



THE ASSAM GAZETTE

অসাধাৰণ

EXTRAORDINARY

প্ৰাপ্ত কৰ্তৃত্বৰ দ্বাৰা প্ৰকাশিত

PUBLISHED BY THE AUTHORITY

নং 142 দিশপুৰ, মঙ্গলবাৰ, 24 মাৰ্চ, 2026, 3 চ'ত, 1948 (শক)

No. 142 Dispur, Tuesday, 24th March, 2026, 3rd Chaitra, 1948 (S. E.)

GOVERNMENT OF ASSAM

ORDERS BY THE GOVERNOR

WATER RESOURCES DEPARTMENT ::: GENERAL BRANCH

NOTIFICATION

The 15th March, 2026

No. E-716263/26.- In pursuance of the approval of State Cabinet and in the interest of Public Service, considering the growing need for the water resources and allied data and recognizing that such data is critical for informed decision making for effective water resource management in the State, the Governor of Assam is pleased to issue the Standard Operating Procedures for various river and floodplain surveys by the Water Resources Department, Assam, which is enclosed herewith.

The SOP will serve as a critical institutional framework to ensure that all river survey activities in the State are conducted in a standardized, transparent, and technically robust manner, enabling data-driven planning of interventions, and long-term resilience against flood and erosion risks. The SOP maintains a flexible technical framework, permitting the assimilation of forthcoming technologies contingent upon comprehensive review and the requisite authorization from relevant governing bodies. The following conditions are approved and authorized for smooth implementation of the SOP and timely execution of survey activities

PART I: Allocation 1% of WRD's Annual Civil Works Budget for Survey Activities and Delegating Financial Power to Chief Engineer (Works) to approve the surveys under this budget

a) WRD shall create a budget head under the Chief Engineer (Works) with minimum allocation of 1% of WRD's overall civil works budget to support various types of surveys for DPR preparation, civil works evaluation, hydro-morphological modeling and analysis studies, asset health assessment, data repository, etc.

b) This 1% budget allocation shall include the budget to be allocated for the QA-QC related survey activities to be implemented by the Chief Engineer (Hydro-Informatics & Quality Control) with a maximum of 30% of the amount allocated for surveys.

c) This allocation shall be under the “Detailed Budget Head: 05- Payment for Professional and Special Services”.

d) The Chief Engineer (Works), WRD shall have the administrative and financial power to approve and oversee the surveys.

PART II: Empanelment of Survey agencies

a) Chief Engineer (Works) shall empanel survey agencies for each type of survey (as identified in Technical Manual Appendix of the SOP) for the period of three (3) years with a provision for extension for another 1 year based on satisfactory performance.

b) Empanelment of agencies shall be conducted through a competitive Request for Empanelment (RFE) through e-tendering, by evaluating the technical capabilities of the agencies following the Assam Public Procurement Rule/acts.

c) After completion of the empanelment, WRD shall use the Limited Bid option on GeM portal to obtain the price bid and for awarding assignments as and when required. Empanelled agencies shall be requested to register on the GeM Portal, if not registered already.

PART III: Prioritization of survey schemes, tendering and allotment of work to empanelled agencies at Chief Engineer (Works) level.

a) Recognizing the importance of undertaking the surveys on urgent or periodic basis, the Government of Assam acknowledges that the authority to (i) shortlist and prioritize the survey locations and (ii) procure services of the empanelled agencies shall be with the Chief Engineer (Works).

b) The Chief Engineer (Works) will annually (at the end of the flood season) initiate the process of inviting the survey action plans for the flood affected and other sensitive areas from the Work Divisions and Hydro-Informatics Unit and prioritize the surveys based on the scales of urgency, severity, importance for long-term planning and management etc.

c) Chief Engineer (Works) will invite the Quotations from the empanelled agencies based on the survey plans developed by the work divisions/HIU, evaluate the Quotations and hire the services of empanelled survey agencies.

d) The Works Divisions, HIU and Chief Engineer (HI&QC) will be responsible for execution of surveys, evaluation of outcomes and submission of relevant bills to the Chief Engineer.

These orders shall come into force with immediate effect.

SYEDAIN ABBASI,

Special Chief Secretary to the Government of Assam,
Water Resources Department.

1. Introduction

The State of Assam, comprising the Brahmaputra and Barak River valleys along with hilly terrain in the east, is highly vulnerable to flooding and riverbank erosion. These valleys exhibit high drainage density, and the rivers—along with their tributaries—frequently overflow during the pre-monsoon and monsoon seasons, leading to recurrent floods and erosion-related challenges.

Since the 1950s, the Water Resources Department (WRD), Assam, has focused on infrastructure development as the cornerstone of its flood management strategy. This includes the construction of embankments, bank protection structures, flood walls, porcupines, and other river training works. The department is also now transitioning towards a more modern, technology-driven approach—centered on hydro-informatics and data-based planning—to build climate-resilient infrastructure and promote Integrated Water Resources Management (IWRM). This shift is driven by the need for robust and adaptive solutions that can respond to evolving hydro-morphological challenges. WRD Assam is actively enhancing the technical capacities of its wings and institutional units, bridging knowledge gaps, and adopting innovative technologies. A key part of this transformation is the establishment of the Hydro-Informatics Unit (HIU), with its dedicated Survey Wing, which plays a central role in survey strategy planning and capacity building.

In this evolving context, dedicated and comprehensive field surveys are foundational. They provide accurate, high-resolution, and timely data essential for planning, implementation, and monitoring of projects and IWRM. WRD Assam is now prioritizing planned and periodic surveys to support its vision of data-driven decision-making, innovative field implementation and integrated flood and erosion management.

Three key types of surveys are envisaged:

1. River Works Monitoring Surveys

These surveys support the planning, progress tracking, and post-construction evaluation of river works such as embankments, bank protection structures, porcupines, and revetments. They help assess effectiveness and guide the necessary course corrections.

2. Periodic Surveys

Real-time to near real-time hydrological, bathymetric, and morphological surveys enable analyses of flood-prone and erosion-prone river stretches. The HIU utilizes these datasets for hydrodynamic and sediment transport modeling, which further informs the design of erosion-control measures and support real-time flood forecasting systems.

3. Routine Surveys (Data Repository Creation)

Surveys generate critical datasets—bathymetric, topographic, hydro-meteorological, remote-sensing, and more—that contribute to the creation of a comprehensive data repository. This repository will support modelling studies, long-term planning, asset management, and the development of the State Water Resources Information System (State-WRIS), enabling integrated and informed water resources management across the state.

In addition to this, certain emergency survey related requirements might arise around monsoon or post-monsoon season to cater to emergency erosion or embankment breach related issues.

This Standard Operating Procedure (SOP) has been developed to streamline, standardize, and guide the financial and technical planning and execution of field surveys by WRD Assam, in alignment with its vision for data-driven, technology-enabled, and climate-resilient water resources management.

2. Objective and Overview of the SOP Chapters

This SOP aims to streamline and standardize the field survey processes by various wings of the Water Resources Department (WRD), Assam—whether through in-house surveys or empaneled agencies, for various purposes, timelines and implementation mechanisms — integrating them with broader departmental reforms. The SOP also establishes a framework for planning, approvals, implementation, monitoring, and audit of surveys.

Below are the key aspects of survey implementation that this SOP establishes protocols for in the subsequent chapters (Chapter 3 onwards):

3. Purpose of Survey:

The SOP covers the purposes of the survey as listed below:

(a) River Work Planning and Monitoring

- **Surveys for DPR Preparation:** Baseline data collection and feasibility assessments
- **Civil Works Implementation Stage:**
 1. Pre-execution, During Execution and Work Completion stages (to be conducted by the contractor under civil works contract)
 2. Quality Control and Progress Tracking (third-party QC survey, as and when required, to be conducted by Chief Engineer (Hydro-informatics & Quality Control) under the civil works contract budget head).
- **Post-Implementation Stage:** Evaluation of results for amendments to design guidelines in medium to long term. {third-party QC survey, as and when required to be conducted by Chief Engineer (Hydro-informatics & Quality Control) from the overall Earmarked Survey Budget}.

(b) Technical Studies and Modelling Driven Strategic Planning

- Supporting hydrological, hydraulic, and sediment modelling

(c) Creation of a Centralized Data Repository

- Ensuring long-term accessibility of data and enabling data-driven planning and decision-making

4. Applicability and Financial Provisions

5. Technical Scope of Surveys (as provided in a separate technical manual)

6. Roles and Responsibilities

7. Survey mechanism

- (a) Surveys through third-party empaneled agencies
- (b) In-house surveys

8. Survey Implementation (Timelines and Milestones etc.)

9. Execution and Oversight

10. Data Evaluation, Bills and Payments

11. Technical Review, Audit and Quality Control (QC) Procedures

12. Data Repository and Sharing

13. Continuous Improvement in SOP

3. Purpose of Survey:

3.1. River Work Planning and Monitoring

This focuses on handling and managing flood and riverbank erosion risk management projects from the conceptual stage to the post-implementation stage.

i. DPR Preparation Stage:

Baseline data shall be collected to assess feasibility, identification of the critical location, understand river morphology, and support the preparation of Detailed Project Reports (DPRs).

ii. Implementation Stage:

- ❖ Civil works contractors shall undertake periodic joint surveys to check pre-execution status, interim status and issues, if any, while executing the work as per directions of the Divisional Engineers. The contractor shall also undertake post-completion surveys for bill purposes.
- ❖ Chief Engineer (Hydro-informatics & Quality Control) shall track the progress and quality of construction activities, ensuring adherence to design specifications and timelines, as and when required.
(Note- For both of these survey types, Civil Works DPRs will define the survey components and related costs will be incorporated in the civil works contracts.)

iii. Post-Implementation Stage:

Post-construction condition surveys will be carried out by the Chief Engineer (Hydro-informatics & Quality Control). These surveys should evaluate the effectiveness of interventions, identify areas requiring maintenance or improvement, and guide future planning. This will help in determining if the restoration goals are being met. {For this, separate budget will be allocated for the Chief Engineer (Hydro-informatics & Quality Control) from the Earmarked Survey Budget.}

3.2. Technical Studies and Modelling Driven Strategic Planning

Survey data shall support hydrological, hydraulic, and sediment transport modelling, which will be essential for flood forecasting and erosion prediction modelling, designing flood and erosion control measures, predicting river behavior, and testing intervention scenarios prior to field implementation. These models shall support strategic planning and financial allocations.

3.3. Creation of a Centralized Data Repository

Currently, surveys are undertaken on a need-based basis—primarily linked to specific project planning or technical studies. Through this SOP, WRD Assam is now working towards institutionalizing regular survey practices to support proactive planning, monitoring, and data-driven decision-making. Periodic surveys shall contribute to the development of a centralized and accessible data repository by:

- Generating sequential datasets for relevant river/floodplain parameters such as bathymetric profiles, topographic maps, hydro-meteorological records, and remote-sensing imagery.
- Supporting long-term planning, asset management, and performance evaluation of water resources infrastructure.
- Enabling consistent, evidence-based decision-making across WRD Assam's wings and facilitating the development of the State Water Resources Information System (State-WRIS)

4. Applicability and Financial Provisions

- The procedures outlined in this SOP are applicable to **all the surveys to be undertaken by the WRD Divisions or HIU, WRD** (either in-house or through a third-party agency).
- WRD takes up schemes of about ₹ 1000 Crores on an annual average (excluding the Externally Aided Projects Schemes). A **provision of 1% of the cost of total annual budget of civil works** will be earmarked by the Chief Engineer (Works) for the hydrographic and topographic and other relevant survey work to be taken up every year.
- This 1% budget allocation includes the budget to be allocated for the civil works QA-QC related survey activities to be implemented by the Chief Engineer (Hydro-Informatics & Quality Control) under the civil works scheme's budget head (0.2 to 0.3% of civil work contract amount).
- Chief Engineer (Works) will have the powers for approvals of surveys from the budget earmarked under **"Revenue and Maintenance" head**.
- All civil works scheme contracts shall include provisions related to survey requirements (including third-party quality control surveys) under the Special Conditions of Contract (SCC). The contractor shall be asked to incorporate all associated survey costs into their bid. These requirements must be explicitly stated in both the bidding and contract documents to ensure clarity and compliance. Third party surveys for quality control shall be implemented by the Chief Engineer (Hydro-informatics & Quality Control) under this contractual provision to ensure technical integrity and compliance across all civil works processes. As required, Chief Engineer (Hydro-informatics & Quality Control) shall raise the requirements to CE (Works) for hiring of empanelled agencies for the QC related third-party inspections of works.
- From the total Earmarked Survey Budget, funds shall also be allocated for any additional third-party inspections for defining any amendments in the civil works design guidelines in any medium to long term. This budget shall be operated by the Chief Engineer (Hydro-informatics & Quality Control).

5. Technical Scope of Surveys

WRD Assam shall undertake a range of technical surveys—including bathymetric, topographic, flow and sediment surveys—to support its integrated flood and erosion risk management vision as well as the broader vision of the Irrigation Department. Bathymetric and topographic surveys are essential for mapping riverbeds and adjacent terrain to support infrastructure planning. When combined with data from flow and sediment surveys, these inputs become vital for hydrologic and hydraulic modeling, hydro-morphological analysis, water availability evaluation, and effective sediment management. The outputs from these surveys can also aid in designing irrigation intakes, canal alignments, and command area development, ensuring more efficient and climate-resilient irrigation systems across the state.

- The technical scope of the SOP includes bathymetric and topographic surveys, flow measurements, sediment transport, bed and bank sediment sampling, and surveys supporting irrigation projects. Please refer to the Technical Manual (Appendix-I) under this SOP.
- The Technical Manual of the SOP outlines objectives, required equipment, survey methods and specifications, and quality control measures for both data and equipment.

- Further, asset health assessment-related surveys including their frequencies, parameters etc. will be outlined and defined in the State Water Resources Asset Management Plan, which is currently under development.

6. Roles and Responsibilities

6.1. Chief Engineer (Works)

- Chief Engineer (Works) shall be responsible for administrative and procurement-related leadership and financial approvals related to survey activities.
- The Chief Engineer (Works) will oversee overall implementation, ensure alignment with departmental priorities, and facilitate coordination across divisions and units.
- Chief Engineer (Works) will prioritize the survey schemes based on urgency, severity, risks and vulnerability, and long-term planning requirements.

6.2. Divisions (Field Offices)

- In WRD, currently there are no investigation divisions in place. Works divisions will be responsible for initiating and executing surveys.
- Divisions shall carry out field-level responsibilities including planning and execution of surveys. This includes conducting site inspections, mobilizing resources, coordinating with survey teams or agencies, and ensuring timely data collection and reporting.
- Divisions shall validate survey outputs and incorporate the findings into project planning and DPR preparation.
- Following data validation, bills shall be prepared by the Divisions and submitted to the Chief Engineer (Works) for further approval.

6.3. Hydro-Informatics Unit (HIU)

- HIU shall serve as the technical advisory body for survey design, methodology, and data standards.
- HIU shall support prioritization of works/schemes etc. by the Chief Engineer (Works) through desktop-based analysis of recent data, information and satellite images etc.
- HIU will support divisions in surveys planning and execution. Additionally, HIU will perform data verification for about 5% of survey data across divisions, through desk verification, for technical quality auditing. This will be irrespective of the payment status.
- In the long run, HIU will maintain the centralized data repository, support modeling and analytics, and guide strategic planning based on survey outputs. It will also ensure that survey data feeds into WRD's digital platforms and supports the department's long-term planning, inter-departmental collaboration, including with the Irrigation Department. HIU will be responsible for technical audit of the survey process.

Role of HIU's Survey Wing in Implementation of Survey by the WRD

- **Role of HIU In Prioritization of Schemes**

HIU will play a crucial role in prioritizing the different identified schemes among all the divisions. It will serve as an anchor and expert agency with required advanced technical, financial, and human resources, essential to facilitate collection, analysis, and dissemination of river hydraulics and morphodynamics and other data. The modelling wing of the HIU will evaluate the proposed schemes based on satellite imagery-based evaluation of hydro-morphological alterations in the given area, and wherever possible, perform simple analyses etc. to establish the strength and weakness of the proposals submitted by the divisions.

- **Role of HIU After Selection of schemes**

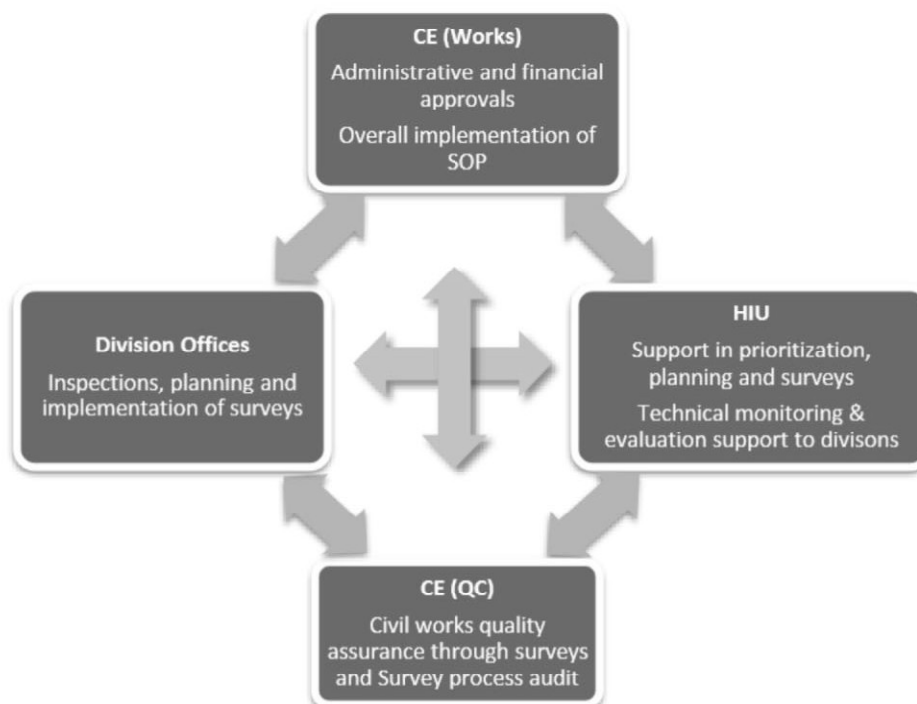
In the initial stages of implementation of this SOP, the survey wing of HIU shall support the respective Divisions in identifying the areas, extents, densities, and other parameters of surveys required for detailed modelling studies and subsequent scheme design. This initial handholding with HIU will enable the capacity building of division offices for subsequent survey planning and implementation by the divisions.

- **Role of HIU in data validation**

HIU shall verify approximately 5% of the survey data through desk-based validation methods. This will support technical quality auditing and course corrections for future survey implementation.

6.4. Chief Engineer (Hydro-Informatics & Quality Control)

- Chief Engineer (Hydro-informatics & Quality Control) will be responsible for ensuring the civil works quality assurance through surveys—either through in-house mechanisms or third-party inspections and internal auditing of survey processes.



7. Survey Mechanism

7.1. Surveys Through Third Party Empaneled Agency

- Empanelment process: Chief Engineer (Works) will empanel survey agencies for each type of survey (as identified in technical manual) for a period of three years with a provision for extension for another 1 year based on satisfactory performance.
- After prioritizing the survey schemes (including civil works DPR preparation surveys, HIU's survey requirements, emergency requirements, periodic requirements etc.), Chief Engineer (Works) will hire agencies through Request-For-Quotation (RFQ) bidding process. Standard RFQ has been designed for this and appended with this SOP (See Appendix II).
- Engagement of third-party empaneled agencies shall be specifically undertaken for high-volume surveys that are time-intensive and for particular project requirements (e.g. DPR preparation, modelling studies, Quality Control etc.)

7.2. In-house Surveys

- Various periodic, small-scale in-house surveys will be carried out by the division engineers or HIU team under the supervision of respective Executive Engineers or Deputy Direct-II, HIU.
- Survey equipment of relatively low cost (e.g. single beam echosounders, topographic equipment etc.) may be proposed for procurement at the divisional level.

8. Survey Implementation (Timelines and Milestones etc.)

8.1. Works Related Surveys

I. September: Submission of Post-Flood Status Reports by Divisions

- In the month of September, all Divisions shall submit post-flood status reports, scheme proposals, and survey action plans to the office of the Chief Engineer (Works). If any significant changes or developments are observed in the field in subsequent month (October), the plan may be then updated in October accordingly to reflect the latest status and again submitted to the Chief Engineer (Works).
- HIU shall also submit relevant requests for modelling study related surveys to Chief Engineer (Works) in September.

Post-Flood Status Reports and Survey Action Plans -Content Requirements:

The submission must include:

- A detailed assessment of flood impact on infrastructure and assets along with high-resolution pictures and locations.
- Proposed schemes for restoration, mitigation, or development.
- Comprehensive survey action plan outlining locations, survey scope, methodology and volume (density, parameters etc.), timelines and survey cost estimates based on standard rates for each scheme. (HIU will provide support to divisions in estimating survey volumes, locations etc. in the initial phases of implementation of this SOP)
- The Divisional Offices shall clearly specify the survey mechanism (in-house/third-party):
 - ❖ Requesting financial approval for in-house survey execution, where sufficient capacity and equipment are available. OR
 - ❖ Clarifying the need for engagement of third-party agencies, particularly for surveys requiring specialized equipment, technical expertise, or significant time investment. These requirements will form the basis for the Request for Quotation (RFQ) to be issued by the Chief Engineer (Works).
- Hazard Scale Categorization: Each issue identified in the post-flood report shall be categorized based on its severity using a hazard scale:
 - ❖ **Severe:** Immediate risk to public safety or critical infrastructure requiring urgent intervention.
 - ❖ **Moderate:** Noticeable damage or disruption that affects functionality but does not pose immediate danger.
 - ❖ **Minor:** Limited or cosmetic damage with minimal impact on operations or safety.

II. October: Scheme Review, Prioritization, and Survey Planning

1. Review Meeting:

In the first week of October, the Chief Engineer (Works) shall convene a meeting with all Divisions and HIU to review the submitted post-flood status reports, scheme proposals, and survey action plans.

2. Scheme Prioritization:

Based on discussions, works schemes shall be prioritized with technical support from the Hydro-Informatics Unit (HIU). HIU will assist in this process by utilizing global satellite-based data products to assess recent morphological changes and validate the urgency and relevance of proposed schemes.

3. Approval Process:

- ❖ The final list of prioritized schemes shall be shared with Divisions and also submitted to the Government for in-principal approval.
- ❖ The approval for conducting DPR preparation-related surveys of individual schemes shall be granted at the level of the Chief Engineer (Works) under the *Revenue and Maintenance Head*.
- ❖ For in-house (small-scale) surveys, approvals will be given quickly after evaluation of survey plan submitted by the division (preferably in October).

4. HIU Vetting for High-Value Surveys:

In cases where survey requirements involve high-value equipment or complex methodologies, the HIU shall vet the proposed survey scope to ensure technical adequacy and cost-effectiveness before RFQ issuance.

5. Inviting Survey Quotations:

The Chief Engineer (Works) shall start inviting quotations from empaneled survey agencies for the approved schemes.

III. November: Survey Work Allocation and Initiation of Surveys

- ❖ In November, based on the evaluation of quotations, survey work shall be allocated to selected agencies in accordance with the defined scope, timelines, and budget provisions.
- ❖ Survey works shall be initiated preferably in November, considering the limited working season.

8.2. Routine and Periodic Surveys

Routine and periodic surveys—such as those conducted every pre-monsoon, post-monsoon, and lean season or specifically timed for some study etc.—are essential for modelling studies, long-term planning, asset management, development of design guidelines, and monitoring of morphological changes etc. The types of data, their frequency, and timing are defined in the Technical Manual Appendix of this SOP.

Under this category:

- For periodic surveys to support technical studies etc. - the HIU will submit the survey requests to the Chief Engineer (Works) in September, in consultation with respective division offices.
- For routine surveys (for data repository and asset management etc. purposes as outlined in the Technical Manual)- respective divisions will initiate the survey requests in September. The

long-term **active erosion areas** should be prioritized for such routine surveys to support timely interventions in future requirements.

These surveys may be carried out either:

- **In-house**, either by the **Divisional Offices** or by **HIU** itself.

In case such surveys are to be done by Division engineers using in-house capacities-regular meetings shall be conducted with them by HIU to guide: -

- ❖ What data to collect?
- ❖ Where to conduct surveys (flexible based on post-monsoon ground conditions)?
- ❖ How much area to cover?
- ❖ Survey frequency; Parameters, Outcomes etc.

HIU shall provide active technical support in survey implementation.

- Through **empaneled agencies**, following the same hiring mechanism as works-related surveys.
- If HIU proposes engaging empaneled agencies for such surveys:
 - HIU shall prepare the **Request for Quotation (RFQ)**, invite quotations, and evaluate them.
 - Final approval for survey execution shall be granted by the **Chief Engineer (Works)**.

8.3. Emergency Surveys

Emergency surveys are undertaken in response to unforeseen events or urgent field conditions that require immediate assessment and technical input such as for planning emergency protection measures.

- **Initiation of Requests:**

Divisional Offices shall raise emergency survey requirements to the **Chief Engineer (Works)** on a **case-by-case basis**, clearly stating the nature of the emergency, the location, and the urgency of the survey.

- **Execution of Emergency Surveys:**

Upon approval, orders for conducting emergency surveys shall be issued **immediately**. These surveys may be carried out:

- **In-house**, by the Division or HIU, depending on the availability of resources and equipment.
- Through **empaneled agencies**, using the same hiring mechanism as routine and works-related surveys, however, timely execution must be ensured through expedited procurement processes.

9. Execution & Oversight

9.1. Surveys to be implemented by Division Offices

To ensure consistency, accountability, and quality across all types of surveys —whether work-related, routine, periodic, or emergency, and whether conducted in-house or through empaneled agencies—the following execution and oversight mechanisms shall be followed:

❖ Divisional Oversight:

The respective **Executive Engineers** shall be responsible for monitoring the progress and ensuring timely execution of all survey activities within their jurisdiction. This includes coordination with survey teams, verifying adherence to approved plans, and addressing any field-level issues.

❖ HIU Technical Support:

The Hydro-Informatics Unit (HIU) shall provide technical support to the Divisions and participate in periodic quality checks in the field to ensure that survey methodologies and outputs meet the required standards.

9.2. HIU's In-House Surveys

For surveys undertaken directly by HIU:

- ❖ HIU shall coordinate with relevant Divisions to plan and schedule the surveys based on approved requirements.
- ❖ These surveys shall be implemented under the supervision of the Deputy Director-II, HIU, and carried out with the approval of the Chief Engineer (Works).

10. Data Evaluation, Bills and Payments

To ensure transparency and quality assurance in survey-related expenditures, the following process shall be followed for data evaluation and payment:

10.1. Under Civil Works Scheme Budget Head:

- ❖ For surveys under the civil works contracts- the divisional engineers will be responsible for the verification and certification of joint survey outcomes. The payment process as per bid-documents will be followed.
- ❖ For the third-party QC surveys for civil works (progress and quality monitoring), the survey outcomes will be reviewed by the Chief Engineer (Hydro-informatics & Quality Control) office. Costs of these third-party surveys will be included in the civil works contracts' estimates (about 0.2 to 0.3% of contract value).

10.2. Under 1% earmarked survey budget

- ❖ After completion of survey activities, the Divisional Offices shall conduct a technical evaluation of the survey data for its quality and quantity verification. Based on this evaluation, bills shall be prepared for submission.
- ❖ For the surveys initiated on HIU's request, HIU will review the data and submit the bills to Chief Engineer (Works) for approval.

- ❖ For Post-Implementation stage QC related surveys, Chief Engineer (Hydro-informatics & Quality Control) will be responsible for overall process, data monitoring and evaluation and raising bills.

10.3. Payments

- ❖ All bills related to survey work shall be ultimately submitted to the Chief Engineer (Works) for final approval, subject to verification and compliance with approved scope and quality standards.
- ❖ The **Chief Engineer (Works)** shall ensure that the payment process is aligned with technical review, budget provisions, and timely disbursement protocols.

10.4. HIU Desk Verification

The Hydro-Informatics Unit (HIU) shall conduct desk-based verification of approximately 5% of the survey data across Divisions for technical quality auditing. This will be irrespective of the payment status.

11. Technical Review, Audit and Quality Control (QC) Procedures

To uphold the integrity and reliability of survey data and process, a robust audit and quality control framework shall be implemented across all survey activities.

11.1. Review and Audit Responsibilities

1. Oversight by Chief Engineer (Hydro-informatics & Quality Control):

The **Chief Engineer (Hydro-informatics & Quality Control)** shall be responsible for overseeing all third-party inspections and administrative implementation related audits of survey activities. This includes ensuring that agencies and in-house teams adhere to approved standards, and processes.

2. Technical Review by HIU:

The **Hydro-Informatics Unit (HIU)** shall conduct technical audits of selected survey datasets and processes. Based on audit findings, HIU will recommend and support remedial actions to address any gaps in data quality, methodology, or execution.

11.2. Audit Submission Requirements

To ensure consistency and accountability in survey-related audits, the following submission requirements shall apply:

1. **Frequency of Audit Submissions:** Annual
2. **Type of Audit:** Overall administrative process audit by Chief Engineer (Hydro-informatics & Quality Control) including technical audit by HIU (5% data verification).
3. **Responsibility:**
 - **Chief Engineer (Hydro-informatics & Quality Control)** shall conduct overall survey process audit and submit annual report to Chief Engineer (Works) for review and records.
 - **HIU** shall submit technical audit reports to **Chief Engineer (Hydro-informatics & Quality Control)** for surveys it reviews.
 - **Divisions** shall ensure timely coordination and provision of data required for audits.

4. **Audit Report Format:** Annual consolidated audit report summarizing findings, corrective actions, and quality trends will be prepared by **Chief Engineer (Hydro-informatics & Quality Control)** including HIU's technical data audit.

Each audit report shall include:

- **Executive Summary** of Findings
- **Scope of Audit** (survey type, location, agency involved)
- **Methodology Used** for verification
- **Observations and Deviations** from approved Standards/Processes/Approaches
- **Recommendations**
- **CAP (Corrective Action Plan)** with Remedial Actions
- **Annexures** with supporting data, maps, and photographs (if applicable)

12. Data Repository and Sharing

A centralized and well-maintained data repository is essential for ensuring long-term usability, transparency, and integration of survey data into broader planning and research frameworks.

12.1. Roles and data hosting

- ❖ The **Hydro-Informatics Unit (HIU)** shall serve as the **technical lead** for all matters related to data overview, review, and repository management. HIU shall ensure that survey data is not limited to individual schemes but is utilized for long-term planning, research and innovation, policy development and future scheme design and monitoring.
- ❖ The Hydro-Informatics Unit (HIU) shall also be responsible for sourcing and making available relevant datasets from other data-collecting agencies—such as the Central Water Commission (CWC)—to the Divisional Offices.
- ❖ In parallel, **Divisional Offices** shall coordinate with regional departments such as Revenue, Agriculture, and others to collect locally relevant datasets. These datasets shall be shared with HIU for proper archiving and integration into the central data repository, ensuring long-term accessibility and use in planning and analysis.

12.2. Data Access for WRD Divisions

Survey data shall be made accessible across the department and to relevant external stakeholders, e.g. the Irrigation Department, through a centralized data management portal. Preferably, this will be incorporated in the Water Resources Asset Management System (WRAMS), which is currently under development. WRAMS is envisioned as a unified digital platform for the storage, retrieval, and analysis of water resource-related survey data across all Divisions. It will facilitate seamless data sharing, support planning and decision-making, and ensure long-term archiving of validated datasets.

13. Continuous Improvement in SOP

The Hydro-Informatics Unit (HIU), the Chief Engineer (Hydro-informatics & Quality Control) and the Chief Engineer (Works) shall periodically review and update this Standard Operating Procedure (SOP) to reflect changes in applicable laws, regulations, technical innovations, and emerging best practices. These updates shall incorporate feedback from Divisional Offices and engaged third-party agencies, ensuring that the SOP remains practical, relevant, and technically sound. As part of its technical manual, the SOP also recommends the future inclusion of additional data types, such as water quality surveys and urban hydrological assessments, which may require different spatial scales, data formats, and levels of detail.