Deputy Secretary(W) to the Govt of Assam,
Irrigation Department, Dispur, Guwahati-06

GOVERNMENT OF ASSAM
OFFICE OF THE ADDITIONAL CHIEF ENGINEER
INSPECTION & QUALITY CONTROL, IRRIGATION, ASSAM
CHANDMARI, GUWAHATI-3

No. E 312166

To,

The Secretary to the Govt. of Assam,
Irrigation Department, Assam,
Dispur, Ghy-06.

Sub. : Re-Submission of Quality Control Manual.

Ref. : Govt. letter no. E-600987/41 dated 22/01/2025.

Sir,

In inviting a reference to the above, I have the honour to re-submit herewith the Quality Control Manual prepared by Inspection & Quality Control, Irrigation, Assam after rectification / inclusion of points as sought for vide letter under reference, for favour of your kind perusal and approval.

This is for favour of your kind information and further needful action.

Enclosed: i) Quality Control Manual (30 pages).

Yours faithfully,

Additional Chief Engineer,
Inspection & Quality Control, Irrigation,
Assam, Chandmari, Guwahati-3

Memo No. E-312166-A

Copy to:

1. The Chief Engineer, Irrigation Department, Assam, Chandmari, Guwahati-03 for favor of kind information and necessary action (Quality Control Manual enclosed).
2. The Deputy Secretary (W) to the Govt. of Assam, Irrigation Department, Dispur, Guwahati-06 for information and necessary action (Quality Control Manual enclosed).

Digitally Signed
Additional Chief Engineer,
Inspection & Quality Control, Irrigation,
Assam, Chandmari, Guwahati-3

2025

QUALITY CONTROL MANUAL
IRRIGATION DEPARTMENT

অসম চৰকাৰ

सत्यमेव जयते

GOVERNMENT OF ASSAM

PREFACE

Irrigation Department, Govt. of Assam is one of the main organisations taking part in the irrigation infrastructural development activities utilising the funds of the State Government as well as the Central Government–the plan fund. The plan Schemes are either centrally/state sponsored schemes. It is the agency that constructs, operate and maintain Minor Irrigation including Lift Irrigation, Major irrigation including major and medium projects, River Protection works.

There are there are 2 (two) Chief Engineers, 12 (twelve) Additional Chief Engineers 38 (Thirty Eight), Superintending Engineers, 115 (Hundred and Fifteen) Executive Engineers, 279 Asst. Executive Engineers, 554 (Five Hundred and Fifty Four) Assistant Engineers, 829 (Eight Hundred and Twenty Nine) Junior Engineer and supporting technical and ministerial staff in the department whom are mainly for the execution of new projects and their maintenance and a few for the investigation & planning, designing, hydraulic data collection, monitoring and quality control.

The execution staff is supposed to adhere to the provisions the relevant Indian Standard Specifications or the Assam PWD Manual, but very often they could not strictly adhere the exact provisions in all aspects of investigation, design, material procurement or execution, may be due to their work load and non-availability of the above specifications at the right place and time.

This manual is planned to orient the whole range of quality effort on a continuous basis covering quality assurance and quality control, broadly out lined below including steps initiated for its meticulous implementation. The Detailed Laboratory manual along with test format and frequency of test will be incorporated after the start of Central Laboratory.

Addl Chief Engineer, I&QC
Irrigation Department
Government of Assam

INDEX

1.0 QUALITYCONTROLANDASSURANCE

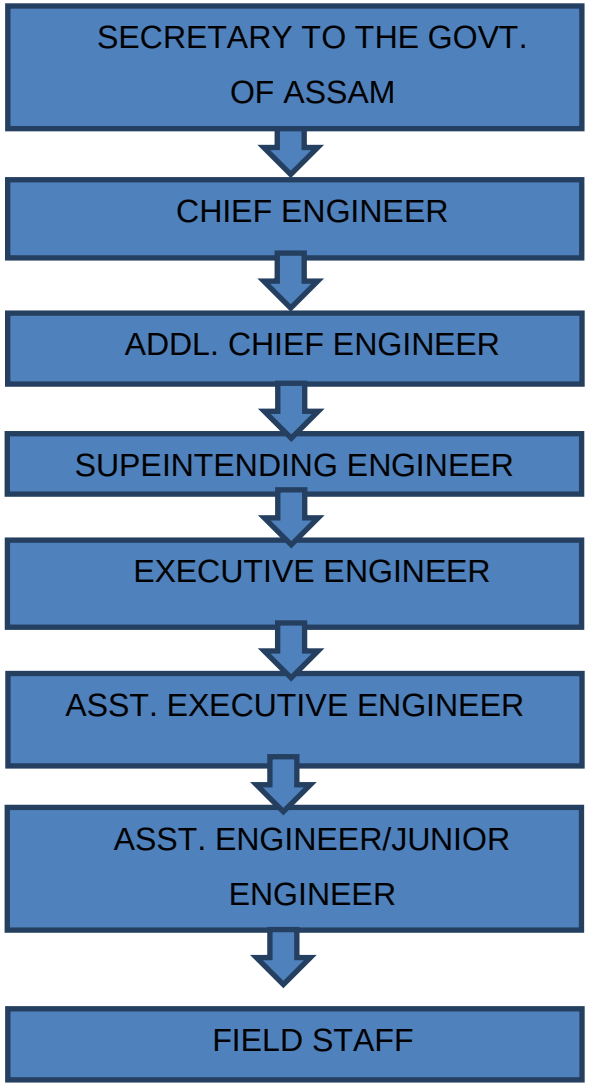
Irrigation Department, Assam is one of the main organizations taking part in the infrastructural development activities utilizing the funds of the State Government as well as the Central Government – the plan fund. The plan Schemes are either centrally/state sponsored. It is the agency that constructs, operate and maintain Minor Irrigation including Lift Irrigation, Major irrigation including major and medium projects, River Protection works. Presently, there are 2 (two) Chief Engineers, 12 (twelve) Additional Chief Engineers 38 (Thirty Eight), Superintending Engineers, 115 (Hundred and Fifteen) Executive Engineers, 279 Asst. Executive Engineers, 554 (Five Hundred and Fifty Four) Assistant Engineers, 829 (Eight Hundred and Twenty Nine) Junior Engineer and supporting technical and ministerial staff in the department whom are mainly for the execution of new projects and their maintenance and a few for the investigation & planning, designing, hydraulic data collection, monitoring and quality control. Projects to the tune of about 500.00 Cores are under taken every year under this department. Though Assistance is being rendered by the Central/state Government to take up new projects, the maintenance are to be done by the state fund only. Due to the lack of sufficient fund, maintenance is not carried out in time and hence the anticipated benefits are not achieved for the years considered for the projects and sometimes most of the components or the project as a whole is to be abandoned prematurely. Producing quality structures, which will, not only survive with the strength characteristics, but also durable till the anticipated life time is the remedy of the above situation and a strict quality control is the only way

Presently there are 69 (Sixty Nine) Divisions, 138 (One hundred and Thirty Eight) Subdivisions with supporting staff spread over Assam under the control of the Superintending Engineer.

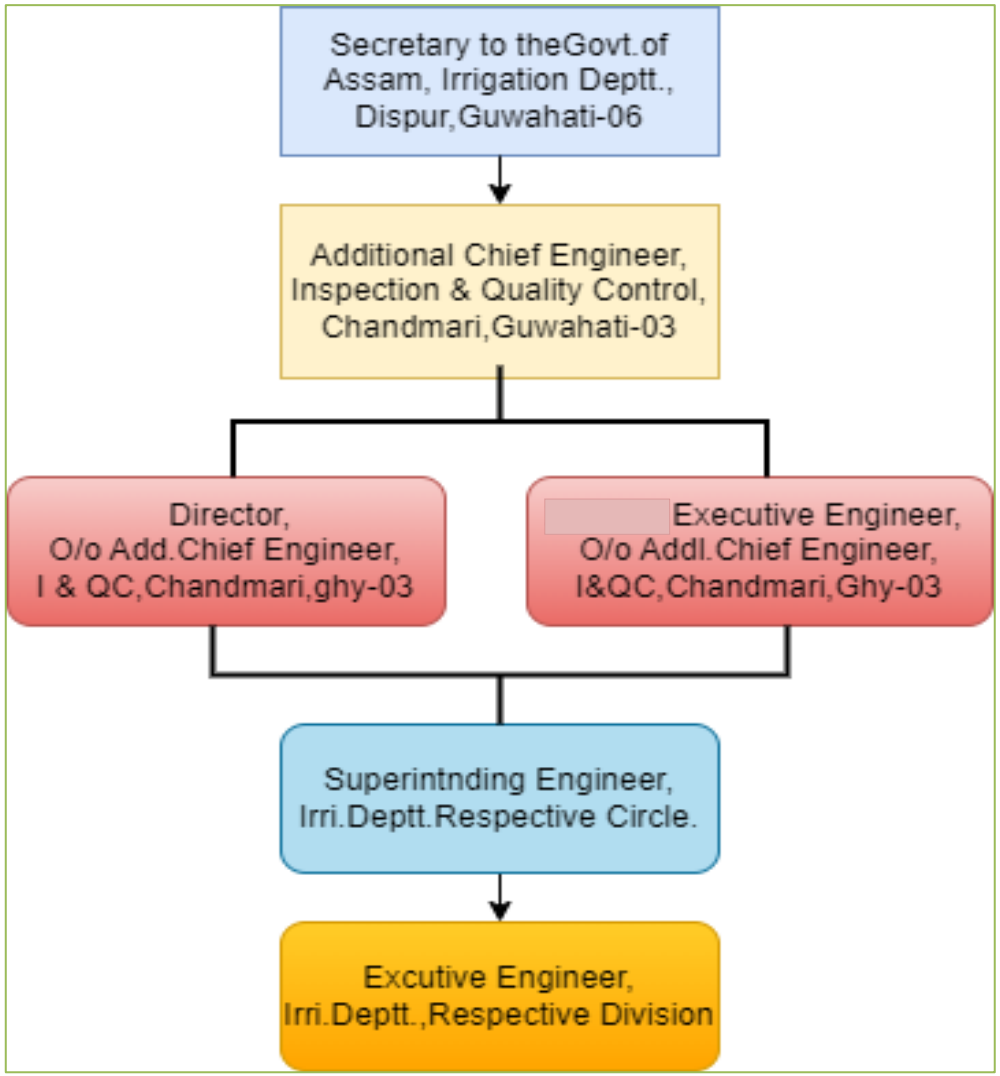
This Quality Control Manual specifying the duties and responsibilities of officers, Methodology of inspection and testing and implementation of quality assurance programme. This manual is planned to orient the whole range of quality effort on a continuous basis covering quality assurance and quality control, broadly out lined below including steps initiated for its meticulous implementation

2.0 ORGANIZATIONALSET-UP OF IRRIGATION DEPARTMENT

1. Organizational Set-up of the Department



2. Organizational Set-up of the Quality Control Wing



3.0 FUNCTIONS OF QUALITY CONTROL WING

The main function of Quality Control wing is to have independent inspection checking and control of quality works. Since the works in different regions are of scattered nature, the Quality Control Wing cannot exercise concurrent quality control, but it is to be planned that these units should act in such a manner that necessary quality control requirements are fulfilled jointly with the execution staff. It will be the responsibility of quality control staff to ensure that all-requisite test as per IS/relevant standards and specifications are carried out in the laboratories. The quality control units will carry out periodic inspections of works and conduct field tests so that any deficiencies in the execution of works are properly brought to the notice of concerned authorities and execution staff for taking corrective measures. The following broad indications of functions of quality control units are given which may be supplemented by issue of any further instructions by the Additional Chief Engineer, Quality Control Circle, Chandmari, Guwahati from time to time

I. They should monitor that all required tests are carried out before start of work as well as during execution.

II. They should ensure that all arrangements for carrying out routine field tests in the field laboratories and site laboratories are duly made including provisions and up-keeping of equipment's, personnel etc. and record of these field tests in prescribed formats are maintained. They should check this record and also sign in the relevant registers in token of their inspection

III. Inspection book should be maintained at site wherein remarks should be recorded by quality control staff whenever they visit site which should be noted for compliance by the execution unit. They should specifically record any deficiency noted to bring the same to the notice of appropriate authority through remarks in the inspection book or inspection note. The execution staff shall ensure the compliance of such deficiency and intimate to the concerned officer of Quality Control Wing.

IV. Provision of trainings to construction team and quality control staff to ensure that they are upto date with latest construction practices and techniques and quality standards

V. The test during start of work and execution should ensure the quality of work and shall include:

a. Observation of moisture contents of earth work in filling reaches.
b. Fineness modulus of sand, grading of sand and coarse aggregate.
c. Water Cement ratio for concrete at site level
d. Checking of lining work/masonry work/concrete work.
e. Depth of Bore hole and water level maintainace of litholog
f. Maintaining initial level and final levels of all structures.
g. Any other requisite test as per case.

3.1 DUTIES AND RESPONSIBILITIES OF QUALITY CONTROL STAFF (CENTRAL & DISTRICT LEVEL)

CONSTRUCTION TEAM	QUALITY CONTROL TEAM
1. Shall take the initial levels of all the structures and prepare the initial level register	1. Shall check the initial level of taken by the construction team and certify the initial level register submitted by the construction team
2. Shall see that the Layout of the scheme to be properly given, shuttering ,centering ,reinforcement are done as per drawing and technical specifications, to record the Pre levels/foundation levels, and to see that mark-out for canal excavation is perfectly given as per drawings. Pre-levels, classification levels and final levels of canal shall be taken as per	2. Shall check the layout plan of the scheme and centering/ shuttering reinforcement arrangement and inform the Executive Engineer in charge of construction to rectify the defects if any.

specification.	
3. Shall see that the construction equipment like mixers, vibrators, compaction equipment, pumping arrangements for dewatering curing/ watering are arranged before starting of any work.	3. Shall check the adequacy of the construction equipment and curing/ watering arrangements before start of work and during execution
4. Shall see that sufficient quantities of input materials as per agreement specifications are made available at site of work and to arrange testing equipment, men and material required for conducting field tests, sending samples of input materials for testing to central lab, field Laboratories as per norms.	4. Shall conduct/ get conducted by different laboratories the field tests on input materials and record the results and to inform the Executive Engineer in charge of construction to rectify the defects if any
5. Shall ensure proper vibration, rolling etc., during course of day to day work. Shall conduct test of earthwork, gradation of materiel, slump test, core drill test and to extract field samples of material and finished products to be sent to different laboratories also provide men and material required for extracting samples of finished product for quality control staff	5. Shall ensure slump test, core tests, proctor density etc., conducted as per norms by the construction and quality control staff and to extract field samples of finished product to be sent to laboratory later
6. Shall maintain(1) mark-out register(2) OK Card files (3) Any other Register	6. Shall maintain registers of field tests conducted

7. Shall get all ingredients of concrete, masonry got tested be before use. Shall see that the soils are tested for various properties like OMC ,MDD ,etc .,in Embankment work	7. Shall remind and verify when the test results are available before starting up of any new work and during execution of Work
8. Shall order the suspension of work if any defects are noticed or reported by quality control staff and resume the work only after rectification of defects in the presence of quality control staff.	8. Shall order the stopping of work if major defects are noticed or reported by quality control staff. Also defects noted during construction are to be reported to the Additional Chief Engineer Quality Control
9. Shall personally see that the samples to the laboratories are sent regularly, obtain the result.	9. Shall pursue and keep track of sending of samples various laboratories and to keep record of results received

District Level Quality Control Cell:-District Level Quality Control Cell should also regularly inspect and monitor the Quality of works as well as the progress of work during the time of execution of the scheme.

4.0 LABORATORIES

Laboratories are to be established as Central Level, District Level and at site. Central Laboratories shall be equipped with major tests while District Laboratories shall have equipment for minor tests. Mobile laboratories are also established to conduct minor tests of small works. The Central Laboratories shall be under the control of the Additional Chief Engineer, Quality Control, Chandmari. The District Laboratories shall be under the control of the Superintending Engineer and the Site/ Mobile Laboratories shall be under the control of the Executive Engineers. However presently there is no District/Central lab provisions hence the Executive Engineer in charge of executing the work are directed to conduct requisite test in the laboratory of nearby technical institute preferably Polytechnic or Engineering College and obtain test reports from the concerned authority

The cost of consumables and other incidental charges for testing shall be charged to the respective works which shall be paid to the quality control wing by the payment authority of the concerned work which shall be recovered from the bill of the contractor as the contractor is bound to bear the testing charges as per agreement conditions.

Any test that cannot be carried out in the above mentioned laboratories shall be carried out an any of the approved laboratories by the Quality Control wing and the charges towards such tests shall be collected from the payment authority of that work, which shall finally be recovered from the contractor.

In addition to evaluate and monitor the inputs and outputs utilising the laboratories, the Quality Control Wing shall also evaluate and monitor the workmanship as well as construction plant, machinery and equipment accompanied by testing as well as inspection.

General functions of laboratories

1. Site/ Field/ Mobile/ Laboratories

To carryout daily routine tests of soils, filter material, ingredients of concrete and mortar for the on-going works and material supplied at site before use. Results will be recorded by the supervisor in charge of execution in registers kept at site for inspection purposes and will be reported to the Executive Engineer, Execution and Additional Chief Engineer Q.C. in the prescribed Performa pertaining to the following. Superintending Engineer shall conduct surprise inspection at least once in a month or at least once in the case of small works and verify the records and conduct test for materials at site, work in progress and the completed portion of the work as he desires to suit to be fit for the circumstance, compile with the records and report the details with specific remarks to the Additional Chief Engineer.

Soils & earth work

- Moisture content (Field), thickness and Consolidation layer wise, Water Absorption Test, Liquid Limit and Plasticity Index (Atterberg limits),OMC & MDD Test, Compressive Strength Test,

Sand

- Gradation analysis & Fineness Modulus.
- Bulkage

Coarse aggregate

- Gradation analysis.

Physical properties

Central Laboratory

To conduct laboratory tests on samples of sand, coarse aggregate, stone, cement and steel for use in masonry and concrete works.

II. To conduct laboratory tests for foundation soil, and for selection of soils from proposed borrow areas, for use in the various zones of embankment as per specifications, proctor density & optimum moisture content of soils before start of earth work.

III. For masonry and concrete, the strength of mortar and concrete has to be as specified in agreement. If requested by the Executive Engineer, Construction, Central Laboratory has to design the proportions of different ingredients through tests for the specified strength. The proportioning shall be done by weight. It should be co-related with volume for volumetric

batching of concrete where quantity of concrete to be placed is of small magnitude. Volume batching may be allowed by the Engineer-in-charge where weight batching is not practical and provided accurate bulk densities of materials to be actually used in concrete have been established. Allowance for bulking shall be made in accordance with IS 2386 (Part 3). The mass volume relationship shall be checked at periodical frequency to ensure that specified grading is maintained.

IV. For concrete and mortars where strength is not given and only proportions have been specified, the strength should be treated as standard for execution.

V. When controlled concrete is specified, it essential that mix designs to be as per specification of relevant IS

VI. Since the strength of cement varies from batch to batch in a cement factory itself, it is essential that a relation between strength of cement versus strength of concrete may be worked out in the lab, well in advance of the starting of the work. This would facilitate in furnishing the proper proportion of the mix for adopting in the field and also it entails adding or reducing cement content based on the strength of the cement.

Results of tests performed in Central laboratory should be documented in prescribedPerformapertainingto followingtests.

Soils:

- Disturbed grain size analysis I.S.2720 part (IV) 1965.
- Proctors compaction I.S. 2720(Part VII & VIII) 1965.
- Atterberg's limit I.S.2720 (Part V) 1970.
- PermeabilityI.S.2720(XVII).1966
- Shear test I.S.2720 (Part XIII) 1972.
- Specific gravity I.S.2720 (Part III) 1964.

- Undisturbed density and natural moisture content, permeability, consolidation, shear test (drained/undrained) at OMC or saturation.
- Dispersibility of soils.
- Total Soluble salts.
- Chemical test for carbonates & sulphates (Chlorides Gypsum test).

Sand:

- For I.S.383(1970)GradingI.S.2386(PartI)FinenessModulusBulkageI.S.(PartIV)Organicand silt content.
- Deleterious material and mica content, and presence of organic impurities, if any.

Cohesive-Non-Swelling Soils

- Requirement should broadly conform toI.S.9451-1994

Cement:

- Fineness, Consistency, specific gravity, compressive strength, setting time,
Soundness by Le-Chetlier test.

Coarse aggregate:

- GradingI.S.2386(Part I)

- Soundness, crushing value, impact test.
- Abrasion, Absorption, I.S.(III)Specific gravity I.S.(PartIII).Flakiness.

Boulders:

- Soundness, weight and size, absorption, specific gravity, weathering conditions (visual) abrasion after breaking to proper sizes.

Filter materials:

- Grading, uniformity co-efficient, weathering conditions (visual) and tests for fine and coarse aggregate fulfillment of filter criteria as per relevant IS. Code.

Water:

- P.H. Value, silt content, soluble salts and any other impurities.

Concrete:

- Air Content, Mix Proportions; Test on admixture(if used);Test on Super-plasticizer (if used)

Hardened concrete and mortars:

- Proportion by chemical analysis and compressive strength.

Bricks:

Dimensions and physical properties including water absorption and compressive strength.

Test Provisions for Basic materials and Finished Works

Sl No	Material	Test To Be Performed	Method	Frequency
1	Cement	Compressive Strength	IS 4031-1985	For Every New Batch, as per recommended IS Specification
		Fineness		
		Soundness		
2	Fine Aggregate	Sieve Analysis & Fineness Modulus	IS: 383, IS 2386 (Part I & IV) IS 2386 (Part II) IS 2386 (Part III) IS 2386 (Part III) IS 2386 (Part III)	For Every New Batch, as per recommended IS Specification
		Test for organic impurities silt & clay		
3.	Coarse Aggregates	Sieve Analysis	IS: 2386-1963 PART - I PART - II PART - III	For Every New Batch, as per recommended IS Specification
		Flakiness index		
		Elongation Index		

		Deleterious materials		
		Specific gravity		
		Bulk Density		
		Moisture content		
		Absorption value		
4.	Embankment	Proctors compaction	IS 2720 Part (vii & viii) 1965	For every 150 mm layer
		Atterbergs Limits	IS 2720 Part (v) 1970	as per recommended IS Specification
		Permeability	IS ; 2720 Part (xvii) 1966	as per recommended IS Specification
		Shear Test	IS : 2720 Part (xiii)1972	as per recommended IS Specification
		Specific gravity	IS : 2720 part (iii) 1964	as per recommended IS Specification
5.	Fresh Concrete	Workability test Slump Test Compaction Factor test	IS: 516-1959	For every new Batch Mix.
6.	Hardened Concrete	Compressive strength	IS 456:200	As per recommended IS Specification

5.0 QUALITY ASSURANCE AND INTERNAL QUALITY AUDITQUALITYASSURANCE:

All planned and systematic strategies and actions necessary to generate adequate confidence that Input and Output product will satisfy given requirements of quality and all the components of works perform satisfactory during life period of service, adequate quality checks as analyze during construction is a record of "Quality Assurance". It comprises planning and policies, education and training standards and specifications, contracts and agreements, and quality control. Quality assurance is to assume that the materials as per standard and as per the requirements have gone into the production of concrete, earth, masonry work etc. This is achieved by evaluating the quality checks during construction and post construction tests made and compared.

QUALITYAUDIT:

It is systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve the objectives. It is considered to been effective management tool to promote good quality construction and workmanship.

It will be expedient and useful to present the requisite of Quality Assurance to the Quality Audit team in as concise format as possible.

Internal Quality Audit shall be conducted periodically, preferably once a year at least, to assess whether the construction procedures, Quality Control procedures, and Quality assurance. Aspects including workmanship are being implemented properly during the execution of works.

Additional Chief Engineer, QC shall constitute the audit team for undertaking the internal quality audit of selective works .The team shall, preferably be headed by the Additional Chief Engineer ,QC
Other members could be an Engineer having good academic qualification and experience in the construction field from any of the institutions other than the Irrigation Department and one nominee of Additional Chief Engineer.

Broadly, the Internal Quality Audit team shall focus:-

i) Visual Inspection of works completed and/or under progress; perusal of photographic record, if any.

ii) Perusal of Quality Control & Quality Assurance (Q.C./Q.A.) documentation; and all test records including O.K. Cards and registers.

iii) Inspection of Testing Laboratories, adequacy of testing facilities, and reliability thereof and general competence of laboratory staff;

iv) Contractor's work force and construction equipment deployed at works and assessing the adequacy thereof in respect of the quality related aspects; whether the contractor is deploying the key/critical equipments,as listed in contract document

v) Whether any corrective actions are being implemented in the shortest possible time period.

The Internal Quality Audit would culminate in a comprehensive report for Additional Chief Engineer, QC, which shall bear the date of audit and the signature of audit team. The Report should contain an abstract of findings, observations, including opinions and recommendations. It should be duly substantiated by the supporting documents and explanations. Major findings if noticed in the report are to be brought to the notice of the Government with his recommendation by the Additional Chief Engineer,QC

5.0 RFI/O.K.CARDS

General

Since O.K. Cards contain important entries/information on execution of works at all stages and are liable to be referred/peruse data later stage also, particularly during the Internal Quality Audit of works, the O.K. Cards shall be maintained in duplicate in two colors. The green coloured card shall form a part of the record of Q.C. /Q.A. Wing and the red coloured card remains in the custody of construction wing. The O.K. Cards, relating to any particular work, shall be put in a tin box and placed right at the construction site. The exterior of the tin box shall be painted red. Senior officers shall also check the O.K. Cards during their field inspections to ensure that those are being maintained and properly/genuinely filled.

An O.K. Card is a condensed form of specifications and essential requirements for achieving specified workmanship and quality level of output. Each work is sub-divided into various construction activities in proper sequence / order of construction. Such activities are listed in chronological order on the O.K. Cards

For various stages of construction activities where laboratory tests or checks with reference to drawing and specification are required from quality control unit, O.K. Cards System shall be followed. The O.K. Cards should be made available on the site in regular manner. Approval of the component of work in progress the times of inspection should be recorded by the inspecting officer.

The O.K. Card consists of two parts for each work. Part first covers the initial preparedness for the work and indicates pre-requisites whereas the second part covers the daily performance of activities based on pre-requisites and also giving permission to perform the job by the construction as well as Quality Control staff. Besides the location and type of work, the first column of

O.K. Card is to be filled by the construction agency (contractor) by preparing each feature and making it ready for inspection by the project construction engineer who Okay through his signatures and then puts up to the Q.C./Q.A. engineer for his final O.K. If Q.C./Q.A .engineer is not available at site then O.K. given by construction engineer will be treated as final ,if anything otherwise is not observed. Should anything otherwise be found, the O.K. card shall not be signed by him and ask the construction engineer/agency for necessary rectification.

It must be borne in mind that work cannot be held up unduly for disposal of OK Card. The Assistant Engineer (Quality Control)/Construction will be okaying authority for concentrated work like dam, spillway, header regulator etc. and Assistant Engineer/Overseeing charge of construction will be okaying authority for scattered works like canals and small structures. Random checks by supervising officers should be recorded on OK Cards at site. Fortnightly report of OK Cards maintained by construction unit should be submitted to E.E/Q.C. of the area who has to monitor and ensure that adequate check is being maintained by field staff. Confirmation regarding rectification of defects be obtained from E.E/Q.C. before making payment once in three bills and final bill of the contractor by the payment authority.

After processing through various levels and entering observations and rectification, OK Card will be closed at the time of taking measurements for releasing payments to the contractor. Photocopy of the OK Cards will be kept at site and original copy will be attached with the bill and will be kept on record by the division/Subdivision office while making payments to the contractor. Photo copy of OK Card of Quality Control will also be enclosed with the bill & kept on record with the bill by the division/subdivision office. However OK Card of quality control will not be closed till the work is finalized and will be kept on record by the Executive Engineer Quality Control after the rectification is completed by the construction wing and final comments are recorded by both the Assistant Engineer.

Specimen of OK Cards for various works such as embankment, concrete, masonry etc. has been enclosed below.

Name of Work										
Agency					Contract No.					
Location					Date					
Date	Description of Activities &location	Weather Pre-Requisites of Sub-grade preparation done.	Satisfactory Quality &Quantity of material Stacked at site	Signature of Contractor/ Engineer	Whether slump checked & cubes casted	Whethr concrete vibrated	Whether specified contraction joints provided	Dated Signature of construction staff		Remarks & dated signature of QC Engineer
								Overseer	AE/JE	

Check list for Quality Control (Civil Part)

For DTWS

Name of the Scheme / Point:

1. The Reduced Level Register has been maintained with proper Bench Mark
2. The litholog with assembly diagram duly signed by site in charge, AEE, EE and verify the items like pipes, strainer etc for proper specifications conformity with M.B. as per work order
3. The cross-section and Long-section of the canal should be checked, and proper gradient should be maintained as per specification and drawing.
4. If there is no lifting mechanism, the FSL of canal should be above the field level with proper gradient so as to supply water till the tail point of canal.
5. All relevant test reports should be available for the scheme.
6. The distributary pipes should conform to the ISI specification with specified pressure and also as per the approved drawing and design.
7. The depth of the tube Well should conform todesign and drawing and as per the site condition.
8. There should be at least three number of soil sample stored for the different layers found during the boring operation.

For LIS

1. The Reduced Level Register for different structures conforming to design RL has to be maintained with proper Bench Mark
2. The discharge register for at least last one year of the river has to be maintained to verify the design lean period discharge.
3. The cross-section and Long-section of the canal should be checked, and proper gradient should be maintained as per specification and drawing.
4. If there is no lifting mechanism within the various chaninage of canal, the FSL of canal should be above the field level with proper gradient so as to supply water till the tail point of canal.
5. All relevant test reports should be available for the scheme.

6. The distributary pipes should conform to the ISI specification and also as per the approved drawing and design.
7. Proper River Protection work should be done conforming the drawings and design.
8. To conduct detailed survey to access topography, soil type and adequate water source.
9. To validate hydraulic model for flow rates, pressure and distribution efficiency as per design.
10. Verification of pump level for lift irrigation scheme should be checked.
11. Verification of canal design , ancillary structures and command areas as per site conditions.
12. If any major changes occur the same shall be forwarded to higher authority with proper suggestion for approval.

For FIS

a) Before Execution:

1. The Reduced Level Register for different structures has to be maintained with proper Bench Mark for giving the initial levels of the headwork, appurtenant works , canals and various protection works both U/S and D/S of the river
2. The discharge register for at least last one year of the river has to be maintained to verify the design lean period discharge.
3. The R.L of cross-section, Long-section of the River and the contour map of the command area should be checked and records need to be maintained before ascertaining the site location of the scheme.
4. H.F.L of the River needs to be verified and ascertained in consultation with the Water Resource Department/ Central Water Commission with proper records and documentation.
5. All relevant soil test reports needs to be available for the scheme which should conform with the design and specification provided for the scheme.
6. To conduct detailed survey to access topography, soil type and adequate water source.
7. To validate hydraulic model for flow rates, pressure and distribution efficiency as per design.
8. Verification of canal design , ancillary structures and command areas as per site conditions.
9. If any major changes occur the same shall be forwarded to higher authority with proper suggestion for approval.

b) During Execution

1. The sheet piles level/cut-off walls should be upto its specification and position in the FIS as per drawing and specification
2. The Initial Level register of all structures should be maintained and kept at the scheme for verification.
3. Proper TBM should be installed at various points.
4. All The earthen embankments constructed such as afflux bund, protection work and guide bund, the soil used should be as per specification and compaction should done in layers as per drawing and specification.
5. Pour card should be maintained and, proper check for reinforcement as per design and specification by site in charge, AEE or EE should be done before the start of concreting works.
6. The specification and sizes of protection work , pitching work and inverted filters needs to be checked for compliance as per specification and drawing
7. Curing for specified days as per IS recommendation is mandatory for all finished concrete works
8. If there is no lifting mechanism, the FSL of canal should be above the field level with proper gradient so as to supply water till the tail point of canal.
9. Slump test should be done before mass concreting works and proper records duly signed by site in charge, AEE or EE should be kept at site which should conform with the design and specification provided for the scheme
10. All relevant Concrete and brick test reports needs to be available for the scheme which should conform with the design and specification provided for the scheme
11. Canal linings for cracks, gaps, or uneven surface should be checked.

Check list for Quality Control (Electrical Part) (Point wise)

(For each point separately)

Name of the Scheme / Point:

No. of Pump set with capacity : Connected Load :

Date of visit :

1. Geo-Coordinates of 11 KV Tapping Point :
2. Geo Co-ordinates of last HT pole/Transformer Sub-station :
3. Geo Co-ordinates of Control Room/Pump House :
4. Total length of HT line :
5. Total length of LT line :
6. Types of Pole (Steel/PSC) :
7. Size of Pole
8. Foundation of Pole (Hard soil/CC Foundation) :
9. No. of Poles (i) HT :

   (ii) LT :

10. Nos. and Type of Channel Cross Arm / Angle Cross Arm :

T Cross Arm :

11. Nos. of Stay set :
12. No of Cross Bracing Sets :
13. Transformer Capacity in KVA :

    Star Rating :

Whether Test Certificate available :
Whether Warranty Card available :
Whether Charging Report available :

14. No & Rating of Gang operated Switch in Transformer Sub-station:
15. No & Rating of Gang operated Switch in Tapping Points :
16. Rating of D.O. fuse :
17. No of Lightning Arrestor :
18. No of Pipe Earthing
a) Nos. of Earthing at Transformer Sub-station :
b) Nos. of Earthing at Panel Board :
19. Brand and sizes of cable with length :
20. Laying of cables with length
a) Laying in air/Open trench :
b) Underground (with or without brick protection) :
21. Sl. No of Energy Meter / HT Meter :
22. Whether Transformer Fencing Provided : Yes/No :
23. Nos. of Electric Resistance Rubber Chequrred sheet :

24. Parameters on Running Conditions,
i) Voltage :
ii) Current : iii) Power factor :
25. Whether Proper Electric connections with lug done :
26. Any Loose connection found (Yes/No) :
27. Power Factor meter Provided: Yes/No :
28. Nos. of Danger Plate
i) in Poles (Yes/No) :
ii) In Transformer Sub-station (Yes/No) :
iii) In Panel Board/Control Room (Yes/No) :
29. Whether Capacitor installed in Control room (Yes/No) :
Rating of capacitor, if yes :
30. Whether Main Panel Board mounted/ fitted tightly on the ground/Wall (Yes/No):

31. Whether Sub Panel Board (if) mounted tightly on the ground/wall/barge(Yes/No) :
32. If Road / River Crossing, Guardings provided (Yes / No) :
33. Channels, T Cross Arm etc. Painted (Yes / No) :
34. Test Result (i) Insulation Test between conductor and earth :
    (ii) Insulation test between conductors :
    (iii) Polarity to SP switches :
    (iv) Earth resistance value at consumer's earth :
35. Brand & specification i) Voltmeter
    ii) Ammeter
    iii) SDF
    iv) MCCB:
    v) HRC Main switch
    vi).....
36. Details of any other (if)……
37. Remarks of the Inspecting Officer :

Signature of visiting Officer :
Name & Designation :
Name of Office

Check list for Quality Control (Mechanical Part) (Point wise)

A) For DTWS:-

1) Check the brand/ specification/ ISI standard mark etc of all items like pump sets, pipe and accessories, starter surge tank, solar panel and controller in case of solar panel of solar operated scheme as per T.S estimate / work order/drawing.

2) Measure the length thickness/diameter of pipes/ Bend/short pipes, etc. as per T.S estimate/ work order/ drawings.

3) Verify all the warranty/ guarantee/ test certificate/purchase invoice and other related documents supplied by the manufacturing company including pump-set/starter, solar panels etc. including all the mechanical and electrical components with estimate/ work order which needs to be duly monitored by the Divisional level quality control cell and to the documents be kept by the concerned Division for future reference. Characteristic curves of pump-set must be enclosed.

4) Check the ISI marks/ specification of various valves –sluice valve/ gate valve, non return valve/ reflux valve, foot valve and there quantities as per work order/ estimates

5) Check the discharge of pump during (commissioning) operation, whether it is as per estimate or not.
6) In case of new DTW check the litholog with assembly diagram duly signed by site in charge, AEE, EE and verify the items like pipes, strainer etc for proper specifications conformity with M.B. as per work order.

7) Depth of the Tube well casing should be measured physically or by depth meter and tally the same with M.B. etc.

Points to be taken care during execution:-

1) The sample soil strata at each 3.00m interval depth of the tube well during the boring works need to inspected by the district level Inspection and Quality Control cell for proper laying of the filter pipes and strainer as per soil strata/specified aquifer is to be checked.

2) Proper shrouding of the tube well with pea gravel of size 4mm-8mm size free from sand/dust and any other foreign materials after lowering of the specified pipes and strainer need to be ensured by the district level Inspection and Quality Control cell.

B)For LIS:-

1) Check the ISI marks/ specification of various valves –sluice valve/ gate valve, non return valve/ reflux valve, foot valve and there quantities as per work order/ estimates.

2) Verify all the warranty/ guarantee/ test certificate/purchase invoice and other related documents supplied by the manufacturing company including pump-set/starter, solar panels etc. including all the mechanical and electrical components with estimate/ work order which needs to be duly monitored by the Divisional level quality control cell and to the documents be kept by the concerned Division for future reference. Characterastic curves of pump-set must be enclosed.
3) Measure the size of barge, thickness of plates used in barge and other items as per T.S estimate/work order/ drawings
4) Measure the length thickness/diameter of pipes/ Bend/short pipes, anchor chain etc. as per T.S estimate/ work order/ drawings
5) Check the discharge of pump during (commissioning) operation, whether it is as per estimate or not.

C)For the Innovative scheme ‘’Solar powered Mobile Lift Irrigation Scheme”:-

For this type of scheme guidelines to be strictly followed as instructed by the Chief Engineer(MI), Irrigation Dept. & Chief Engineer Irrigation Dept. vide their letter no **i)ACE/O&M-MI/26/EII/2023-24/59, Dtd-24.06.2024 & ii) ACE/O&M-MI/26/EII/2023-24/68, Dtd-10.09.2024** respectively**.**

D)For FIS:-

1) Check the size of shutter of cross regulator gates/head regulator gates, thickness of plates, spacing and size of horizontal guarder and vertical stiffener, as per T.S. estimate/ work order / drawing.

2) Check the size of screw shaft, steel wire rope, counter weight etc. as per T.S. estimate/ work order / drawing.

3) Check the size of platform assembly, roof structure as per T.S. estimate/ work order / drawing.

E)Specifications of Electric Motor Driven Submersible Pump-Set:-

1)3 HP/ 2900 RPM and assembly of KSB/ KK/ CALAMA/ LUBI make as approved by Deptt. suitable for discharge capacity of **0.0067 cumec** at 20 Mtr head conforming to IS : 8034–2002

2)7.5 HP/ 2900 RPM and assembly of KSB/ KK/ CALAMA/ LUBI make as approved by Deptt. suitable for discharge capacity of **0.0212 cumec** at 20 Mtr head conforming to IS : 8034–2002

3)10 HP/ 2900 RPM and assembly of KSB/ KK/ CALAMA/ LUBI make as approved by Deptt. suitable for discharge capacity of **0.0283 cumec** at 20 Mtr head conforming to IS: 8034–2002

4)15 HP/ 2900 RPM and assembly of KSB/ KK/ CALAMA/ LUBI make as approved by Deptt. suitable for discharge capacity of **0.0425 cumec** at 20 Mtr head conforming to IS: 8034–2002

5)20 HP/ 2900 RPM and assembly of KSB/ KK/ CALAMA/ LUBI make as approved by Deptt. suitable for discharge capacity of **0.0566 cumec** at 20 Mtr head conforming to IS: 8034–2002

Specifications of Centrifugal Pump set:-

1) 20 H.P Centrifugal Pump set (Horizontal Split casing type, size: 150 mm(suction) x 125 mm dia. (delivery) of **60 LPS(0.06 cumec)** minimum discharge at 13.00 Mt head coupled with 3 ph, 415 V, 50 Hz, 1450 RPM squirrel cage induction motor of complete Pump-set .