

# JUNE 2022 SPRING HARBOR HYDROGRAPHIC SURVEY

PREPARED BY FRESHWATER USA

**Prepared for:**  
City of Madison Wisconsin

June 2022

**FreshWater  
Construction**

Fresh Water USA LLC

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June 2022

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## **RE: Bathymetric Survey of Spring Harbor**

Dear Ms. Wegner,

FreshWater USA is pleased to submit this summary of the recent hydrographic survey of Spring Harbor on Lake Mendota. Surveying work was performed on 20 June 2022 by FreshWater staff. Feel free to contact me should you have any questions or require additional information.

Sincerely,

TYLER KAPLA  
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## 1.0 Introduction

The city of Madison contracted FreshWater USA (FW) to perform hydrographic surveying services at Spring Harbor. The survey site is located on Lake Mendota approximately 5 miles east of the Madison, WI city center. The purpose of the survey was to provide information about bathymetric conditions of the harbor channel.

FW conducted the survey using a SonTek M9 echosounder mounted on a remote-operated vehicle (ROV).

## 2.0 Site Conditions

The hydrographic mapping survey was conducted on 20 June 2022 by Tyler Kapla and Nathan Kainz of FW. Prior to arriving FW staff checked in with the GPS Rover at a benchmark location with established elevation. The hydrographic survey equipment was set up and deployed, with an approximate start time of 1:00 PM. The survey of the slip was completed at approximately 6:00 PM.

Lake conditions were generally favorable at the site. Wind was moderate, and flows were stable at the time.

FW collected water surface elevation (WSE) data at the site before and after the survey. Elevations are given in feet and referenced to the WI State Plane - South coordinate system with NAD83

**Table 1. Surveyed water surface elevation measurements**

Description	WSE Readings [ft NAD 83]
Measured WSE [beginning of survey]	850.041
Measured WSE [end of survey]	850.096

## 3.0 Hydrographic Mapping Equipment

FW deployed calibrated and certified hydrographic survey equipment on the SonTek HydroBoard II. This is a floating base designed for the M9 and associated equipment. The platform includes thrusters and a radio control system to enable operation as a remote-operated vehicle (ROV). The entirety of the survey was conducted using the radio controlled thrusters.

### 3.1 M9 Echosounder

A SonTek M9 pseudo-multibeam echosounder was used to collect survey data. Depth measurements were collected throughout the survey area in a grid pattern to ensure adequate coverage. Specifications for the SonTek M9 system are listed in Table 2.

**Table 2. SonTek M9 echosounder specifications.**

Vertical Transducer	Angled Transducers	Range	Accuracy	Resolution
0.5 MHz	4 x 3.0 MHz/ 4 x 1.0 MHz	0.20 m to 80m	1% of measured depth or 1 cm	0.001 m

The probe was submerged approximately 3.0 in below the water surface, which was sufficient to avoid interference from the HydroBoard platform and shallow enough to prevent impacting debris on the slip bottom surface. The distance was incorporated into the results using a positive z-value offset.

### 3.2 GPS

Horizontal measurements were recorded with a Hemisphere Differential GPS antenna. It was mounted directly above the M9 sonar head and submitted location information for each sounding throughout the survey. All echosounder and location data was saved within HYPACK for processing after the survey was completed.

## 4.0 Data Collection

Echosounder data was collected with a SonTek M9 echosounder. Data was sent to HYPACK surveying software wirelessly, which provided real-time tracking and aided in navigation. The echo sounder was deployed on a HydroBoard II platform and operated as an ROV. The entirety of the survey was conducted using the radio controlled thrusters.

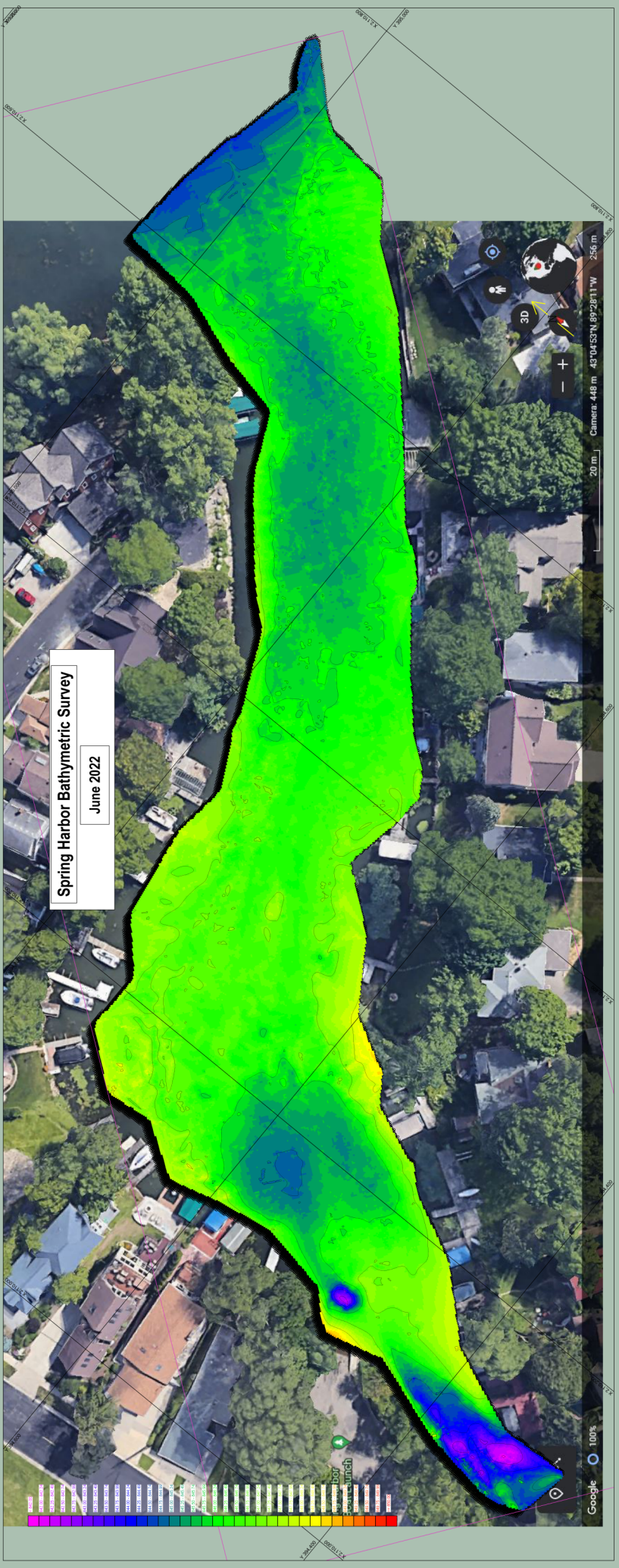
## 5.0 Data Processing

After data collection, all echosounder data was downloaded as XYZ point data for processing. HYPACK surveying software was used to visually inspect data for erroneous measurements and sounding spikes. Spikes may appear due to suspended particles in the water column, underwater vegetation, or signal penetration into the riverbed. Data editing was performed with care considering the adjacent soundings to ensure that bathymetric changes or material on the bed were not filtered out.

Sounding data was processed in HYPACK to create an interpolated bathymetric surface. Data was recorded and mapped in the WI State Plane - South coordinate system with NAD83 as the vertical datum. Point data was used to create a raster surface and contour lines of bathymetry in the study area.

## 6.0 Results

- The following graphical representations of the survey results are also included in this survey package
  - [2022 Spring Harbor Final PP Plot.pdf](#)
  - [2022 Spring Harbor 2d Contour PP EXPORT.DXF](#)
  - [2022 Spring Harbor Final PP XYZ Export 1 x1 Sort.XYZ](#)



Spring Harbor Bathymetric Survey  
June 2022



Google 100% Camera: 448 m 43°04'53"N 89°28'11"W 256 m 20 m