भारतीय सर्वेक्षण विभाग
SURVEY OF INDIA

टेलिफैक्स Telefax +91-135-2744064, 2743331
वेबसाईट Website www.surveyofindia.gov.in
ई-मेल E-Mail sgo.soi@gov.in
sgo.technical.soi@gov.in

भारत के महासर्वेक्षक का कार्यालय
Office of the Surveyor General of India
हाथीबड़कला एस्टेट, डाक बक्स सं. 37
Hathibarkala Estate, Post Box No. 37
देहरादून - 248 001 (उत्तराखण्ड), भारत
DEHRADUN - 248 001 (UTTARAKHAND), INDIA

**No. T- 260/1147-Project (NAKSHA PROJECT)/Comp_25490 Dated: 10th Feb, 2025.**

**NAKSHA PROJECT**

**SGO's Order No. 2**

**To,**

**All Addl. SGs,**
**Directors of Geospatial Directorates, and**
**Wing In-Charges**
**[involved in NAKSHA PROJECT (as per list)]**

**SUB: QA/QC and Progress Monitoring Related Instructions - Reg.**

Following instructions are being issued with respect to NAKSHA Project being executed by Survey of India:

1. As per directions issued in NAKSHA Instruction-1 (now to be read as **NAKSHA PROJECT SGO's Order No. 1)**, Additional Surveyor General (s) of respective zones will monitor financial and physical progress of the packages in their zone as per NAKSHA project, whereas Directors of GDs/ Wing In charges will execute the Contract of various packages under their AoR and process payments as per the terms and conditions of the Contract.

2. Directors/ Wing In-charges in their GD/ Wing should ensure-

   i. Work Plan submitted by the Contractors as 1st Milestone should be a detailed work plan including work methodology, deployment plan for package specific Towns/ULBs, time schedule for the various activities and milestones, Resource deployment plan etc. NAKSHA RFP, its corrigendums and prebid clarifications issued by SGO should be referred to for any issue/doubt.
   ii. For coordination with the contractor regarding NAKSHA project. Project/Contract Managements Wing within a GD or Wing should be made functional for contract execution, coordination with Contractors, State Nodal Departments, Local Town/ULB Nodal Officers and District administration. This wing shall also include personnel for QA/ QC of deliverables submitted by contractor.

iii. QA /QC reports at various stages of Project as per technical specifications including validating horizontal and vertical accuracy of ORIs, DEMs and 3D models should be submitted by Contractors.
iv. GD's/Wing's own QC reports should be prepared for the deliverables submitted by the Contractor.
v. Maintaining necessary versions of data during the QA/QC cycle till its final acceptance.
vi. Perusal and required action on salient reports submitted by contractor including Survey report, Flight Plans, Photo-index, Aerial Flying Reports, AT (Aerial Triangulation) report, Block file, QA/QC reports (QCRs), etc.
vii. Carrying out Quality Audit to ensure that the QA/QC measures, plan/ methodology/ arrangements etc. detailed by the contractor in their Bid are being properly followed.
viii. It shall also conduct audit to ensure that the QCRs are being properly maintained.
ix. GD/Wings must revert to Contractor with observations, if any, within 7 working days from the submission of deliverables to GDs/Wings.
x. Contractors shall carry out corrections as per Quality Audit Report/Observations respective GD/ Wing.
xi. All correspondences with Contractors, State Nodal Department, ULB's Nodal Office, should be properly maintained.
xii. All delays should be recorded in writing and should be maintained properly for each package.
xiii. Proactive attempts should be made to resolve any issues at GD level first.
xiv. Further, if any issue requires intervention of Zonal Addl SGs or SGO, the same should be flagged promptly and proposed solutions.

3. Geo-spatial Directorates/Wings should check all the deliverables as per strict QA/ QC guidelines mentioned in the RFP and its Corrigendums/Clarifications which are integral part of the Contract.

4. Salient QA/ QC parameters are mentioned below:

| Sl No. | Deliverable from Contractor | QA/QC Parameter | Applicable |
|---|---|---|---|
| 1. | Control and check points reports | i. Control Points should be provided to control the periphery of the Flying Area. In a rectangular block, a minimum of 4 pre-pointed control points at the 4 corners and one control point at the centre should be provided.<br>ii. Additional control points to be provided at sharp kinks in the boundary of Flying area.<br>iii. For Control/check-point provision, CORS network established by the Survey of India is to be used.<br>iv. Control/Check Points provided by the Contractor should stable and should be clearly visible on the ORI/3D models. | Technology -1<br>Technology -2<br>Technology -3 |

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| | | v. A minimum of 30 check points will also be provided by Contractor with the help of CORS and RMSE accuracy reported accordingly.<br>vi. Also, a minimum of 30 **Independent** check points will also be provided by GDs/Wings with the help of CORS and RMSE accuracy reported accordingly.<br>vii. It **MUST** be ensured that both the contractors and GDs/Wings should use SOI's CORS/Passive GCP libraries for provisioning of Control or Check Points. This is crucial to ensure consistency between various observations.<br>viii. The Horizontal accuracy (RMSEx, RMSEy) of Control/ Check Points shall be better than 5 cm.<br>ix. Network Adjustment Reports/ Post-processing reports<br>x. Should more than 5% of the GNSS data that are subjected to QC fail to meet the specifications the contractor should to rectify these problems, and (where necessary to comply with the specification) make fresh GNSS observation at his own cost to achieve the required accuracy.<br>xi. Control points will be audited by SOI's GD/ Wing teams to ensure independent Quality Assurance (QA) of the survey operation.<br>xii. Checkpoints to be used for DEM evaluation, **should not be** made on Roof top, Bridge, Culverts or any man made raised platform not part of general topography. | |
| 2. | Aerial data Acquisition | **i.** Ensuring use of **only type-certified drones** by the contractors in case of unmanned aerial vehicle.<br>**ii.** For Technology-2 and Technology-3, **contractor must use the same type-certified drones as mentioned in the contract along with payloads mentioned in contract.**<br>**iii.** Assessment of drone fly data reports for ensuring minimum 70% forward overlap and 60% side overlap, and ground sampling distance (GSD) of 05 cm. | |

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| | | **iv. In case of Technology-1 cross-grid fly to be ensured.**<br>**v.** Detailed metadata should include information on the flight parameters, camera settings etc. | |
| 3. | Post Processing for generation of Ortho-mosaic, DEM, DSM, DTM | i. Ortho-mosaics should be generated with a ground sampling distance (GSD) of 5 cm and should be geo-referenced to the project coordinate system.<br>ii. For ORIs/3D Models and ortho-mosaics at 5cm GSD RMSE x≤10 cm, RMSEy≤10 cm.<br>iii. For DEM/DSM/DTMs, at regular spacing of 0.5 m:<br>RMSEz≤15 cm (WGS 84)<br>iv. DTMs (bare earth DEM) should be generated after DSM cleaning and editing.<br>v. Visual inspection of the mosaic to check blurred imagery, improper colour balancing, colour bleeding and shadow details, edge mis- matches, tone, etc must be carried out.<br>vi. Ortho-Rectified Images should be clear and sharp in detail with no light streaks, static marks, scratches, ice effects, voids, or other noticeable blemishes. The ORI should be free from defects, such as out-of-focus image/photo, and should not contain inconsistencies in tone and/or density.<br>vii. To ensure consistency, the imagery should be radiometrically and geometrically corrected to enable adjacent files to be displayed simultaneously without obvious distinctions between them.<br>viii. The ORI should have no distortions and smearing and should be seamless edge-matched and of highest quality.<br>ix. Horizontal accuracy of the Ortho rectified image will be checked/validated using GNSS coordinate on of 30 independent Check Points to be provided GDs/ Wings.<br>x. All deliverables must conform to the following projection, datum, and coordinate system | Technology -1<br>Technology -2<br>Technology -3 |

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| | | | ▪ **Projection**: Universal Transverse Mercator projection.<br>▪ **Horizontal datum**: The World Geodetic Datum 84 (WGS84)<br>▪ **Vertical datum**:<br>a. The World Geodetic Datum 84 (Ellipsoidal datum), realized through SoI CORS Network Network and<br>b. DEM/DSM/DTM on Indian Vertical Datum should be generated using SOI's Geoid Model. Where Geoid Model is available, Geodetic and Research Branch (G&RB), Dehradun, SOI will provide the Geoid Model. **Where Geoid Model is not available, G&RB will develop Geoid Models with the assistance of GDs/Wings for field observations required for generation of Geoid Models.** | |
| 4. | 2D feature extraction (FE) from the processed data (using a. ORI and b. digital stereo images) | i.<br>ii.<br>iii.<br>iv.<br>v. | Feature extraction is to be done on ORI and in Stereo mode **separately** by the Contractors.<br>**Deliverables, Timelines and payments milestones for FE as defined in Corrigendum-3 to RFP (Sl 7 & 9)** for FE should be adhered to.<br>Contractor should integrate them into a GIS platform to create a features layers including a detailed topographical layer based on property markers.<br>All buildings, utilities, roads, and other relevant infrastructure must be accurately extracted and attributed as per SDMS/ Schema circulated and approved by Competent Authority.<br>All topological test should be done for completeness and consistent vector layers. | Technology -1 |
| 5. | 3D feature extraction from the processed data to generate LOD-2 3D vector models | i.<br>ii.<br>iii. | 3D Feature extraction is to be done by the Contractors.<br>**Deliverables, Timelines and payments milestones for FE as defined in Corrigendum-3 to RFP (Sl 7 & 9)** for FE should be adhered to.<br>Contractor should integrate them into a GIS platform to create a features layers including a detailed topographical layer based on property markers. | Technology -2&3 |

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| | | iv. All buildings, utilities, roads, and other relevant infrastructure must be accurately extracted and attributed as per SDMS/ Schema circulated and approved by the Competent Authority.<br>v. All topological test should be done for completeness and consistent vector layers.<br>vi. Horizontal/Vertical slicing should be done for buildings based on visible markers.<br>vii. Layout plans may also be used for some buildings for building plan based horizontal/vertical slicing. | |
| 6. | General | All salient reports generated including Survey report, Flight Plans, Photo-index, Aerial Flying Reports, AT (Aerial Triangulation) report, Block file, generation of 3D mesh model, topological checks performed, QA/QC reports (QCRs), etc. | |

5. Formats for Physical Progress & Financial Monitoring are attached herewith.
6. Physical progress report should be submitted to Zone as well as SGO on weekly basis.
7. Financial Monitoring report should be submitted to Zone as well as SGO on monthly basis.
8. Separate accounting for NAKSHA project should be maintained. Expenditure for departmental activities, and for contract of each packages should be maintained and monitored. A detailed financial instruction will be issued by DAF, SGO separately for accounting under NAKSHA project.

Above instructions should be followed scrupulously by all the concerned.

This is issued with the approval of Surveyor General of India.

Signed by Misal Roshan Srivastava .
Date: 10-02-2025 21:46:28

**( Misal Roshan Srivastava )**
Superintending Surveyor,
*for* Surveyor General of India
e-mail: sgo.technical.soi@gov.in
Tel No.:0135 - 2747058

**Encl:** Physical Progress & Financial Monitoring formats.

**Copy to:**

i) The Secretary, Department of Science and Technology, New Delhi for information, please. (Kind Attn: Shri Sanjay Kumar, Director SMP, DST)

ii) The Secretary, Department of Land Resources, G Wing, NBO Building, Nirman Bhawan, New Delhi for information, please. (Kind Attn: Shri Kunal Satyarthi, JS, DoLR).

iii) The Addl. SG (P&C)/ DSG (Tech)/ DAF, S.G.O, Dehradun for information please.

iv) All Zonal Addl. SG's for compliance please.

v) DAF, SGO for information and necessary action as per point 8 of this order, please.

vi) All concerned Directors, Geo-spatial Directorates and Wing In-charges for compliance with request to circulate these orders to concerned Nodal officer of the State Govt./UTs, please.

vii) All Contractors of NAKSHA Project for Packages 1 to 17 for information, please.

viii) Sr. PS to SGI for information please.

ix) I/c Web Admn. to host on SOI website please.

x) Guard file (NAKSHA Project).

# Format for maintaining State/GD wise Expenditure details under NAKSHA Project

DO NOT DELETE THIS SHEET

GD/Wing NAME- [*NAME*] | ZONE NAME-[*NAME*] | LOA Details to be filled by GD- [*LOA DETAILS*]

| Sl No | Zone | Package | State Name | Mode of Work | Towns/ULBs for which bill is raised | Activity | Activity Code | Sub Activity | Sub Activity Code | Sub-Head | Sub Head Code | Sanction Order | Sanction Order Date | Sanctioning Authority | Fund under which Sanction is accorded (NAKSHA LOA or Departmental) | Bill No | Bill Date | Bill Amount | Remarks (mention town against which bill is claimed, whereever applicable) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | |

# Physical Progress For NAKSHA Project

| | Week No. (as per current calender year): | | | | Monday *(dd/mm/yyyy)* to Sunday *(dd/mm/yyyy)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sl. No. | Zone | Package No. | GD/Wing | ULB/ Town | Area of ULB (in sq km | | Aerial Vehicle (manned/ unmanned) | Data Delivered to State Authorities (in sq km) | | | Percentage Area Completed | Remarks |
| | | | | | Without Buffer | With Buffer | | Area completed till week | Area completed this week | Cummulative area completed | | |
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| | | TOTAL- | | (total No. of towns) | | | | | | | | |

NOTE- 1. Physical progress report to be strictly sent in this format weekly

2. Details mentioned in italics to be updated by GD

3. Must mention TOTAL of figures in cells (highlighted in yellow) in the end of every weekly report