1. **Field Surveyor for Field work for Precision Survey**

   Qualification & Expertise/Experience Required:
   The Field Surveyors should have minimum qualification and experience.

   i. Diploma /Degree in Engineering preferably Civil Engineering Or

   ii. Degree in any Science stream with minimum 1 year experience in field of Precision Survey by Levelling and/or GNSS.
   Or

   iii. Certification of Profession Surveyor from Govt recognized awarding bodies.

   Maintenance of Professional Ethics:

   a. The intellectual Property Rights (IPR) of the data collected as well as deliverables produced for the Department/organization shall remain with **<name of organization>.**

   b. Field Surveyor shall be bound to hand over the entire set of records of assignment to the **<name of organization>.** or his representative, before the expiry of the contract, and before the final payment is released by **<name of organization>.**

2. **Digitisers for Feature Extraction:**

The Digiters should have the following qualifications:

   a. Must have bachelors degree or expertise in designing and implementing the project related to GIS. Working knowledge of GIS processes, procedures standard, specifications and workflows including those for QA/QC, and demonstrate competency in the full range of assigned duties

   b. At least 3 years of experience in reputed National/International project involving GIS based Feature extraction, QA/QC, Analysis etc.

   c. Experience in working with atleast 2 GIS software i.e. ArcGIS, QGIS etc.

   d. Expertise in GIS s/w with working experience in production environment in different modules such as Geostatistical Analyst, Spatial Analyst, Network Analyst ,defining and building topology ,conversant with Data Conversion, Data interoperability and Data management tools, designing and creating maps as per project requirement.

3. **Mapping using Aerial Platforms:**

   Compliance requirements:

   i. In case of Drone based mapping, the drone pilot should have a valid Drone Pilot Certificate issued by DGCA certified Remote Pilot Training organization.

ii. The Drone used for the data acquisition should have valid type certificate and registered UIN Number in compliance to the Drone Rules- 2021.

iii. The Control Points and Check points used for the Surveying activity should be provided with reference to the National Geodetic Framework, prepared and maintained by SoI.

iv. The Area of Interest for the survey should be planned as per SoI standard grid of 1:2000 Scale.

QA/QC parameters for Mapping using Aerial Platforms:

SI No.	Deliverable	QA/QC Parameter
1.	Control and check points reports	i. GCP with accuracy 5cm or better on National Geodetic framework disseminated using CORS network ii. Network Adjustment Reports/ Post-processing reports iii. Should more than 5% of the GNSS data that are subjected to QC fail to meet the specifications the contractor is expected 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. iv. All control points will be audited by **<name of organization>** teams to ensure independent Quality Assurance (QA) of the survey operation. v. 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. ii. For Oblique Camera and LiDAR sensor, contractor must use the same type-certified drones. 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. iv. In case of 3D mapping using Nadir Camera, cross-grid fly to be ensured. v. Detailed metadata should include information on the flight parameters, camera settings etc.
3.	Post Processing for	i. Ortho-mosaics should be generated with a

	generation of Ortho-mosaic, DEM, DSM, DTM		ground sampling distance (GSD) of 5 cm and should be geo-referenced to the project coordinate system.
		ii.	For ORIs and ortho-mosaics, RMSE x≤10 cm, RMSEy≤10 cm and RMSEz≤15 cm (WGS 84)
		iii.	Visual inspection of the mosaic to check blurred imagery, improper colour balancing, colour bleeding and shadow details, edge mis- matches must be carried out.
		iv.	Orthorectified Images should be clear and sharp in detail with no light streaks, static marks, scratches, ice effects 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.
		v.	To ensure consistency, the imagery should be radiometrically and geometrically corrected to enable adjacent files to be displayed simultaneously without obvious distinctions between them.
		vi.	The ORI should have no distortions and smearing and should be seamless edge-matched and of highest quality.
		vii.	Horizontal accuracy of the Ortho rectified image will be checked using GNSS coordinate of minimum 30 independent Check Points.
		viii.	All deliverables must conform to the following projection, datum, and coordinate system ▪ Projection: Universal Transverse Mercator projection. ▪ Horizontal datum: The World Geodetic Datum 84 (WGS84) ▪ Vertical datum: The World Geodetic Datum 84 (Ellipsoidal datum), realized through SoI CORS Network Network and Indian Vertical Datum maintained by SOI realized through SOI's Height Benchmarks or Geoid Model. Where Geoid Model is available, which may be availed from SoI.
4.	2D feature extraction from the processed data	i.	Contractor should integrate the features into a GIS platform to create a features layers including a detailed property layer based on topographical markers.
		ii.	All buildings, utilities, roads, and other

		relevant infrastructure as decided must be accurately extracted and attributed as per SDMS/ Schema circulated and approved by **\<name of organization\>**.