

St Helier Harbour 2019 4th Quarter Routine Survey



Project	Client	Location
St Helier Harbour, Routine	Ports of Jersey	St Helier, Jersey
Survey		

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St Helier Harbour routine survey 2019 Q4



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Disclaimer: The acquired data, information and any interpretation contained in this report has been compiled with due care and diligence. However, Ports of Jersey Limited gives no warranty that the information provided is without error.



Methodology

Vessel and equipment

Ports of Jersey Marine Services mobilised their vessel Rival with an R2Sonic Multibeam Echosounder, along with an SBG Navsight inertial navigation system. Differential GNSS systems were used to provide sub 5cm accuracy by utilising the ATLAS H10 L-Band correction service. All the systems were interfaced to a Hypack acquisition system. Ocean conditions were monitored by a Valeport sound velocity sensor installed at the transducer head and periodic sound velocity casts were taken using a Valeport Swift SVP.



Figure 1 Archive photo of the vessel Rival mobilised with Survey equipment

Equipment	System
Multibeam Echosounder.	R2Sonic 2024 – UHR Capable, 170 – 700KHz
Primary GNSS	Hemisphere R330
Differential GNSSS correction service	Atlas Link L-Band H10 Offshore
Secondary GNSS	Apogee Navsight Dual Antenna system
Motion Reference Unit	Apogee-U Navsight
Ocean monitoring	Valeport SVS
	Valeport Swift SVP
Acquisition Software	Hypack

Table 1 List of survey equipment

Calibration

Following the mobilisation, a patch test was also completed, and the results were verified when processing the final data set. The results of the patch test are shown in Table 2. A vertical verification was completed by comparing lines of data over the sill into St Helier Marina, which is 3.6m above Chart Datum (CD). The results of this vertical verification are shown in figure 2.



Table 2 Patch test results

Rotation	Correction
Roll	0.00°
Pitch	0.00°
Heading	-0.30°

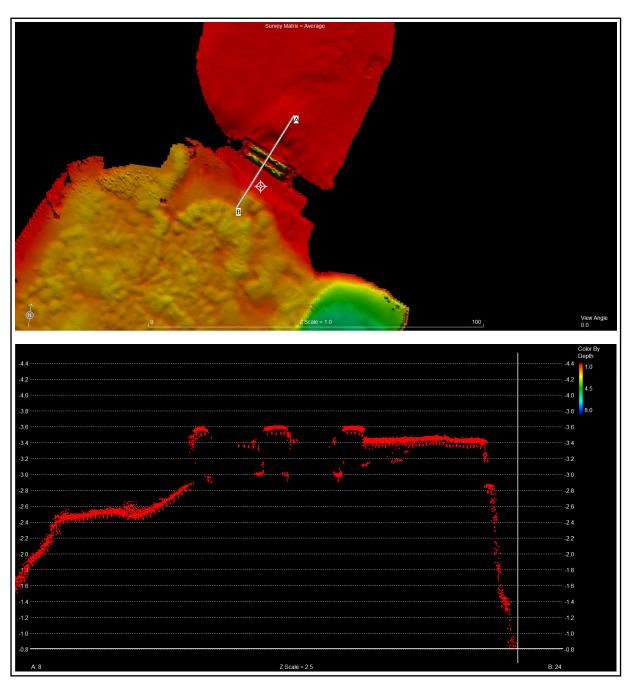


Figure 2 Profile across St Helier Marina Sill, multiply lines of data, showing a height of 3.6m above CD

Geodetic Parameters

Tables 3 and 4 outline the projects geodetic parameters.

Table 3 WGS84 definition

Ellipsoid	
Ellipsoid	World Geodetic System (WGS-84)
Semi Major Axis	6378137.000 metres
Inverse Flattening (1/f)	298.257223563

Table 4 UTM Project definition

Projection	
Projection	Universal Transverse Mercator
	(UTM 30N)
Central Meridian	003° West
Reference Latitude	0° North
Scale Factor	0.9996
False Easting	500000 metres
False Northing	0 metres

Vertical reduction

Vertical control onboard the Rival was provided by an Apogee-U Navsight SBG system combined with positional data from a Hemisphere R330, supplemented by a differential correction, accurate to sub 5cm. The Apogee-U Inertial Navigation System (INS) provided real time Heave corrections onboard. Sounding depths were reduced to Chart Datum (CD) - Lowest Astronomical Tide (LAT) using the Vertical Offshore Reference Frame (VORF) model.

Acquisition

Acquisition was completed over two high tides on 10th and 15th of October. The First day of operation focussed on the Main Harbour and East and West Berths. The scope of work was extended, and a second day of operations were completed covering the small roads and tanker berth. Despite the weather conditions being less than ideal, strong winds and a sea state of over a 1m at Southern end of the small roads, the data quality was still acceptable. Prior to acquisition each day a series of dynamic manoeuvres were then completed in order to align the SBG INS system. The GNSS status of the L-Band differential correction was allowed to reach its optimal setting of 'RTK Int' meaning the GNSS receivers had fully converged to sub 5cm accuracy. Sound Velocity casts were completed before acquisition and periodically during the survey. The multibeam echosounder was operated at 450KHz in order to best image small objects. The sonars transducer saturation, gates and ranges were monitored throughout the survey in order to provide the best quality data. Figure three shows an overview of the data set acquired.





Figure 3 October 2019Harbour survey, bathymetric data set

Results

Main Harbour

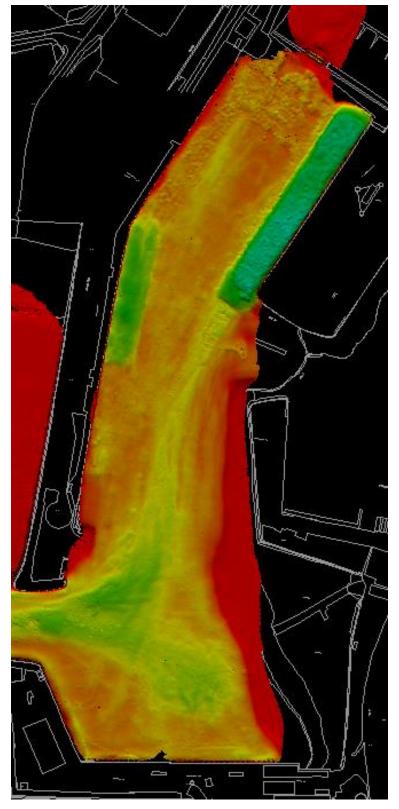


Figure 4 Bathymetry data, St Helier Main Harbour





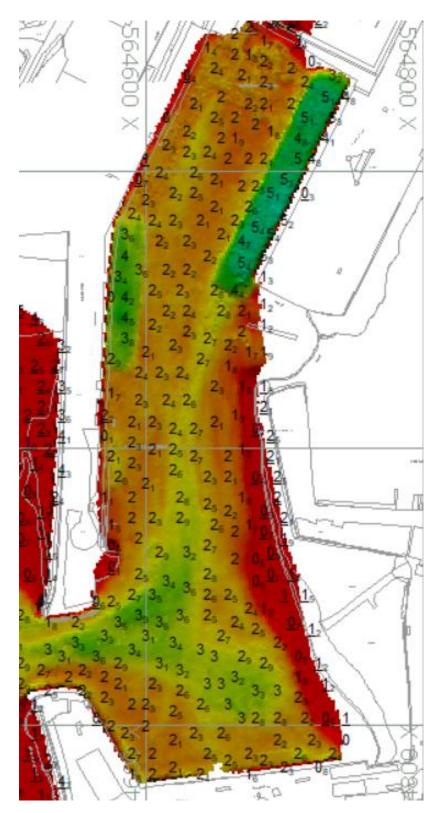


Figure 5 Bathymetry data, St Helier Main Harbour with Soundings overlay



East and West Berths

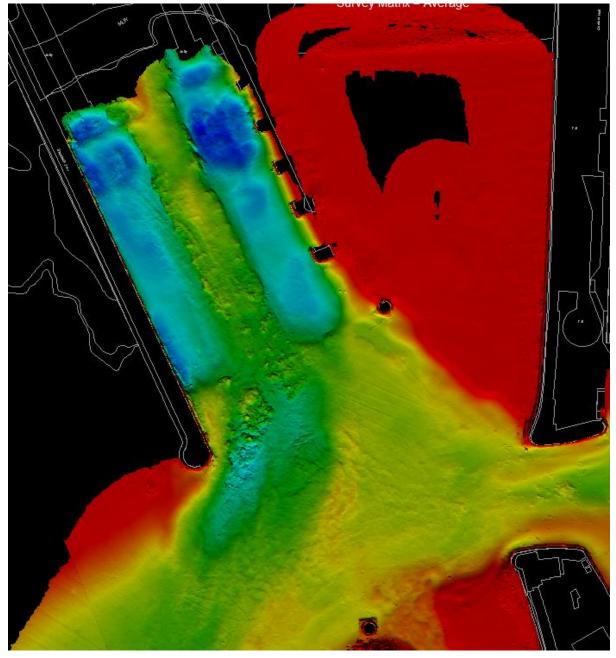


Figure 6 Bathymetry data, East and West Berths



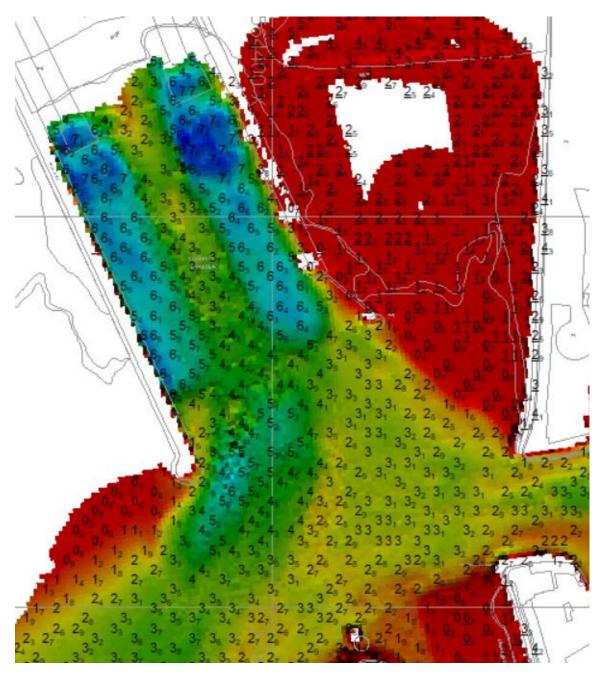


Figure 7 Bathymetry data, East and West Berth with Soundings overlay



Tanker Berth

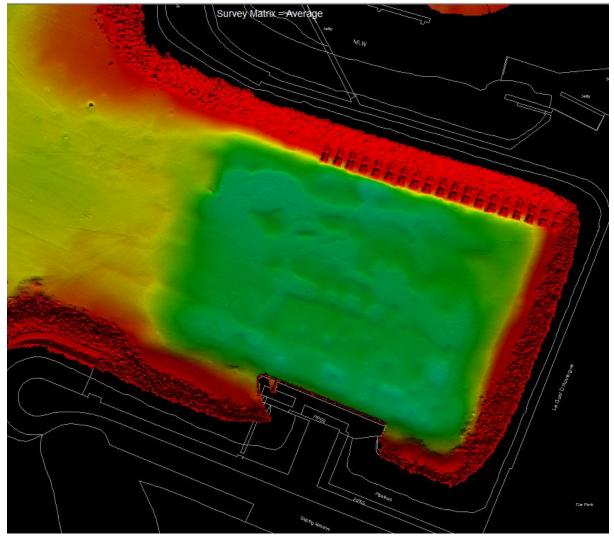


Figure 8 Bathymetry data, Tanker Berth



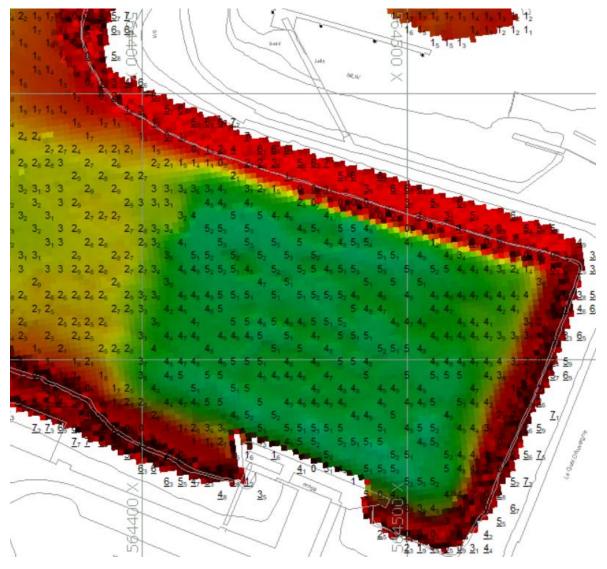


Figure 9 Bathymetry data, Tanker berth with Soundings overlay



Small Roads

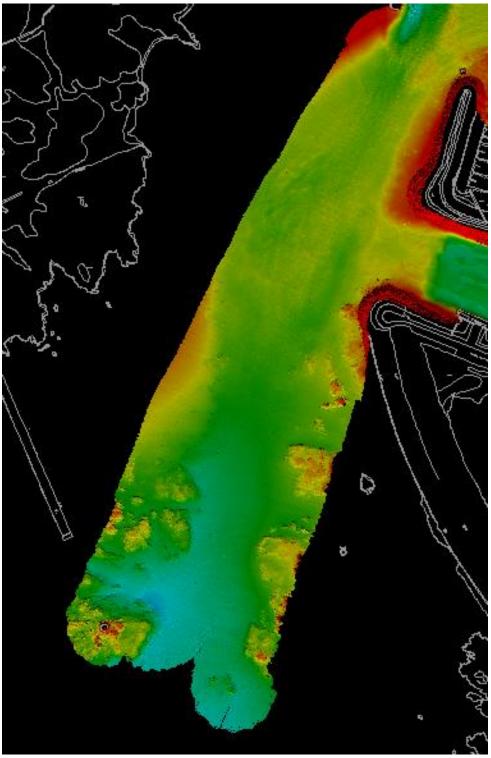


Figure 10 Bathymetry data, St Helier Small roads



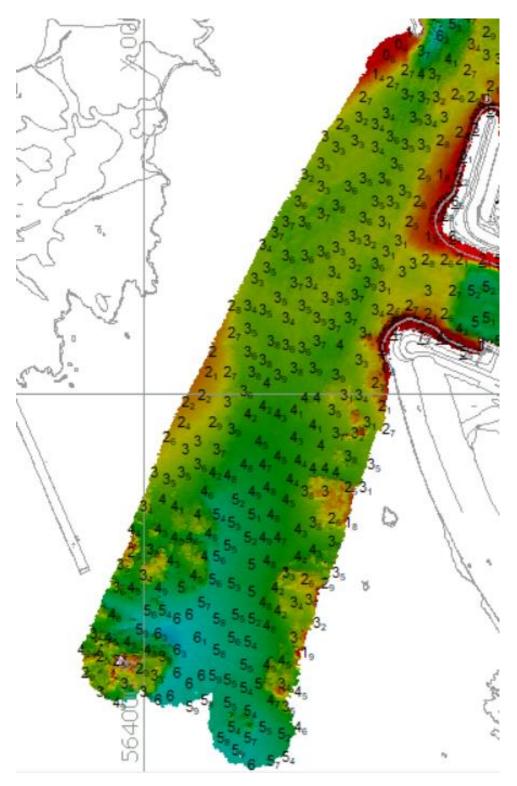


Figure 11 Bathymetry data, St Helier Small Roads with Soundings overlay