PMIDC
Enabling Urban Infrastructure

To

1.   All the Commissioners, Municipal Corporations of the State,
2.   All the Additional Deputy Commissioners (UD) of the State,
3.   All Executive Officers of Class I, Municipal Councils, of the State

Memo No.: PMIDC/2022/ 5776-78   Date: 12|8|2022

Subject: Regarding SOP of GIS Based Property Tax Survey

With reference to the subject cited above, various Municipal Corporations, Municipal Councils are contemplating to undertake GIS based Property Tax Survey in their respective ULBs in order to enhance the Revenue from Property Tax and to assertain the correct number of properties within their ULBs.

In order to facilitate the ULBs in adoption of correct technical parameters for GIS based Property Tax Survey, PMIDC has prepared a Standard Operating Procedure (SOP) for conducting the fresh/up-dation of Property survey through GIS with the approval of competent authority.

In view of above, all are requested to follow the SOP (Copy attached) for conducting/updating the GIS based Property survey in their respective ULBs wherever required.

Chief Executive Officer, PMIDC

CC:

PS to PSLG for kind information of PSLG.

STANDARD OPERATING PROCEDURE (SOP) FOR IMPLEMENTATION OF GIS PROJECT

The standard operating Procedure for undertaking GIS survey in the Municipal Corporations/Councils of the State is shared as therein under to facilitate them. A uniform approach would help in enhancing usability of data of the state level.

1. **OBJECTIVE OF THE ASSIGNMENT**

   The main objective of this assignment is for Implementation of GIS Project:

   A. Procurement of Ready to use Base Map, Property Survey and its database generation, UID plate fixing in localities of the towns.

   B. In case of updation of existing GIS survey, Enhancement of Ready to use Base Map, identifying new properties in different categories, change in area and change in category of properties in comparison to existing digitized record of properties of the ULB, and its database generation, UID plate fixing in localities of the towns.

2. **PURPOSE OF TASK**

   The purpose of this assignment is property survey, its database generation and integration of the property data with Base Map to produce property maps with all the details for revenue enhancement through survey/identification of newly assessed property, under assessed property, change in usage etc. that will contribute to enhancing the Municipal resource base, improve citizens facilities and service delivery. It also includes house number plate fixation for each property with unique ID number, updation of other spatial data collected through different survey and its integration to Base Map in GIS environment to develop the web based property information system, which will enable to achieve transparency between department & citizens and bring in ease for assessment.

3. STUDY AREA

The study area will be the existing Municipal area of the town. However, if there is any change in Municipal area before or after award of the contract, the new Municipal area will be considered as study area of the town. Total number of tentative buildings, households and population within the municipal limits of the ULB will be provided.

4. BROAD SCOPE OF WORK

A. The complete task is focused on detailed door to door survey of each property/holding, capturing its location (lat/long), its measurement for property taxation as per Punjab Municipal Corporation Act, 1976 or Punjab Municipal Act, 1911 within municipal area through High resolution Imagery.

B. The firm will collect all relevant information as per approved format.

C. The other major task is linkage of property database (creating polygon feature of the properties and associating the respective data to it, collected during field survey) with enhanced Base Map.

D. The firm shall also work on providing Unique ID for the respective ULBs and suggest/simplify it, fixing of QR code enabled house number plate for each property, take digital photograph of each property and link it with the database of the respective property in the GIS environment.

E. The firm's key professionals in respective ULBs will be responsible for all the activities like data entry, database generation & its linkage with base map with updation will be done in the respective ULBs.

   a) The project team for each town provided by the firms shall work closely with municipal officials and staffs of the respective ULBs and to ensure long term sustainable improvement in municipal record keeping.

F. The firm shall procure ready to use GIS base map in standard GIS File format which can be utilized for detailed household survey. The <u>detailed scope of work</u> is discussed below:

i) The firm shall get Demarcation of MC area on Imagery for drone survey from the Client/ULB.

ii) The firm shall arrange and procure ready to use base maps of the respective town. The GIS base map procured shall be in Standard GIS File Format. The ready to use GIS Base Map should be procured only from OEM having spatial data copyright certificate. This will ensure good quality data for faster implementation of work. Process the Captured images and create ortho mosaic image. The base map is to be updated and enhanced by the firm during field survey as per **Annexure I** of this Terms of Reference.

iii) Agency will capture GPS points according to notification letter of Zone/Block Boundary /Locality Boundary.

iv) The Agency will collect all other existing/available property related data form the ULB & other departments.

v) Zone Boundary/Block Boundary/Locality Boundary will be divided in to Sub Zone/Sub Block Boundary / Sub Locality Boundary according to Colony/locality if required.

vi) Agency will create property survey based app & will upload Drone map with auto generated Property Id & road ID. If during the survey any additional property/ partitioned property is found the UID will be split & a Sub UID will be assigned.

vii) The expectation is to create centroid point feature of the property on the polygon and link the associate attribute data with it.

viii) Detailed survey of each property/holding through DGPS survey and its database generation as per approved format.

ix) Database structure design for property/holdings to keep all records collected during field survey and as mandated for property tax calculation as per Punjab Municipal Corporation Act, 1976 & Punjab Municipal Act, 1911 and its amendments. Also highlight the new properties in different categories identified, change in area or category in properties vis-à-vis the existing digitized property tax records.

x) In case of updation, integration and verification of existing holding data available with ULBs through contact survey.

xi) The details to be collected through contact survey for property in Survey Form **(Annexure-II)** should include:

a) Individual buildings

- Owner Name, Father/Husband Name of Owner, Property Address, Mobile number of property owner.
- Property Address must contain locality and Road name, if available.
- New (Existing) Holding Number, Old Holding Number (If any) Zone number, Block No, locality.
- Occupancy status: rented /self-occupied/mix.
- Total number of floors
- Total area on ground floor and total Built up area and other parameters necessary for property tax calculation shall be as per as per the Drone Imageries (DSM/ DTM) in case of individual buildings.
- In case of individual Flats in an Apartment or multi-storey building Super Built up area will be considered as total built-up area.
- Water connection, sewerage connection No ID.
- Measurement detail through imagery – pilot area, total built up area and its break up collected through measurement of buildings, flats, and plots by the surveyor.
- Uses of Property – If the use of property is mixed please

specify use the property area wise.

- o Property tax ID if available
- o Other information as mentioned in the format.
- o Year of Construction
- o Digital photograph of each property within the municipal boundary for its linking with respective property/holdings database.
- o If property usage category fall in more than one category separate sheets will be attached with the form mentioning separate usage

b. Multi-storey Building (Commercial complex /Apartments) following information shall be also collected

- o Apartment/Building Name
- o Total No. of Property
- o Total built up area
- o Total number of floors
- o Total open space area
- o Total no. of residential and non-residential holdings
- o Source of water for the building

c. Commercial/Industrial/Institutional following additional information shall be also collected

- o Firm/Shop/Industry/Institution Name
- o License Status – Yes/No & License number if available
- o Firm/Shop/Industry Owner Name and address
- o Shop area
- o Business/Industry type

d. Compilation of Data as per database structure

Client will provide database structure for Property; the firm will compile the data strictly as per provided database structure. The firm shall also integrate existing holding number as per

municipal record for each property except new properties identified during survey. Unique ID shall be structured for each property.

Survey data and Property Images will be received from **App** in softcopy and Field Survey Maps received in softcopy/hardcopy format.

Rename Property Images and Update Property Mapping according to map.

Crosscheck the survey data with property images and it should be linked with respective database of the building in base map.

Resend the survey data in the field for updation if required and publish the list.

Update the property mapping according to field survey in Arc Map software.

If there are any discrepancies, Map to be sent back to the field for further updation.

e. Integration of Database with Base Map and its Updation

The selected firm shall integrate the final database for each property with the base map database and also update the thematic layers of base map accordingly.

f. Fixing of House Number Plate

The firm shall generate House Number in GIS as per Punjab Municipal Corporation Act, 1976, Punjab Municipal Act, 1911 and amendments regarding that in close consultation with Client. In absence of the same, a standardized format to be followed as proposed below:

After Property mapping is finalized then a final UID will be created as under:

No. **001-A01-0001-001-V/H.**

- 001 stands for Zone/Block/Sector no.
- A01 stands for Sub-Zone/Sub-Block/ Sub-Sector No.

- 0001 stands for Parcel no.
- 001 stands for Sub-Id. (If Allotted)
- V stands for Vertically Division.
- H stands for Horizontally Division.

The firm shall fix UID No. Plate—rust free QR code enabled **Aluminum/Tin** number plates on each Property in a systematic way with Screw/ Rivet. Vacant Plots shall be also given numbers in continuity. The size of the number plate shall be 150 mm in length, 80 mm in width and 1 mm in thickness with letter and numbers embossed in white with lack background color. The House Number Plate must also include QR code installation for integration of all kind of taxes.

g. Updation of Base Map

During the survey if there is any change in status of administrative boundaries (like ward boundary, tax zone, circle) Parcel, Buildings, road, land use etc. All these should be updated in the Base Map.

Provide services for handholding and updation of GIS data and maps for three years after the successful completion of the assignment

5. QUALITY CONTROL

The firm shall follow standard Government of India norms and guidelines for Survey, Mapping and Database generation. Each property shall be measured accurately and total built up area and plot area be calculated through imagery. The thematic layers attribute data should be attached on the basis of unique ID. The firm will submit the data and at least 10% of the data will be taken as sample and checked randomly by the State Headquarter i.e. PMIDC and or by the respective ULBs and if less than 5% of sample data is found to be incorrect, the firm will correct it within 15 days after

getting feedback from the Client/ULBs and resubmit. In case of more than 5% of the sample data found to be incorrect, the firm will have to redo the survey for the area without any extension of time and resubmit the corrected data for quality check.

The firm has to ensure that existing PID should invariably match with the UID so as to ensure an effective database for realization of Property tax.

6. Handholding & Maintenance

After successful completion of the assignment the firm shall provide handholding & maintenance support for three years in the respective towns and State head quarter. The handholding & maintenance includes updation (in- house). Updation of maps, database, and training to identified ULB executives and staff for Implementation of GIS for the respective towns. New property identified through Self-Assessment System or survey based on inputs from municipality or provided by the municipality shall be updated in GIS environment by the firm. For the purpose of updation & maintenance, the firm will depute one resource for the period of 3 years for In-house GIS updations. Field updation will be carried out by Municipality staff. The GIS resource personnel shall be deployed with hardware (computer) & software (open source GIS Software) for this purpose in ULB and at State Data Center at PMIDC.

The resource personnel working hours, leaves etc. will be applicable as per prevailing laws and firms' policies.

d. Outcome and Deliverables

It is very important to note clearly in detail the exact outputs required and what they should contain. The desired outputs & deliverables under this contract are as shown below.

In Hard Copy

One (1) Set of Check Prints of all the maps in Hard copy with Holding/Property ID,

Property usage, Zone boundary along with Block/locality boundary on A1 paper in readable format verified and approved by ULBs staff/official.

One (1) set of updated base map with Zone, Block & Locality on A1 paper. One (1) set each of Block Property & Locality database (Bounded volumes) with GIS ID, owner's name, usage, floor wise details and total taxable area etc. on A4 paper

Note:

All hardcopy deliverables in hard copy shall be submitted to the respective ULB.

Final delivery in soft copy (CD media) to ULB and at State Headquarter i.e. PMIDC.

Digital photograph of each property attached with base map

Digital photographs of each property are to be provided in a DVD separately with ID and relevant data. This should be linked with Property database.

Number Plates on Properties and Vacant plots Digital data

Procured Base Map in standard GIS Format Enhanced Base Map in standard GIS Format

Database of Property attached with Base map data in standard GIS format (shp file) and digital photograph of each property.

Updated Base map in Arc GIS (.shp file with database) format with existing zone Boundary and Block Boundary on 1: 1000 scale.

GIS Base Map Thematic layers Details for updation

S.NO	THEMATIC LAYER	ATTRIBUTE FIELD	FEATURE TYPE
1	Town/ Municipal Area Boundary	ULB Name, ULB Area	Polygon
2	Zone/Block/ Locality Boundary	Zone/Block No, Locality Name & Area Zone/Block, Population 2011, Delineation Date	Polygon
3	Slum Boundary	Slum Name, Zone/Block No, Slum Area in m^2 (Survey)	Polygon
4	Locality	Locality Name & Area	Point
5	Sub-Locality	Sub-Locality Name & Area	Polygon
6	Pin code	Pin code Number	Polygon
7	Building Boundary	Building Area	Polygon
8	Building/Parcel ID	Zone/Block No, Building ID, Auto generated Parcel ID, Survey Date, Address, Land-use Code, Road ID, Road Name	Point
9	Water Bodies	Water Body ID, Water Body Name	Polygon
10	Road Network	Road Type (NH, SH, DH ,OH, Arterial Road, Streets, lane, b-lanes) Road ID, Zone/Block No, Road Name, Road Length in meters (GIS)	Line
11	Railway Network	Railway ID	Line
12	Green Cover	ID, Type	Polygon
13	Major Landmarks	Point of Interest Name, Categories	Point

Sno.	Map ID:		Date of Survey:	DD/MM/YY :
1	UID (Auto generated)		2. Property Tax Id :	
3	Owner Name:		4. Father/Husband name	
5	Mobile No. of Property Owner		6. E- mail ID:	
7	House No/Flat No:		8. Locality	
9	Road Name (if any)		10. Pin Code:	
11	Year of Construction:		12. Age of the Buildings	(01 - > 30 Years; 02 - 15 –30 Years; 03 - 15 - 5 Years; 04 - < 5 Years)
13	Total No. of Floors		14. Total Plot area(Sq.ft)	
15	Built- up area (In Sq. Feet) – Only in case of individual buildings		16. Photograph	
17	Water Connection No		18. Sewerage Connection No	
19	Type of Construction: Pucca		20. Semi Pucca	
21	**Property Usage (√ mark in the box below):**		**22. Occupancy Status (√ mark in the box below):**	
a	Residential		a. Self-Occupied	
b	Commercial		b. Tenant	
c	Mix		c. Kutcha	
d	Industrial		d. Other	
e	Other (Please Specify)		e. Remarks	
A	**Commercial/Industrial/Institutional:**		**B. Multi Storeyed :**	
i.	Firm/Shop/Industry/Institution Name		i. Apartment/ Building Name	
ii.	License Status- Yes/No & License number if available		ii. Total No. of property	
iii.	Firm/Shop/ Industry/Owner Name & address		iii. Total built up area	
iv.	Shop area		iv. Total no of floor	
v.	Business/Industry type		v. Total open space area	
			vi. Total No of residential & Non-residential holdings	
			vii. Source of water for the building	