

# Guidelines for Land Registration Survey of Island

Maldives Land and Survey Authority

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# Contents

Acronyms.....	3
Introduction .....	3
Summary of Requirements .....	4
Survey Reference System .....	4
Topographic Surveying.....	4
Scale.....	4
Features to be Map.....	5
Accuracy.....	5
Calculation of Land Area .....	5
Final Surveyed Map.....	6
AutoCAD Guideline.....	6
Digital Data .....	6
Survey Report.....	7
Deliverables .....	7

## Acronyms

DWG - AutoCAD drawing file format  
HWL - High Water Level  
LWL - Low Water Level  
LRS - Land Registration Survey  
MLSA - Maldives Land Survey Authority  
MSL - Mean Sea Level  
PDF - Adobe Portable Document format  
PSM - Permanent Station Mark  
UTM - Universal Transverse Mercator  
WGS - World Geodetic System

## Introduction

In order to strengthen the land administration of the country it is mandatory to purposefully document the land information. Due to increased land transactions and to accommodate the decentralization act already in-place, it had become very important to provide reliable land information for fiscal and administrative purposes.

An Island is defined as a piece of land (formed naturally or man-made) surrounded by water. If an island is administratively subdivided, each separate piece of land will be considered as a single island. If two islands are merged for administrative purposes, it will be identified as a single island.

As the islands are based on fully or partly on its shoreline defining the land with such a highly dynamic line can be quite challenging from cadastral surveying perspective.

In order to fulfil the requirements of the administrative/fiscal purposes and minimize errors, minimum survey standards need to be adopted to maintain reasonable quality and reliable survey information.

**This guideline evolved from the Surveying and Land Registration Standards for Tourist Properties of the Maldives which now will serve as a guide to all islands of The Maldives regardless of land use or industry.**

Control Survey Guidelines of MLSA should be referred along with this guideline.

## Summary of Requirements

All the surveys should be carried out by a Registered Surveyor at Maldives Land and Survey Authority.

The Registered Surveyor shall:

- Establish Primary Survey Control Network for the island as required by the Control Survey Guideline of MLSA. In islands which has pre-existing Permanent Survey Marks, the Registered Surveyor should use them as the reference for the particular LRS.

- Supply Survey Maps in AutoCAD .dwg file format and .pdf file format

- All observation data in raw format.

- Processed point data in ASCII format.

- Survey Report.

The Registered Surveyors shall implement quality management procedures to ensure that the data conforms to specification and adhere to the surveying best practices. This shall include thorough checking for quality of products prior to delivery.

## Survey Reference System

The surveyor shall relate all the observations regarding Land Registration Survey to one or more Permanent Survey Marks within the island and present the data with reference to the following system.

- Projection:** Universal Transverse Mercator (UTM), Zone 43, North Hemisphere even if its south of Equator.

- Ellipsoid:** WGS 84

- Vertical Datum:** Local Mean Sea level (MSL) ortho-height.

In special cases where an island is excused from installation of a PSM inside the island, survey could be related to a PSM in a neighbouring island with prior approval in writing from MLSA.

## Topographic Surveying

### Scale

All maps to be produces at a scale of 1:1000.

Unit used for this survey should be in meters, decimal degrees.

## Features to be Map

### The limits of the island

The High Water Line (HWL) and Low Water Line (LWL) shall be surveyed (this includes any coastal features which would have an effect on the boundary line (for example groynes, jetties, quay wall, etc). Both HWL and LWL shall be represented as a closed polygon.

In cases where a natural island is subdivided into two or more islands, all the structures (roads, buildings, land parcels, etc) along the borderline to a width of 25m to either side should surveyed.

### Limits of vegetation

The extent of the vegetation canopy, except fallen or dead trees. Vegetation line shall be represented as a closed polygon. Area of vegetation line should be mentioned in the survey report.

Nodes of well-defined features (Example: Quay wall, Water tanks, Boundary walls) should be precisely identified and measured with sufficient data to map features with arcs and lines. General feature presentation should be made for the less well-defined features (Example: Vegetation line, Beach line).

Any doubt regarding observation of topographic features should be clarified by MLSA.

## Accuracy

Name	Description	Positional Accuracy	Type
Vegetation line	The extent of the vegetation canopy, except fallen or dead trees.	<1m	closed polygon
The High-Water Line (HWL) and Low Water Line (LWL)	Limits of island at high tide and low tide including any coastal features which would have an effect on the boundary line (for example groynes, jetties, quay wall, etc).	<1m	closed polygon
Permanent structures	roads, buildings, land parcels, fences, etc.	<0.1m	Lines or polygons

## Calculation of Land Area

Land area of the island should be calculated using the following formula.

$$\text{Land Area} = (\text{LWL Area} + \text{HWL Area})/2$$

Calculations should be shown in the survey report.

## Final Surveyed Map

The Registered Surveyor shall supply following maps to be used for land registration purpose.

All the Maps to be printed in A3 paper size.

Control Survey Map showing all the permanent and temporary control points used in the survey with details of base lines or traverse lines.

Final Survey Map

An Index Map (This map should fit in one A3 paper)

Maps in 1:1000 scale with Grid lines

If the maps are tiled, joint lines must be shown.

All the Maps shall include

Grid Information (grid intervals at 50m).

Survey date and time.

Administrative information: Atoll, Island Name, Fcode

Name of the Registered Surveyor with Surveyor Registration Number

HWL, LWL, Vegetation Line with coastal structures affecting the island boundary

Lengths of HWL and LWL in meters (to the nearest meter).

Land Area in square meters (to the nearest square meter).

Site map showing:

High tide line, Low tide line, Vegetation line, North Arrow, Scale, Legend

## AutoCAD Guideline

Follow these guidelines for mapping purpose

Paper space text height	2mm	Normal Text
	4mm	Highlighted Text
	5mm	Headline Text

Description	Layer	Colour	Line Type	Line Weight
High Water Line	HWL	30 (Orange)	Continuous	0.30mm
Low Water Line	LWL	4 (Cyan)	Continuous	0.50mm
Vegetation Line	VEG	3 (Green)	Continuous	0.20mm
PSM	PSM	1 (Red)		0.18mm
Joint Line	JOINT	9 (Grey)	Hidden	0.18mm
Grid Line	GRID	8 (Grey)	Hidden	0.09mm
Traverse Line	TRV	11	Hidden	0.18mm
Other Features *	Relevant Name	6 (Magenta)	Continuous	0.20mm

\* These are mainly revetments, groynes and jetties. However, surveyor is not restricted from differentiating these features with different pen and colour settings.

\* All features shall be drawn as 2 dimensional polylines and should not be smoothed.

## Digital Data

The Registered Surveyor shall supply Surveyed Maps in AutoCAD DWG format (version 2018 or less), and PDF format. All the map sheets must be combined to one pdf file. The digital raw files from the

survey also should be submitted for reviewing. Final processed data in .csv file format (Point ID, Easting, Northing, and Description).

Survey Report should be combined to one .pdf along with other data.

All data collected and final deliverables shall be supplied in CD-ROMs as two copies.

## **Survey Report**

A detailed report stating the survey site, location, registered surveyor and assistants, equipment, methodology, referenced PSMs, computation and results should be generated and submitted for approval.

The results of any analyses, tests and audits carried out shall be supplied as part of the survey report.

Registered Surveyor shall include his/her declaration the report.

## **Deliverables**

The Registered Surveyor shall supply following information, data and deliverables after undertaking the survey.

3 sets of printed Survey Reports with Maps.

2 CD-ROM with Digital AutoCAD .dwg, .pdf files and RAW data.