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ADDENDUM NO. 1 TO PROJECT NO. 46108

CONSTRUCTION WORK
CAYUGA INLET FLOOD RISK
REDUCTION AND RESTORATION
CAYUGA LAKE INLET
900 TABER STREET
ITHACA, NY

November 5, 2026

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

APPENDIX

1. PRE-DESIGN INVESTIGATION REPORT: Discard the Document bound in the Project Manual and substitute with the accompanying Document (pages 1 thru 109) noted "Addendum No. 1."

END OF ADDENDUM

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PRE-DESIGN INVESTIGATION REPORT, PROVIDE DREDGING AT CAYUGA LAKE INLET PN 46108, PREPARED BY AECOM (2024)

Provide Dredging at Cayuga Lake Inlet PN 46108 Pre-Design Investigation Report

City of Ithaca, Tompkins County, New York

NYSOGS Project Number: PN46108
AECOM Project Number: 60736218

December 6, 2024

Provide Dredging at Cayuga Lake Inlet PN 46108

Pre-Design Investigation Report

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Acronyms and Abbreviations

%	percent
B&L	Barton & Loguidice, DPC
CY	cubic yards
DQO	Data Quality Objective
EoR	Engineer of Record
ft	foot
gal	gallon
GPS	Global Positioning System
GSI	Geo-Synthetics Systems, LLC
hr.	hour
JPA	Joint Permit Application
L	liters
lb.	pound
lb./ft^2	pound per square foot
lf	linear foot
LOI	loss on ignition
MG	million gallons
mg/L	milligrams per Liter
min	minutes
mL	milliliters
mm	millimeters
NAD83	North American Datum of 1983
NAVD	North American Vertical Datum
No.	number
NYSDEC	New York State Department of Environmental Conservation
NYSFOLA	New York State Federation of Lake Associations
NYSOGS	New York State Office of General Services
PDI	Pre-design Investigation
PFT	paint filter test
PM	Project Manager
ppm	parts per million
PSD	particle size distribution
RTK	Real Time Kinetic
TSS	Total Suspended Solids
SMF	Sediment Management Facility
S/S	Solidification/Stabilization
sq ft	square feet
UCS	Unconfined Compressive Strength
UPS	United Parcel Service
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UV	ultraviolet

1.0 Introduction

AECOM USA, Inc. (AECOM) is providing design and construction phase services at various sites across New York State through Contract SE155-00 with the New York State Office of General Services (NYSOGS) Design and Construction Group. The work is being conducted in collaboration with the New York State Department of Environmental Conservation (NYSDEC) Division of Water, Bureau of Flood Protection and Dam Safety. AECOM has been retained by NYSOGS to provide engineering and consulting services for the dredging design of sediment within the Cayuga Inlet and Old Cayuga Inlet (Cayuga Inlet) located in the City of Ithaca, Tompkins County, New York. The Flood Risk Management Channel was constructed in Cayuga Inlet by the United States Army Corps of Engineers (USACE) in the late 1960s to reduce the risk of flooding. However, significant shoaling has developed within Cayuga Inlet from upland stormwater runoff and movement of sediment from upstream areas.

The overall project objective is to advance the design from 60% to 100%, inclusive of bid documents, to procure a dredging contractor, and to obtain the required regulatory approvals and permits for construction. A pre-design investigation (PDI) was performed by AECOM to collect additional data needed to complete the 100% design. This report details and summarizes the PDI field work and results.

1.1 Site Background

The City of Ithaca is situated in the Finger Lakes region of central New York State, at the southern end of Cayuga Lake. Several streams, including the Cayuga Inlet, Six Mile Creek, Cascadilla Creek, and Fall Creek, make up the Oswego River Watershed. The watershed's headwaters originate in the Adirondack Mountains and along the northern edge of the Appalachian Plateau. The Oswego Watershed makes up approximately 5,070 square miles (NYSFOLA). A study conducted by the NYSDEC in 2017 classified the southern portion of Cayuga Lake as mesotrophic, characterized by moderate levels of water clarity, nutrients, and algae (Cayuga Lake Watershed Network).

Cayuga Inlet is approximately 2.5 miles long and is a major tributary for Cayuga Lake. The west shore of Cayuga Inlet adjacent to the dredge areas is developed with public parks and residential areas located along Taughannock Boulevard. The east shore adjacent to the dredge areas is developed with a golf course, a wastewater treatment plant, commercial properties, and residential properties beyond North Meadow Street.

1.2 Project Background

In 2019, NYSOGS retained AECOM to prepare a Program Phase Report and 60% Design documents for dredging Cayuga Inlet in the City of Ithaca, New York. The purpose of dredging Cayuga Inlet is to reduce the risk of flooding at adjacent upland areas by increasing the storage capacity of the inlet and to improve navigation by deepening the existing navigation

channels. The limits of proposed dredging presented in the 60% Design were based on hydraulic modeling performed by Barton & Loguidice, DPC (B&L) for the City of Ithaca. The design entailed dredging approximately 80,200 cubic yards (CY) of in-situ sediment from locations identified as Reaches A, B, and C within Cayuga Inlet, dewatering and consolidating the dredged material at a nearby sediment management facility (SMF) (AECOM, 2020). **Figure 1 - Site Layout** illustrates Cayuga Inlet, Old Cayuga Inlet, adjacent tributaries, the SMF, and City of Ithaca.

On March 19, 2024, NYSDEC requested AECOM to advance the 60% Design to a 100% Design and to prepare and submit the Joint Permit Application (JPA) for regulatory approvals. On July 3, 2024, and clarified in a meeting on July 12, 2024, the NYSDEC requested that AECOM include additional dredging scope to the bid backage, identified as "Navigation Dredge – Cascadilla Creek to Cayuga Lake" (Navigation Dredge), to remove an additional 100,000 in-situ CY of sediment. The Navigation Dredge is 100-feet (-ft) wide and extends between Alternative 5 and Cayuga Lake. **Figure 2 – Dredge Areas for Base Bid and Navigation Dredge – Cascadilla Creek to Cayuga Lake** shows Reach A1, Reach B, Alternative 5 areas in red (identified as Bise Bid) and the Navigation Dredge area in blue. NYSDEC revised the sediment removal quantity for the overall project to approximately 207,000 in-situ CY; half for the Base Bid and half for the Navigation Dredge.

1.3 Purpose of PDI

The overall Data Quality Objectives (DQOs) for the PDI are:

- To collect existing bathymetric conditions within Cayuga Inlet to replace and/or supplement previous data collected in 2016. The new bathymetric data will be used for dredge design and accurate quantity take-off calculations.
- To perform a Site visit by AECOM's Engineer of Record (EoR) to obtain photos and information necessary to enhance the design quality and constructability.
- To conduct sediment dewatering treatability testing to verify the capacity of the previously constructed SMF to manage hydraulically dredged material in geotextile tubes.

Development of the PDI data quality objectives is summarized in Table 1.

Table 1 Site-Specific Data Quality Objectives

DQO Step	Site-Specific Information
Step 1: State the Problem	Ithaca has experienced flooding numerous times, and significant shoaling has developed in the Flood Risk Management Channel. Dredging approximately 207,000 CY of sediment with geotextile tube dewatering was recommended to mitigate future flooding. The SMF has been constructed and thus capacity to contain all dredge material will need to be confirmed with treatability testing.
Step 2: Identify the Decisions	The existing grades and elevations of the top of sediment (i.e. the existing mudline) are outdated and insufficient for accurate dredge design and quantity take-offs. Site sediments proposed for removal have not been characterized appropriately to develop dewatering and water treatment designs.
Step 3: Identify Inputs to the Decision	The current sediment surface elevation will be updated by performing a bathymetric survey. SMF capacity using geotextile tube dewatering will be verified by treatability testing performed on representative sediment samples collected from the proposed dredge areas.
Step 4: Define the Study Boundaries	The bathymetric survey area is approximately 95 acres in size and 2.5 miles long. The areas targeted for dredging extend approximately 2.1 miles in Cayuga Inlet and Old Cayuga Inlet (see **Figure 2**).
Step 5: Develop the Approach	Perform a Site Inspection and gather information to incorporate into the design documents to provide a more detailed and constructable design, and to mitigate potential conflicts that may arise during construction due to field conditions. A bathymetric survey will be performed by Prudent Engineers following the United State Army Corps. of Engineers (USACE) standard EM-1110-2-1003 – Recommended Accuracy Standards for Federal Navigation Projects for soft bottom materials. Treatability tests will be performed to evaluate sediment dewatering efficacy and refine process flow assumptions for geotextile tube dewatering within the SMF.
Step 6: Specific Tolerable Limits of Decision Errors	Data that meets the DQOs and fulfills project goals will be deemed acceptable. Data that does not meet objectives and goals will be reviewed on a case-by-case basis to ascertain its usefulness.
Step 7: Optimize the Design	Update bathymetric survey. Incorporate information obtained during the Site inspection into enhance constructability. Chemical conditioning will be verified with representative sediment slurry samples. Geotextile pillow tests will be used to optimize the recommended approach. SMF capacity will be confirmed and recommendations for geotextile size and stacking will be provided.

2.0 Site Visit

2.1 Overview

AECOM's EoR and project manager (PM) visited the project Site to evaluate existing conditions at the SMF, proposed dredge locations, pipeline conveyance routes, filtrate discharge location, and potential dredge equipment mobilization points. Inspections were performed from the land and adjacent bridges.

2.2 Objectives

The objective of the Site visit was to perform visual observations, obtain photographs, and gather information to incorporate into the design documents to provide a more detailed and constructable design, and to mitigate potential conflicts that may arise during construction due to field conditions.

2.3 Inspection Activities

The Site visit occurred on September 17 and 18, 2024. On September 17, 2024, Darrell Kennedy (EoR) arrived on Site and performed a visual and photographic inspection of the following areas:

- The City of Ithaca SMF and surrounding areas.
- Cecil Malone Drive bridge and Norfolk Southern Railroad bridge.
- Portions of the Norfolk Southern Railyard access road.
- West State Street bridge, West Seneca Street bridge, and West Buffalo Street bridge including general water and shoreline conditions between and downstream/upstream of the bridges.
- Water and shoreline along Cayuga Waterfront Trail on the east side of Cayuga Inlet from Old Cayuga Inlet to Cascadilla Creek.
- Water, shoreline, and bridges along Waterfront Trail on the west side of Cayuga Inlet from Turtle Lane to Floral Avenue Community Garden.
- Cayuga Inlet water control structure at the end of Inlet Road.

On September 18, 2024, Kevin Shanahan (PM) and Darrell Kennedy performed visual and photographic inspection of the SMF and other work areas. Some inspections were performed with representatives from the City of Ithaca and NYSDEC to obtain access and discuss project challenges. The following areas were inspected:

- The peninsula and boat house area.
- Portions of Cayuga Waterfront Trail on the west side of Cayuga Inlet.
- The SMF and surrounding wooded areas and City spoils management area.
- Cecil Malone Drive bridge and Norfolk Southern Railroad bridge.

- The City was able to provide access to a larger portion of the Norfolk Southern Railroad property and access road.
- City property noted as available for Project use on Cecil Malone Drive near Six Mile Creek.
- The proposed pipeline alignment from the Relief Channel to the wooden fence behind Lowes.
- Cass Park and Allan H. Treman State Marine Park.

2.4 Summary of Observations

A combined summary of field observations of the following general areas that comprise of the dredge areas, pipeline alignments, and SMF are presented below. A photolog of the site visit is included as **Attachment A**.

2.4.1 Sediment Management Facility (SMF)

Approaching the SMF prior to the first vehicular swing gate, there is a road (west) to the City of Ithaca spoils management area. The area is used for management of asphalt, concrete, fill, aggregate, and large woody debris from City of Ithaca operations. There is a 12-ft wide access road that circles the property and wooded area. There is a vehicular swing gate and then approximately 100 feet further is the primary 24-ft wide access gate into the SMF. There are three other access gates along the perimeter, and they are located along the eastern, western, and southern edges of the fence line. The surrounding chain link fence is 8-ft tall.

The dewatering area of the SMF was in good condition. There is a large dewatering area with exterior channels that slope to a sump area. The rock was a mixture of material ranging from 1-inch (-in) to approximately 3-in. There is a vehicular ramp into the dewatering area in the northwest corner. The sump discharges through an 18-in PVC pipe to the southeast where it discharges onto cobble stone and a scour mat and ultimately through a storm ditch. The entire discharge area was vegetated including the storm ditch. Beaver obstructions further down the ditch were observed and cleared in the past.

Vegetation was present at the SMF in areas where there was no liner. There was silt fence along the exterior chain link fence that was in poor condition and should be replaced prior to dredge construction. There was an existing power drop, panel (120/408 Volt), transformer, and switch (277/480 Volts) that was in good condition. In terms of safety, there were homeless people around the SMF and surrounding woods. Trash, debris, shelters, and other structures were present along with people and animals.

2.4.2 Pipeline at Lowes

The area between the SMF fence line and the Lowes fence line is wooded, and electric lines and power poles are present. The fence behind Lowes is a 6-ft wood panel fence. There is a stormwater drainage basin/ditch that runs along the north side of Lowes about 10- to 20-ft below the surrounding area. A stormwater outfall discharges to it from the west. To the east,

there is a concrete box culvert (3' x 4') where the proposed sediment conveyance pipeline alignment is located which discharges to the Old Cayuga Inlet Relief Channel. The shoreline and approach through the discharge swale and box culvert is heavily vegetated with grasses and shrubs.

2.4.3 Pipeline Crossing Under the Norfolk Southern Railroad Bridge and Cecil Malone Drive Bridge

There are two artesian wells in the area and the area is heavily vegetated. The Cecil Malone Drive Bridge is concrete and steel and in good condition. The shoreline is stabilized with heavy rock under the bridge. Clearance from the top of the water to the bridge structure is approximately 5- to 10-ft. The railroad bridge is steel.

The railroad property to the south has an existing asphalt paved access road that will be evaluated and discussed as an alternate pipeline route identified during the Site visit. The road was approximately 18- to 24-ft wide and paved asphalt was cracked along the edges. Vegetation along the road shoulder was maintained. The area looks suitable for project pump and pipe operations if permissible, accessible, and beneficial to the Contractor.

The City property upstream of the Norfolk Southern Railroad bridge has a primary access location on the west side of Cecil Malone Drive Bridge. The property has vehicle access and is secured by a vehicle swing gate and a 24-ft wide access swing gate in the 8-ft chain link fence. The property was accessed by foot from Taber Street where there is an existing unofficial footpath into the property. There was access to the convergence of Old Cayuga Inlet, Six Mile Creek, and the Relief Channel. The shoreline area was vegetated and steep. The City representatives had cautioned about footing due to known drug use by the homeless community that occurs on the property.

2.4.4 Old Cayuga Inlet from West State Street Bridge to West Buffalo Street Bridge

West State Street, West Seneca Street, and West Buffalo Street bridges are steel and concrete. There is a steel pedestrian bridge on the north side of West Buffalo Street bridge. There is a steel sheetpile bulkhead on both sides of the water from West State Street to about 50 feet upstream of West Buffalo Street.

2.4.5 The Peninsula

North of Taughannock Boulevard on the east side of the peninsula are small docks, finger piers, boat houses, and restaurants. On the west is a trail, the US Coast Guard Auxiliary and a parking lot. The western shoreline is rock near the point and then a bulkhead structure continues. Access to the water to the west is clear. A parking lot that may be available for Project use is paved asphalt and there are two access points for the parking lot that exits onto Old Taughannock Boulevard.

2.4.6 Cayuga Inlet from Peninsula to Cliff Street Bridge

The East shoreline is concrete and steel bulkhead from the peninsula to the Taughannock Boulevard Bridge, then it becomes rock stabilized shoreline past the West State Street Bridge. The west shoreline is rock stabilized shoreline. Banks are short and less than 10 feet wide. Water is open. Bridges are in good condition and made of concrete and steel. Utility crossing markers were observed on the edge of water.

2.4.7 Upstream of the Peninsula

Upstream of the peninsula, Cayuga Inlet is open and wide. The east shoreline is mostly rock stabilized past the boat houses up to Cascadilla Creek. There are several small docks and slips near the Creek then there is rock and forested shoreline to Cayuga Lake. The west shoreline is composed of stabilized rock aside from the boat launch at Allan H. Treman State Marine Park. The City property on the south side of Linderman Creek at Cass Park is a small grassy area that has waterside access from a rock shoreline available for Project use. The area is well maintained and accessible from Taughannock Boulevard. Utility crossings were observed along the shoreline south of Cass Park.

3.0 Bathymetric Survey

3.1 Survey Objectives

The previous bathymetric survey of Cayuga Inlet was completed in 2016 by the United States Coast Guard (USCG). The absence of current bathymetry was a significant data gap that needed to be addressed to allow AECOM to advance the dredge design. AECOM retained Prudent Engineering to perform a multi-beam bathymetric survey of Cayuga Inlet in accordance with the PDI Work Plan. The survey work was completed between September 9 and 17, 2024 as discussed in detail in **Section 3.3**; final survey deliverables are provided in **Attachment B1**. The bathymetric survey data will be incorporated into the design drawings and used for dredge design, quantity take-off calculations, and permitting. The Dredging Station Survey Recovery data is presented in **Attachment B2**. This survey control can be used during dredging activities.

3.2 Survey Means and Methods

Survey lines were run on a pre-selected grid with appropriate side slope corrections being made of volumetric computations. The orientation system was configured such that the nominal survey line spacing did not exceed 20 feet with minor track deviations (defined as 5 feet or less) smoothed onto the nominal sections. The degree of survey accuracy conformed to the standards required for the Navigation Support Surveys for soft bottom materials designated in USACE EM-1110-2-1003. The data collected was reviewed in the office by Prudent Engineering technical staff and sediment elevations were mapped at 1-foot and 5-foot contour intervals using North American Vertical Datum (NAVD 88). The horizontal datum is North American Datum of 1983 (NAD83) New York State Plane Coordinate System Central Zone.

The following equipment was utilized by Prudent Engineering to collect and process the survey data:

- Vessel: 2011 aluminum 25-fooyt survey boat, z-boat 1800 RP, and jon boat
- Multibeam System: R2Sonic 2022
- Positioning: Applanix Wavemaster Position/Motion System
- GPS/RTK Data: Trimble R8s RTK GPS
- Data Collection Software: Hypack 2024
- Data Mapping Software: MicroStation V8i (Select Series 10)

3.3 Summary of Survey Field Activities

AECOM provided subcontractor oversight during the bathymetric survey field activities. Daily reports were prepared by AECOM oversight personnel to document the bathymetric survey work (September 10, 11, 12, 13, 16, and 17, 2024) and sediment sample collection

(September 16, 2024, see **Section 4.0** below). AECOM daily reports are included as **Attachment C**; a summary of the work performed each day is included below.

Each of the six bathymetric survey workdays had clear, calm, and dry conditions. Air temperatures were 70 to lower 80°F. Each day began at 0730 hours with a tailgate safety meeting. Personnel left the site between 1700 hours and 1800 hours, except on September 13 when they left the site at 1200 hours. Daily activities were as follows:

- Prudent Engineering staff established survey control at multiple locations adjacent to Cayuga Inlet on September 9, 2024. The Dredging Station Survey Recovery data is presented in **Attachment B2**.
- September 10: Survey completed from the entrance of Cayuga Lake to Clarkin Boat Rentals (approximately 920,000 square feet [sq ft]).
- September 11: Survey completed from Clarkin Boat Rentals to Ithaca College boat house (approximately 807,000 sq ft).
- September 12: Survey completed at the West Buffalo Street Bridge and along the Cayuga Inlet to Black Diamond trail bridge (approximately 566,000 sq ft).
- September 13: Survey completed along the Cayuga Inlet to just beyond Black Diamond trail bridge (approximately 193,000 sq ft).
- September 16: Survey completed along the Cayuga Inlet in jetty area (approximately 100,000 sq ft). Also completed sediment and water sample collection.
- September 17: Survey completed along the Cayuga Inlet and Six Mile Creek (approximately 500,000 sq ft). Survey work complete.

3.4 Survey Results

Shallow water depths were encountered during the bathymetric survey work because of sedimentation and sediment migration that occurred since the last survey in event in 2016. These shallower depths along with significant vegetation growth adjacent to the shoreline prevented the survey to be completed within the entire 95-acre survey boundary identified in the PDI Work Plan (AECOM 2024) using the survey equipment and means and methods that Prudent Engineering proposed in the PDI Work Plan and mobilized to perform the work.

The following results were determined and computed by AECOM using Autodesk Civil 3D 2025 and the bathymetric survey data provided from Prudent Engineering. Survey data was collected across approximately 75.5 acres as determined by the 2D surface area of the bathymetric existing conditions surface. The minimum, maximum, and mean elevations from the existing conditions surface are 367.0', 380.2', and 375.1' NAVD88, respectively. Using a volumetric surface comparison between the Prudent Engineering data and the USGS 2016 data, approximately 39,000 in-situ cubic yards of sediment were deposited within the 75.5-acre survey area. Deposition was greater west of the Cayuga Inlet centerline with the greatest amount of deposition being less than 1' above the 2016 existing grade. Deposition

greater than 1’ above the 2016 existing grade occurred adjacent the marina near Cayuga Lake, in front of Cass Park, at the tip of the peninsula, and south of West State Street Bridge within the western reach of the Cayuga Inlet.

4.0 Sediment Sampling

AECOM performed treatability testing using sediment and surface water collected from Cayuga Inlet at AECOM's Treatability Laboratory in Austin, Texas. To support this work, Prudent Engineering collected five sediment (SS-01 through SS-05) and five water samples (WS-01 through WS-05) from the five locations indicated on **Figure 3**. The sediment and water samples were collected on September 16, 2024. Vessel positioning at each sediment sample location was determined using Global Positioning System (GPS), Real Time Kinetic (RTK) calibrated using previously established reference points.

Sediment samples were collected using a ponar grab sampler. The depth of sample collection was approximately 6- to 12-inches below the sediment surface. Each sediment sample consisted of one 5-gallon bucket of sediment. Each water sample consisted of one 5-gallon bucket of water collected at the sediment sample location. **Table 2** provides the actual coordinates of each sediment sample location, top of sediment elevation, and sample collection time. The water surface elevation at the sediment sample locations was reported to be 381.59 ft NAVD 88.

Prudent shipped the ten samples (five 5-gallon buckets of sediment and five 5-gallon buckets of surface water) to AECOM's Treatability Laboratory by United Parcel Service (UPS). Sediment samples SS-01 and SS-05 and water samples WS-01 and WS-02 did not arrive at AECOM's laboratory. UPS indicated the samples were not located and were presumed destroyed. Additional sediment and water samples were not collected.

Table 2 Sediment/Water Sample Collection Data

Sediment/Water Sample ID	Northing	Easting	Top of Sediment Elevation (ft)	Sample Collection Time
SS-01/WS-01	890430.57	838983.11	373.04	14:15
SS-02/WS-02	890382.86	839504.10	376.10	13:45
SS-03/WS-03	892685.81	839633.90	373.00	13:25
SS-04/WS-04	894262.18	839646.50	374.40	12:00
SS-05/WS-05	895814.56	839448.85	373.90	11:34

Note: Coordinates are in New York State Plane coordinate system – Central Zone, NAD83

5.0 Treatability Testing

5.1 Objectives

Treatability testing was performed to evaluate and verify the use of hydraulic dredging and geotextile tube dewatering of 207,000 CY from Cayuga Inlet using an existing SMF. Bench-scale treatability tests were performed to assess dewatering efficacy and close site data gaps, prioritizing previously recommended technologies and associated process flows best suited for the project sediment management needs.

Dewatering tests were focused on 1) sediment removal by a hydraulic dredge and 2) ex-situ dewatering (i.e., passive dewatering techniques for hydraulic dredge slurry containment and consolidation). Preliminary evaluations identified data gaps for design, chemical conditioning, sizing the SMF, and spacing and sequencing of key process flow and sediment/water management elements. Treatability testing described in this section used surficial sediment samples to test and address these data gaps in sediment characterization and dewatering efficacy (see **Table 3**).

Table 3 Treatability Tests Completed to Evaluate Sediment Management Alternatives

Treatability Tests	Dredging and Dewatering Strategy
Passive dewatering tests • Chemical conditioning tests • Geotextile tube efficacy with paint filter tests and pillow tests	• Hydraulic dredging of sediment • Hydraulic pumping of sediment • Polymer-assisted settling and consolidation in a geotextile tube
Filtration Characterization	• Determines requirements for treatment and/or solids removal from filtrate

Upon receipt of the sediment samples, AECOM homogenized the aliquots and performed initial characterization testing as indicated in **Table 4.** A slurry of 5-percent (%) solids was prepared and confirmed prior to chemical conditioning testing.

Table 4 Initial Characterization Analytical and Geotechnical Methods

Analysis	Method	Matrix
pH	Hach® Multimeter	Water
Total Suspended Solids	D5907	Water
Moisture Content	D2216	Sediment
Particle Size	Laser Diffraction	Sediment
Density	D7263	Sediment
Carbon Content	D7348	Sediment
Paint Filter Test (PFT)	9095B	Solid
Unconfined Compressive Strength (UCS)	D2166	Solid

5.2 Hydraulic Dredging Dewatering Tests

Passive dewatering using geotextile tubes is commonly used on sediment management sites where sufficient land area is available and/or where hydraulic dredging is more practical and cost-effective than mechanical dredging. Geotextile tube dewatering can better accommodate changes to conditions and requires less energy. Geotextile tube dewatering treatability testing was conducted to:

- Evaluate dewatering characteristics and the ability to dewater chemically conditioned hydraulically dredged/pumped slurry;
- Summarize and evaluate the range of physical characteristics of the sediment and dewatering performance in order to support a mass balance of potential dewatering processes;
- Determine the physical characteristics of the dewatered filter cake; and
- Determine the physical characteristics of the filtrate resulting from geotextile tube dewatering.

5.2.1 Chemical Conditioning Evaluation

Slurry samples (5% dry weight solids) were tested to determine the type and dosage of polymer required to efficiently dewater the hydraulically dredged material**.** AECOM utilized polymers from ChemTreat, Inc. a widely available and known polymer manufacturer and supplier within the market and industry (see **Table 5**). Each ChemTreat polymer was diluted to 0.5% with deionized water. Test jars were filled with 150 milliliters (mL) of a 5% slurry sample and dosed with 0.5-mL of a diluted polymer. Jars were swirled and rolled and subsequently allowed to settle. Observations were noted on the release of water from the solids, filtrate clarity, and floc characteristics of the solids (see **Attachments D1 and D2**). The polymer concentration was increased incrementally until the dose appeared to be optimized. This entire process was repeated for each sediment sample and polymers screened for efficacy.

Table 5 Chemical Conditioning Polymers Screened for Sediment Dewatering

Polymer Name	Polymer Type
P816E	Anionic
P817E	Anionic
P835E	Cationic
P845E	Cationic
P847E	Cationic
P822L + P816E	Coagulant + Anionic
P822L + P817E	Coagulant + Anionic
P891L + P816E	Coagulant + Anionic
P891L + P817E	Coagulant + Anionic

To confirm the selection and dosage of the polymer(s) determined during chemical conditioning evaluation (i.e., jar testing), 500-mL conditioned slurry samples were poured through a 10-inch diameter geotextile fabric (i.e., Geo-Synthetics Systems LLC [GSI] Geotex® 4x6) filter prepared and positioned in a dewatering filter-test apparatus. Conditioned 5% slurry samples were poured through the geotextile tube filter material, allowing solids to be captured on the fabric sample. Dewatered sediment retained on the fabric samples was used to evaluate filter cake percent solids at 24-hours (hrs.) as a function of polymer type, dosage, and dewatering time. Filtrate volume and total suspended solids were measured 24-hrs after initiating the test. Each sample location was also tested with an unconditioned control.

5.2.2 Geotextile Tube Pillow Test

Geotextile tube pillows are manufactured from a woven, high-strength polypropylene geotextile using the same geotextile fabric, seams and proportions as a full-scale geotextile tube (GSI GEOSTRUX™). With the aid of chemical conditioning agents, sediment in the tubes consolidate, releasing filtrate through the geotextile while retaining solids. Excavation of the dried materials from the tubes and subsequent disposal and/or beneficial use occurs when retained solids meet dryness goals (e.g., pass a paint filter test).

Conditioned 5% slurry and unconditioned controls were tested using geotextile tube pillows to measure the efficacy of geotextile tube dewatering, confirm the selection and dosage of the chemical conditioning program, and generate enough filter cake and filtrate for characterization and stabilization testing, if necessary. Filtrate was collected and composited over 24-hrs after each sediment dose to the pillow and analyzed for total suspended solids (TSS).

A pillow test was set up for each sample site location plus a control. For this test, 30-liters (L) of conditioned slurry was poured through a 40-L geotextile tube pillow. Each pillow was dosed with 30-L at 0-hrs and 48-hrs with conditioned slurry for testing. Dewatered sediment

retained within the test pillow was collected over a 14-day period (5 samples) to evaluate solids content as a function of dewatering time. Filtrate volume and quality were evaluated over a 24-hr period after introduction to the pillow.

5.3 Mechanical Dredging Dewatering Tests

5.3.1 Gravity Stack Testing of Bulk Sediment

Gravity stack testing was performed on the as-received samples by placing one kilogram of homogenized sediment on a gravity drainage deck, covering it with cheesecloth to minimize evaporation, and determining if the sediment will dewater under its own weight over a 48-hr period. Subsequently, the 0-hr and 24-hr stacked material was assessed with a PFT to determine if the material is suitable for transportation and disposal.

5.3.2 Stabilization Tests - Amendment Screening

The objective of stabilization tests was to identify a range of reagents and mix ratios that can be used to successfully dewater and/or stabilize mechanically excavated sediment and passively dewatered filter cake (i.e., filter cake produced in the geotextile tubes) that does not pass a paint filter test (PFT, USEPA Method 9095B) upon excavation for subsequent transport and disposal, if necessary.

Amendment screening was performed by mixing sediment from each sample location with lime kiln dust (i.e., Calciment™), Portland cement, and quick lime at 5% and 15% (by weight) concentrations. The mixtures were poured into paper cups and cured for 96-hrs. Every 24-hrs, the material was either mixed, or if it was set-up too much to mix, the sample was flipped to increase air exposure. The mixtures were screened for ability to pass a PFT, relative strength using a pocket penetrometer at 24-hrs, 48-hrs, 72-hrs, and 96-hrs and a subset of the mixes were identified for optimized mix testing.

5.3.3 Optimized Amendment Tests

Filter cake collected after 7-days of dewatering in the geotextile tube pillows was mixed with 5% Calciment™, Portland cement, and quick lime, and tested further for moisture content and unconfined compressive strength (UCS) by ASTM International (ASTM) Method D2166. The mixtures were poured into paper cups and cured for 96-hrs. Every 24-hrs, the material was either mixed, or if it was too set-up to mix, it was flipped to increase air exposure. Penetrometer testing was performed at 24-hrs, 48-hrs, 72-hrs, and 96-hrs. A split of each mixture was placed into 3-inch x 6-inch molds for UCS testing. UCS tests were performed at 96-hrs on the best performing mixtures based on penetrometer measurements.

6.0 Results

6.1 Sediment Characterization

Initial characterization was performed on the homogenized, "as received" sediment and surface water samples. Density, organic carbon (i.e., loss on ignition [LOI]) and dry weight solids concentrations as well as particle size distribution (PSD, median diameter) are shown on **Table 6**. The as-received Site water had an average total suspended solids (TSS) concentration of 5.5 milligrams per liter (mg/L) and an average pH of 7.7.

Table 6 Initial Sediment Characterization Results

Sample ID	Density (g/mL)	LOI (%)	Moisture (%)	Dry weight Solids (%)	Median PSD (µm)
SS-02	1.39	13.2	52.2	47.8	36.9
SS-02 dup	1.40	13.6	51.2	48.8	34.3
SS-03	1.68	7.5	33.7	66.3	41.9
SS-03 dup	1.66	7.6	33.7	66.3	41.2
SS-04	1.57	9.8	40.2	59.8	19.1
SS-04 dup	1.58	10.0	40.5	59.5	19.6

6.2 Hydraulic Dredging Dewatering Results

6.2.1 Chemical Conditioning and Filter Testing

After extensive polymer testing, a dual polymer program using ChemTreat's coagulant P822L followed by the anionic polymer P816E performed the best to achieve the greatest release of filtrate volume after 5-minutes (min) and a filtrate with low TSS concentration (**Attachments D1 and D2**).

An unconditioned control sample and conditioned slurry samples with 5% solids were developed and evaluated with geotextile tube filtration tests (see photolog in **Attachment D3**). The TSS of the filtrate released from the 5% conditioned samples ranged between 11.8 mg/L (ChemTreat P847E) and 17.7 mg/L (ChemTreat P822L + P816E) compared to the unconditioned control, which had a filtrate TSS of 1,793 mg/L (see **Table 7).** While the control sample dewatered sufficiently without the addition of a polymer program, the high TSS observed in the control indicates that a polymer program would be required for these sediments in a geotextile tube application. Conditioned samples dewatered from 5% solids at the beginning of the test to 76.1% solids at 24-hrs using the dual polymer conditioning program consisting of 128-ppm P822L followed by 64-ppm P816E.

Table 7 Chemical Conditioning Filtration Testing

Sample ID	Polymer dose (mg/L)	Filtrate TSS (mg/L) 24-hrs	Filter Cake Solids (%) 24-hrs
Control	**NA**	**1,793**	**98.5**
P847E	**130**	**11.8**	**62.5**
P822L + P816E	**128 + 64**	**17.7**	**76.1**

6.3 Geotextile Tube Pillow Tests

Pillow tests were subsequently performed over 14-days, with a dosing event of 30-L of 5% slurry at both 0-hrs and 48-hrs. The conditioned samples dewatered effectively over 14-days using the dual polymer conditioning program of 128-ppm P822L followed by 64-ppm P816E. Samples SS-02, SS-03 and SS-04 filter cake increased from 5% solids at the beginning of the test (0-hrs) to 50.3%, 70.4% and 55.5%, respectively after 7-days. Samples SS-02, SS-03, and SS-04 filter cake increased to 64.1%, 93.8% and 72.2%, respectively after 14-days. Filter cake and filtrate results are provided below in **Table 8**.

Table 8 Geotextile Tube Pillow Test Results - Filter Cake and Filtrate Data

Sample ID	Filter Cake Solids (%)					Filtrate TSS (mg/L)	
	24-hrs	48-hrs	7-days	10-days	14-days	0-hrs	48-hrs
SS-02	37.7	41.0	50.3	57.9	64.1	88.7	23.8
SS-03	56.0	58.2	70.4	77.4	93.8	103.2	8.8
SS-04	44.4	43.4	55.5	64.2	72.2	112.1	90.6

6.4 Mechanical Dredging Dewatering Results

6.4.1 Gravity Stack Tests

An unamended composite sample failed PFTs at 0-hrs (57.4% solids) and 24-hrs (59.9% solids) gravity stacking. After 48-hrs gravity stacking, the composite sample passed a PFT and was 61.5% solids (see **Table 9**). Gravity stacking test photos can be found in **Attachment D4**.

Table 9 Gravity Stack Test Results

Sample ID	Solids 0-hrs (%)	PFT 0-hrs	Solids 24-hrs (%)	PFT 24-hrs	Solids 48-hrs (%)	PFT 48-hrs
Composite	57.4	Fail	59.9	Fail	61.5	Pass

6.4.2 Amendment Screening Tests

Stabilization amendment screening was performed on a composite sample of the as-received sediment with Calciment™, Portland cement, and quick lime at 5% and 15% admixture concentrations (see **Table 10**). All Calciment™, Portland cement, and quick lime mixtures exceeded 1,000 pounds per square foot (lb./ft^2) after a 96-hr cure time, which is a typical landfill strength requirement for bulk waste. Safety Data Sheets for Calciment™, Portland cement, and quick lime are provided in **Attachment D5**.

Table 10 Amendment Screening Test Results (Pocket Penetrometer)

Amendment	Concentration (%)	0-hr (lb/ft^2)	24-hr (lb/ft^2)	48-hr (lb/ft^2)	72-hr (lb/ft^2)	96-hr (lb/ft^2)
Calciment™	5	0	144	432	864	2,160
Calciment™	15	0	864	1,440	1,872	3,312
Portland cement	5	0	0	144	576	2,016
Portland cement	15	0	144	720	1,400	2,448
Quick Lime	5	0	0	144	576	2,160
Quick Lime	15	0	576	1,440	2,304	2,880

6.4.3 Optimized Amendment Tests

In the optimization phase of testing, 5% admixtures of Calciment™, Portland cement, and quick lime (96-hr cure time) were used to evaluate efficacy of the amendments to stabilize 7-day geotextile tube filter cake samples to meet the landfill requirement of 1,000 lb./ft^2 as measured by UCS (see **Table 11**). Calciment™ amendments dewatered and strengthened the samples better than Portland cement and quick lime. All mixtures exceeded the 1,000 lb./ft^2 requirement except for the following trials: SS-02 - 5% Portland cement, SS-02 - 5% quick lime, and SS-04 - 5% Portland cement.

Table 11 Optimized Amendment Tests of Geotextile Tube Filter Cake (Unconfined Compressive Strength)

Sample ID	Amendment	Concentration (%)	UCS (lb/ft^2)	% Moisture, (96-hr)
SS-02	Calciment™	5	1,345	36.0
SS-02	Portland cement	5	681	36.3
SS-02	Quick Lime	5	755	37.7
SS-03	Calciment™	5	2,072	16.5
SS-03	Portland cement	5	1,438	18.6
SS-03	Quick Lime	5	1,834	17.6
SS-04	Calciment™	5	1,935	29.2
SS-04	Portland cement	5	893	29.9
SS-04	Quick Lime	5	1,661	29.7

7.0 Process Flow for Sediment Management

The primary option for removing sediment from Cayuga Inlet is to hydraulically dredge or pump a slurry to the SMF for ex-situ dewatering using geotextile tubes. Average process flow results from the discrete treatability tests are presented below for confirmation of SMF capacity, dredge and dewatering design, and cost-estimating based on the results of the bench-scale treatability testing and geotextile tube pillow efficacy.

7.1 Hydraulic Dredging and Geotextile Tube Dewatering Calculations

Based on a conceptual in-situ dredge volume of 207,000 CY at 57.4% in-situ solids (average of all three treatability test samples), a hydraulic dredge will slurry and discharge approximately 240 million gallons (MG) of slurry at approximately 10% solids (typical hydraulic dredge discharge concentration for river and lake fines with a greater than 0.5-mile pump distance) for chemical conditioning and subsequent containment and consolidation in geotextile tubes (see **Table 12**). Based on the 14-day dewatering efficacy measured during treatability testing, 18,225 linear feet (lf) of 80-foot (ft) circumference geotextile tubes will dewater the 207,000 CY to 154,913 CY (76.7% solids).

The footprint required for the geotextile tubes stacked three layers high is approximately 7.3-acres (**Table 13**) compared to the current SMF (765-ft x 400-ft) which is approximately 7.0-acres (306,000 ft^2). If necessary, an additional 1.2-acres of laydown space is available within the lined SMF for geotextile tube laydown if the water management swales are filled in with rock. The recommended chemical conditioning program is a dual program of ChemTreat P822L followed by ChemTreat P816E at approximately 192-ppm (total) which equals approximately 46,082 gallons (460,824 lbs.) of total polymer emulsion (**Table 14**).

Table 12 Mass Balance Calculations

Geotextile Tube Dewatering (average condition)	Units	Quantity
In situ volume at 57.4% solids	CY	207,000
In situ volume at 57.4% solids	US gallons	41,809,000
Volume pumped @ 10% solids for chemical conditioning	US gallons	240,012,360
Volume of sediment in geotextile tubes, 76.7% solids	US gallons	31,292,355
Volume of sediment in geotextile tubes, 76.7% solids	CY	154,913
60' circumference geotextile tubes (6.1 CY/lf)	linear ft	25,396
80' circumference geotextile tubes (8.5 CY/lf)	linear ft	18,225

Table 13 Geotextile Tube Requirements – Stacked Three Rows High

Layer	No. of Tubes	Tube Size	CY	ft^2
Bottom Layer	36	80-ft circumference x 200-ft long	61,200	316,800
Second Layer	35	80-ft circumference x 171-ft long	50,873	
Third Layer	34	80-ft circumference x 142-ft long	41,038	
Totals	105		153,111	316,800 (7.3 acres)

Table 14 Chemical Conditioning Polymer Calculations

Chemical Conditioning Program (average condition)	Units	Quantity
Treatability Testing (coagulant and flocculant)	ppm	192
Volume of Emulsion Polymer	US gallons	46,082
Polymer (10 lbs./gal)	lbs.	460,824
Totes of Polymer (~2,500 lb.)	No.	184

7.2 Solidification of Filter Cake for Potential Off-site Disposal

Table 15 presents the mass balance for stabilizing 154,913 CY of geotextile tube filter cake (58.7% solids) with 5% Calciment™ and 5% quick lime. After 96-hr cure time, 5% Calciment™ and 5% quick lime admixtures results in 224,498 tons and 227,942 tons of dewatered and stabilized sediment for transportation and landfill disposal, respectively.

Excavation and disposal of dewatered filter cake is not part of this dredge design scope. Geotextile tubes are expected to remain within the SMF for an extended dewatering and consolidation period (months to years). Although excavation, transportation, and disposal of geotextile tubes is not expected in the near-term, geotextile tubes may be cut open and filter cake stabilized with lime kiln dust or quick lime at a low mix ratio (<5%) and transported and disposed at a landfill, if necessary. This would allow the SMF to be used for additional dredging.

Table 15 Geotextile Tube Stabilization Calculations

Parameter	Units	Quantity	
Filter cake volume at 58.7% solids	CY	202,416	
Converted to tons (1.55 g/mL or 1.31 ton/CY)	tons	265,165	
Amendment used		5% Calciment™	5% Quick Lime
Mass of amendment	tons	13,258	13,258
Total mass	tons	278,423	278,423
Solids concentration after 96-hr cure time	%	72.8	71.7
Stabilized sediment for disposal	tons (CY)	224,498 (171,373)	227,942 (174,002)

8.0 Sediment Management Recommendations

8.1 Hydraulic Dredging and Geotextile Tube Dewatering

Hydraulic dredging and dewatering in geotextile tubes is the recommended approach for removal of 207,000 in-situ CY of sediment from Cayuga Inlet. Hydraulic dredging may be conducted with a cutter-suction dredge, jet-suction dredge, or excavator with a Bell or Toyo dredge/pump mounted on an articulated arm. Initial characterization results of the in-situ sediment collected across the dredge prisms varied for percent solids (47.8 to 66.3%), density (1.39 to 1.68 g/mL) and organic carbon content (7.5 to 13.6%). Dewatering efficacy was calculated for the average condition assuming the range of conditions is equitable across the dredge prisms. The capacity of the SMF to contain, dewater and consolidate all 207,000 CY of sediment is sufficient if the geotextile tubes are stacked three rows high.

Geotextile tube dewatering efficacy may be improved as tubes will be left over winter to dewater through a freeze-thaw cycle, recovering additional capacity in the spring after release of additional water during the thaw. Also, additional geotextile tube lay-down area is available within the SMF as approximately 1-acre of lay-down capacity may be created by filling the drainage swales along the toe of the containment berms. Although not part of this design, AECOM recommends that NYSOGS re-evaluate SMF berm height and sump capacity for managing filtrate volume and flow including assessment of sufficient berm height for a potential rupture or leak of a geotextile tube stacked on the third row.

A hydraulic dredge/pump will slurry the sediment to approximately 10% solids in the discharge pipe, to be chemically conditioned with a dual polymer conditioning program, ChemTreat P822L followed by ChemTreat P816E (organic coagulant followed by anionic flocculant) prior to dewatering in geotextile tubes. From testing, greater than a 10% dredge slurry can be conditioned in the dredge discharge line and subsequently contained and consolidated in geotextile tubes for short periods. However, feeding greater than 400-ppm of polymer is typically not recommended as this high dose of polymer is indicative of low interstitial space and potential for incomplete mixing and separation of water and solids in the dredge line. Use of static mixers, polymer injection quills and other best management practices may assist in improving mixing of the recommended dual polymer conditioning program and subsequent release of filtrate.

For a geotextile tube application, the recommended polymers can be sequentially introduced into the dredge discharge pipe prior to an inline static mixer or a few elbows in the header and manifold system to facilitate mixing. These polymers are not shear sensitive and over-mixing will not impact capture, dewatering and consolidation of this residual in the geotextile tubes or filtrate quality. The coagulant is water-soluble and can be fed “neat” with a high viscosity pump directly into the discharge pipe or made down to 0.5% concentration with non-potable water and fed diluted with a progressive cavity or diaphragm pump. The

anionic flocculant must be made-down to less than 0.5% with non-potable water (e.g., fire hydrant water or filtered river water) with a make-down system (e.g., Cleanwater1 or Velodyne Systems) or in tank batches and fed with a progressive cavity pump. If the project is large enough, a cost benefit analysis is recommended for using dry polymer in lieu of emulsion polymer. Dry polymer make-down units are more expensive to buy or rent, but efficacy of make-down and dewatering of the dredge slurry may increase enough to consider the use of dry products. Disadvantages include sensitivity of the system and products to moisture (precipitation and humidity) and thus all equipment and raw products must be maintained in a temperature-controlled structure.

Hydrilla growing within the dredge prism may be a challenge for sediment disposal and/or beneficial use as seeds (5-6 millimeters [mm] long), tubers (5-10 mm long), turions (5-8 mm long) and rhizomes may be captured in the geotextile tubes during dredging. In addition, filtrate treatment may be required prior to discharge to the Cayuga Inlet to meet TSS and/or Hydrilla discharge criteria. AECOM recommends additional bench-testing and engineering to evaluate technologies (e.g., screening, filtration, herbicide, pH adjustment and/or ultraviolent light [UV] treatment) for managing this flow and volume prior to discharge to the Cayuga Inlet, if necessary.

8.2 Mechanical Dredging

The SMF only has capacity for 57,600 CY of mechanically dredged material stacked 8-ft high at any time for dewatering and processing. Based on treatability test results, stacked sediment would require stabilization prior to off-site transportation and disposal. Dredging, stacking, stabilization, transportation and disposal would need to occur simultaneously during dredging operations to maximize dredge productivity goals and schedule compared to hydraulic dredging and geotextile tube dewatering.

Mechanical dredge equipment and hoppers should have sufficient draft to access dredge prisms located in the proposed navigation channel but may have difficulty accessing shallow areas of the Inlet or areas with a bridge, utility crossing or other infrastructure. In addition, a transloading area has not been constructed, therefore transfer of mechanically dredged sediment from hopper barges and stacking of the sediment in the SMF would require trucks, conveyors and/or rehandling of the sediment several times for placement prior to dewatering.

Mechanical dredging followed by slurry generation of the dredge material in a hopper and pumping to geotextile tubes contained in the SMF may be a viable dredge and dewatering alternative for this project. Although an extra rehandling step is required to slurry and pump the dredge material from a hopper, the efficiency of mechanical dredging into a hopper may be greater than hydraulic dredging in many areas of the dredge prism that are difficult to reach, have sensitive infrastructure and/or debris is expected to interfere with hydraulic dredging productivity and efficiency.

9.0 References

AECOM. 2024. Provide Dredging at Cayuga Lake Inlet PN 46108 – Pre-Design Investigation (PDI) Work Plan. Ithaca Cayuga Inlet, Ithaca, NY. Prepared for the New York State Office of General Services. September 2024.

Figures

Project Management Initials: Designer:____ Checked:____ Approved:____ ANSI D 22" x 34"



LEGEND:

50+00 — — — 55+00 USACE CHANNEL LINE AND STATIONING (SEE NOTE 1)

NOTES:

1. THE CHANNEL LINE WAS ESTABLISHED BY THE USACE FOR CONSTRUCTION OF STAGE III OF THE LOCAL FLOOD CONTROL PROJECT, CAYUGA INLET, ITHACA, NEW YORK (DRAWINGS DATED MAY 1967). STATIONING WAS REVISED IN "HYDRAULIC ANALYSIS AND IMPACTS OF LONG TERM SHOALING FOR FLOOD RISK MANAGEMENT PROJECT, CAYUGA INLET, ITHACA, NEW YORK" (USACE, MAY 2011). AS SHOWN ON THESE DRAWINGS THE CHANNEL IS TAKEN FROM CADD FILES DEVELOPED BY OBRIEN AND GERE (NOW RAMBOL) FOR ITHACA FLOOD CONTROL PROJECT 30-PERCENT BASIS OF DESIGN REPORT (APRIL, 2015).
2. BATHYMETRIC SURVEY DATA FROM USGS SCIENCEBASE-CATALOG: WERNLY, J.F., AND NYSTROM, E.A., 2016, GEOSPATIAL DATASET OF BATHYMETRIC SURVEY OF THE CAYUGA INLET FLOOD-CONTROL CHANNEL AND SELECTED TRIBUTARIES, ITHACA, N.Y., 2016: U.S. GEOLOGICAL SURVEY DATA RELEASE, HTTP://DX.DOI.ORG/10.5066/F7K935NQ.
3. ORTHOIMAGERY: NYSDOP HIGH RESOLUTION IMAGERY 2023.
4. APPROXIMATE PROPERTY LINE INFORMATION: NYS ITS GPO, NYS TAX PARCELS, AUGUST 2020.
5. THE SEDIMENT MANAGEMENT FACILITY WAS CONSTRUCTED BASED ON DESIGN DRAWINGS BY RAMBOLL (FORMERLY O'BRIEN AND GERE).

AECOM

PROJECT

ITHACA CAYUGA INLET DREDGING

ITHACA, NEW YORK
NYSOGS PROJECT NUMBER 46108

CLIENT

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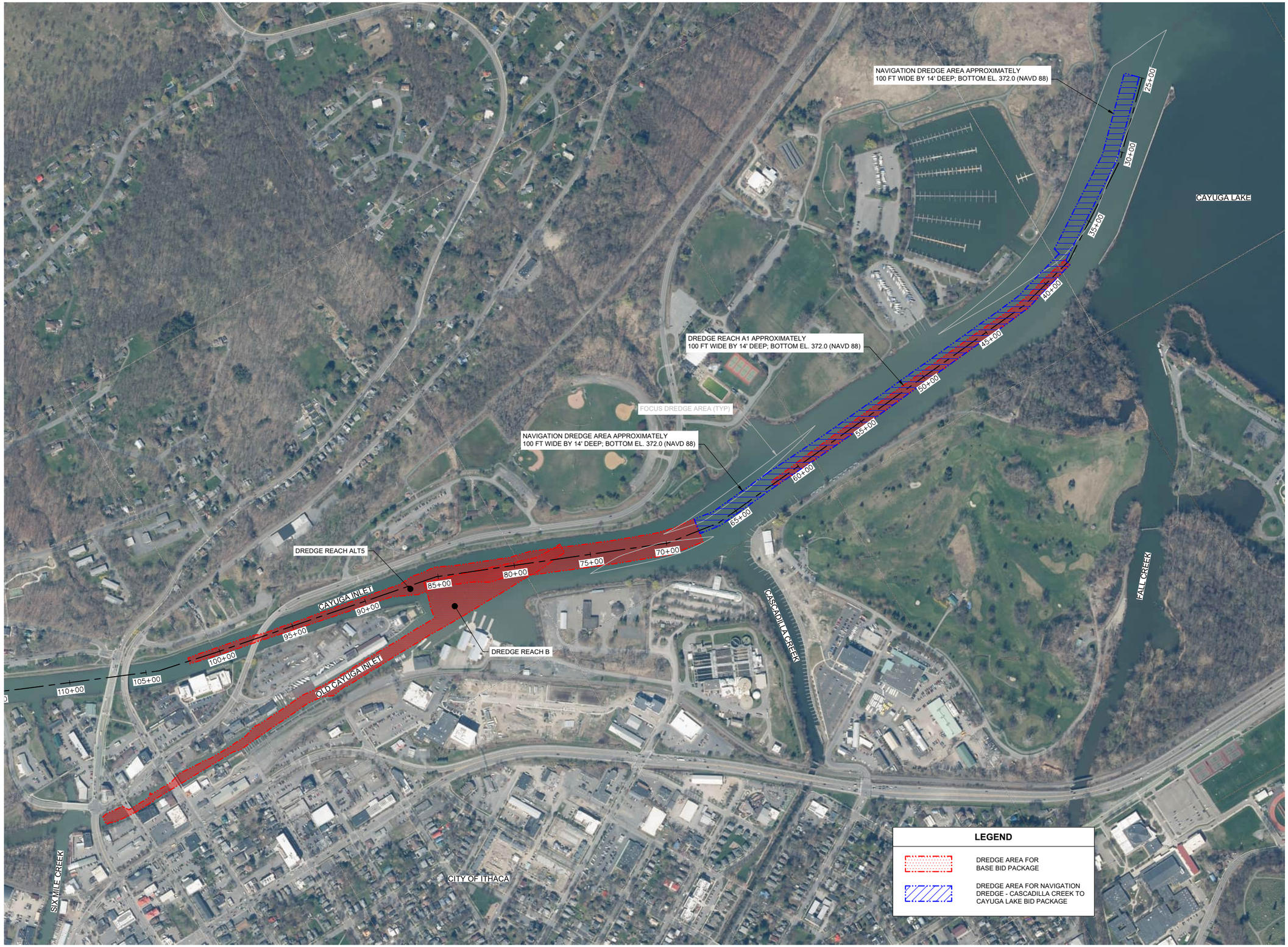
DRAFT & NOT FOR CONSTRUCTION

PROJECT NUMBER
60736218

SHEET TITLE
SITE LAYOUT

SHEET NUMBER
FIGURE 1

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Filename: C:\USERS\JOHN.SCHIFANO\DESKTOP\ACAD\DESIGNS - SYS_CAD\CS-SHEETS\REV\ FIGURE 1_SITE LAYOUT.DWG



Project Management Initials: Designer: Checked: Approved: ANSI D 22" x 34"

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Filename: C:\USERS\JOHN.SCHIFANO\AECOM\ITHACA\DREDGING - WC\CAD\3-SKETCHES\REV 1\FIGURE 3_NAVIGATION DREDGING PLAN.DWG

AECOM

PROJECT

ITHACA CAYUGA INLET DREDGING

ITHACA, NEW YORK
NYSOGS PROJECT NUMBER 46108

CLIENT

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N

0 300' 600'
1" = 300'

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CONSTRUCTION

PROJECT NUMBER

60736218

SHEET TITLE

DREDGE AREAS FOR BASE BID AND NAVIGATION DREDGE - CASCADILLA CREEK TO CAYUGA LAKE

SHEET NUMBER

FIGURE 2

ANSI D 22" x 34"



LEGEND

- PROPOSED BATHYMETRIC SURVEY AREA
- AS-BUILT (EXISTING CONDITIONS) BATHYMETRIC SURVEY AREA
- PROPOSED SEDIMENT SAMPLE LOCATION
- AS-BUILT SEDIMENT SAMPLE LOCATION

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Filename: C:\USERS\DARRELL.KENNEDY\ACCOMM\ITHACA DREDGING - 60618365_DOS\THORD\000\CAD_DWGS\ALT\CHES\PDI REPORT\FIGURE 3 AS-BUILT SEDIMENT SAMPLE LOCATIONS.DWG

AECOM

PROJECT

CAYUGA INLET DREDGING

ITHACA, TOMPKINS COUNTY, NEW YORK
NYSOGS PROJECT NUMBER 46108

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1" = 500'

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PROJECT NUMBER

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SHEET TITLE

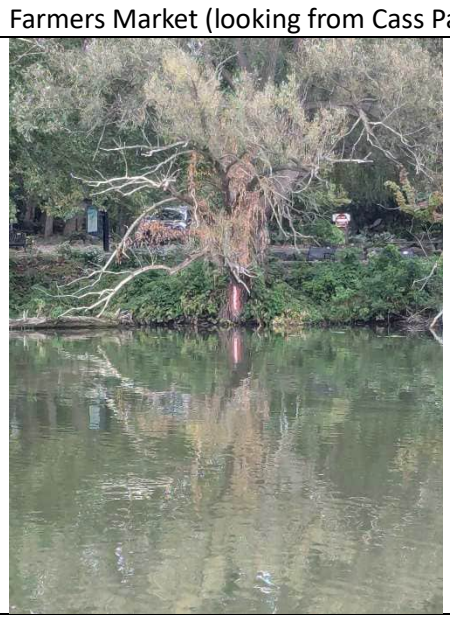
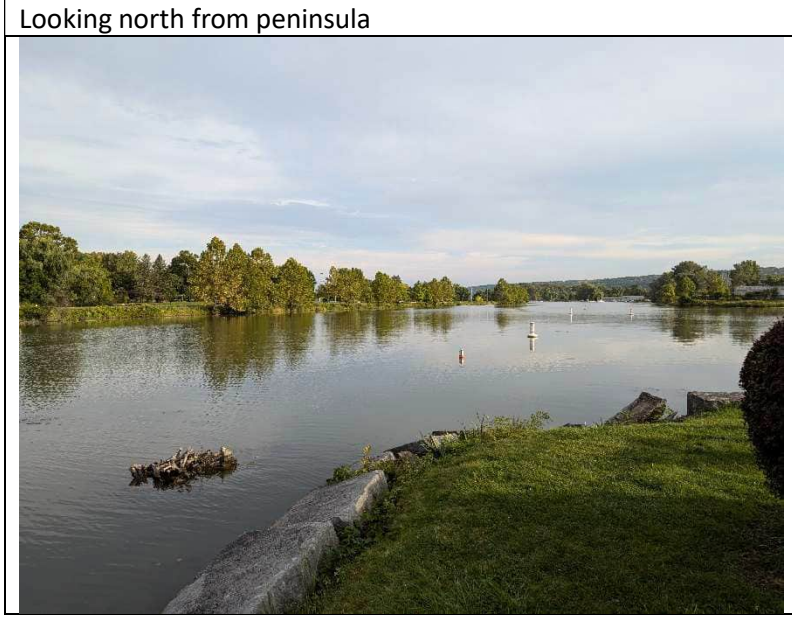
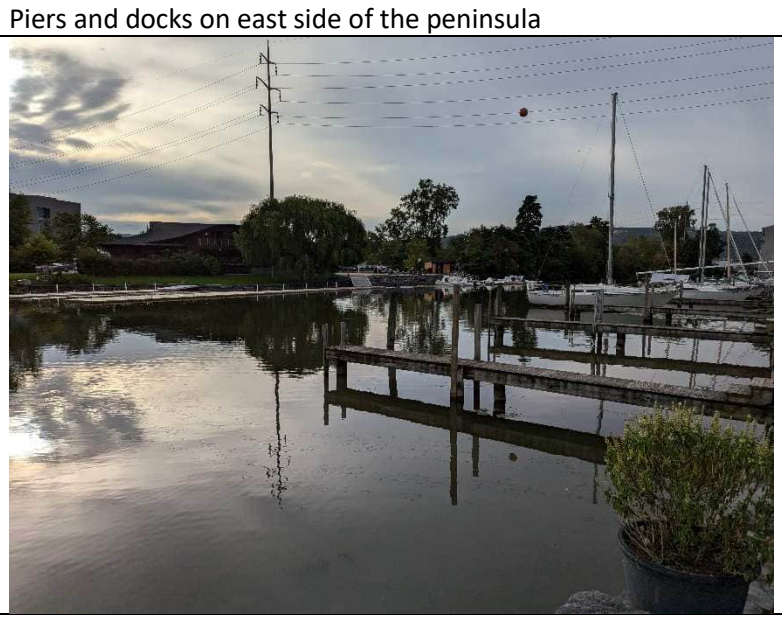
AS-BUILT SEDIMENT
SAMPLE LOCATIONS

SHEET NUMBER

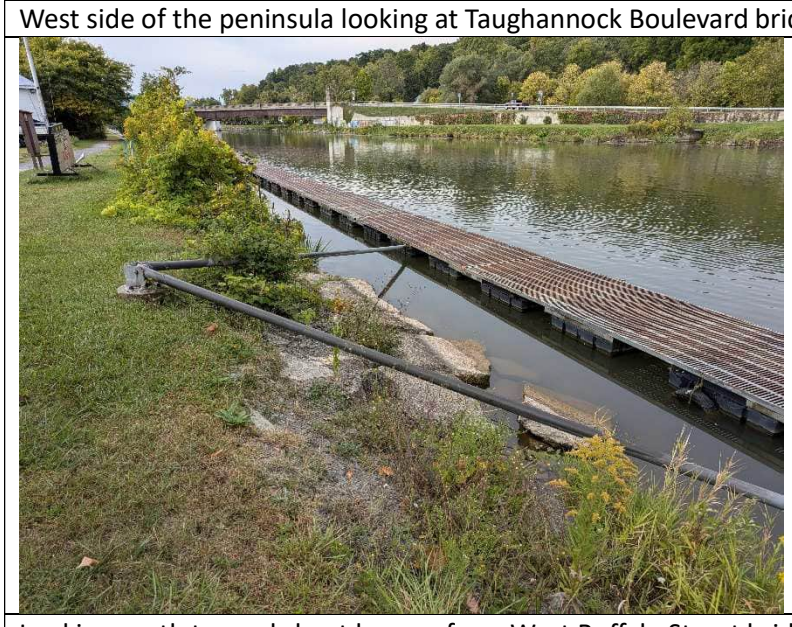
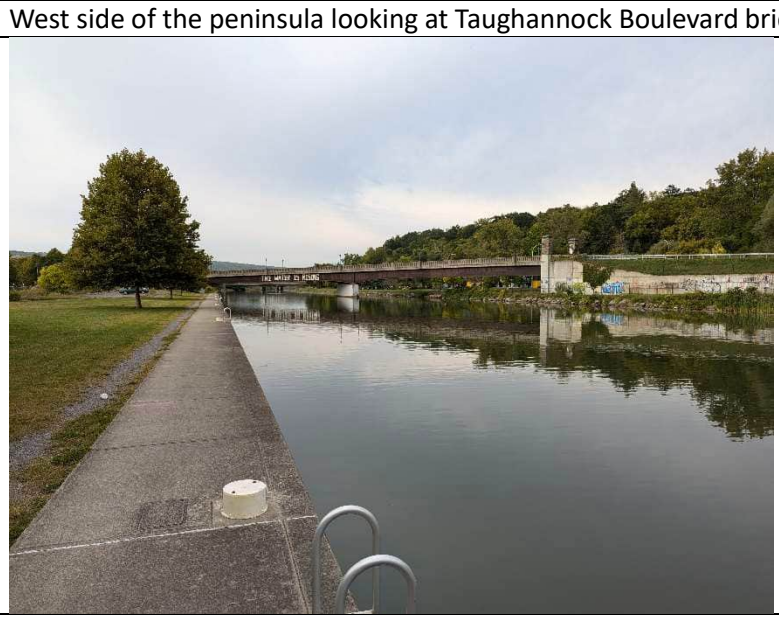
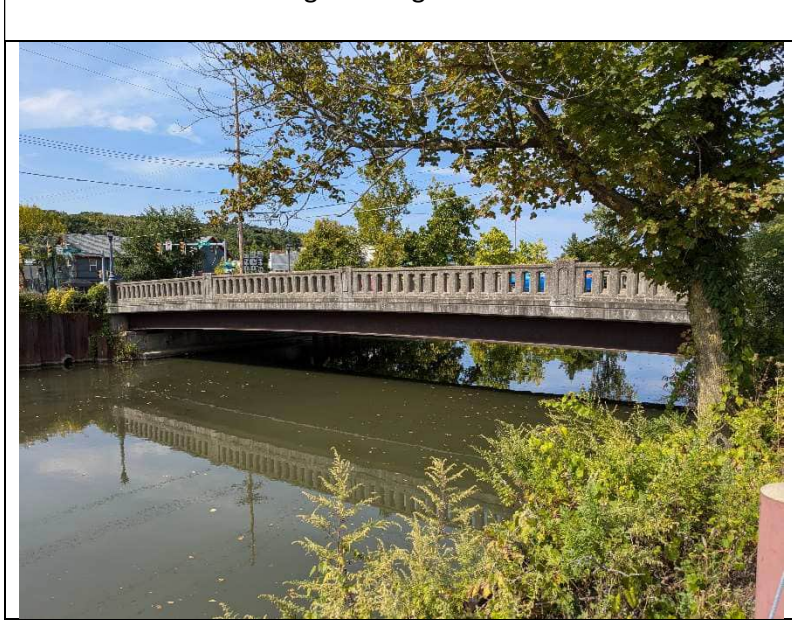
FIGURE 3

Attachment A - Site Visit Photolog

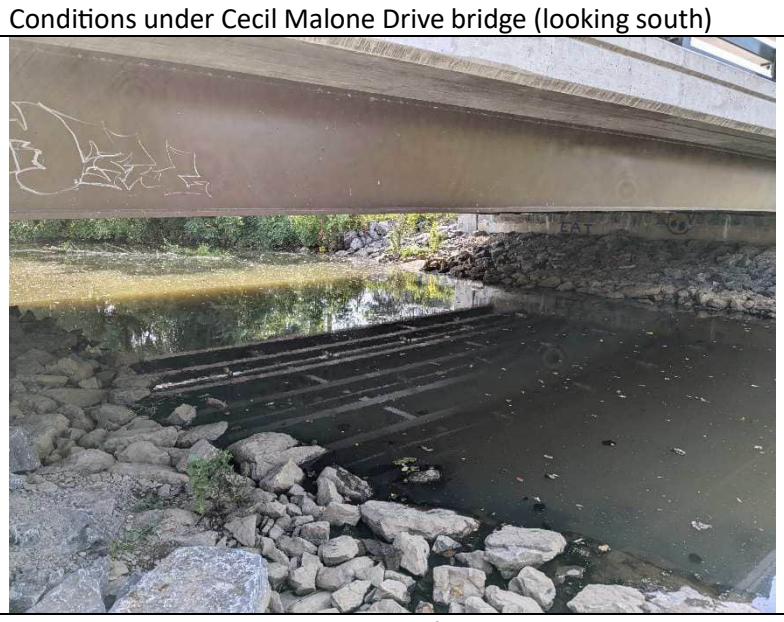
Site Visit Photolog

City property for possible staging area at Cass Park near Linderman Creek (north side of Creek)	City property for possible staging area at Cass Park near Linderman Creek (north side of Creek)
	
City property for possible staging area at Cass Park near Linderman Creek (south side of Creek)	City property for possible staging area at Cass Park near Linderman Creek (south side of Creek)
	
Piers and docks at mouth of Cascadilla Creek (looking from Cass Park)	Possible red/white utility marking along west shoreline of Ithaca Farmers Market (looking from Cass Park)
	
Looking north from peninsula	Piers and docks on east side of the peninsula
	

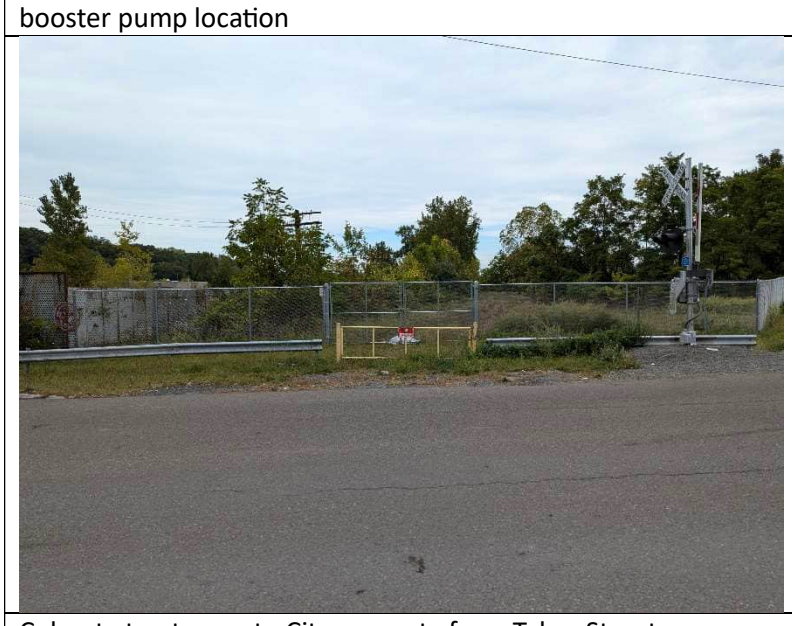
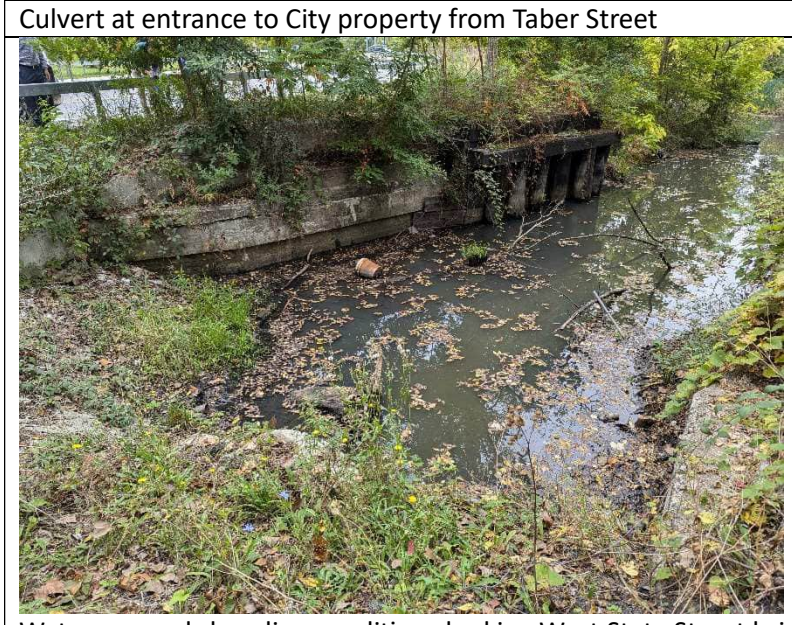
Site Visit Photolog

Petroleum pipeline crossing sign looking east to peninsula/boat houses	Taughannock Boulevard bridge looking north
	
West side of the peninsula looking at Taughannock Boulevard bridge	West side of the peninsula looking at Taughannock Boulevard bridge
	
Looking north towards boat houses from West Buffalo Street bridge (many small piers and floating docks)	West Buffalo Street bridge looking south
	
West Seneca Street bridge looking north	Bulkhead and West State Street bridge looking south from West Seneca Street bridge
	

Site Visit Photolog

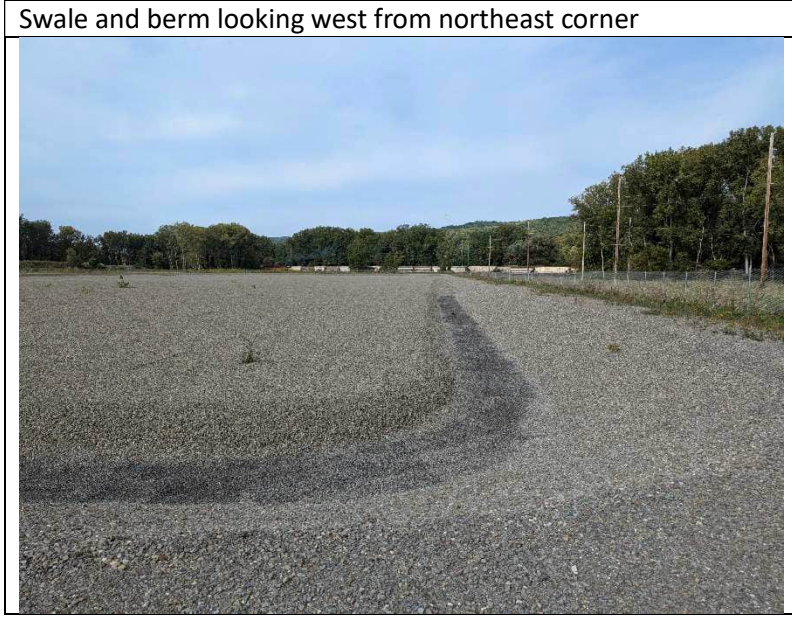
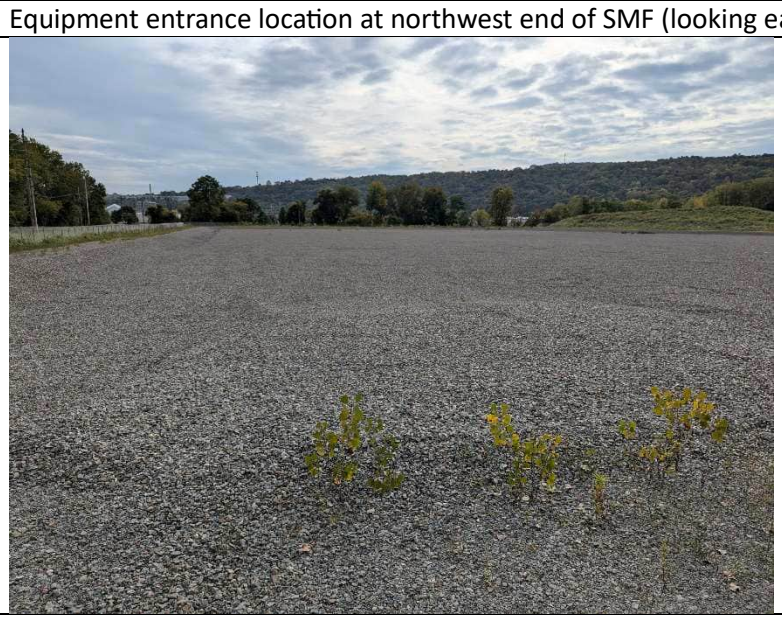
Unmarked totes stored along waterway in Herbert Van Horn City Park	Large wooded debris in water looking north between West State Street bridge and West Seneca Street bridge
	
Debris and garbage from homeless under West State Street bridge	Vegetation and waterway conditions looking south from West State Street bridge
	
Conditions under Cecil Malone Drive bridge (looking south)	Conditions under Cecil Malone Drive bridge (looking south)
	
Looking south along railroad tracks from Cecil Malone Drive	Looking south along railroad tracks from access road adjacent tracks
	

Site Visit Photolog

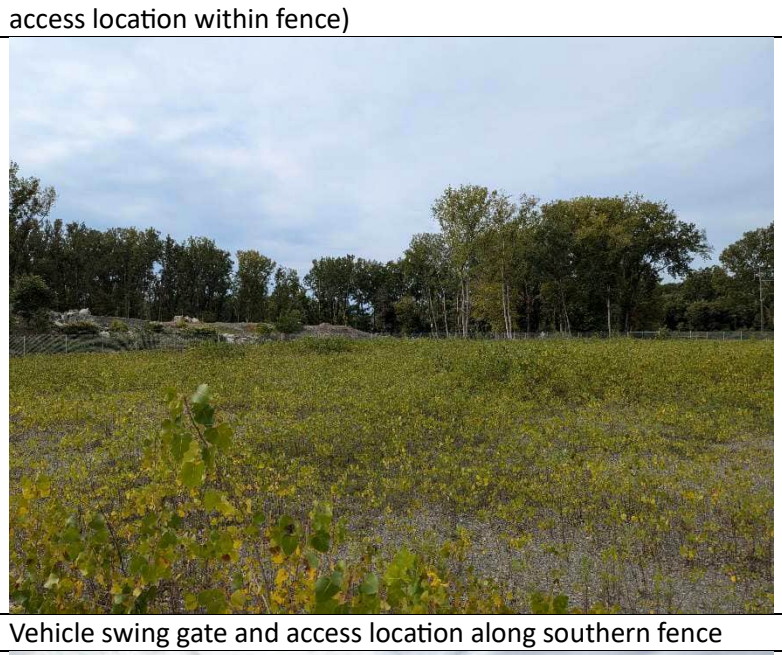
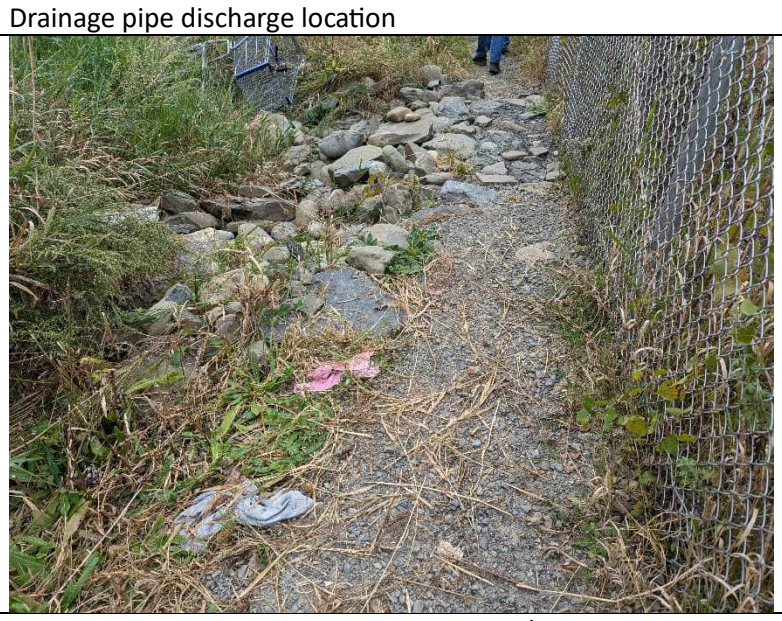
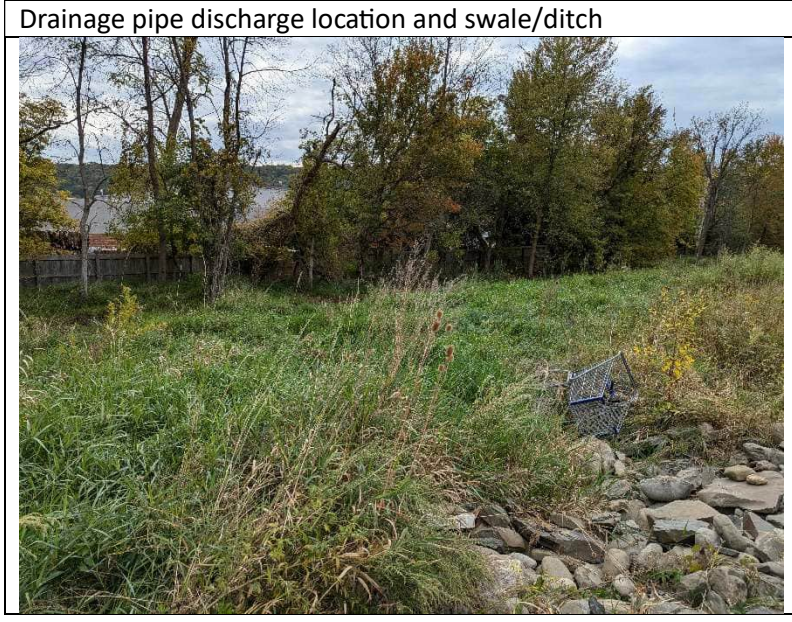
Cecil Malone Drive entrance to City property available for staging and booster pump location	City property conditions at entrance from Cecil Malone Drive
	
Culvert at entrance to City property from Taber Street	City property looking south from Taber Street entrance
	
Waterway and shoreline conditions looking West State Street bridge from City Property (high vegetation and debris)	Shoreline area where hydraulic dredge slurry pipe will exit the Old Cayuga Inlet and head towards Lowes/SMF
	
Culvert at Lowes within hydraulic dredge pipeline alignment	Hydraulic dredge pipeline alignment on northwest edge of Lowes property
	

Site Visit Photolog

Conditions on other side of Lowes property heading towards SMF within hydraulic dredge pipeline alignment	Vehicle Swing Gate at Entrance to SMF
	
Homeless encampment on exterior of SMF near entrance	Swing gate at entrance to SMF
	
Conditions within SMF near entrance (southwest area)	Conditions along east fence of SMF
	
South swale and berm from southeast corner	East swale and berm from southeast corner
	

SMF looking northwest from southeast corner	Vehicle swing gate and access location along east fence
	
Temporary power drop, panel, and meter along east fence	Inside the panel
	
Power switch	Power box behind panel
	
Swale and berm looking west from northeast corner	Equipment entrance location at northwest end of SMF (looking east)
	

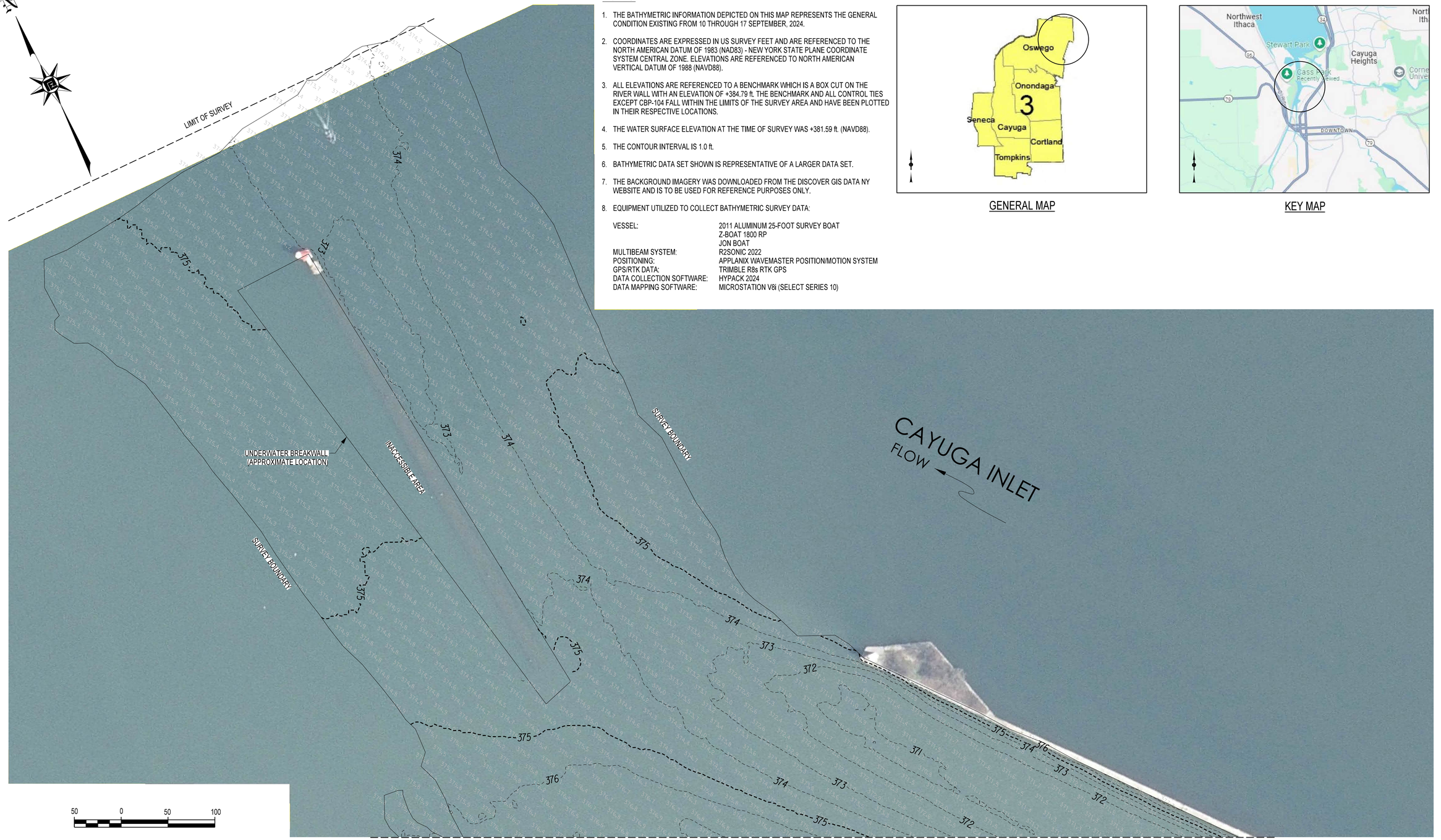
Site Visit Photolog

Southwest open space existing conditions	Southwest open space existing conditions (Vehicle swing gate and access location within fence)
	
South berm and swale looking southeast	Vehicle swing gate and access location along southern fence
	
SMF sump pit and drainage pipe	Drainage pipe discharge location
	
Drainage pipe discharge location and swale/ditch	Drainage pipe discharge location and swale/ditch
	
Drainage pipe discharge location and swale/ditch	Drainage pipe discharge location and swale/ditch

Site Visit Photolog

SMF southwest area from the City's elevated spoils staging area to the south	SMF looking northeast from the City's elevated spoils staging area to the south
	

Attachment B1 - Bathymetric Survey Drawings



NOTES:

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5. THE CONTOUR INTERVAL IS 1.0 ft.
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MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

GENERAL MAP

KEY MAP

POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
	All values are in Survey Feet (ft.)				
101	884320.61	836741.60	399.10	CBP	MAG NAIL WITH DISC SET IN END OF CONC. WALL WEST OF WATER EDGE
102	889539.50	838706.23	387.59	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
103	889381.94	839453.02	387.22	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
104	897139.94	837714.11	384.97	CBP	CAPPED IRON ROD SET IN GROUND SOUTH OF WATER EDGE
100	890302.01	839041.05	384.79	CPBM	BOX CUT ON RIVER WALL

STATE OF NEW YORK · DAVID J. LARUE · 050403 · LICENSED LAND SURVEYOR

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DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_01.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

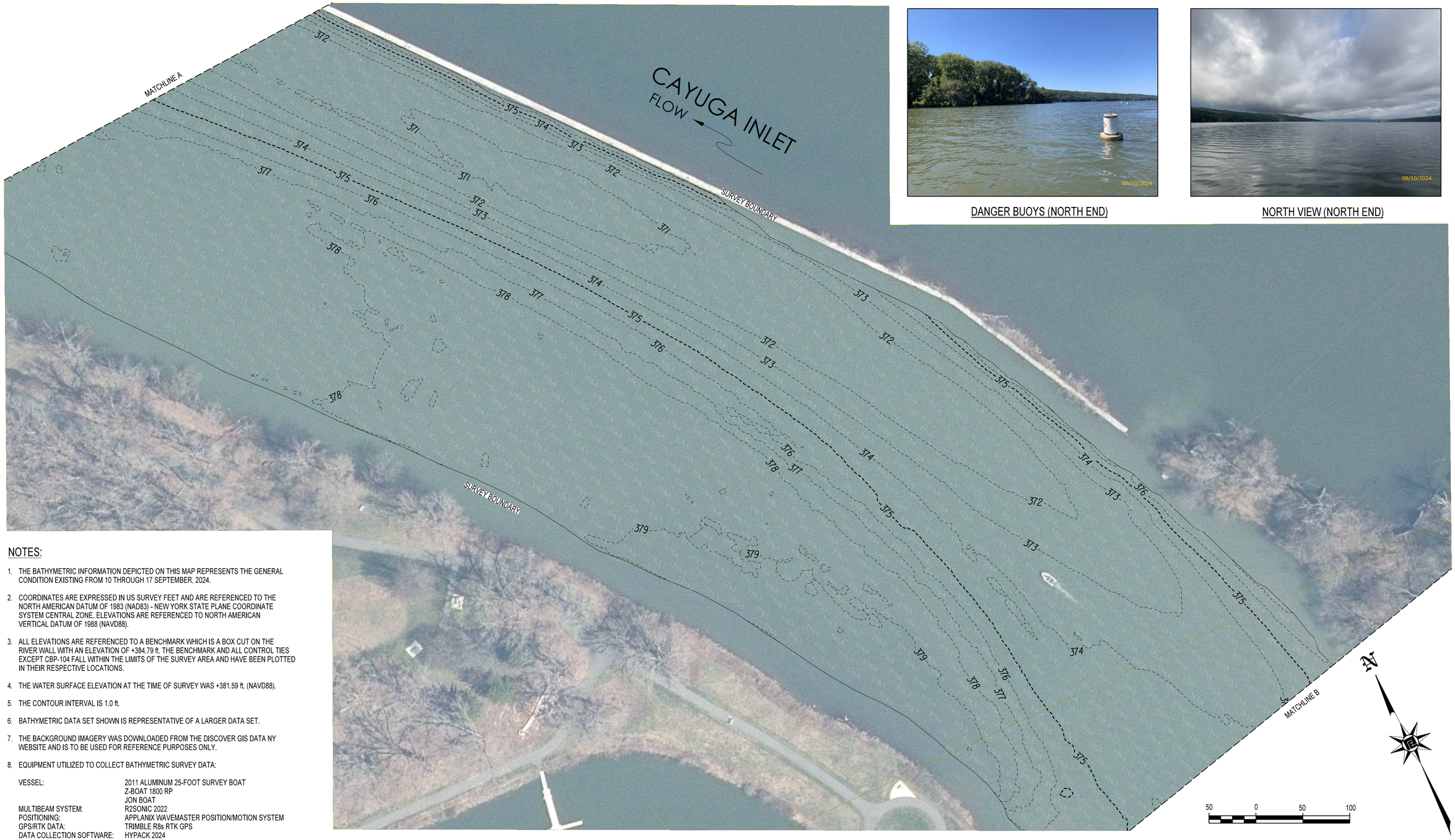
BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 1 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK CHECK
CHECK
DESIGN SUPERVISOR JOB MANAGER S. WAITE DESIGN CHECK
FILE NAME = J:\111\052\CAYUGA LAKE INLET\052-H24-010_539 AECOM\DELIVERABLE PREP\H24-010_539_RPT_BRD_PLN_01.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK



DANGER BUOYS (NORTH END)

NORTH VIEW (NORTH END)

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MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

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STATE OF NEW YORK · DAVID J. LARUE · 50403 · LICENSED LAND SURVEYOR

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DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_02.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

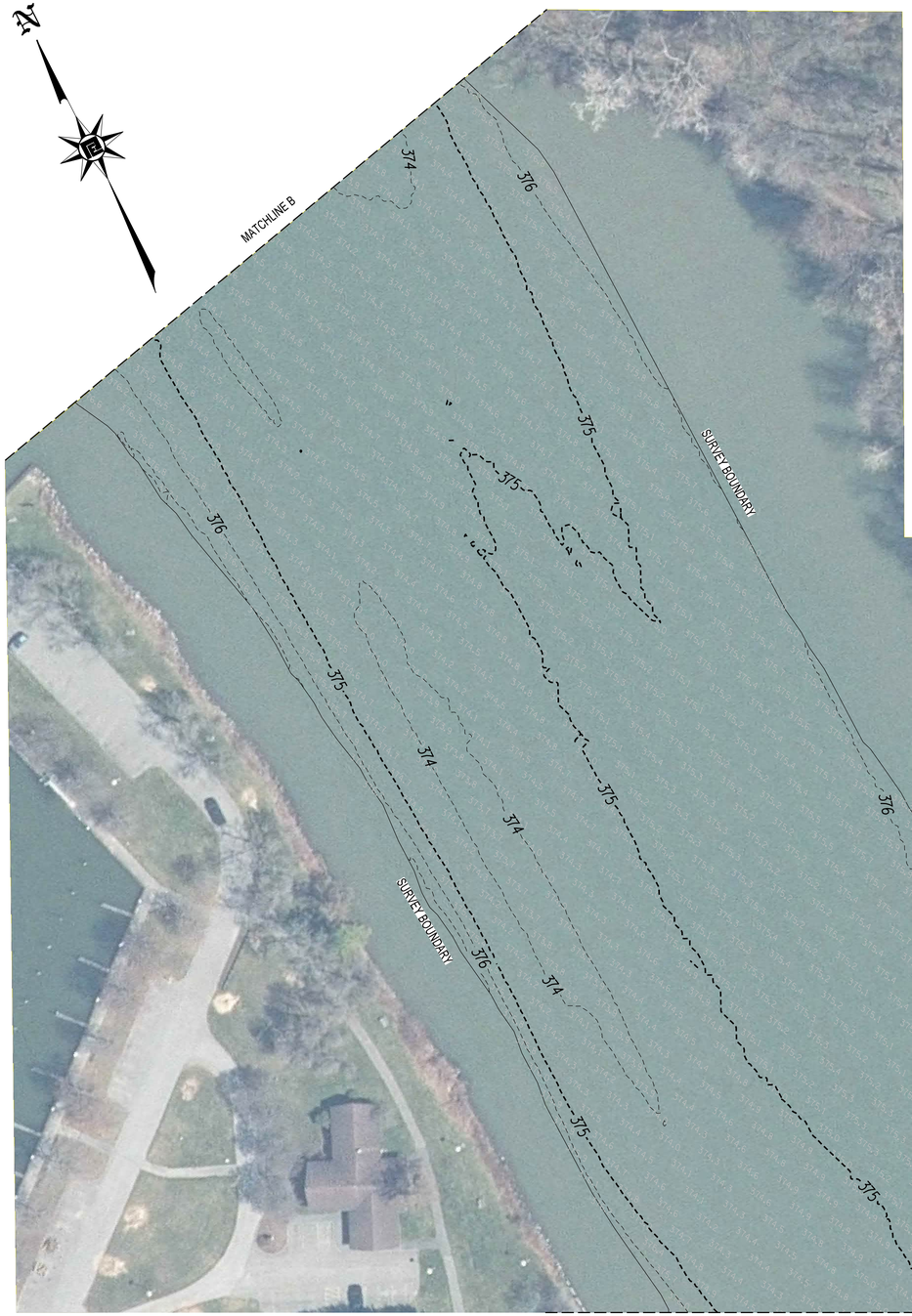
DRAWING NO. 1
SHEET NO. 2 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK CHECK
JOB MANAGER S. WAITE DESIGN
DESIGN SUPERVISOR CHECK

FILE NAME = J:\ III \ 052 \ CAYUGA LAKE INLET \ 052-H24-010_539 AECOM DELIVERABLE PREP\ H24-010_539_RPT_BRD_PLN_02.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK





50 0 50 100

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DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)



SUBMERGED JETTY (NORTH END)



SOUTH VIEW (NORTH END)

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L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_03.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 3 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

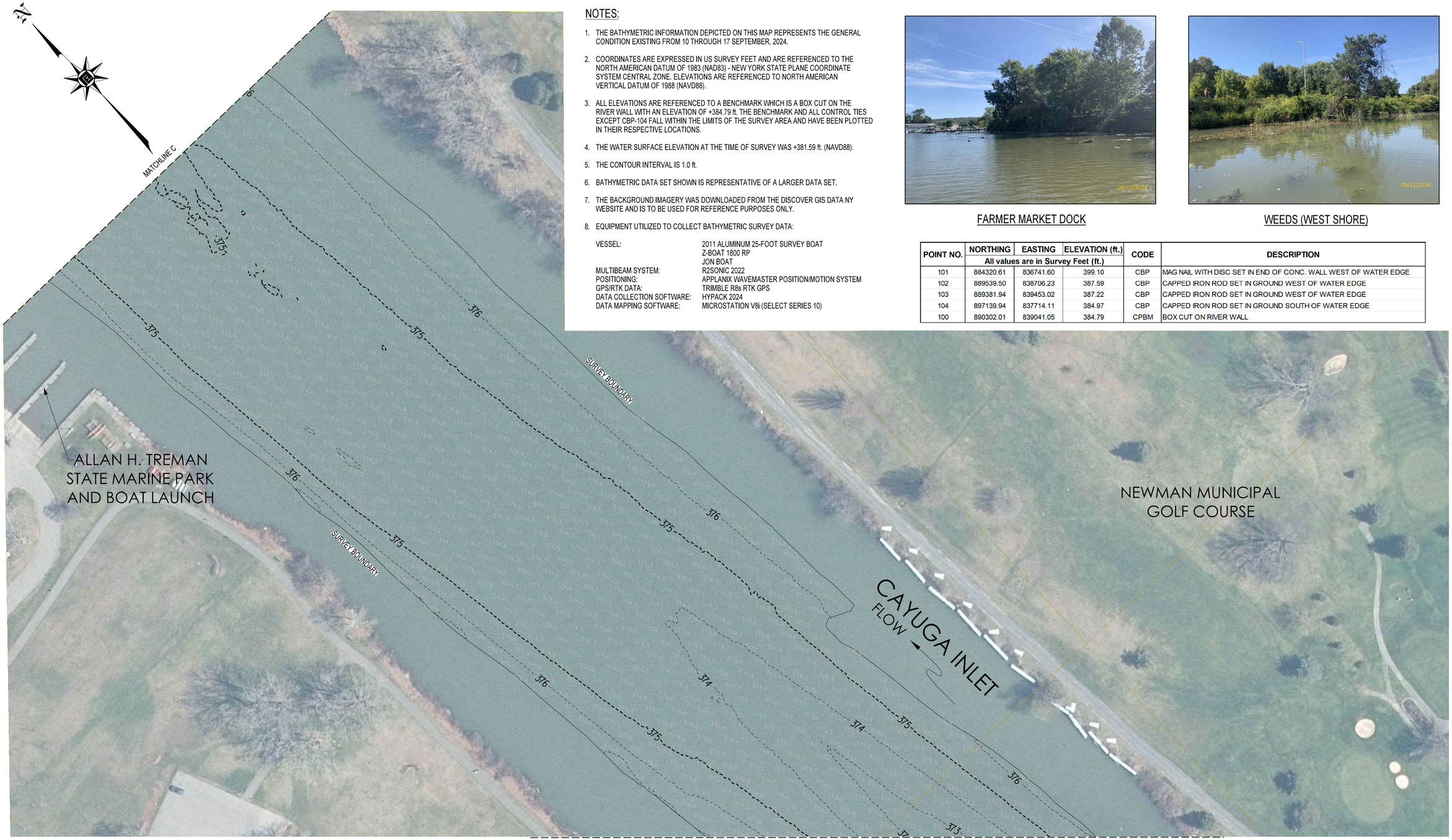
AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK CHECK
JOB MANAGER S. WAITE DESIGN
DESIGN SUPERVISOR CHECK

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DATE/TIME = OCTOBER 2024
USER = E. HADCOCK

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK
CHECK
CHECK
JOB MANAGER S. WAITE
DESIGN
CHECK
DESIGN SUPERVISOR

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DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

FARMER MARKET DOCK

WEEDS (WEST SHORE)

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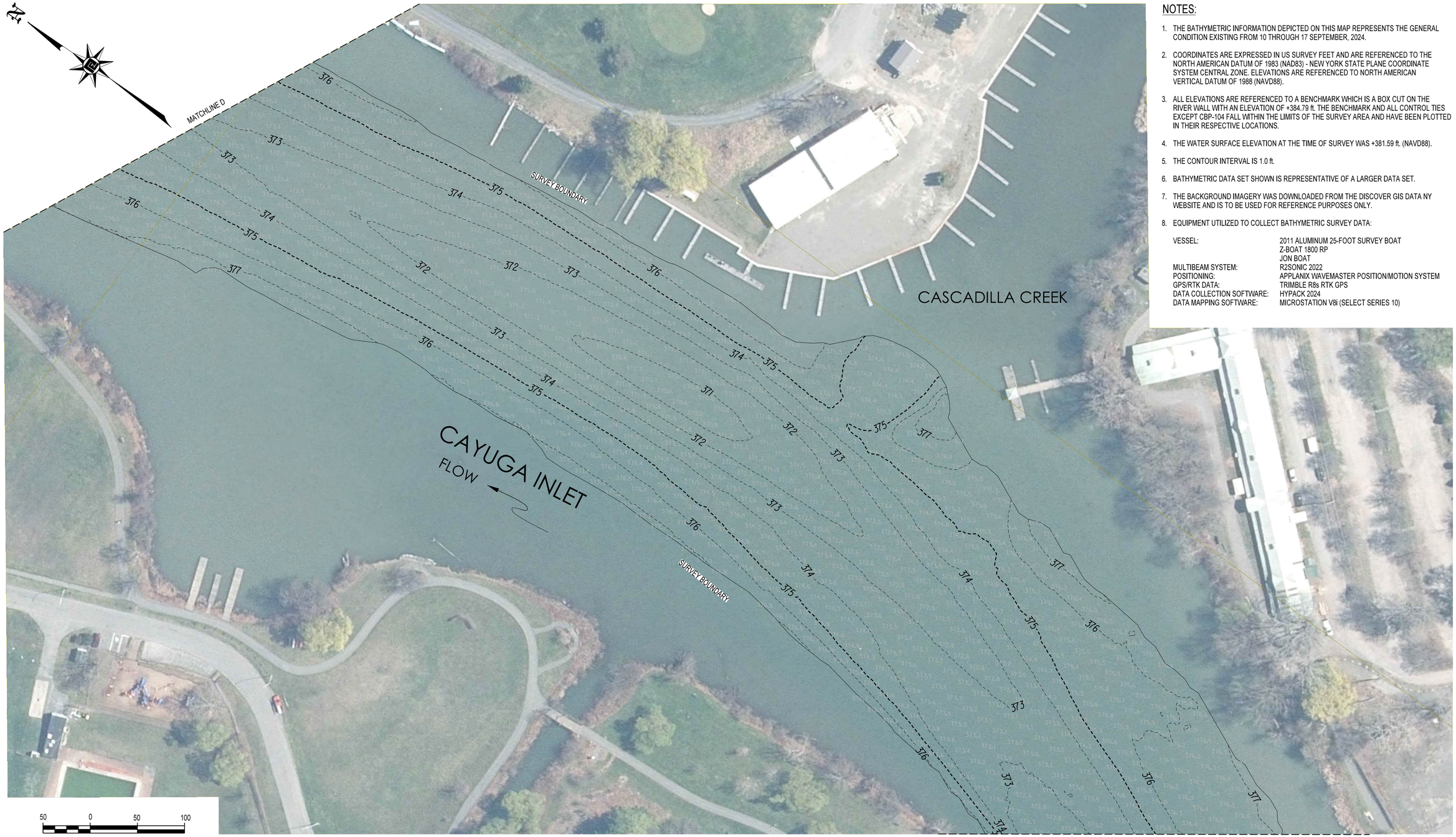
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BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 4 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM



NOTES:

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2. COORDINATES ARE EXPRESSED IN US SURVEY FEET AND ARE REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83) - NEW YORK STATE PLANE COORDINATE SYSTEM CENTRAL ZONE. ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. ALL ELEVATIONS ARE REFERENCED TO A BENCHMARK WHICH IS A BOX CUT ON THE RIVER WALL WITH AN ELEVATION OF +384.79 ft. THE BENCHMARK AND ALL CONTROL TIES EXCEPT CBP-104 FALL WITHIN THE LIMITS OF THE SURVEY AREA AND HAVE BEEN PLOTTED IN THEIR RESPECTIVE LOCATIONS.
4. THE WATER SURFACE ELEVATION AT THE TIME OF SURVEY WAS +381.59 ft. (NAVD88).
5. THE CONTOUR INTERVAL IS 1.0 ft.
6. BATHYMETRIC DATA SET SHOWN IS REPRESENTATIVE OF A LARGER DATA SET.
7. THE BACKGROUND IMAGERY WAS DOWNLOADED FROM THE DISCOVER GIS DATA NY WEBSITE AND IS TO BE USED FOR REFERENCE PURPOSES ONLY.
8. EQUIPMENT UTILIZED TO COLLECT BATHYMETRIC SURVEY DATA:

VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
	All values are in Survey Feet (ft.)				
101	884320.61	836741.60	399.10	CBP	MAG NAIL WITH DISC SET IN END OF CONC. WALL WEST OF WATER EDGE
102	889539.50	838706.23	387.59	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
103	889381.94	839453.02	387.22	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
104	897139.94	837714.11	384.97	CBP	CAPPED IRON ROD SET IN GROUND SOUTH OF WATER EDGE
100	890302.01	839041.05	384.79	CPBM	BOX CUT ON RIVER WALL

STATE OF NEW YORK · DAVID J. LARUE · 050403 · LICENSED LAND SURVEYOR

I HEREBY CERTIFY THAT THIS MAP WAS PREPARED IN ACCORDANCE WITH COUNTY OF MONROE PROJECT DESIGN SCOPE OF SERVICES SECTION 2 SURVEY REQUIREMENTS AND SECTION 5.04 MAPPING REQUIREMENTS FROM REFERENCES LISTED HEREON.

DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_05.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

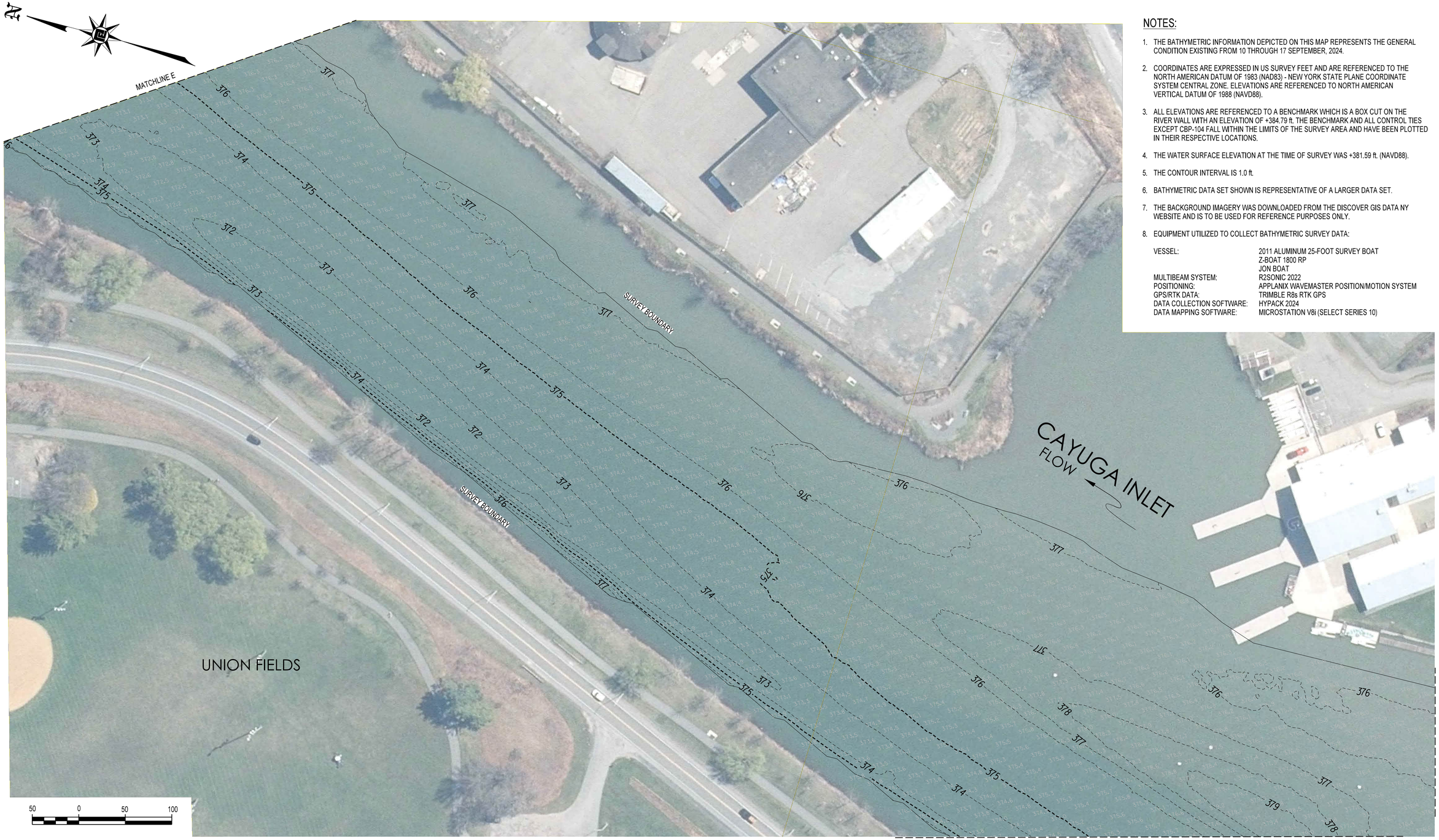
DRAWING NO. 1
SHEET NO. 5 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK CHECK
JOB MANAGER S. WAITE DESIGN CHECK
DESIGN SUPERVISOR

FILE NAME = J:\111\052\CAYUGA LAKE INLET\052-H24-010_539.AECOM\DELIVERABLE PREP\H24-010_539_RPT_BRD_PLN_05.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK



NOTES:

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VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

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100	890302.01	839041.05	384.79	CPBM	BOX CUT ON RIVER WALL

STATE OF NEW YORK · DAVID J. LARUE · 50403 · LICENSED LAND SURVEYOR

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DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_06.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

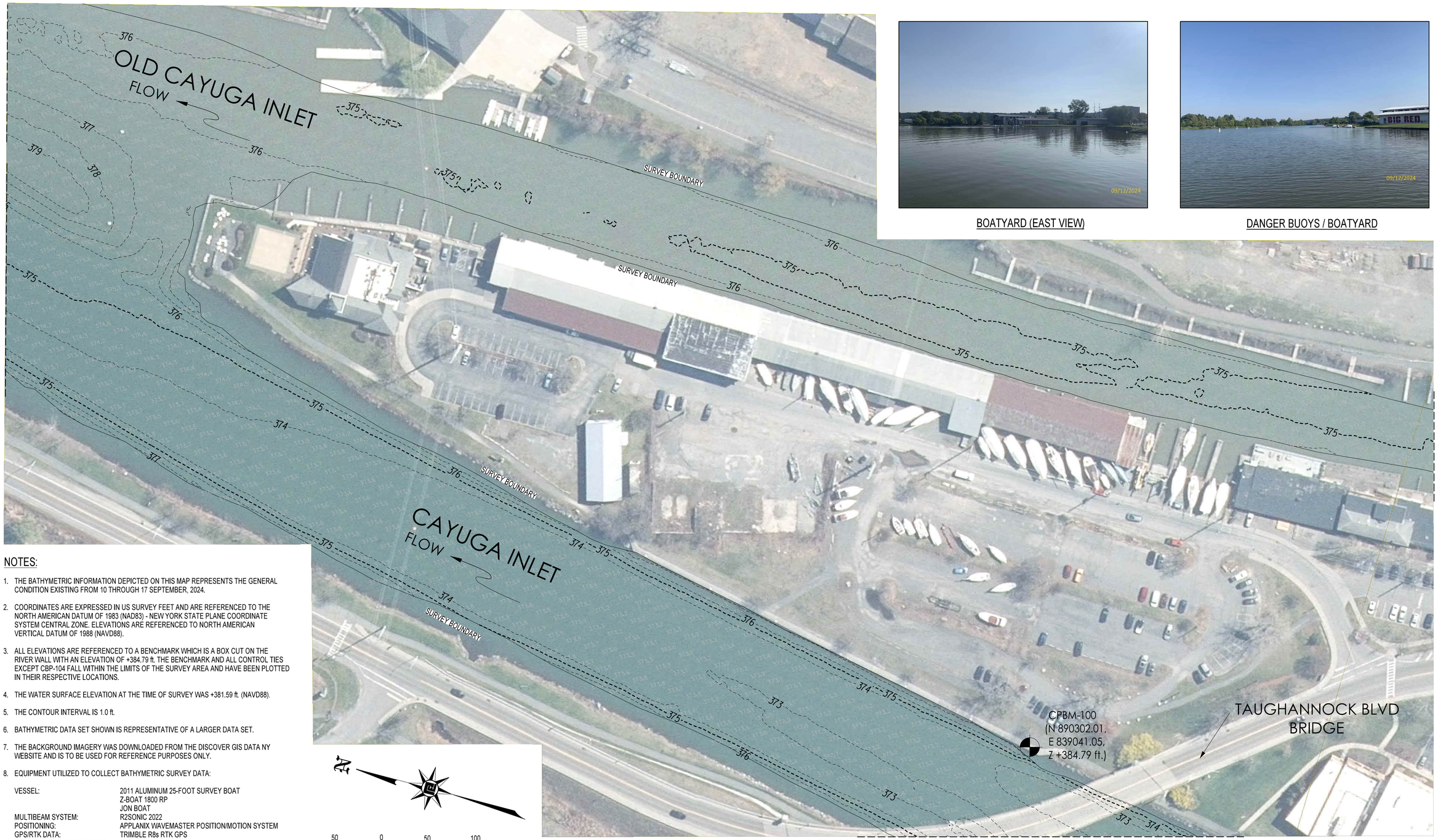
DRAWING NO. 1
SHEET NO. 6 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

DESIGN SUPERVISOR ____ JOB MANAGER S. WAITE ____ DESIGN ____ CHECK ____
DRAFTING E. HADCOCK ____ CHECK ____ PROJECT MANAGER S. WAITE

FILE NAME = J:\ III \ 052 \ CAYUGA LAKE INLET \ 052-H24-010_539 AECOM DELIVERABLE PREP\ H24-010_539_RPT_BRD_PLN_06.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK



BOATYARD (EAST VIEW)

DANGER BUOYS / BOATYARD

NOTES:

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VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
	All values are in Survey Feet (ft.)				
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STATE OF NEW YORK · DAVID J. LaRUE · 050403 · LICENSED LAND SURVEYOR

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DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_07.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

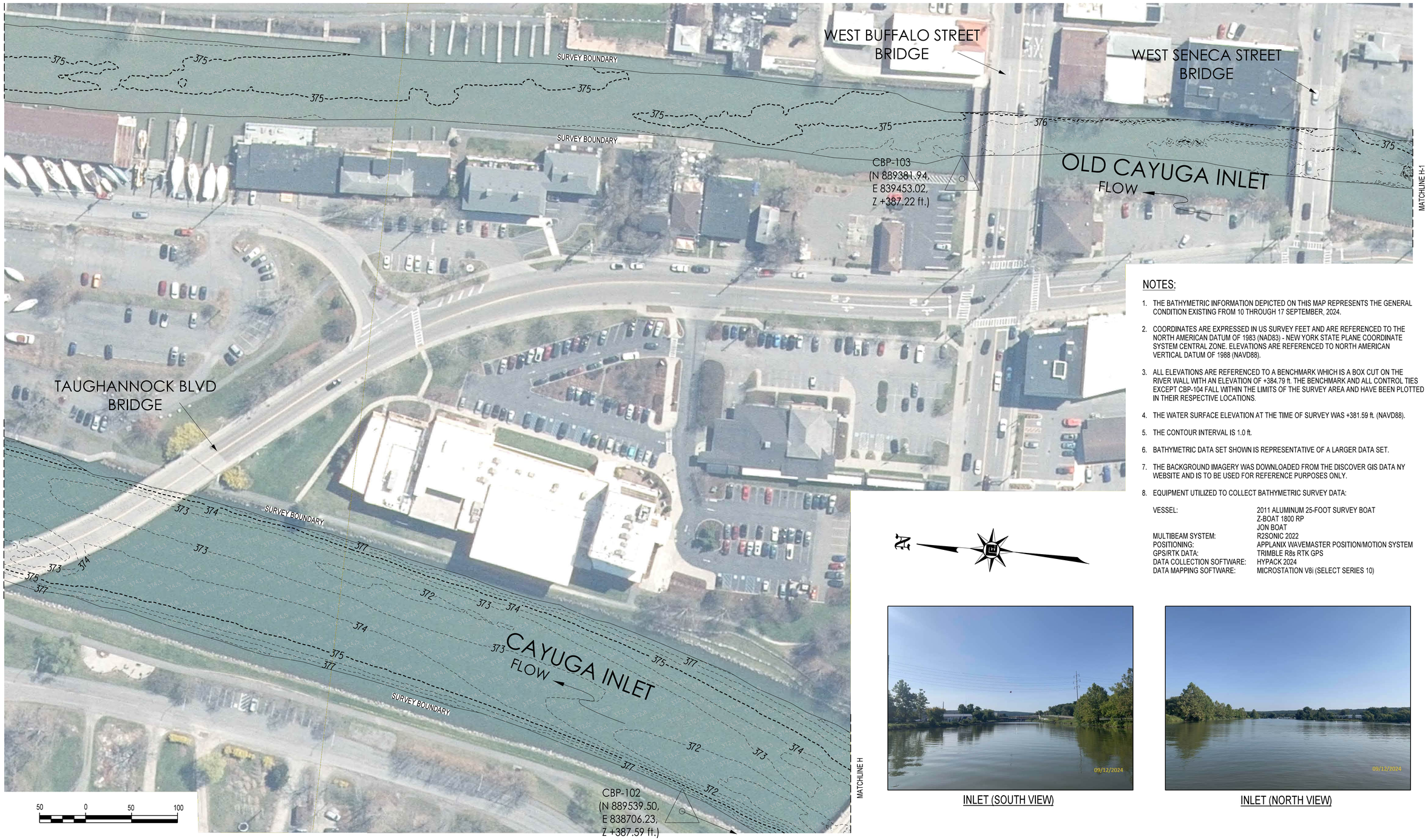
DRAWING NO. 1
SHEET NO. 7 OF 13

AECOM

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK
CHECK
JOB MANAGER S. WAITE
DESIGN
CHECK
DESIGN SUPERVISOR

FILE NAME = J:\111\052\CAYUGA LAKE INLET\052-H24-010_539 AECOM\DELIVERABLE PREP\H24-010_539_RPT_BRD_PLN_07.DGN
DATE/TIME = OCTOBER 2024
USER = E.HADCOCK



NOTES:

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VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

INLET (SOUTH VIEW)

INLET (NORTH VIEW)

POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
	All values are in Survey Feet (ft.)				
101	884320.61	836741.60	399.10	CBP	MAG NAIL WITH DISC SET IN END OF CONC. WALL WEST OF WATER EDGE
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STATE OF NEW YORK · DAVID J. LARUE · 50403 · LICENSED LAND SURVEYOR

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DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_08.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 8 OF 13

AECOM

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

DESIGN SUPERVISOR
DRAFTING E. HADCOCK
JOB MANAGER S. WAITE
DESIGN
CHECK
PROJECT MANAGER S. WAITE

FILE NAME = J:\ III \ 052 \ CAYUGA LAKE INLET \ 052-H24-010_539 AECOM DELIVERABLE PREP\ H24-010_539_RPT_BRD_PLN_08.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK





BOATYARD



INLET (SOUTH VIEW)

NOTES:

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VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)





POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
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STATE OF NEW YORK · DAVID J. LARUE · 50403 · LICENSED LAND SURVEYOR

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DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_09.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 9 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK CHECK
JOB MANAGER S. WAITE DESIGN
DESIGN SUPERVISOR CHECK

FILE NAME = J:\ III \ 052 \ CAYUGA LAKE INLET \ 052-H24-010_539 AECOM\ DELIVERABLE PREP\ H24-010_539_RPT_BRD_PLN_09.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK



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VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
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STATE OF NEW YORK · DAVID J. LARUE · 50403 · LICENSED LAND SURVEYOR

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DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_10.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 10 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK
CHECK
JOB MANAGER S. WAITE
DESIGN
CHECK
DESIGN SUPERVISOR

FILE NAME = J:\111\052\CAYUGA LAKE INLET\052-H24-010_539 AECOM\ DELIVERABLE PREP\ H24-010_539_RPT_BRD_PLN_10.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK



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POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
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100	890302.01	839041.05	384.79	CPBM	BOX CUT ON RIVER WALL

STATE OF NEW YORK · DAVID J. LARUE · 50403 · LICENSED LAND SURVEYOR

I HEREBY CERTIFY THAT THIS MAP WAS PREPARED IN ACCORDANCE WITH COUNTY OF MONROE PROJECT DESIGN SCOPE OF SERVICES SECTION 2 SURVEY REQUIREMENTS AND SECTION 5.04 MAPPING REQUIREMENTS FROM REFERENCES LISTED HEREON.

DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_11.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 11 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK
CHECK
CHECK
JOB MANAGER S. WAITE
DESIGN
DESIGN SUPERVISOR
CHECK

FILE NAME = J:\111\052\CAYUGA LAKE INLET\052-H24-010_539 AECOM\DELIVERABLE PREP\H24-010_539_RPT_BRD_PLN_11.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK



NOTES:

1. THE BATHYMETRIC INFORMATION DEPICTED ON THIS MAP REPRESENTS THE GENERAL CONDITION EXISTING FROM 10 THROUGH 17 SEPTEMBER, 2024.
2. COORDINATES ARE EXPRESSED IN US SURVEY FEET AND ARE REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83) - NEW YORK STATE PLANE COORDINATE SYSTEM CENTRAL ZONE. ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. ALL ELEVATIONS ARE REFERENCED TO A BENCHMARK WHICH IS A BOX CUT ON THE RIVER WALL WITH AN ELEVATION OF +384.79 ft. THE BENCHMARK AND ALL CONTROL TIES EXCEPT CBP-104 FALL WITHIN THE LIMITS OF THE SURVEY AREA AND HAVE BEEN PLOTTED IN THEIR RESPECTIVE LOCATIONS.
4. THE WATER SURFACE ELEVATION AT THE TIME OF SURVEY WAS +381.59 ft. (NAVD88).
5. THE CONTOUR INTERVAL IS 1.0 ft.
6. BATHYMETRIC DATA SET SHOWN IS REPRESENTATIVE OF A LARGER DATA SET.
7. THE BACKGROUND IMAGERY WAS DOWNLOADED FROM THE DISCOVER GIS DATA NY WEBSITE AND IS TO BE USED FOR REFERENCE PURPOSES ONLY.
8. EQUIPMENT UTILIZED TO COLLECT BATHYMETRIC SURVEY DATA:

VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)

POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
	All values are in Survey Feet (ft.)				
101	884320.61	836741.60	399.10	CBP	MAG NAIL WITH DISC SET IN END OF CONC. WALL WEST OF WATER EDGE
102	889539.50	838706.23	387.59	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
103	889381.94	839453.02	387.22	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
104	897139.94	837714.11	384.97	CBP	CAPPED IRON ROD SET IN GROUND SOUTH OF WATER EDGE
100	890302.01	839041.05	384.79	CPBM	BOX CUT ON RIVER WALL

STATE OF NEW YORK · DAVID J. LaRUE · LICENSED LAND SURVEYOR · 50403

I HEREBY CERTIFY THAT THIS MAP WAS PREPARED IN ACCORDANCE WITH COUNTY OF MONROE PROJECT DESIGN SCOPE OF SERVICES SECTION 2 SURVEY REQUIREMENTS AND SECTION 5.04 MAPPING REQUIREMENTS FROM REFERENCES LISTED HEREON.

DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_12.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 12 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK
CHECK
CHECK
DESIGN
JOB MANAGER S. WAITE
DESIGN SUPERVISOR

FILE NAME = J:\111\052\CAYUGA LAKE INLET\052-H24-010_539 AECOM\DELIVERABLE PREP\H24-010_539_RPT_BRD_PLN_12.DGN
DATE/TIME = OCTOBER 2024
USER = E.HADCOCK



NOTES:

1. THE BATHYMETRIC INFORMATION DEPICTED ON THIS MAP REPRESENTS THE GENERAL CONDITION EXISTING FROM 10 THROUGH 17 SEPTEMBER, 2024.
2. COORDINATES ARE EXPRESSED IN US SURVEY FEET AND ARE REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83) - NEW YORK STATE PLANE COORDINATE SYSTEM CENTRAL ZONE. ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. ALL ELEVATIONS ARE REFERENCED TO A BENCHMARK WHICH IS A BOX CUT ON THE RIVER WALL WITH AN ELEVATION OF +384.79 ft. THE BENCHMARK AND ALL CONTROL TIES EXCEPT CBP-104 FALL WITHIN THE LIMITS OF THE SURVEY AREA AND HAVE BEEN PLOTTED IN THEIR RESPECTIVE LOCATIONS.
4. THE WATER SURFACE ELEVATION AT THE TIME OF SURVEY WAS +381.59 ft. (NAVD88).
5. THE CONTOUR INTERVAL IS 1.0 ft.
6. BATHYMETRIC DATA SET SHOWN IS REPRESENTATIVE OF A LARGER DATA SET.
7. THE BACKGROUND IMAGERY WAS DOWNLOADED FROM THE DISCOVER GIS DATA NY WEBSITE AND IS TO BE USED FOR REFERENCE PURPOSES ONLY.
8. EQUIPMENT UTILIZED TO COLLECT BATHYMETRIC SURVEY DATA:

VESSEL:	2011 ALUMINUM 25-FOOT SURVEY BOAT Z-BOAT 1800 RP JON BOAT
MULTIBEAM SYSTEM:	R2SONIC 2022
POSITIONING:	APPLANIX WAVEMASTER POSITION/MOTION SYSTEM
GPS/RTK DATA:	TRIMBLE R8s RTK GPS
DATA COLLECTION SOFTWARE:	HYPACK 2024
DATA MAPPING SOFTWARE:	MICROSTATION V8i (SELECT SERIES 10)



50 0 50 100
SCALE IN FEET

POINT NO.	NORTHING	EASTING	ELEVATION (ft.)	CODE	DESCRIPTION
	All values are in Survey Feet (ft.)				
101	884320.61	836741.60	399.10	CBP	MAG NAIL WITH DISC SET IN END OF CONC. WALL WEST OF WATER EDGE
102	889539.50	838706.23	387.59	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
103	889381.94	839453.02	387.22	CBP	CAPPED IRON ROD SET IN GROUND WEST OF WATER EDGE
104	897139.94	837714.11	384.97	CBP	CAPPED IRON ROD SET IN GROUND SOUTH OF WATER EDGE
100	890302.01	839041.05	384.79	CPBM	BOX CUT ON RIVER WALL

STATE OF NEW YORK · DAVID J. LARUE · 50403 · LICENSED LAND SURVEYOR

I HEREBY CERTIFY THAT THIS MAP WAS PREPARED IN ACCORDANCE WITH COUNTY OF MONROE PROJECT DESIGN SCOPE OF SERVICES SECTION 2 SURVEY REQUIREMENTS AND SECTION 5.04 MAPPING REQUIREMENTS FROM REFERENCES LISTED HEREON.

DAVID J. LARUE, PLS
L.S.# 050403

SURVEYED BY:	AEJ
DRAWN BY:	EGH
SCALE:	1" = 50'
DATE OF SURVEY:	10-17 SEPTEMBER, 2024
COUNTY:	CAYUGA - REGION 3
DOCUMENT FILE:	H24-010_539_RPT_BRD_PLN_13.DGN

ALL DIMENSIONS IN US SURVEY FT UNLESS OTHERWISE NOTED

BATHYMETRIC SURVEY
CAYUGA LAKE INLET
ITHACA, NY

DRAWING NO. 1
SHEET NO. 13 OF 13

PRUDENT ENGINEERING
6390 FLY ROAD, E. SYRACUSE, NY 13057

AECOM

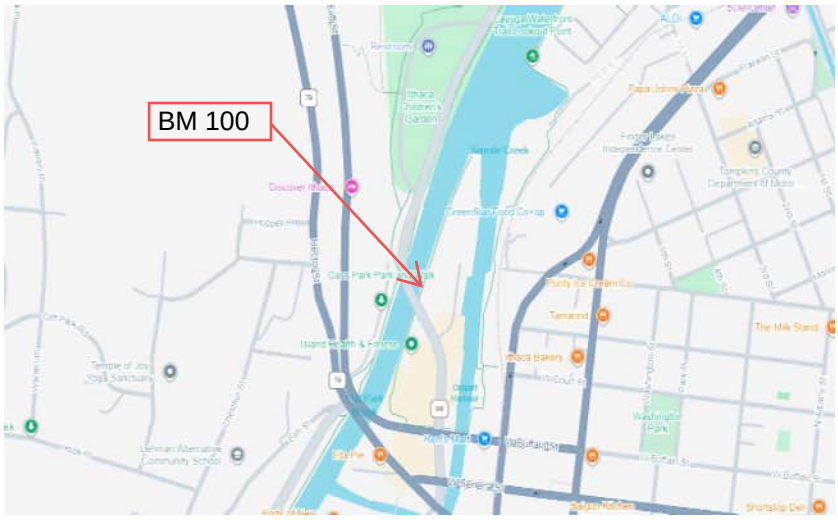
PROJECT MANAGER S. WAITE
DRAFTING E. HADCOCK CHECK
CHECK
JOB MANAGER S. WAITE DESIGN
DESIGN SUPERVISOR
CHECK
FILE NAME = J:\111\052\CAYUGA LAKE INLET\052-H24-010_539 AECOM\ DELIVERABLE PREP\ H24-010_539_RPT_BRD_PLN_13.DGN
DATE/TIME = OCTOBER 2024
USER = E. HADCOCK

Attachment B2 - Dredging Station Recovery File

USACE Survey Marker Archive & Retrieval Tool Datasheet

Type: New

Designation: 100
Project: Ithaca Dredging
Stamping:
PID **NGS:** **COE:**
State: New York
County: Tomkins
District Buffalo
Nearest Town: Ithaca
USGS Quad: Ithaca west
Parcel ID #:
Nearest Hwy/Mi:
Date Recovered: 09/10/2024
By: JW, CH
Condition/Stability: Good
Setting/Monument Type: Cut Box in River Wall
Owner: Prudent
GPS Suitable: (•) Yes ( ) No
Obstructions: [ ] N [ ] E [ ] S [ ] W
Magnetic: ( ) Yes (•) No



- Horizontal -

Datum: NAD83 (2011)
Lat: 42°26'36.8734" N
Lon: 76°30'48.8103" W
Local Accuracy: 1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method:
RTK to NYS CORS
Date Observed: 09/10/2024

- Vertical -

Datum: NAVD88 (GEOID 2018)
Elevation Ht: 384.791 Ft
Ellip Ht:
Local Accuracy: 0.1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method:
Digital Levels
Date Observed: 09/10/2024 **Geoid 2018**

Access: By Automobile/ Foot

- Tidal/Hydraulic Gage Relationships -

Owner:	Gage ID:	- Elevation -	- Datum -	Epoch:

Description/Comments: Benchmark 100 is located on a cut box on the river wall, on the east side of the Cayuga Inlet and west of old taughnnock blvd.

- State Plane Coordinates -

Zone: 3102 **Northing:** 890302.01 USFT **Easting:** 839041.05 USFT **Convergence:** **CSF:**

- Horizon/Setup View -



- Close-Up View-



Required Fields In Red

Submit

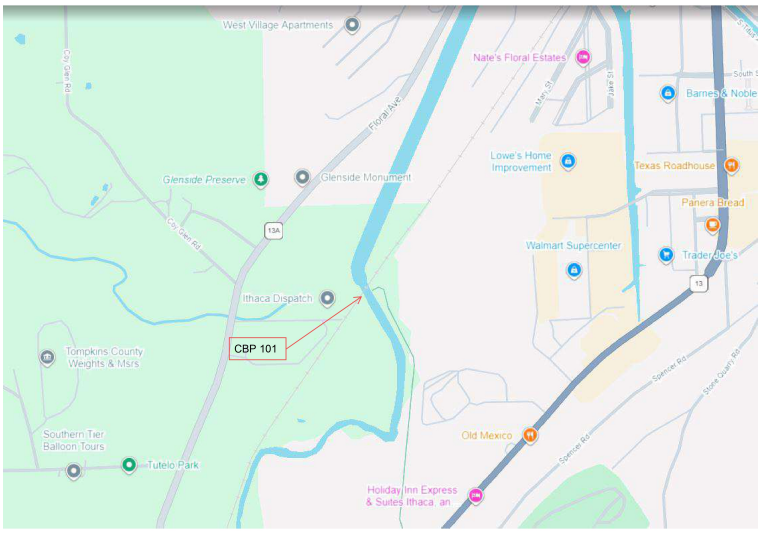
System Fields in Green

U-SMART ver 2.4.2
10/8/2010

USACE Survey Marker Archive & Retrieval Tool Datasheet

Type: Used

Designation: 101
Project: Ithaca Dredging
Stamping: LRB 08 2010
PID NGS: _____ **COE:** _____
State: New York
County: Tomkins
District Buffalo
Nearest Town: Ithaca
USGS Quad: Ithaca West
Parcel ID #: 525.0-06-1
Nearest Hwy/Mi: NY 13A
Date Recovered: 09/10/2024
By: JW,CH
Condition/Stability: Good
Setting/Monument Type: Mag Nail With Disc
Owner: USACE
GPS Suitable: (•) Yes ( ) No
Obstructions: [ ] N [ ] E [ ] S [ ] W
Magnetic: (•) Yes ( ) No



- Horizontal -

Datum: NAD83 (2011)
Lat: 42°25'37.8021" N
Lon: 76°31'19.5378" W
Local Accuracy: 1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: RTK to NYS CORS
Date Observed: 09/10/2024

- Vertical -

Datum: NAVD88 (GEOID 2018)
Elevation Ht: 399.102 Ft
Ellip Ht: _____
Local Accuracy: 0.1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: Digital Levels
Date Observed: 09/10/2024 **Geoid 2018**

Access: By Automobile/ Foot

- Tidal/Hydraulic Gage Relationships -

Owner:	Gage ID:	- Elevation -	- Datum -	Epoch:

Description/Comments: To reach LRB08 from post office at 213 North Tioga Street Ithaca, NY 14850:
Head south on N tioga St. and go 230 feet. Turn right at E Seneca St and go 0.8 mi. Turn slightly right at MLK Jr St. and go 0.1 mi. Turn left at NY13-A and continue 1.2 mi. Turn left at Inlet Rd. and go 0.3 mi. Point is on left (to the north).

LRB08 is 42' S of RR tracks, and 36' NE of a power pole. Said point set in a concrete structure on the level

- State Plane Coordinates -

Zone: 3102 **Northing:** 884320.605 USFT **Easting:** 836741.596 USFT **Convergence:** _____ **CSF:** _____

- Horizon/Setup View -



- Close-Up View-



Required Fields In Red

Submit

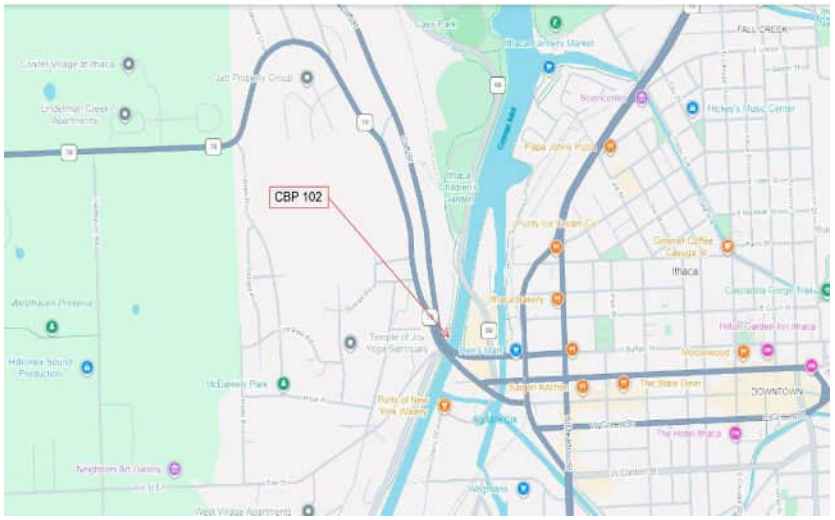
System Fields in Green

U-SMART ver 2.4.2
10/8/2010

USACE Survey Marker Archive & Retrieval Tool Datasheet

Type: New

Designation: 102
Project: Ithaca Dredging
Stamping: Prudent
PID **NGS:** _____ **COE:** _____
State: New York
County: Tomkins
District Buffalo
Nearest Town: Ithaca
USGS Quad: Ithaca west
Parcel ID #: _____
Nearest Hwy/Mi: _____
Date Recovered: 09/10/2024
By: JW, CH
Condition/Stability: Good
Setting/Monument Type: Capped Iron Rod in Ground
Owner: Prudent
GPS Suitable: (•) Yes ( ) No
Obstructions: [ ] N [ ] E [ ] S [ ] W
Magnetic: (•) Yes ( ) No



- Horizontal -

Datum: NAD83 (2011)
Lat: 42°26'29.3434" N
Lon: 76°30'53.2843" W
Local Accuracy: 1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: RTK to NYS CORS
Date Observed: 09/10/2024

- Vertical -

Datum: NAVD88 (GEOID 2018)
Elevation Ht: 387.586 Ft
Ellip Ht: _____
Local Accuracy: 0.1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: Digital Levels
Date Observed: 09/10/2024 **Geoid 2018**

Access: By Automobile/ Foot

- Tidal/Hydraulic Gage Relationships -

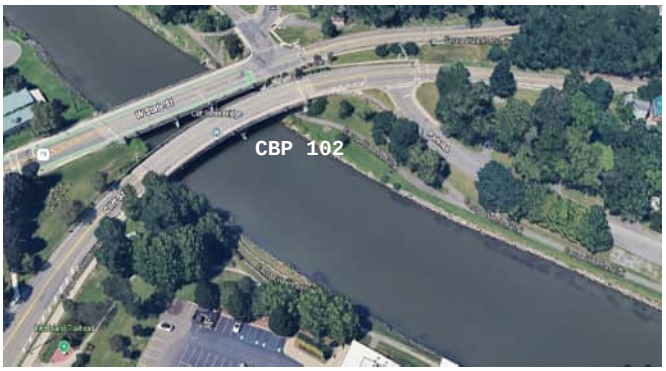
Owner:	Gage ID:	- Elevation -	- Datum -	Epoch:

Description/Comments: CBP 102 is located on the ground on the west side of Cayuga Inlet, near the W Buffalo Street Bridge, 7.55 feet from the southeast corner of the concrete slab, 13.15 feet from the water's edge, and 37.70 feet from the 48" CLF.

- State Plane Coordinates -

Zone: 3102 **Northing:** 889539.496 USFT **Easting:** 838706.234 USFT **Convergence:** _____ **CSF:** _____

- Horizon/Setup View -



- Close-Up View-



Required Fields In Red

Submit

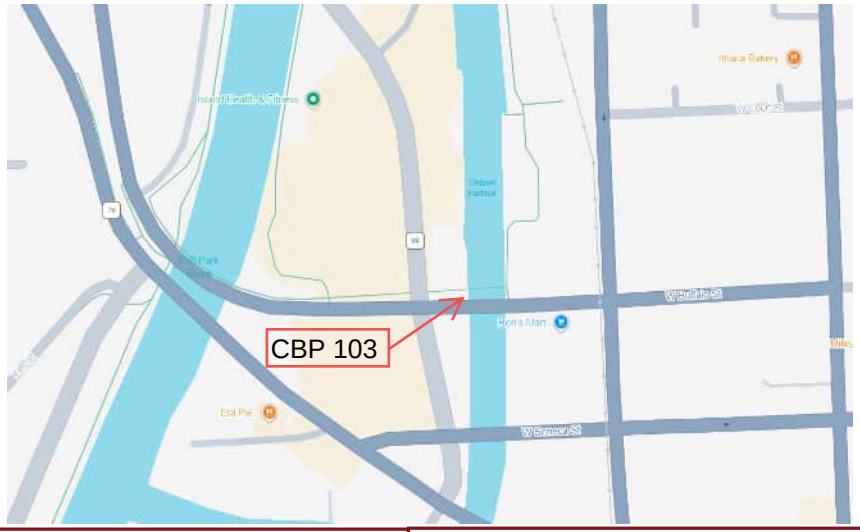
System Fields in Green

U-SMART ver 2.4.2
10/8/2010

USACE Survey Marker Archive & Retrieval Tool Datasheet

Type: New

Designation: 103
Project: Ithaca Dredging
Stamping: Prudent
PID NGS: _____ **COE:** _____
State: New York
County: Tomkins
District Buffalo
Nearest Town: Ithaca
USGS Quad: Ithaca west
Parcel ID #: 58.0-03-7
Nearest Hwy/Mi: _____
Date Recovered: 09/10/2024
By: JW, CH
Condition/Stability: Good
Setting/Monument Type: Capped Iron Rod in Ground
Owner: Prudent
GPS Suitable: (•) Yes ( ) No
Obstructions: [ ] N [ ] E [ ] S [ ] W
Magnetic: (•) Yes ( ) No



- Horizontal -

Datum: NAD83 (2011)
Lat: 42°26'27.7809" N
Lon: 76°30'43.3258" W
Local Accuracy: 1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: RTK to NYS CORS
Date Observed: 09/10/2024

- Vertical -

Datum: NAVD88 (GEOID 2018)
Elevation Ht: 387.222 Ft
Ellip Ht: _____
Local Accuracy: 0.1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: Digital Levels
Date Observed: 09/10/2024 Geoid 2018

Access: By Automobile/ Foot

- Tidal/Hydraulic Gage Relationships -

Owner:	Gage ID:	- Elevation -	- Datum -	Epoch:

Description/Comments: CBP 103 is located on the ground west of the water's edge, near the W Buffalo Street and Taughannock Blvd intersection parking, 4.2 feet from the northeast corner of the abutment, 4.1 feet from the sheet piling, and 5.0 feet from the paved corner.

- State Plane Coordinates -

Zone: 3102 **Northing:** 889381.943 USFT **Easting:** 839453.02 USFT **Convergence:** _____ **CSF:** _____

- Horizon/Setup View -



- Close-Up View-



Required Fields In Red

Submit

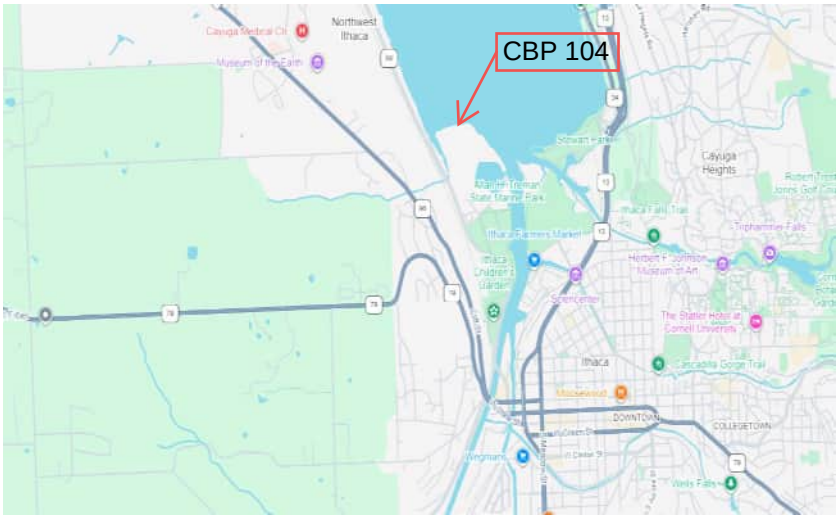
System Fields in Green

U-SMART ver 2.4.2
10/8/2010

USACE Survey Marker Archive & Retrieval Tool Datasheet

Type: New

Designation: 104
Project: Ithaca Dredging
Stamping: Prudent
PID NGS: _____ **COE:** _____
State: New York
County: Tomkins
District Buffalo
Nearest Town: Ithaca
USGS Quad: Ithaca west
Parcel ID #: 2.0-1-1.1
Nearest Hwy/Mi: _____
Date Recovered: 09/10/2024
By: JW, CH
Condition/Stability: Good
Setting/Monument Type: Capped Iron Rod in Ground
Owner: Prudent
GPS Suitable: (•) Yes ( ) No
Obstructions: [ ] N [ ] E [ ] S [ ] W
Magnetic: (•) Yes ( ) No



- Horizontal -

Datum: NAD83 (2011)
Lat: 42°27'44.4339" N
Lon: 76°31'06.4393" W
Local Accuracy: 1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: RTK to NYS CORS
Date Observed: 09/10/2024

- Vertical -

Datum: NAVD88 (GEOID 2018)
Elevation Ht: 384.968 Ft
Ellip Ht: _____
Local Accuracy: 0.1-cm
NSRS Accuracy: 2nd Order
Survey/Computation Method: Digital Levels
Date Observed: 09/10/2024 **Geoid 2018**

Access: By Automobile/ Foot

- Tidal/Hydraulic Gage Relationships -

Owner:	Gage ID:	- Elevation -	- Datum -	Epoch:

Description/Comments: CBP 104 is located on the ground west of the water's edge, at the southwest corner of the Cayuga Lake light beacon, 9.8 feet and 9.3 feet from the pavement markings in Mag nail, and 7.8 feet from the water's edge."

- State Plane Coordinates -

Zone: 3102 **Northing:** 897139.939 USFT **Easting:** 837714.108 USFT **Convergence:** _____ **CSF:** _____

- Horizon/Setup View -



- Close-Up View-



Required Fields In Red

Submit

System Fields in Green

U-SMART ver 2.4.2
10/8/2010

Attachment C - AECOM Daily Field Reports

Attachment C - AECOM Daily Field Reports

AECOM

DATE: 9/10/2024

DAY	S	M	T	W	TH	F	S

DAILY CONSTRUCTION REPORT

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Still	Moder	High	Report No.	
HUMIDITY	Dry	Moder	Humid		

PROJECT: Ithaca Dredging Project
CONTRACTOR: Prudent Engineering
AECOM JOB No.: 60736218
AECOM PROJECT MANAGER: Kevin Shanahan

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks
Prudent Engineering		Audrey Gerald Andrew Fishbach Jordan James	

VISITORS

Time	Representing	Representing	Remarks

EQUIPMENT AT THE SITE:

Pickup truck
Survey boat

CONSTRUCTION ACTIVITIES:

Onsite at 730am
Completed tailgate safety meeting.
Bathymetric survey completed from the entrance of the Cayuga to Clarkin Boat Rentals (approximately 920,000 square feet).
Offsite at 500pm.

See attached photos

Sheet: 1 of 1

☐ X - designates info on backside of page

By: Keith Stahle Title: Geologist IV

Reviewed by: Title:

Attachment C - AECOM Daily Field Reports

AECOM

DATE: 9/11/2024

DAY	S	M	T	W	TH	F	S

DAILY CONSTRUCTION REPORT

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Still	Moder	High	Report No.	
HUMIDITY	Dry	Moder	Humid		

PROJECT: Ithaca Dredging Project
CONTRACTOR: Prudent Engineering
AECOM JOB No.: 60736218
AECOM PROJECT MANAGER: Kevin Shanahan

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks
Prudent Engineering		Audrey Gerald Andrew Fishbach Jordan James	

VISITORS

Time	Representing	Representing	Remarks

EQUIPMENT AT THE SITE:

Pickup truck
Survey boat

CONSTRUCTION ACTIVITIES:

Onsite at 730am
Completed tailgate safety meeting.
Bathymetric survey completed from Clarkin Boat Rentals to the Ithaca College boat house (approximately 807,000 square feet).
Offsite at 600pm.

See attached photos

Sheet: 1 of 1

☐ X - designates info on backside of page

By: Keith Stahle Title: Geologist IV

Reviewed by: Title:

Attachment C - AECOM Daily Field Reports

AECOM

DATE: 9/12/2024

DAY	S	M	T	W	TH	F	S

DAILY CONSTRUCTION REPORT

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Still	Moder	High	Report No.	
HUMIDITY	Dry	Moder	Humid		

PROJECT: Ithaca Dredging Project
CONTRACTOR: Prudent Engineering
AECOM JOB No.: 60736218
AECOM PROJECT MANAGER: Kevin Shanahan

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks
Prudent Engineering		Audrey Gerald Andrew Fishbach Jordan James	

VISITORS

Time	Representing	Representing	Remarks

EQUIPMENT AT THE SITE:

Pickup truck
Survey boat

CONSTRUCTION ACTIVITIES:

Onsite at 730am
Completed tailgate safety meeting.
Bathymetric survey completed at the West Buffalo Sreet bridge and along the Cayuga inlet to the Black Diamond trail bridge (approximately 566,000 square feet).
Offsite at 500pm.

See attached photos

Sheet: 1 of 1

☐ X - designates info on backside of page

By: Keith Stahle Title: Geologist IV

Reviewed by: Title:

Attachment C - AECOM Daily Field Reports

AECOM

DATE: 9/13/2024

DAY	S	M	T	W	TH	F	S

DAILY CONSTRUCTION REPORT

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Still	Moder	High	Report No.	
HUMIDITY	Dry	Moder	Humid		

PROJECT: Ithaca Dredging Project
CONTRACTOR: Prudent Engineering
AECOM JOB No.: 60736218
AECOM PROJECT MANAGER: Kevin Shanahan

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks
Prudent Engineering		Audrey Gerald Andrew Fishbach Jordan James	

VISITORS

Time	Representing	Representing	Remarks

EQUIPMENT AT THE SITE:

Pickup truck
Survey boat

CONSTRUCTION ACTIVITIES:

Onsite at 730am
Completed tailgate safety meeting.

Bathymetric survey completed along the Cayuga inlet to just beyond the Black Diamond trail bridge (approximately 193,000 square feet).

Offsite at 1200pm.

See attached photos

Sheet: 1 of 1

☐ X - designates info on backside of page

By: Keith Stahle Title: Geologist IV

Reviewed by: Title:

Attachment C - AECOM Daily Field Reports

AECOM

DATE: 9/16/2024

DAY	S	M	T	W	TH	F	S

DAILY CONSTRUCTION REPORT

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Still	Moder	High	Report No.	
HUMIDITY	Dry	Moder	Humid		

PROJECT: Ithaca Dredging Project
CONTRACTOR: Prudent Engineering
AECOM JOB No.: 60736218
AECOM PROJECT MANAGER: Kevin Shanahan

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks
Prudent Engineering		Audrey Gerald Andrew Fishbach Jordan James	

VISITORS

Time	Representing	Representing	Remarks

EQUIPMENT AT THE SITE:

Pickup truck
Survey boat

CONSTRUCTION ACTIVITIES:

Onsite at 730am
Completed tailgate safety meeting.

Bathymetric survey completed along the Cayuga inlet in jetty area (approximately 100,000 square feet).
Completed the collection of the following sediment samples: SS-01, SS-02, SS-03, SS-04 and SS-05.
Completed the collection of the following water samples: WS-01, WS-02, WS-03, WS-04 and WS-05.
Offsite at 500pm

See attached photo

Sheet: 1 of 1

☐ X - designates info on backside of page

By: Keith Stahle Title: Geologist IV

Reviewed by: Title:

Attachment C - AECOM Daily Field Reports

AECOM

DATE: 9/17/2024

DAY	S	M	T	W	TH	F	S

DAILY CONSTRUCTION REPORT

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 and up
WIND	Still	Moder	High	Report No.	
HUMIDITY	Dry	Moder	Humid		

PROJECT: Ithaca Dredging Project
CONTRACTOR: Prudent Engineering
AECOM JOB No.: 60736218
AECOM PROJECT MANAGER: Kevin Shanahan

AVERAGE FIELD FORCE

Name of Contractor	Non-manual	Manual	Remarks
Prudent Engineering		Audrey Gerald Andrew Fishbach Jordan James	

VISITORS

Time	Representing	Representing	Remarks

EQUIPMENT AT THE SITE:

Pickup truck
Jon boat
Survey boat

CONSTRUCTION ACTIVITIES:

Onsite at 730am
Completed tailgate safety meeting.

Bathymetric survey completed along the Cayuga inlet and six mile creek (approximately 500,000 square feet).
Bathymetric survey work completed.

Offsite at 600pm

See attached photo

Sheet: 1 of 1

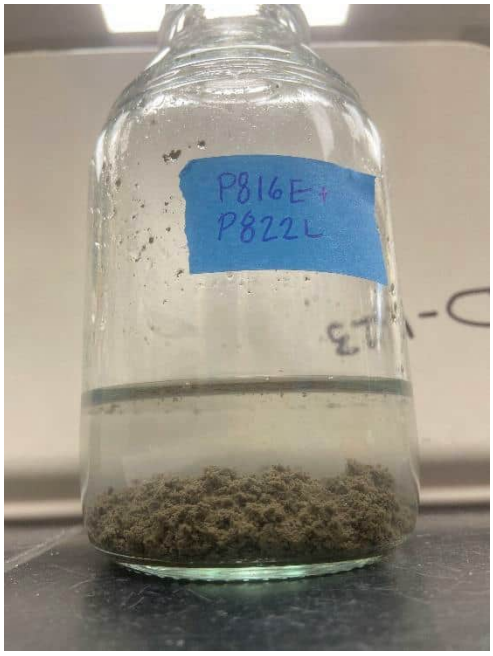
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By: Keith Stahle Title: Geologist IV

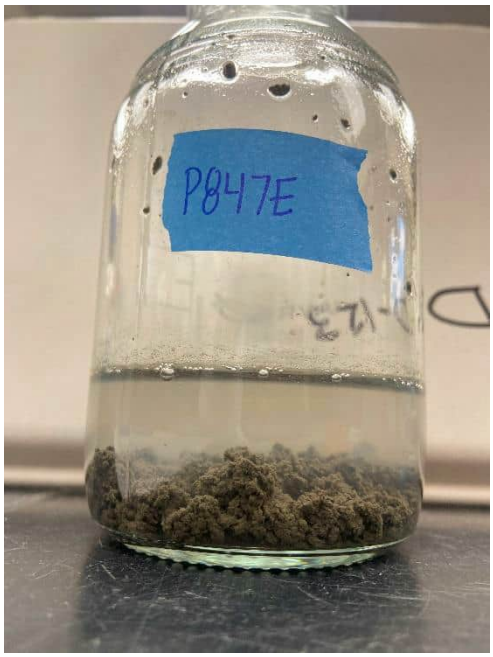
Reviewed by: Title:

Attachment D1 - Chemical Conditioning Photos

Top Performing Polymers and Doses (on composited sample at 5% solids)

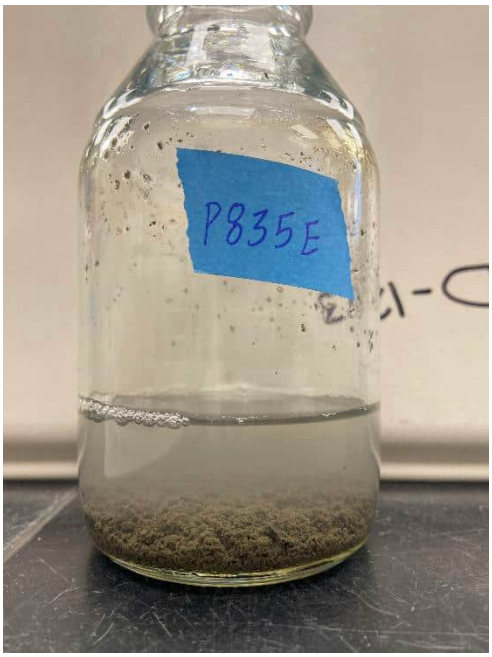


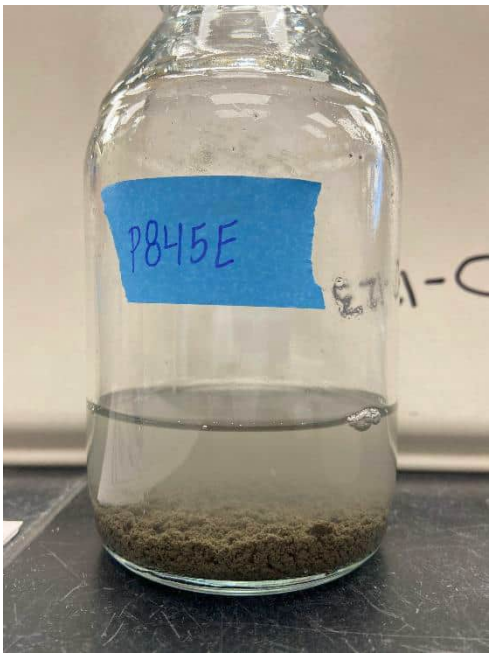
128 mg/L P822L + 64 mg/L P816E



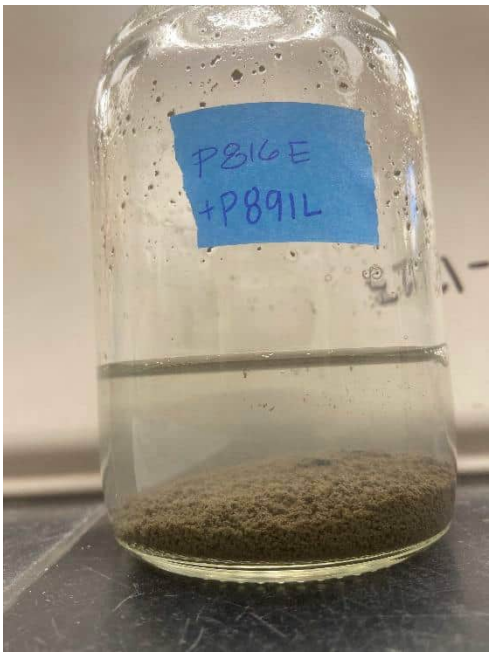
130 mg/L P847E

Other Polymers Trialed



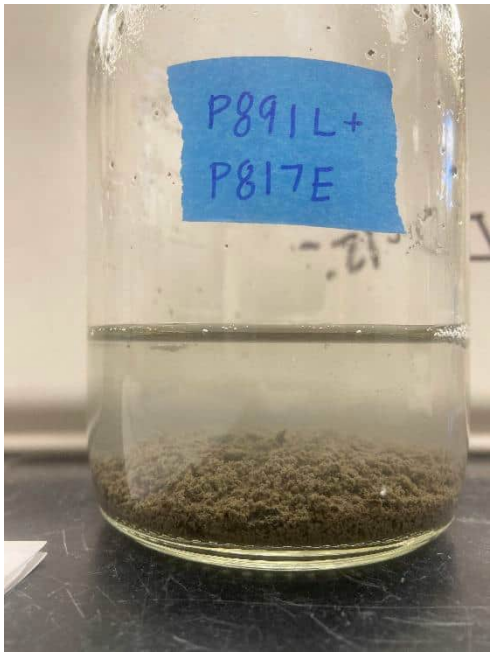


130 mg/L P835E	130 mg/L P845E





112 mg/L P891L + 96 mg/L P816E	128 mg/L P822L + 64 mg/L 817E



128 mg/L P891L + 80 mg/L P817E

Attachment D2 - Chemical Conditioning Logs

AECOM Technical Services

Chemical Conditioning Evaluation Worksheet

Customer: ITHACA, CAYUGA
Project name: "
Job #: 60736218 TASK 01
Sample #: COMPOSITE SS02, SS03, SS04

Sediment/residual type: CANAL SEDIMENT
Dewatering technology: CHEMTREAT POLYMERS
Date: 10/09/24
Analyst: MKK

Polymer make-down concentration: 0.5%
Test residual dilution: 5% SOLIDS (TOTAL)

1=Best 6=Worst

Test Number	Polymer Name	Polymer Volume (mL)	Residual Volume (mL)	Water Release Rate (1-6)	Water Volume (1-6)	Water Clarity (1-6)	Floc Appearance (1-6)	Comments
1	P816E	1		2	2	5.5	4	
2	P816E	2		2	2	5.5	4	
3	P816E	3		2	2	5	3.5	
4	P816E	4		2	2	5	3.5	NO CHANGE
5	P816E	5		2	2	5	3.5	FLOC SLIGHTLY SUSPENDED
6	P817E	1		2	2	5.5	3.5	
7	P817E	2		2	2	5.5	3.5	
8	P817E	3		2	2	5.5	3.5	
9	P817E	4		2	2	5.5	3.5	
10	P817E	5		2	2	5.5	3.5	
11	P817E	10		2	2	5.5	3.5	NO CHANGE
12	P835E	1		2	2.5	4.5	3	
13	P835E	2		2	2.5	3.5	2.5	BIGGER FLOC
14	P835E	3		2	2.5	3	2.5	SOME SOLIDS STILL LOOSE
15	P835E	4		2	2.5	3	2.5	
16	P835E	5		2	2.5	3	2.5	
17	P835E	6		2	2.25	3	2.5	
18	P835E	10		2	2.5	3	2.5	NO CHANGE
19	P845E	1		2	3	3.5	2.5	
20	P845E	2		2	2	3	2	
21 *	P845E	3		2	2	2.5	2	
22	P845E	4		2	1.5	2.5	2	
23	P845E	5		2	1.5	2.5	2	NO CHANGE
24	P845E	10		2	1.5	2.5	2	NO CHANGE AND

Recommendations

	Option #1	Option #2	Option #3
Chemical conditioning program(s):			
Dose:			
Dilution:			

Additional observations and comments:

AECOM Technical Services

Chemical Conditioning Evaluation Worksheet

Customer: SEE PG 1
Project name:
Job #:
Sample #:

Sediment/residual type: SEE PG 1
Dewatering technology:
Date:
Analyst:

Polymer make-down concentration: 0.5%
Test residual dilution: 5% SOLIDS (TOTAL)

1=Best 6=Worst

Test Number	Polymer Name	Polymer Volume (mL)	Residual Volume (mL)	Water Release Rate (1-6)	Water Volume (1-6)	Water Clarity (1-6)	Floc Appearance (1-6)	Comments
1	P847E	1		2	2	3.5	4	
2 *	P847E	2		2	2	2.5	1	TIGHT FLOC
3 *	P847E	3		2	2	2	1	
4	P847E	4		2	1	2	1	
5	P847E	10		2	1	2	1	NO CHANGE
6	P822L+P816E	3+1		2	2	3	2.5	
7 *	P822+P816	3+2		1	1	1.5	1	BEST SO FAR
8	822+816	3+3		1	1	1.5	1	NO IMPROVEMENT
9	891+816	3/0		3	3	5	5	
10	891+816	3.5/0		3	3	5	3.5	
11	891+816	3.5/2		2	2	3.5	2.5	STILL SOME LOOSE SOLIDS
12 *	891+816	3.5/2.5		2	2	2.5	2	
13	891+816	3.5/3		2	2	2.5	2	NO CHANGE
14	822+817	~~3/0~~ 4/0		2	2	3.5	3	PIN FLOC
15	822+817	4/1		2	2	2.5	2	
16	822+817	4/2		2	2	2	1.5	
17 *	822+817	4/3		1	1.5	1.5	1	
18	891+817	4/1		2	3	3	2	
19	891+817	4/2		2	2	2	2	
20 *	891+817	4/2.5		2	2	1.5	1.5	
21	891+817	4/3		2	2	1.5	1.5	NO CHANGE
22 *	~~891+0~~ 822+816	4/1		1	1	1	1	
23	822+816	~~3~~ 4/2		1	1	1	1	NO CHANGE
24	~~822~~ 891+816	4/1		1	1	2	2	
*	891+816	4/2		1	1	2	1	

Recommendations

	Option #1	Option #2	Option #3
Chemical conditioning program(s):	P847E	822+816	891+816
Dose:	4	~~3+2~~ 4+2	~~3.5/2.5~~ 4/2
Dilution:	0.5%	0.5%	0.5%

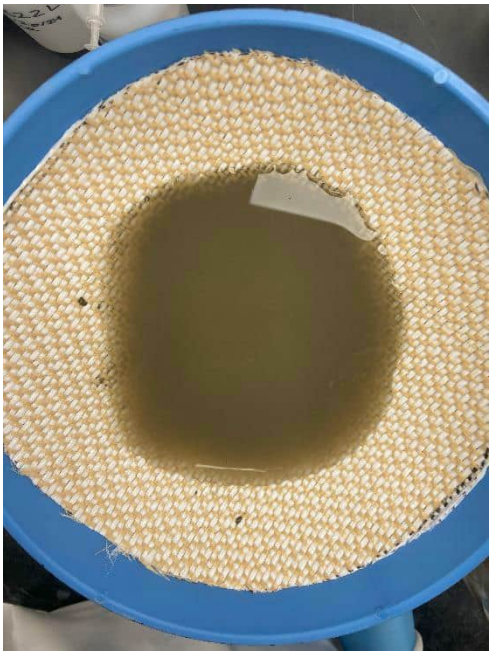
Additional observations and comments:

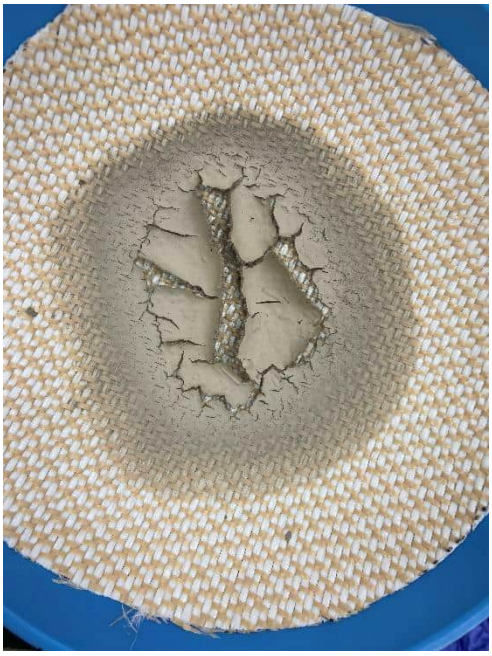
822+817
4+3 mL

822+817
4+2.5

Attachment D3 - Geofiltration Photos

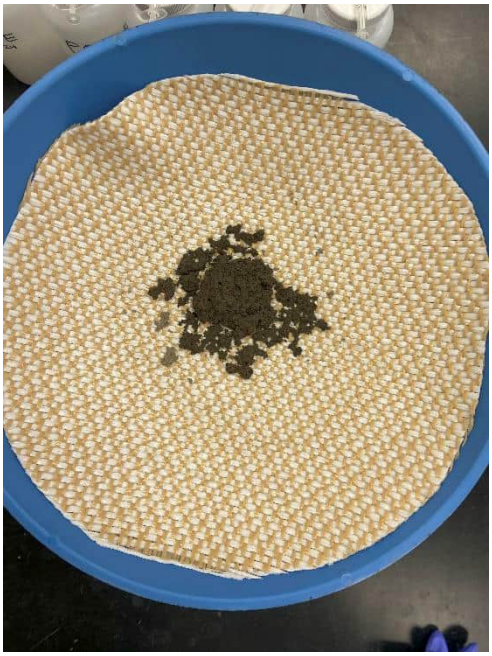
24hr Geofiltration Tests (on composite sample at 5% solids)





Control @ 0hr	Control @ 24hr





128 mg/L P822L + 64 mg/L P816E @ 0hr	128 mg/L P822L + 64 mg/L P816E @ 24hr





130 mg/L P847E @ 0hr	130 mg/L P847E @ 24hr

Sample ID	***Gross Filtrate (g)***	***TSS (mg/L)***	***Filter Cake % Solids***
Control	164	1793.34	98.47
130 mg/L P847E	159	11.82	62.45
128 mg/L P822L + 64 mg/L P816E	163	17.73	76.11

Attachment D4 - Gravity Stacking Photos

Gravity Stacking (composite)



0hr (failed PFT)



24hr (failed PFT)



48hr (passed PFT)

Attachment D5 - Safety Data Sheets - Calciment™, Portland Cement and Quick Lime

1. Identification

Product Name:	Calciment
Synonyms:	High Calcium Lime Kiln Dust, Lime Kiln Dust, LKD, Envirolime , CKD, Cement Kiln Dust
Recommended Uses:	Manufacture of glass, brick, block and other building materials; pH adjustment; flocculation; soil conditioning; soil stabilization; solidification and dewatering.
Distributor:	MIntek Resources 3725 Pentagon Blvd. Suite 100 Beavercreek, OH 45431 Phone: 888-431-0218
Emergency Contact:	ChemTel Inc.: (800) 255-3924 (MIS8507735)

2. Hazards Identification

GHS classification

Physical Hazards

None

Health Hazards

Skin Irritation	Category 2
Eye Damage	Category 1
Carcinogenicity	Category 1A
Specific Target Organ Toxicity – Single Exposure	Category 3
Specific Target Organ Toxicity – Repeated Exposure	Category 1

GHS Label Elements:

Signal Word: Danger

Hazard Statements:

Causes skin irritation.
Causes serious eye damage.
May cause respiratory irritation.
May cause cancer through inhalation
Causes damage to lungs through prolonged or repeated exposure by inhalation.
May react violently with water, releasing heat which can ignite combustible materials.

Precautionary Statements:	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep container tightly closed Do not breathe dust. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in well-ventilated area Wear protective gloves, clothing and eye protection Do not use water on material spills.
Pictograms:	

3. Composition

Chemical name	% by weight	CAS#
Calcium carbonate	0-90	1317-65-3
Calcium oxide	0-50	1305-788
Calcium hydroxide	0-70	1305-62-0
Calcium magnesium carbonate	0-50	16389-88-1
Calcium magnesium oxide	0-50	37247-91-9
Magnesium carbonate	0-5	546-93-0
Magnesium oxide	0-5	1309-48-4
Silica-crystalline quartz	< 10	14808-60-7

4. First Aid Measures

Eyes:	Immediately flush eyes with generous amounts of water for at least 15 minutes. Pull back the eyelid to ensure that all lime dust has been washed out. Seek medical attention immediately. Do not rub eyes.
Skin:	Wash exposed area with large amounts of water. Seek medical attention immediately.
Ingestion:	Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth unless instructed to do so by medical personnel.
Inhalation:	Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration
Most Important Symptoms:	Irritation of skin, eyes, gastrointestinal tract or respiratory tract.
Immediate medical attention / special treatment?	See first aid information above. Note to Physicians: Provide general supportive measures and treat symptomatically.

5. Fire Fighting Measures

Suitable (and unsuitable) fire extinguishing media:	Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of this product.
Specific hazards arising from the product	Inhalation, skin or eye contact, can result in serious injury. This product is not combustible or flammable. However, this product may react violently with water, and can release heat sufficient to ignite combustible materials. This product is not considered to be an explosion hazard, although reaction with water or other incompatible materials may rupture containers. When this product is wet, it can be very slippery and can result in a slip hazard. Hazardous Combustion Products: None.
Special protective equipment and precautions for fire fighters	Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (SCBA) to prevent inhalation, skin or eye contact.

6. Accidental Release Measures

Personal precautions, protective equipment, emergency procedures:

Avoid inhalation, eye and skin contact. Avoid generating airborne dust. Wear appropriate protective clothing as described in section 8.

Methods and materials for containment and clean up:

Utilize cleanup methods that minimize generating dust: vacuum. Avoid dry sweeping. Do not use water on large spills, as this product may react violently with water and release heat. Residue on surfaces may be removed with copious amount of water or vinegar.

7. Handling & Storage

Safe Handling:	Avoid inhalation, skin and eye contact. Avoid generating airborne dust. An eye wash station should be readily available when this product is handled.
Safe Storage:	Keep in tightly closed containers. Protect containers from physical damage. Store in a cool, dry, and well-ventilated location. Do not store near incompatible materials (see Section 10 below). Keep away from moisture. Long-term storage in aluminum containers is not recommended, as calcium oxide may corrode aluminum over long periods of time

8. Exposure Controls/Personal Protection

Occupational Exposure Limits

	OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)	Ont. Reg. 833 TWAEV (mg/m^3)
Calcium carbonate	15 5 (respirable)	10	10
Calcium oxide	5	2	2
Calcium hydroxide	15 (total) 5 (respirable)	5	5
Calcium magnesium carbonate	-	-	-
Calcium magnesium oxide	-	-	-
Magnesium carbonate	15 (total) 5 (respirable)	10	10
Magnesium oxide	15	10	10
silica - crystalline quartz	30 / (% silica +2) (total) 10 / (% silica +2) (respirable)	0.025 (respirable)	0.1

Engineering Controls: Use with adequate general or local exhaust ventilation and to maintain exposure below occupational exposure limits.

Individual Protection Measures (Personal Protective Equipment):

Specific Eye / Face Protection: Safety glasses with side shields. In windy conditions, or if work activity generates elevated airborne dust levels, dust proof or chemical goggles are recommended. Contact lenses should not be worn.

Specific Skin Protection: When there is a risk of skin contact, wear appropriate clothing and gloves to prevent contact.

Specific Respiratory Protection: If exposure limits are exceeded, an approved particulate respirator, or supplied air respirator, appropriate for the airborne concentrations, should be used. Selection and use of the respiratory protective equipment must be in accordance with applicable regulations and good industrial hygiene practices.

Other: An emergency eye wash fountain and shower are recommended.

9. Physical & Chemical Properties

Appearance:	White or grayish white material
Odor:	Odorless
Odor threshold:	Not Applicable
pH at 25 degrees C:	12.45
Melting Point:	°F (1410 °C)
Boiling Point and range:	°F (1565 °C)
Flash Point:	Not Applicable

Evaporation Rate:	Not Applicable
Flammability:	Not Applicable
Upper/lower flammability or explosive limits	Not Applicable
Vapor pressure/density:	Non Volatile
Relative density:	2.4 – 3.0
Solubility:	0.100- 0.125 g/100g - but reacts with water to produce $Ca(OH)_2$ and heat Soluble in acids, glycerin, and sugar solutions
Partition coefficient: n-octanol/water	Not applicable
Auto-ignition temperature:	Not Available
Decomposition temperature:	Not available
Viscosity:	Not Applicable

10. Stability & Reactivity

Reactivity:	Reacts violently with water to form calcium hydroxide, releasing heat. Reacts with acids to form calcium salts, releasing heat. Reacts with carbon dioxide in air to form calcium carbonate. See also Incompatibility below.
Chemical stability:	Stable under normal storage and handling conditions.
Possibility of Hazardous Reactions:	See “reactivity” above.
Conditions to avoid:	Vicinity of incompatible materials.
Incompatibility:	This product should not be mixed or stored with the following materials, due to the potential for violent reaction and release of heat: • water (unless in a controlled process) • acids • reactive fluoridated compounds • reactive brominated compounds • reactive powdered metals • reactive phosphorous compounds • aluminum powder • organic acid anhydrides • nitro-organic compounds • interhalogenated compounds
Hazardous decomposition products:	None

11. Toxicological Information

Likely routes of exposure & symptoms:

Eyes:	Contact can cause severe irritation or burning of eyes, including permanent damage.
Skin:	Contact can cause severe irritation or burning of skin, especially in the presence of moisture.
Ingestion:	This product can cause severe irritation or burning of gastrointestinal tract if swallowed.
Inhalation:	This product can cause severe irritation of the respiratory system.

Chronic health effects:	This product contains trace amounts of crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica can cause silicosis, as serious lung disease.
Respiratory or skin sensitization:	This material is not known to cause sensitization
Germ cell mutagenicity:	No data available.
Carcinogenicity:	This product is not listed as carcinogenic by OSHA, IARC, NTP, ACGIH, or the EU Directives. This product may contain trace amounts of crystalline silica quartz which is listed by IARC as “Carcinogenic to Humans” (Group 1) and “Known to be a Human Carcinogen" by NTP (National Toxicology Program).
Reproductive toxicity:	No Data Available.
Numerical Measures of Toxicity	Crystalline Silica: Oral (rat) LD_{50} > 22,500 mg/kg Calcium hydroxide: Oral (rad) LD_{50}: 7340 mg/kg Calcium oxide: Oral (rat) LD_{50}: 3059 mg/kg

12. Ecological Information

Because of the elevated pH of this product, it might be expected to produce some ecotoxicity upon exposure to certain aquatic organisms and aquatic systems in high concentrations
This material shows no bioaccumulation effect or food chain concentration toxicity.

13. Disposal Considerations

Dispose of contents in accordance with federal, state, provincial and local regulations.

14. Transport Information

UN Number	UN1910
UN Proper shipping name	Calcium Oxide
Transport Hazard class(es)	When transported by air only: Hazard Class 8-Corrosive
Packing group	When transported by air only: Packing Group III
Environmental hazards	This material is alkaline and if released into water or moist soil will cause an increase in pH

Transport in bulk (according to Annex II of MARPOL 73/79 and the IBC Code:

Special precautions which a user needs to be aware of	When being transported by air, calcium oxide is classified in the Department of Transportation (DOT) regulations as a hazardous material. (49 CFR 172.101). For aircraft transport only, Calcium Oxide is classified as Hazard Class 8-Corrosive, UN1910, Packing Group III. For passenger aircraft, the maximum net quantity allowed per container is 25 kg. For cargo aircraft, the maximum net quantity allowed per container is 100 kg. For quantities greater than 25 kg up to and including 100 kg, the container shall be labeled with CARGO AIRCRAFT ONLY. Because express carriers (i.e., Federal Express, Airborne Express, and United Parcel Service) ship by air, calcium oxide presented to these carriers for shipment must be packaged, marked, and labeled in accordance with IATA requirements, and must be accompanied by the appropriate shipping documentation. Only personnel trained and certified under applicable DOT Hazardous Materials Regulations (contained in Title 49 of the Code of Federal Regulations) may prepare any calcium oxide product for air transport. Calcium oxide is not classified as a hazardous material by DOT when transported by means other than by air.

15. Regulatory Information

CERCLA Hazardous Substances	Not listed
SARA Toxic Chemical (40 CFR 372.65)	Not listed
SARA Section 302 Extremely Hazardous Substances (40 CFR 355)	Not listed
SARA 311/312	Not listed
SARA Section 313 Toxic Chemicals reporting requirements	None
Threshold planning quantity (TPQ)	Not listed
RCRA Hazardous Waste Classification (40 CFR 261)	Not Classified
EPA Toxic Substances Control Act (TSCA) Status	All of the components of this product are listed on the TSCA
California Proposition 65	Airborne crystalline silica particulates of respirable size are known to the State of California to cause cancer.
NFPA ratings	Health: 3 Fire: 0 Reactivity: 2 ~~W~~
HMIS Ratings	Health: 3 Fire: 0 Reactivity: 2 Personal protection: E
OSHA Specifically regulated substance (29 CFR 1910)	Not listed
OSHA Air contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A)	Listed
MSHA	Not listed
Canada DSL	Listed

Canadian WHMIS Classification	D2A, Materials Causing other toxic effects. E, Corrosive Material	
Canada CPR	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation of a Canada and this SDS contains all the required information.	

16. Other Information

List of GHS Hazard Statements:	H315: Causes skin irritation H318: Causes serious eye damage H335: May cause respiratory irritation. H350: May cause cancer through inhalation H372: Causes damage to lungs through prolonged or repeated exposure by inhalation.
List of GHS Precautionary Statements:	P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P233: Keep container tightly closed P260: Do not breathe dust. P264: Wash thoroughly after handling. P270: Do not eat, drink or smoke when using this product. P271: Use only outdoors or in well-ventilated area P280: Wear protective gloves, clothing and eye protection

Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act	IARC	International Agency for Research on Cancer
NTP	National Toxicology Program		

The information contained herein is believed to be accurate and reliable as of the date hereof. However, Mintek Resources makes no representation, warranty or guarantee as to results or as to the information's accuracy, reliability or completeness. Mintek Resources has no liability for any loss or damage that may result from use of the information. Each user is responsible to review this information, satisfy itself as to the information's suitability and completeness, and circulate the information to its employees, customers and other appropriate third parties.

CEMENT & CONCRETE PRODUCTS™

D1: Packaged Raw Materials

SAFETY DATA SHEET
(Complies with OSHA 29 CFR 1910.1200)

SECTION I: PRODUCT IDENTIFICATION

The QUIKRETE® Companies
5 Concourse Parkway, Suite 1900
Atlanta, GA 30328

Emergency Telephone Number
INFOTRAC (800) 535-5053
Information Telephone Number
(800) 282-5828

SDS D1
Revision: Feb-23

QUIKRETE® Product Name	Code #
QUIKRETE® PORTLAND CEMENT (GRAY OR WHITE)	1124/1231
PORTLAND/POZZOLAN CEMENT	1118-35
QUIKRETE® PORTLAND T-I AND T-III CEMENT	2126-53
QUIKRETE® PORTLAND T-I/II OR IL	1124-08
QUIKRETE® PORTLAND T-10 AND T-30 CEMENT	2126-54
QUIKRETE® PORTLAND T-III W FLY ASH	1125-22
QUIKRETE® PORTLAND T-II/V	1124-87
ALL-STAR PORTLAND CEMENT TYPE-I	1121-94
ZIA PORTLAND CEMENT	2124-97
CONCRETE ACCELERATOR	9800
HIGH PERFORMANCE CEMENT (GRAY &WHITE)	1247-87
HIGH PERFORMANCE PRE-CAST GRAY CEMENT	1247-88
HIGH PERFORMANCE PRE-CAST WHITE CEMENT	1247-89
CEMENT, TYPE HS (TYPE 50) 40 KG BAG	9994005

PRODUCT USE: HYDRAULIC CEMENTS FOR GENERAL CONSTRUCTION AND REPAIR

SEE MOST CURRENT REVISION OF THIS DOCUMENT AT WWW.QUIKRETE.COM.

SECTION II - HAZARD IDENTIFICATION

Hazard-determining components of labeling: Silica, Portland cement

2.1 Classification of the substance or mixture

Carcinogen – Category 1A
Skin Corrosion – Category 1B
Skin Sensitization – Category 1B
Specific Target Organ Toxicity Repeat Exposure – Category 1

Specific Target Organ Toxicity: Single Exposure – Category 3

2.2a Signal word DANGER!

2.2b Hazard Statements
May cause cancer through chronic inhalation
Causes severe skin burns and serious eye damage
May cause an allergic skin reaction
Causes damage to lungs through prolonged or repeated inhalation
May cause respiratory irritation

2.2c Pictograms



2.2d Precautionary statements
Do not handle until all safety precautions have been read and understood.
Wear impervious gloves, such as nitrile. Wear eye protection, protective clothing and rubber boots.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.
Use only in a well-ventilated area.
Do not breathe dust.

If swallowed: Rinse mouth. Do NOT induce vomiting.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If on skin (or hair): Remove immediately all contaminated clothing and wash before re-use. Rinse skin or hair with water.
If significant skin irritation or rash occurs: get medical advice or attention.

Immediately seek medical advice or attention if symptoms are significant or persist.

Store in a well-ventilated place. Keep container tightly closed.
Dispose of contents/containers in accordance with all regulations.

2.3 Additional Information

The Portland cement in this product can cause serious, potentially irreversible damage to skin, eye, respiratory and digestive tracts due to chemical (caustic) burns, including third degree burns.
Burns from Portland cement may not cause immediate pain or discomfort. You cannot rely on pain to alert you to cement burns. Portland cement can cause dermatitis or sensitization. Therefore precautions must be taken to prevent all contact with Portland cement. Cement burns can become worse even after contact has ended. If there is contact with this product, immediately remove all product from body and thoroughly rinse with water. If you experience or suspect a cement burn or inflammation you should immediately see a health care professional.

Skin burns and irritation may be caused by brief exposure, though often are caused by extended exposure of 15 minutes, an hour, or longer. Interaction of Portland cement with water or sweat releases a caustic solution which produces the burns or irritation. Any extended exposure should be treated as though a burn has occurred until determined otherwise.

Skin contact with Portland cement can also cause inflammation of the skin, referred to as dermatitis. Signs and symptoms of dermatitis can include itching, redness, swelling, blisters, scaling, and other changes in the normal condition of the skin. Signs and symptoms of burns include the above and whitening, yellowing, blackening, peeling or cracking of skin.

The Portland cement in this product may cause allergic contact dermatitis in sensitized individuals. This overreaction of the immune system can lead to severe inflammation. Sensitization may result from a single exposure to the low levels of Cr (VI) in Portland cement or repeated exposures over months or years. Sensitization is long lasting and, after sensitization, even very small quantities can trigger the dermatitis. Sensitization is uncommon. Individuals who experience skin problems, including seemingly minor ones, are advised to seek medical attention.

2.3a HNOC – Hazards not otherwise classified: Not applicable

2.3b Unknown Acute Toxicity: None

SECTION III - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components	CAS No.	% by Weight
Portland Cement	65997 15 1	99-100
Sand, Silica, Quartz	14808-60-7	<1

*Trace silica may be present as a contaminant.
None of the constituents of this material are of unknown toxicity.

SECTION IV – FIRST AID MEASURES

4.1 Description of the first-aid measures

General information:
After inhalation: Remove person to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. In case of unconsciousness, place patient stably in side position for transportation.
After skin contact: Wash skin with cool water and pH-neutral soap or a mild detergent. If significant skin irritation or rash occurs: get medical advice or attention.
After eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
After swallowing: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms/effects, acute and delayed
Inhalation: May cause respiratory tract irritation. Causes damage to organs through prolonged or repeated inhalation. This product contains crystalline silica. Prolonged or repeated inhalation of respirable silica from this product can cause silicosis.

Skin contact: The Portland cement in this product can cause serious, potentially irreversible damage to skin, eye, respiratory and digestive tracts due to chemical (caustic) burns, including third degree burns.
Burns from Portland cement may not cause immediate pain or discomfort. You cannot rely on pain to alert you to cement burns. Portland cement can cause dermatitis or sensitization. Therefore precautions must be taken to prevent all contact with Portland cement. Cement burns can become worse even after contact has ended. If there is contact with this product, immediately remove all product from body and thoroughly rinse with water. If you experience or suspect a cement burn or inflammation you should immediately see a health care professional.

Skin burns and irritation may be caused by brief exposure, though often are caused by extended exposure of 15 minutes, an hour, or longer. Interaction of Portland cement with water or sweat releases a caustic solution which produces the burns or irritation. Any extended exposure should be treated as though a burn has occurred until determined otherwise.

Skin contact with Portland cement can also cause inflammation of the skin, referred to as dermatitis. Signs and symptoms of dermatitis can include itching, redness, swelling, blisters, scaling, and other changes in the normal condition of the skin. Signs and symptoms of burns include the above and whitening, yellowing, blackening, peeling or cracking of skin.

The Portland cement in this product may cause allergic contact dermatitis in sensitized individuals. This overreaction of the immune system can lead to severe inflammation. Sensitization may result from a single exposure to the low levels of Cr (VI) in Portland cement or repeated exposures over months or years. Sensitization is long lasting and, after sensitization, even very small quantities can

trigger the dermatitis. Sensitization is uncommon. Individuals who experience skin problems, including seemingly minor ones, are advised to seek medical attention.

Eye Contact: Causes serious eye damage. Symptoms may include discomfort or pain, excess blinking and tear production, with marked redness and swelling of the conjunctiva.

Ingestion: May be harmful if swallowed. Ingestion may cause discomfort and/or distress, nausea or vomiting.

4.3 Indication of immediate medical attention and special treatment needed:
Immediately seek medical advice or attention if symptoms are significant or persist.

SECTION V - FIRE FIGHTING MEASURES

5.1 Flammability of the Product: Non-flammable and non-combustible
5.2 Suitable extinguishing agents: Treat for surrounding material
5.3 Special hazards arising from the substance or mixture: None
5.3a Products of Combustion: None
5.3b Explosion Hazards in Presence of Various Substances: Non-explosive in presence of shocks

SECTION VI – ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures: Wear personal protective equipment (See section VIII). Keep unprotected persons away.

6.2 Methods and material for containment and cleaning up:
Do not allow to enter sewers/ surface or ground water. Dispose of unwanted materials and containers properly in accordance with all regulations.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND STORAGE

7.1 Handling
Precautions for safe handling: Ensure good ventilation/exhaustion at the workplace. DO NOT BREATHE DUST. In dusty environments, the use of an OSHA, MSHA or NIOSH approved respirator and tight fitting goggles is recommended. Wear appropriate PPE (See section 8).Do not mix with other chemical products, except as indicated by the manufacturer. Do not get in eyes, on skin or clothing. Good housekeeping is important to prevent accumulation of dust.

7.2 Storage
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Not required.
Further information about storage conditions: Keep out of the reach of children. Keep container tightly closed and prevent exposure to humidity. Do not allow water to contact the product until time of use to preserve product utility.

SECTION VIII – EXPOSURE CONTROL MEASURES / PERSONAL PROTECTION

8.1 Components with limit values that require monitoring at the workplace:

Hazardous Components	CAS No.	PEL (OSHA) mg/M^3	TLV (ACGIH) mg/M^3
Silica Sand, crystalline	14808-60-7	0.05	0.025 (resp)
Portland Cement	65997-15-1	5 (resp) 15 (total)	10 (resp)

8.2 Exposure Controls
Use ventilation adequate to keep exposures below recommended exposure limits.

8.3 General protective and hygienic measures
Keep away from foodstuffs, beverages and feed. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin.

8.3a Personal protective equipment
Protection of hands and feet:
Wear gloves of adequate length to offer appropriate skin protection from splashes. Nitrile, Butyl and PVC gloves have been found to offer adequate protection for incidental contact. Wear rubber boots when stepping in concrete. You cannot rely on pain to alert you to cement burns. Portland cement can cause dermatitis or sensitization.

Eye protection:
Wear approved eye protection (properly fitted dust- or splash-proof chemical safety glasses.

Respiratory protection:
A NIOSH-approved dust mask or filtering face piece is recommended in poorly ventilated areas or when permissible exposure limits may be exceeded. Respirators should be selected by and used under the direction of a trained health and safety professional, following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2).

SECTION IX - PHYSICAL/CHEMICAL CHARACTERISTICS

General Information

Appearance	Form: Granular Solid Color: Gray to gray-brown colored Odor: None
pH-value at 20°C (68 °F):	13 (10%)
Boiling point/Boiling range:	Not applicable
Flash point:	Not applicable
Auto igniting:	Product is not self-igniting
Vapor pressure at 21°C (70°F)	Not available
Density at 25°C (77 °F):	3.15
Solubility in / Miscibility with Water:	Insoluble
VOC content:	0 g/L VOC

SECTION X – STABILITY AND REACTIVITY

10.1 Reactivity
No dangerous reaction known under conditions of normal use.
10.2 Chemical stability
Stable under normal storage conditions. Keep in dry storage.
10.3 Possibility of hazardous reaction
No dangerous reaction known under conditions of normal use.
10.4 Thermal decomposition / conditions to be avoided
No decomposition if used according to specifications.
10.5 Incompatible materials
Contact of silica with powerful oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide, or oxygen difluoride may cause fires
10.6 Hazardous Decomposition or By-products
Silica will dissolve in Hydrofluoric Acid and produce a corrosive gas – silicon tetrafluoride.

SECTION XI – TOXICOLOGICAL INFORMATION

11.1 Exposure Routes: Skin contact, skin adsorption, eye contact, inhalation, or ingestion.

11.2 Symptoms related to physical/chemical/toxicological characteristics:

Inhalation: May cause respiratory tract irritation. Causes damage to organs through prolonged or repeated exposure. This product contains crystalline silica. Prolonged or repeated inhalation of respirable silica from this product can cause silicosis.

Skin contact: Causes skin irritation. Handling can cause dry skin, discomfort, irritation, and dermatitis. May cause sensitization by skin contact. Product becomes extremely alkaline when exposed to moisture, and can cause alkali burns and affect the mucous membranes.

Eye Contact: Causes serious eye damage. Symptoms may include discomfort or pain, excess blinking and tear production, with marked redness and swelling of the conjunctiva.

Ingestion: Harmful if swallowed. Ingestion may cause discomfort and/or distress, nausea or vomiting.

11.3 Delayed, immediate and chronic effects of short-term and long-term exposure

Short Term

Skin Corrosion/Irritation: Causes severe skin burns.
Serious Eye Damage/Irritation: Causes severe eye damage.
Respiratory Sensitization: Not available
Skin Sensitization: May cause an allergic skin reaction.
Specific Target Organ Toxicity-Single Exposure: (Category 3) May cause respiratory irritation.
Aspiration Hazard: Not available

Long Term

Carcinogenicity: May cause cancer through chronic inhalation.
Germ Cell Mutagenicity: Not available
Reproductive Toxicity: Not available
Specific Target Organ Toxicity- Repeated Exposure: (Category 1) Causes damage to lungs through prolonged/repeated exposure
Synergistic/Antagonistic Effects: Not available.

SECTION XII – ECOLOGICAL INFORMATION

12.1 Ecotoxicity

May cause long-term adverse effects to the aquatic environment. Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system. Must not reach bodies of water or drainage ditch undiluted or un-neutralized

12.2 Persistence and degradability

No further relevant information available.

12.3 Bioaccumulative potential:

No further relevant information available.

12.4 Mobility in soil

No further relevant information available.

12.5 Other Adverse Effects
No further relevant information available.

SECTION XIII – DISPOSAL CONSIDERATIONS

13.1 Waste Disposal Method
The packaging and material may be land filled; however, material should be covered to minimize generation of airborne dust. This product is not classified as a hazardous waste under the authority of the RCRA (40CFR 261) or CERCLA (40CFR 117&302). Disposal must be made in accordance with local, state and federal regulations.

13.2 Other disposal considerations
Uncleaned packaging
Recommendation: Disposal must be made in accordance with local, state and federal regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

SECTION XIV – TRANSPORT INFORMATION

	DOT (U.S.)	TDG (Canada)
UN-Number	Not Regulated	Not Regulated
UN proper shipping name	Not Regulated	Not Regulated
Transport Hazard Class(es)	Not Regulated	Not Regulated
Packing Group (if applicable)	Not Regulated	Not Regulated

14.1 Environmental hazards:
Not Available

14.2 Transport in bulk according to Annex II of Marpol 73/78 and the IBC Code
Not available

14.3 Special precautions for user
Do not handle until all safety precautions have been read and understood.

SECTION XV – OTHER REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/Legislations specific for the chemical

Canada

WHMIS Classification: Considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations and subject to the requirements of Health Canada's Workplace Hazardous Material Information (WHMIS). This document complies with the WHMIS requirements of the Hazardous Products Act (HPA) and the CPR.

15.2 US Federal Information

SARA 302/311/312/313 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302, 311, 312 or 313.
RCRA: Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.
CERCLA: Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.
Emergency Planning and Community Right to Know Act (SARA Title III): Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.
FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b)(3)(xxvi).
NTP: Respirable crystalline silica, primarily quartz dusts occurring in industrial and occupational settings, is classified as Known to be a Human Carcinogen.
OSHA Carcinogen: Crystalline silica (quartz) is not listed.

15.3 State Right to Know Laws

California Prop. 65 Components

WARNING: This product can expose you to chemicals including crystalline silica which is known to the State of California to cause cancer and Portland cement which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.
California Inhalation Reference Exposure Level (REL): California established a chronic REL of 3 µg for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.
Massachusetts Toxic Use Reduction Act: Silica, crystalline (respirable size, <10 microns) is "toxic" for purposes of the Massachusetts Toxic Use Reduction Act.

15.4 Global Inventories

DSL All components of this product are on the Canadian DSL list.

TSCA No.: Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7. All constituents are listed in the TSCA inventory.

SECTION XVI – OTHER INFORMATION

Last Updated: February 13, 2023

NOTE: The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to silica contained in our products.

Prepared by The QUIKRETE Companies, LLC

End of SDS

Austin White Lime Company
P.O. Box 9556, Austin, TX 78766
1-800-553-LIME

Safety Data Sheet

1. Product and Company Identification

Product Identifier: Quicklime
Other means of identification: Calcium Oxide, CaO
Company Identification:
Austin White Lime Company
P.O. Box 9556
Austin, TX 78766-9556
(512) 388-7316 ext 235
Date Prepared: 01/01/2020

2. Hazards Identification

Hazard Classification: Eye Damage Category 1, Skin Irritation Category 2, Specific Target Organ Toxicity Single Exposure Category 3 (Respiratory System), Carcinogen Category 1.

Label Elements:

Signal word:

Danger

Hazard statements: Causes skin irritation, causes serious eye damage. May cause cancer through inhalation. May cause respiratory irritation. Reacts violently with water, releasing heat which can ignite combustible materials.

Symbols:



Precautionary Statements:
Wear protective gloves and eye protection. Wash exposed skin thoroughly after handling. Avoid breathing dust. Use only outdoors or in a well-ventilated area. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

If on skin: Wash exposed skin with plenty of water. If skin irritation occurs: Get medical attention. Take off contaminated clothing and wash it before reuse.

If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical attention immediately.

If inhaled: Remove person to fresh air and keep comfortable for breathing. Seek medical attention if you feel unwell.

If exposed or concerned: Get medical advice.

Store in a cool, dry, and well-ventilated location.

Dispose of contents or containers in accordance with applicable regulations. Do not use water on material spills.

Hazards not otherwise classified:

Calcium Oxide reacts violently with water, releasing heat which may ignite combustible materials in certain instances.

Ingredients with unknown toxicity: Not applicable

3. Composition/Information on Ingredients

Chemical Name: Calcium Oxide

Common name and synonyms: Quicklime, CaO, Hi-cal lime

Composition/Information on Ingredients

CAS numbers and concentrations of ingredients:

Component	CAS#	% by weight
Calcium Oxide	1305-78-8	>87%
Crystalline Silica	14808-60-7	<0.2%

4. First Aid Measures

Description of First Aid Measures:

Eyes: Contact can cause severe irritation or burning of eyes, including permanent damage. Immediately flush eyes with generous amounts of water for at least 15 minutes. Pull back the eyelid to ensure that all lime dust has been washed out. Seek medical attention immediately. Do not rub eyes.

Skin: Contact can cause severe irritation or burning of skin, especially in the presence of moisture. Wash exposed area with large amounts of water. Seek medical attention immediately.

Ingestion: Contact can cause severe irritation or burning of gastrointestinal tract if swallowed. Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth unless instructed to do so by medical personnel.

Inhalation: This product can cause severe irritation of the respiratory system. Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration.

Most important symptoms and effects, both acute and delayed: Irritation of skin, eyes, gastrointestinal tract or respiratory tract. Long-term exposure by inhalation may cause permanent damage. This product contains crystalline silica, which has been classified by IARC as (Group I) carcinogenic to humans when inhaled. Inhalation of silica can also cause chronic lung disorder, silicosis.

Indication of any immediate medical attention and special treatment needed: See first aid information above. Note to Physicians: Provide general supportive measures and treat symptomatically.

5. Fire Fighting Measures

Extinguishing Media: Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of hydrated lime.

Fire Hazards: Quicklime is not combustible or flammable. However, quicklime reacts violently with water, and can release heat sufficient to ignite combustible materials. Quicklime is not considered to be an explosion hazard, although reaction with water or other incompatible materials may rupture containers.
Hazard Combustion Products: None.

Special Protective Equipment and Fire Fighting Instructions: Keep personnel away from and upwind of fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

6. Accidental Release Measure:

Personal precautions, protective equipment, and emergency procedures

Spill/Leak Procedure: Do NOT use water on bulk material spills. Lime reacts violently with water, releasing heat. Use proper protective equipment.

Small Spills: Use dry method to collect spilled materials. Avoid generation of dust. Do not clean up materials with compressed air. Store collected materials in dry, sealed plastic or metal containers. Residue on surfaces may be water washed.

Large Spills: Use dry methods to collect spilled materials. Evacuate area downwind of clean-up operations to minimize dust exposure. Store spilled materials in dry, sealed plastic or metal containers.

Methods and materials for containment and cleaning up

Containment: For large spills, as much as possible, avoid the generation of dusts. Prevent release to sewers or waterways.

Cleanup: Residual amounts of material can be flushed with large amounts of water. Equipment can be washed with either a mild vinegar and water solution, or detergent and water.

7. Handling and Storage:

Precautions for Safe Handling

Keep in tightly closed containers. Protect containers from physical damage. Avoid direct skin contact with the material.

Conditions for Safe Storage, including incompatibilities:

Store in a cool, dry, and well-ventilated location. Do not store near incompatible materials (see Section 10 below). Keep away from moisture. Long-term storage in aluminum containers is not recommended, as calcium oxide may corrode aluminum over longs periods of time.

8. Exposure Controls/Personal Protection

Exposure Limits

Component	CAS#	Exposure Limit
Calcium Oxide	1305-78-8	OSHA PEL: 5 mg/m3 ACGIH TLV: 2 mg/m3
Crystalline Silica	14808-60-7	OSHA PEL: 20mg/m3 divided (by the percentage of silica in the dust plus 2) respirable ACGIH TLV: 0.1 mg/m3

Engineering Controls: Provide ventilation adequate to maintain PELs.

Individual Protection Measures

Respiratory Protection: Use NIOSH/MSHA approved respirators if airborne concentrations exceed PEL.

Skin Protection: Use appropriate gloves to protect skin contact. When there is a risk of skin contact, wear suitable clothing to prevent such contact.

Eye Protection: Use safety glasses with side shields or safety goggles. Contact lenses should not be worn when working with lime products.

Other: Eye wash fountain and emergency showers are recommended.

9. Physical and Chemical Properties

Appearance: White or grayish-white powder and/or pebble
Odor: Odorless
Odor threshold: Not applicable
pH at 25 degrees C: 12.45
Melting Point: 4658°F, 2570°C
Initial boiling point: 5162°F, 2850°C
Flash Point: Not applicable
Evaporation Rate: Not available
Flammability: Not applicable
Upper/Lower flammability or explosive limits: Not applicable
Vapor Pressure: Not applicable
Vapor Density: Not applicable
Relative density: 3.2 – 3.4
Solubility in Water: Negligible but reacts with water to produce calcium hydroxide and heat.
Partition co-efficient: n-octanol/water: Not available
Auto-ignition temperature: Not applicable
Decomposition temperature: Not applicable
Viscosity: Not available

10. Stability and Reactivity

Reactivity: Quicklime reacts violently with water to form calcium hydroxide, releasing heat. See also Incompatibility below.

Chemical stability: Quicklime is chemically stable.

Possibility of hazardous reactions: See a. above.

Conditions to avoid: Do not allow Quicklime to come into contact with incompatible materials.

Incompatibility: Quicklime should not be mixed with or stored with the following materials, due to potential for violent reaction and release of heat:

WATER (unless in a controlled process)
ACIDS
REACTIVE FLUORIDATED COMPOUNDS
REACTIVE BROMINATED COMPOUNDS
REACTIVE POWDERED METALS
ALUMINUM POWDER
ORGANIC ACID ANHYDRIDES
NITRO-ORGANIC COMPOUNDS
REACTIVE PHOSHOROUS COMPOUNDS
INTERHALOGENTAED COMPOUNDS

Hazardous Decomposition Products: None

11. Toxicological Information:

Information on the likely routes of exposure: See First Aid discussion above.

Symptoms related to the physical, chemical and toxological characteristics: See First Aid discussion above.

Delayed and immediate effects and also chronic effects from exposure: See First Aid discussion above.

Numerical measures of toxicity: No LD50/LC50 have been identified for this product's components.

Carcinogen listing: Quicklime is not listed by MSHA, OSHA, or IARC as a carcinogen, but this product may contain trace amounts of crystalline silica, which has been classified by IARC as (Group I) carcinogenic to humans when inhaled.

12. Ecological Information:

Ecotoxicity: Because of the high pH of this product, used in high concentrations, it could be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.

Persistence and degradability:

Bioaccumulative potential: This material shows no bioaccumulation effect or food chain concentration toxicity.

Mobility in soil:

Other adverse effects (such as hazardous to the ozone layer): This material is alkaline and if released into water or moist soil will cause an increase in pH.

13. Disposal Considerations:

Dispose of in accordance with all applicable federal, state, and local environmental regulations. If this product as supplied, and unmixed, becomes a waste, it will not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act.

14. Transportation Information:

UN number: UN1910

UN proper shipping name: Calcium Oxide

Transportation Information:
Transport hazard class: When transported by air only: Hazard Class 8-Corrosive.

Packing group: When transported by air only: Packing Group III

Environmental hazard (e.g. Marine pollutant (yes/no): This material is alkaline and if released into water or moist soil will cause an increase in pH.

Transport in bulk according to Annex II of MARPOL 73/79 and the IBC Code

Special precautions which a user needs to be aware of, or needs to comply with in connection with transport or conveyance either within or outside their premises: When being transported by air, quicklime is classified in the Department of Transportation (DOT) regulations as a hazardous material. (49 CFR 172.101). For aircraft transport only, Calcium Oxide is classified as Hazard Class 8-Corrosive, UN1910, Packing Group III. For passenger aircraft, the maximum net quantity allowed per container is 25 kg. For cargo aircraft, the maximum net quantity allowed per container is 100 kg. For quantities greater than 25 kg up to and including 100 kg, the container shall be labeled with CARGO AIRCRAFT ONLY. Because express carriers (i.e. Federal Express, Airborne Express, and United Parcel Services) ship by air, quicklime presented to these carriers for shipment must be packaged, marked, and labeled in accordance with IATA requirements, and must be accompanied by the appropriate shipping documentation. Only personnel trained and certified under applicable DOT Hazardous Materials Regulations (contained in Title 49 of the Code of Federal Regulations) may prepare any quicklime product for air transport. Quicklime is not classified as a hazardous material by DOT when transported by means other than by air.

15. Regulatory Information:

EPA Regulations:
RCRA Hazardous Waste Number: not listed (40 CFR 261.33)
RCRA Hazardous Waste Classification (40 CFR 261): not classified
CERCLA Hazardous Substance (40 CFR 302.4) unlisted specific per RCRA, Sec.3001; CWA, Sec.311 (b)(4); CWA Sec.307(a), CAA, Sec.112
CERCLA Reportable Quantity (RQ), not listed
SARA 311/312 Codes: not listed
SARA Toxic Chemical (40 CFR 372.65): not listed
SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed, Threshold Planning Quantity (TPQ): not listed
All chemical ingredients are listed on the USEPA TSCA Inventory List.

OSHA/MSHA Regulations:
Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1A): 5 mg/m3 TWA-8
MSHA: not listed
OSHA Specifically Regulated Substance (29 CFR 1910) not listed
State Regulations: Consult state and local authorities for guidance.
HMIS: Health Risks 3, Flammability 0, Reactivity 1, Personal Protection E
NFPA: Health Hazard 3, Fire Hazard 0, Reactivity 1
WHMIS Classification: "E" Corrosive Materials
WHMIS Classification: "D2A" Materials causing other toxic effect

16. Other information

Austin White Lime Company provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide. Individuals receiving this information must consult their own technical and legal advisors and/or exercise their own judgment in determining its appropriateness for a particular purpose. Austin White Lime will not be responsible or liable for claims, losses or damages resulting from the use of or reliance upon or failure to use this information.