Table 26 Bathymetric Roughness - Rugosity

	DATA OPTION 1: Airborne Laser Scanning	**DATA OPTION 2: Quickbird 2 (or other satellite multi-spectral)**
Spatial Dimensions		
Area to cover	Can be up to 1000 km ^{2}	12 km x 12 km per scene
Mapping unit	0.5m to 10m – depends on sample intensity	068m panchromatic 4.0 m multi-spectral
Positional accuracy	10 cm or more depending on geo-referencing process	Dependent on geo-referencing process
Temporal Dimensions		
When	User controlled	Approx 10.45 am
How often	User controlled	Minimum every 4 days
Variable to map	Bathymetric Roughness - Rugosity	Bathymetric Roughness - Rugosity
Environmental / Sensor Restrictions	Not possible for turbid water Clouds, strong winds and breaking waves	Not possible for turbid water Clouds, strong winds and breaking waves
Processing technique **(Output)**	Ocean surface and seafloor return extraction, interpolation and ground mapping. Raster or image surface with each pixel containing an absolute elevation.	Inversion of radiative transfer model to estimate depth. Or Empirical estimate of depth using Beer's Law
Resources – Hardware and Software	PC Image processing software GIS with image analysis capabilities.	PC Image processing software GIS with image classification module (e.g. ARCGIS Image Analyst)
Resource – Personnel	Trained and with experience in ALS mapping. Knowledge of area to be mapped	Trained in image classification Experience with high spatial resolution data. Knowledge of area to be mapped
References: Note these are some example references	Zawada et al. (2009) Wedding et al (2009)	Hogrefe et al. (2008)

Hogrefe, K., D. Wright, and E. Hochberg, (2008). “Derivation and Integration of Shallow-Water Bathymetry: Implications for Coastal Terrain Modeling and Subsequent Analyses.” Marine Geodesy 31, 299-317.

Wedding, L., A. Friedlander, M. McGranaghan, R. Yost, and M. Monaco, (2008). “Using bathymetric lidar to define nearshore benthic habitat complexity: Implications for management of reef fish assemblages in Hawaii.” Remote Sensing of Environment 112, 4159-4165.

Zawada, D. and J. Brock, (2009). “A Multiscale Analysis of Coral Reef Topographic Complexity Using Lidar-Derived Bathymetry.” Journal of Coastal Research SI(53): 6-15.