

In-Survey and Out Survey Guide Lines for Harbour Construction.

(as of March 2008)

Engineering Section,
Ministry of Construction and Public Infrastructure.

In- Survey:

Scope and Method of Survey.

Topography:

- Topography of the island facing the entire stretch and thirty meters further of construction area should be surveyed. All shapes of natural terrain and artificial structures, such as vegetation boundaries, shore line, road, harbor facilities, buildings, houses and alike, from thirty meters inside of the shore to the edge of the reef shall be surveyed.
- Levels of this specified area should be done at 5-10 meter grid with a horizontal accuracy of not more than 0.5 meter and vertical accuracy less than 0.1 meter. In case of steep slope, additional spot levels should be measured in order to draw the accurate contour lines.
- Survey should be carried out by using one or more of the following methods.
 - ❖ Differential GPS
 - ❖ Total Station
 - ❖ Level

Bathymetry:

- Bathymetry of the area of construction defined by the authorities and twenty meters further should be surveyed.
- Data should be collected at 5-10 meter grid with a horizontal accuracy of not more than 2 meters and vertical accuracy less than 0.1 meter. In case of steep slope, additional spot levels should be measured in order to draw the accurate contour lines.
- Echo sounder should be used for the bathymetric survey. The positioning should be done by D-GPS or Total station. Where in appropriate like shallow water area or surf zone, Total station method, lead or leveling staff can be used.

Mapping:

The standards of mapping for both topography and bathymetry.

- *Projection:* DHIVEHI NATIONAL GRID (DNG). This is the local grid derived from UTM Zone 43 with a false origin. The Northing is shifted 100 km to South in order to avoid using negative values or two projections for The Maldives. i.e. North and South of Equator.
- *Spheroid:* WGS 84
- *Datum Level for Elevations and Depths:* MEAN SEA LEVEL (MSL).

- All the measurements of intended points should be converted to XYZ coordinates. The coordinate values (horizontal) of the four corners of the map sheet should be labeled.
- The scale of mapping is 1:1000. The contour interval should be 0.5 meter.
- Where available a satellite or aerial image of the area should be inserted to background and aligned to the map.
- The topographic and bathymetric map should be combined and incorporated in the final products (both digital and sheet map).
- The final map should be created using AutoCAD system or any other software currently in use in MCPI.
- The size of the map sheets should basically be A3. Where A3 is in appropriate the next larger size should be used.
- All maps should show all the bench marks and where applicable permanent stations with all details.
- All measurements should be in metric unit system.

Monumentation:

- Atleast **two** BENCH MARKS should be installed in the project site to be surveyed and it should be intervisible. These stations should be properly installed, monumented and recorded according to the specification laid by the Ministry of Construction and Public Infrastructure.
- If the island to be surveyed has a Permanent Station Mark (PSM) established prior to the commencement of this survey, then all the bench marks installed in this survey should be tied to the PSM.

Deliverables:

- Final Report. *Final Report should explain the methods of surveys, survey equipments and devices, the dates of surveys, details of the Control Points, condition of the site, information about the surveyors and persons involved in the survey from community side.*
- 1:1000 scale topographic and bathymetric map (A3 or larger).
- CD-ROM of Final Reports and Products.
 Contents: All field notes, sketches digitized to PDF format. All reports in both PDF and MS Word format. All raw and processed data in ASCII and PDF format. All drawings in AutoCAD and PDF format.

Out- Survey:

Scope and Method of Survey.

Topography:

- Shoreline and vegetation line for a stretch of fifty meters further from construction area should be surveyed. All the structures of construction during the project should be surveyed. If the island has been reclaimed that area should be included in the survey.
- Levels of this specified area should be done at 5-10 meter grid with a horizontal accuracy of not more than 0.5 meter and vertical accuracy less than 0.1 meter. In case of steep slope, additional spot levels should be measured in order to draw the accurate contour lines.
- Survey should be carried out by using one or more of the following methods.
 - ❖ Differential GPS
 - ❖ Total Station
 - ❖ Level

Bathymetry:

- Bathymetry of the area of construction (harbour and channels) should be surveyed.
- Data should be collected at less than 5 meter grid with a horizontal accuracy not more than 0.5 meter and vertical accuracy less than 0.1 meter.
- Echo sounder should be used for the bathymetric survey. The positioning should be done by D-GPS or Total station. Where in appropriate like shallow water area or surf zone, Total station method, lead or leveling staff can be used.

Mapping:

The standards of mapping for both topography and bathymetry.

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- All maps should show all the bench marks and where applicable permanent stations with all details.
- All measurements should be in metric unit system.

Control point of the Survey

- The BENCH MARKS installed for the in-survey of the project should be used as controls points of out-survey. These stations should be properly recorded according to the specification laid by the Ministry of Construction and Public Infrastructure.

Deliverables:

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