



CITY OF RYE

To: Mayor Cohn and City Council
From: Greg Usry, City Manager
Re: Channel and Boat Basin Dredge Update
Date: September 17, 2021

Background

The City of Rye Boat Basin dates back to the 1950's when the City purchased the land to build the marina. Because of factors related to tidal changes and the run off from the Blind Brook, the Channel and Basin require regular removal of silt (dredging) to remain navigable. Following the initial dredge by the City in the late 1950s, regular dredging took place every 5-7 years, with the Federal Government (Army Corps of Engineers) taking responsibility for the channel dredge. The last regular dredge completed by the ACOE was in 1992. In 2013 FEMA funded the channel dredge as part of the SANDY storm reimbursement

Until recently, all dredged silt was removed and deposited off shore in the Long Island Sound. However, as a result of statutory and regulatory changes regarding environmental issues, off-shore disposal is now extremely restrictive. For silt that is deemed chemically and/or physically unsuitable for off shore disposal, the options are quite limited and significantly more expensive.

Under current regulations, the New England Army Corps of Engineers reviews sediment data for proposed dredge projects and makes a determination if the material is suitable for off shore disposal. The Army Corps and New York State have taken a more rigorous view of sediment, based upon requirements of the Clean Water Act, Marine Protection Research and Sanctuaries Act, 2016 Dredged Material Management Plan, Regional Implementation Manual (RIM), and the New York State Coastal Management Program. All of this contributes to the significantly higher cost of dredging and disposal while, at the same time, the Federal government has become particularly selective about which channels it dredges.

Current Scope

For the last several years, Coastline Consulting has been retained by the City to analyze conditions in Milton Harbor and the Boat Basin. Over this time, there have been numerous analysis of sediment toxicity, rates of silting and review of disposal options. Coastline has also been charged with administering the permitting process with the US Army Corps of Engineers and the respective environmental departments of New York and Connecticut. Based upon current facts, a proposed dredge is comprised of two distinct (but related) plans:

- Channel dredge with offshore deposit
- Basin dredge with upland disposal

For additional information concerning the permit process, summary of upland disposal facilities, silting survey information, including silting frequency and related information, please see the attached material.

Channel Dredge

In order to make the Channel navigable for most boats, it will need to be dredged to a depth of five feet and width of 75 feet from the area just south of the Boat Basin to the mouth of Milton Harbor. Historically, the channel has been dredged to its full width of 100 feet and a depth of 8 feet. However, due to permit limitations for open water disposal (25,000cy max) the proposed dredge narrowed the channel. Based upon Coastline's most recent survey, this would require the removal of approximately 21,000 cubic yards of silt. The ACOE and relevant state agencies have deemed the Channel silt to be clean enough to dispose offshore. Based upon this finding, and the current estimated cost of dredging and transporting, the estimated total cost is approximately \$1.5mm (\$60 per cubic yard plus a 20% contingency).

Basin Dredge

Although there was early hope that a biological test of the Basin silt could allow for open water disposal, this is not an option. As a result, the cost of disposing of the Basin silt to an upland facility is approximately \$160/cubic yard. Initially, the Basin Commission requested a dredge of up to six feet, with a foot of over-dredge. This would require a total dredge of approximately 43,000 cubic yards. Based upon disposal cost, this would likely exceed \$7.7 mm (including contingency). This amount far outstrips the current and future financial resources of the Basin Enterprise.

Alternatively the Commission and Basin Supervisor are examining scenarios which meet slip-holder and mooring needs, while providing the financial resources for necessary future dredges. Under these scenarios the initial dredge would total 20-25,000 cubic yards with additional dredges every five years. This plan and the financial impact are discussed in greater detail below.

Timeline

The Channel and Basin are on slightly different timelines and are currently under regulatory review, however, assuming no extraordinary review comments we anticipate having everything in hand to go to bid by early fall of next year (2022). Assuming the City and Commission identify the funding sources and the Council decides to proceed, it is hopeful that the dredges can be completed by the 2023 season. It is important to note that once the permits are granted, they may be used for five to ten years (in whole or in part).

Channel Estimated Timeline:

Sept '21 – obtain update suitability determination from NE USACE
Oct '21 – submit update suitability determination to NYDEC/USACE
Oct '21 – file CT-DEEP disposal permit application (3+ month review)
June '22 – dredging/disposal permit decisions (x3): DEC, USACE, CT-DEEP
Summer '22 - City SEQRA
August '22 - Bid/receipt process
October '22 – January '23 - Dredge underway/complete

Basin Estimated Timeline:

Aug '21 - obtain preliminary acceptance letters from disposal facilities
Sept'21- file permit application with the NY agencies (DEC, USACE, DOS, OGS)
Spring '22 – conduct sample/testing for disposal facilities to accept material
June '22 – dredging permit decisions
Summer '22 – City SEQRA
August '22 - Bid/receipt process
October '22 – January '23 Dredge underway/complete

The items noted above are in process and will be completed over the remainder of the year and into 2022. To the extent the Council wishes to advance the dredge project(s), they will be integrated into the City's priority capital projects finance plan.

Financial Impact and Planning

Channel

Similar to City streets and general infrastructure, regular reinvestment will be required to assure the sustainability of the Channel. Based upon surveys over the last five years, Coastline estimates that the silting of the Channel amounts to approximately 2,225 cubic yards annually. With this silting rate, and further assuming that a target depth/width of 5ft./75ft., it will be necessary to dredge approximately every five – ten years at a cost of \$800k-1.6mm (at current cost estimates). Should the Council wish to make this part of the priority capex program, it will be integrated in the current financial plan.

Similar to the Basin dredge discussed below, the submissions and analysis required for the Channel permits are in process and will be unaffected by the developing financial plan. In the coming months, as the capital projects financial model is refined further, we can integrate the Channel dredge into our cost estimates and financial impact.

Boat Basin

As originally scoped, the Basin would require a dredge of approximately 43k cubic yards. This amount was based upon a goal of achieving a depth of approximately six feet throughout the Marina, with an additional foot of over-dredge. The cost to achieve that dredge amount is estimated to be in excess of \$7.7mm, based upon the upland disposal cost of \$150/cubic yard and 20% contingency. Assuming current Basin Commission financial resources and an ongoing net income amount of \$430k, that dredge is not realistic nor sustainable. Summarized in the chart below are various dredge amount options, including cost scenarios, resulting annual net income and potential future dredges.

Basin Dredge Scenarios				
	Base Case(100%)	30K	25k	20k
Silt Removed (cubic yards)	43,000	30,000	25,000	20,000
\$ Cost / cubic yard	150	150	150	150
\$ Contingency (20%)	30	30	30	30
Estimated Basin Dredge Cost	\$ 7,740,000	\$ 5,400,000	\$ 4,500,000	\$3,600,000
Basin Cap Reserve (Dec '22)¹	<u>(3,320,000)</u>	<u>(3,320,000)</u>	<u>(3,320,000)</u>	<u>(3,320,000)</u>
Dredge cost to be financed	\$ 4,420,000	\$ 2,080,000	\$ 1,180,000	\$ 280,000
Annual Debt Service (5 yrs)	\$ 884,000	\$ 416,000	\$ 236,000	\$ 56,000
Basin Annual Net Income	\$ 430,000	\$ 430,000	\$ 430,000	\$ 430,000
Pro forma NI (after D/S)	\$ (454,000)	\$ 14,000	\$ 194,000	\$ 374,000
Fund Balance (5 yr)²	\$ _____ -	\$ <u>70,000</u>	\$ <u>970,000</u>	\$ <u>1,870,000</u>
Estimated y3 Dredge in 5 yrs³		<u>389</u>	<u>5,389</u>	<u>10,389</u>
<p>¹ Current reserve of \$2.46mm + assumed \$430k net income for 2021 and 2022</p> <p>² Fund balance after 5 years, assuming \$430k of annual net income, less annual debt cost of 2022 dredge.</p> <p>³ Estimated dredge in 5 years, assuming accumulated fund balance above and dredge cost of \$160 per cubic yard and 20% contingency</p>				

As of the end of 2020, the Basin enterprise fund had an accumulated fund balance of \$2.46mm. Last year, the Basin produced \$430k of net income and it is reasonable to assume the same result for 2021 and 2022. Based upon this assumption, the expected/assumed accumulated fund balance is approximately \$3.32mm for a dredge in late 2022. The scenarios above lay out potential dredge options based upon the use of fund balance, and possible borrowings for the additional funds needed to complete the requisite amount. Because any borrowing would be done so via the City, consideration must be given to the City Code and the resulting impact on Council Authorized debt. Per the City Code, for an enterprise fund to borrow, it is required to meet certain financial tests, including a pro forma fund balance and debt service coverage test. As plans evolve, the Basin's financial situation will have to be evaluated in the context of this test. Otherwise, any borrowing will reduce the Council's authorized debt amount for City projects.

Alternatively, were the Basin to undertake a dredge of 20,000 cubic yards or less, it could do so solely utilizing its existing fund balance and a minimal loan from the City. Further, assuming the same financial performance in future years, it could complete a second dredge in five years totaling approximately 10k cubic yards (based upon current cost estimates). Based upon surveys over the last five years, the annual silting of the Basin is estimated to be 2,347 per year. This would allow for maintenance of the target depths, as well as, additional dredged silt. Although the silting is not uniform across the marina, it does provide a sense of the sustainability.

The financial plan for the Basin will be an ongoing development. Because the requisite permits and operational process are underway, and will not be completed until late summer/early fall 2022, we will have the remainder of the year to finalize the plan. Once permits are in hand, a choice can be made to dredge any amount up to the expected 43,000 cubic yard permit. This would be determined prior to the bid documents.

MEMO #1

City of Rye Dredging Project

Coastline Consulting & Development, LLC

To: Ryan Coyne, City Engineer
From: David R. Provencher, Coastline Consulting & Development, LLC
CC: Victoria L. Man, LEP, Zuvic; File
Date: 4/20/2021
Re: **Project Status**

Background The City of Rye (City) desires to dredge the Municipal Boat Basin and the navigation channel that connects it to the naturally deep water of Long Island Sound (LIS). Maintenance dredging is needed because the basin and channel have filled in with sediment, creating shallow water conditions. These conditions make it difficult for boats to safely navigate and berth during lower portions of the tide cycle. Various regulatory permits are needed before dredging can begin. The permits authorize the act of dredging and where the dredged sediment will be disposed. The disposal location(s) must be evaluated and selected in advance of applying for permits. Typical disposal locations include open-water (LIS), upland on-site, and upland off-site. Open-water is the traditional and typically the most cost-effective option, but the sediment must pass stringent pre-permit testing requirements. The City elected to pursue open-water disposal.

Sediment from the basin and channel was chemically tested in 2018; the New England Army Corps (NAE) determined that the sediment in the basin was unsuitable for open-water, but the sediment in the channel was suitable for open-water. However, the Corps provided an option to conduct biological testing of the basin sediment as a second and final path for open-water. While considering how to move forward with the basin, the City elected to have a permit application prepared for just the channel with open-water disposal, which was filed in July 2019. In the spring of 2020, the City elected to pursue two parallel tracks for the basin, one seeking biological testing for open-water and one evaluating upland disposal options. A request for biological sampling plan (SAP) was filed with NAE in August 2020 and the City hired Zuvic in November 2020 to lead the upland disposal evaluation work.

This memo provides a status updates on the open-water (page 2) and upland (page 3) disposal project tracks.

MEMO #1

City of Rye Dredging Project

Open-Water (Coastline) Coastline had a conference call with the New York Army Corps (NAN) and NAE on Thursday, April 15, 2021 to discuss the status of the pending application for the channel and the pending SAP request for the basin. The NAE has determined that the channel (~10,000-20,000 CY) and basin (~30,000 CY) will be considered one dredging project for open-water disposal purposes and will, therefore, be issuing a single/comprehensive biological sampling plan for both dredge areas—this means that if the City wants to pursue open-water for the basin, that the channel sediment must also be tested biologically. According to statutes, any dredging project requesting to dispose 25,000 CY or more into LIS and/or does not meet chemical testing standards, must pass biological testing to be deemed suitable for open-water. Both criteria are met because the NAE decided to combine the basin and channel. Based on this, the City has the following options:

1. Accept the SAP (once issued) and test sediment from both the basin and channel. This would require the City to withdraw the pending channel application. If the basin sediment fails (likely) and the channel sediment passes (likely), NAE and NAN have stated that the channel can proceed with open-water while the basin proceeds with upland, presumably under a single/new permit application.

Estimated timeline of one comprehensive/new application:

July/Aug 2021—update sampling/testing cost + sampling/testing work

Sep 2021—pass/fail determination from Corps

Oct 2021—file new permit applications

Oct 2022—permit decisions

2. Reject the SAP. This means that the City decides to pursue an upland disposal solution for the basin and proceeds with the pending channel application for open-water. The pending channel application would be modified to increase the proposed dredge volume to 20,000 CY based on the recent 2020 survey.

Estimated timeline of two applications (basin/upland + channel/water):

May/June 2021—submit updated channel volumes to Corps

Sep 2021—file NY permit apps for basin

Sep 2021—file CT-DEEP disposal permit app for channel

Sep 2021—update NY pending channel apps with new volumes

Jun 2022—permit decisions

All timelines subject to change based on agency review time.

MEMO #1

City of Rye Dredging Project

Upland
(Zuvic)

Numerous upland disposal options for the basin sediment continue to be explored by Zuvic. The attached spreadsheet (progress draft) documents several options, including location, sediment solidification, and various associated costs.

Discussion

Two solidification facilities appear feasible—Clean Earth New Jersey and Tipping Point New Haven. From these facilities, the dredged sediment can be disposed at Griswold, CT (associated with Tipping Point but accessible by other transport and disposal [T&D] brokers who are less expensive), two facilities in PA and NJ (associated with Clean Earth), and one at Hazelton PA (through Jack Nelson, Concorde Environmental). Other facilities could take the solidified material but are more expensive and are not included in the spreadsheet.

An out-of-region option is the Weanack Land in VA that does not require solidification; however, ocean barge transport is required and likely prohibitively expensive. Un-costed at this time are transloading of the shallow-drafted dredge barges to deep-drafted ocean barges to leave Rye and in reverse to access the Weanack facility.

The following are items that are included and excluded in the costs outlined in the spreadsheet:

Included Costs

- Barge transport to the solidification facilities
- Solidification if required (not required for Weanack)
- T&D to/at the upland disposal/reuse facilities
- Barge cleaning (which may or may not be required)
- Testing costs for the required parameters and number of samples for acceptance by the disposal/reuse facilities
- Permitting costs are included in the T&D costs and are undertaken/completed by the disposal facilities

Excluded Costs

- Collection of the required samples for facility approval (including barge, sampling equipment, sampling activities and associated consulting/sampling/reporting time)
- Barge mob/demo costs or other costs associated the shallow-water and deep-water barge transport
- Any required transloading costs (for transport to VA)
- Contingency costs

Costs Associated with Dredging and Upland Disposal
Milton Harbor Municipal Boat Basin, Rye, NY

DRAFT

Disposal Facility	Location	Dredging Cost (1)	Solidification Cost	Solidification Location	Transport/Disposal Cost	Barge Transport	Barge Cleaning (if required)	# of samples	Testing Cost (CET)	Sampling Cost	TOTAL	Notes
Clean Earth - solidification and minimum T&D cost	National Park, NJ and/or Bethlehem, PA	\$1,000,000	\$945,000	Clean Earth - Jersey City, NJ	\$1,497,000	\$600,000	\$45,000.00	60	\$61,650	Unknown; would require a minimum of 120 cores	\$4,148,650	\$30/cy solidification plus \$45,000 mob/demob; \$25/cy upland T&D plus 4,500 cy debris disposal at \$166/cy; \$20/cy barge for transport; 3 barges cleaned at \$15,000/barge; testing on raw and amended samples required
Clean Earth - solidification and maximum T&D cost	National Park, NJ and/or Bethlehem, PA	\$1,000,000	\$945,000	Clean Earth - Jersey City, NJ	\$2,097,000	\$1,200,000	\$100,000.00	60	\$61,650	Unknown; would require a minimum of 120 cores	\$5,403,650	\$30/cy solidification plus \$45,000 mob/demob; \$45/cy upland T&D plus 4,500 cy debris disposal at \$166/cy; \$40/cy barge transport; 5 barges cleaned at \$20,000/barge; testing on raw and amended samples required
Green Earth Triangle - minimum solidification and T&D costs	Griswold, CT	\$1,000,000	\$1,290,000	Tipping Point - New Haven, CT	\$930,000	\$600,000	\$45,000.00	17	\$19,706	Unknown; would require a minimum of 70 cores	\$3,884,706	\$43/cy solidification; \$31/cy upland disposal plus \$20/cy barge transport; 3 barges cleaned at \$15,000/barge
Green Earth Triangle - maximum solidification and T&D costs	Griswold, CT	\$1,000,000	\$1,830,000	Tipping Point - New Haven, CT	\$1,650,000	\$1,200,000	\$100,000.00	17	\$19,706	Unknown; would require a minimum of 70 cores	\$5,799,706	\$61/cy solidification; \$55/cy upland disposal plus \$40/cy barge transport; 5 barges cleaned at \$20,000/barge
Hazleton Creek - minimum solidification and T&D costs	Hazleton, PA	\$1,000,000	\$1,290,000	Tipping Point - New Haven, CT	\$1,050,000	\$600,000	\$45,000.00	30	\$32,963	Unknown; would require a minimum of 120 cores	\$4,017,963	\$43/cy solidification; \$35/cy upland disposal plus \$20/cy barge transport; 3 barges cleaned at \$15,000/barge
Hazleton Creek - maximum solidification and T&D costs	Hazleton, PA	\$1,000,000	\$1,830,000	Tipping Point - New Haven, CT	\$1,050,000	\$1,200,000	\$100,000.00	30	\$32,963	Unknown; would require a minimum of 120 cores	\$5,212,963	\$61/cy solidification; \$35/cy upland disposal plus \$40/cy barge transport; 5 barges cleaned at \$20,000/barge
Weanack Land	Charles City, VA	\$1,000,000	NA	NA	\$270,000	\$2,250,000	Unknown	3	\$3,296	Not required	\$3,523,296	\$2,250,000 estimate for barge transport to VA; \$9/cy upland disposal (no transport); doesn't include barge mobilization fee, transloading in Rye or VA, or contingencies (all currently unknown); lab testing parameters assumed but unknown

Note:

1. Approximate dredging cost provided by Coastline Consulting, LLC based on previous estimates (\$30+- per cy).

MEMO #2

City of Rye Dredging Project

Coastline Consulting & Development, LLC

To: Ryan Coyne, City Engineer
From: David R. Provencher, Coastline Consulting & Development, LLC
CC: Victoria L. Man, LEP, Zuvic; File
Date: 6/2/2021
Re: **Project Status + Timeline**

Status Based on instructions from the City, Coastline submitted a request to the New York USACE to withdraw the pending Biological Sampling Plan for open-water disposal. This means that the City decided to pursue an upland disposal solution for the basin and proceed with the pending channel permit application for open-water disposal. The permitted dredge volumes for both projects will be based on a 2021 Hydrographic Survey that is scheduled for June 8, 2021.

Channel Permitting Estimated Timeline:

Jun 2021—complete 2021 hydro survey
Jun 2021—submit updated volumes to NE USACE for suit det (3+ month review)*
Jun 2021—submit updated volume docs to NYDEC/USACE (1 year review)*
Oct 2021—obtain updated suitability determination from NE USACE
Oct 2021—submit updated suitability determination to NYDEC/USACE*
Oct 2021—file CT-DEEP disposal permit application (3+ month review)*
Jun 2022—dredging/disposal permit decisions (x3): DEC, USACE, CT-DEEP

Basin Permitting Estimated Timeline:

Jun 2021—complete 2021 hydro survey
Jun 2021—obtain preliminary acceptance letters from disposal facilities
Jul 2021—file permit application with NY agencies (DEC, USACE, DOS, OGS)*
Spring 2022—conduct sampling/testing for disposal facilities to accept material*
Jun 2022—dredging permit decisions (x2): DEC, USACE

**Start of regulatory/facility review; timelines subject to change based on actual review time.*

Milton Harbor Dredging Project City of Rye

2021 Project Dredge Volumes

Volume Computations are based on June 9, 2021 survey data and were performed using
Hypack Version 21.0.0.0, Tin Model

<u>Footprint</u>	Dredge Depth	Volume (y³)
Milton Harbor Comprehensive (Full Federal Channel & Basin)	-6.0 + 1.0	131,540.5
Proposed 75' Channel	-5.0	20,938.5
Proposed Basin	-6.0 + 1.0	42,764.3

Fill Volume Estimates 2015-2019

Volume Computations are based on November 16, 2015 (baseline) and June 5, 2019 survey
data and were performed using Hypack Version 20.1.15.0, Tin Model

<u>Footprint</u>	Dredge Depth	Volume (y³)
Milton Harbor Comprehensive	-6.0 + 1.0	25,159.1
	No Depth	26,361.8

Fill Volume Estimates 2019-2020

Volume Computations are based on the difference between 2015-2020 fill totals and 2015 -
2019 fill totals.

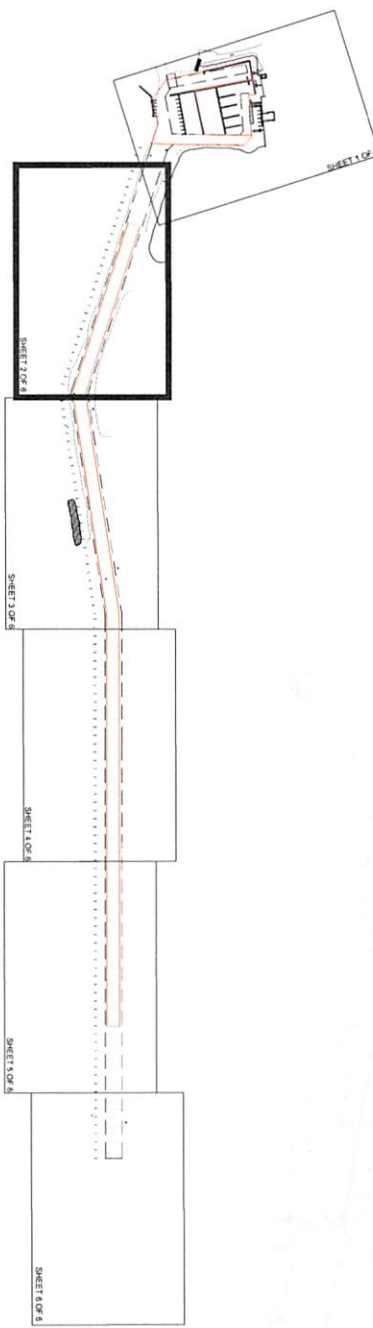
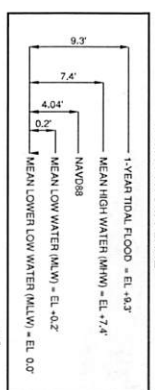
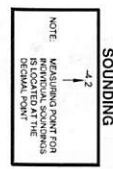
<u>Footprint</u>	Dredge Depth	Volume (y³)
Milton Harbor Comprehensive	-6.0 + 1.0	2,982.6
	No Depth	2,998.0

Fill Volume Estimates 2020-2021

Volume Computations are based on the difference between 2015-2020 fill totals and 2015 -
2021 fill totals.

<u>Footprint</u>	Dredge Depth	Volume (y³)
Milton Harbor Comprehensive	-6.0 + 1.0	5,980.7
	No Depth	6,031.8

N STATE PLANE COORDINATE
N STATE SYSTEM (NAD 83)

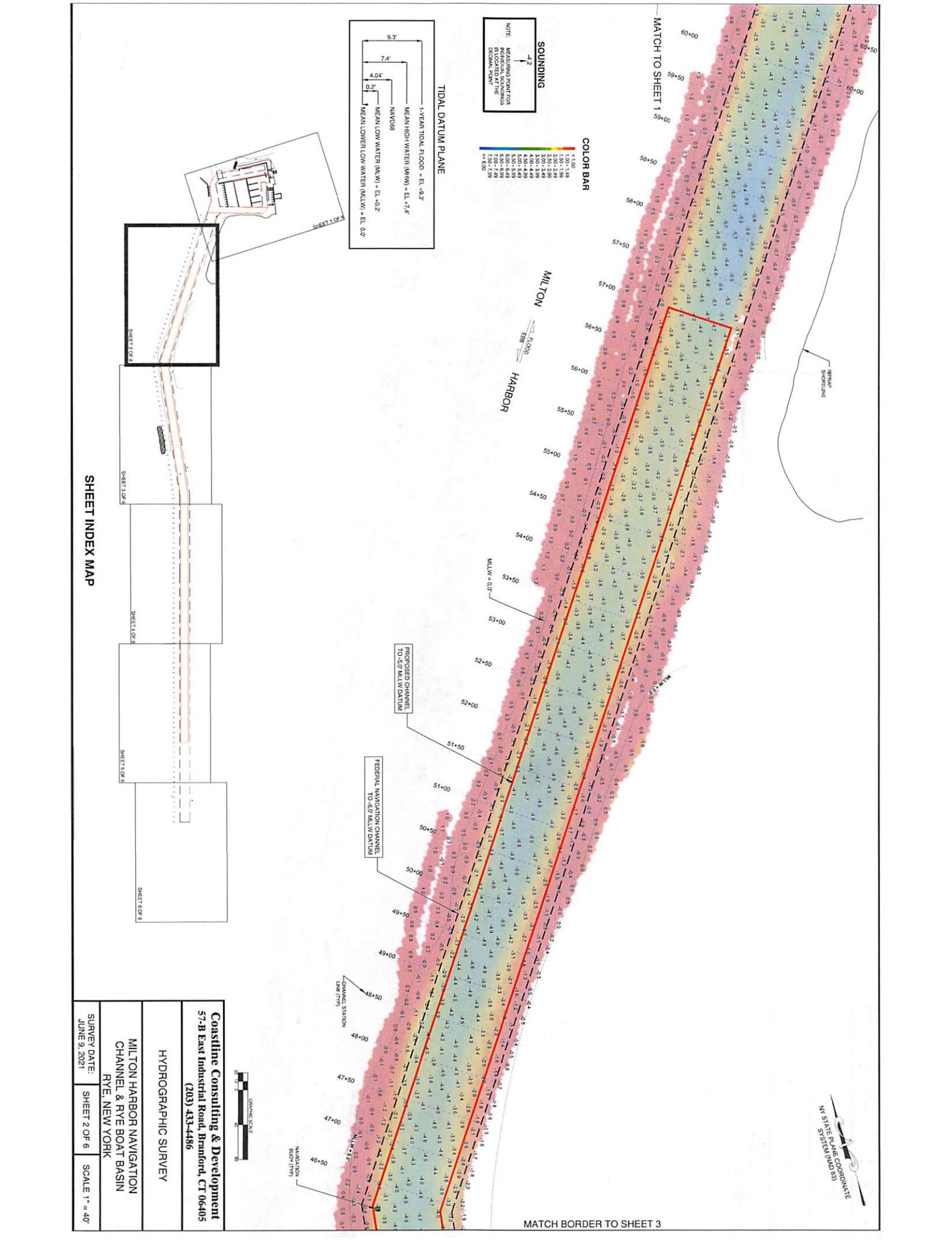


Costline Consulting & Development
57-B East Industrial Road, Branford, CT 06405
(203) 433-4486

HYDROGRAPHIC SURVEY

MILTON HARBOR NAVIGATION CHANNEL & RYE BOAT BASIN
RYE, NEW YORK

SURVEY DATE: JUNE 9, 2021
SHEET 2 OF 6
SCALE 1" = 40'

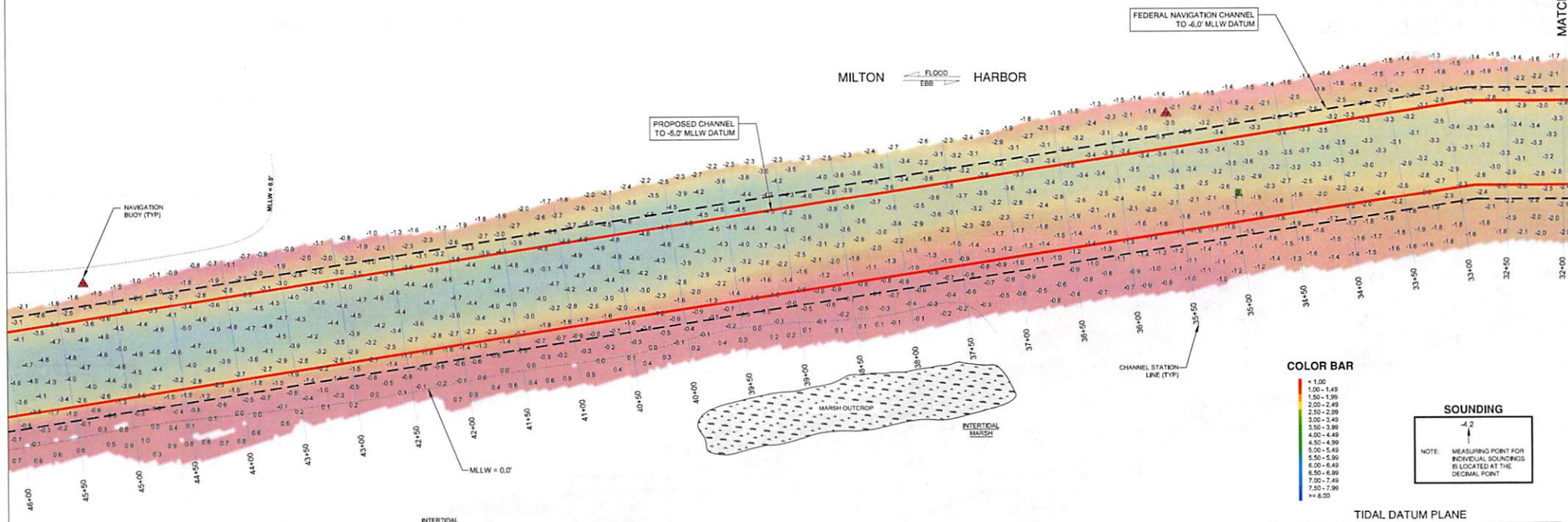


MATCH BORDER TO SHEET 3

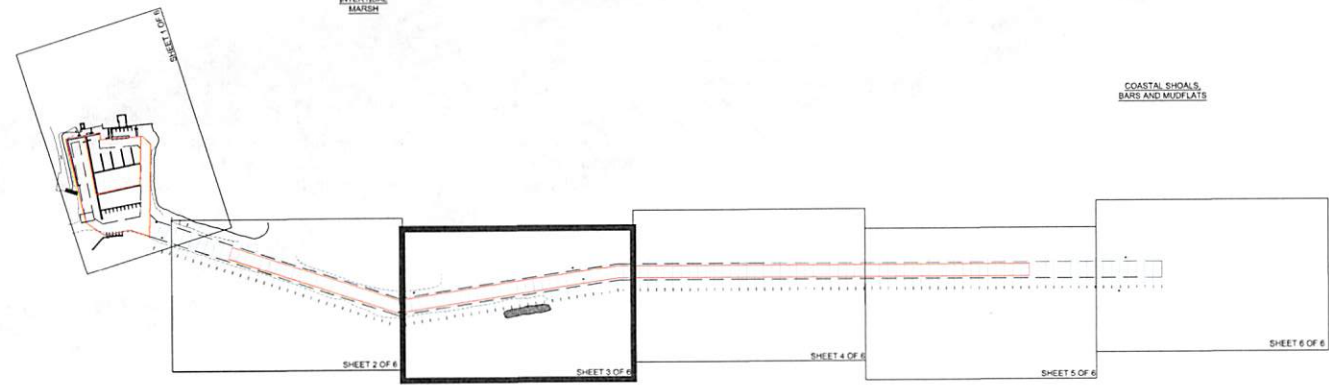
MATCH TO SHEET 1

NY STATE PLANE COORDINATE SYSTEM (NAD 83)

MATCH BORDER TO SHEET 4



MATCH BORDER TO SHEET 2



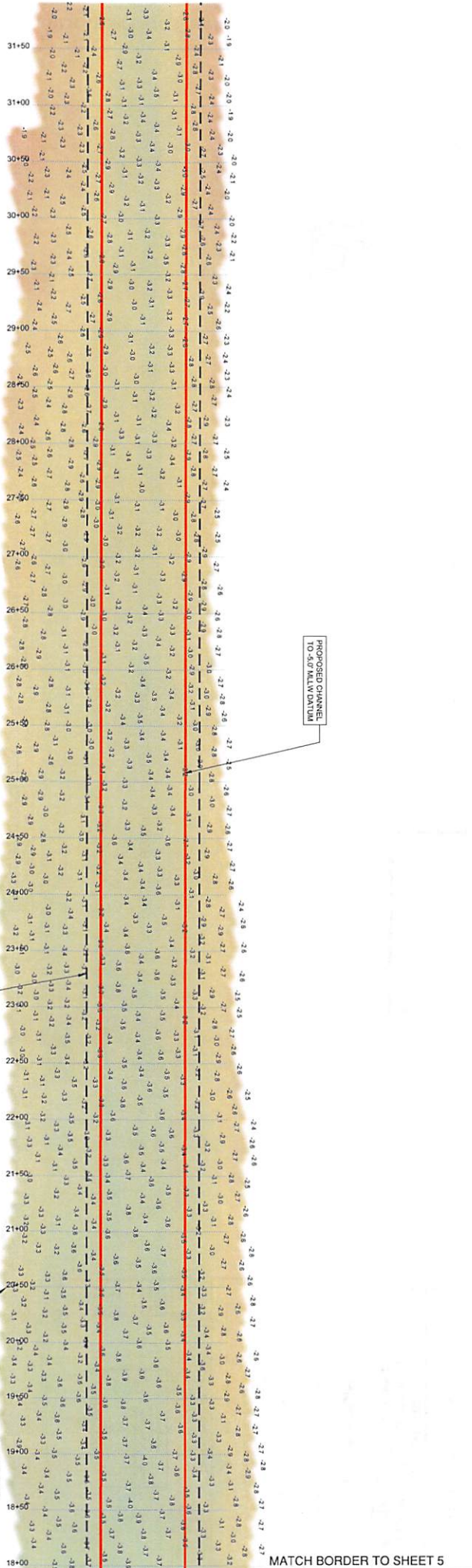
SHEET INDEX MAP

Coastline Consulting & Development
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HYDROGRAPHIC SURVEY

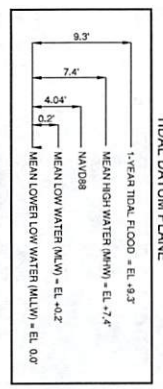
MILTON HARBOR NAVIGATION
 CHANNEL & RYE BOAT BASIN
 RYE, NEW YORK

SURVEY DATE: JUNE 9, 2021	SHEET 3 OF 6	SCALE 1" = 40'
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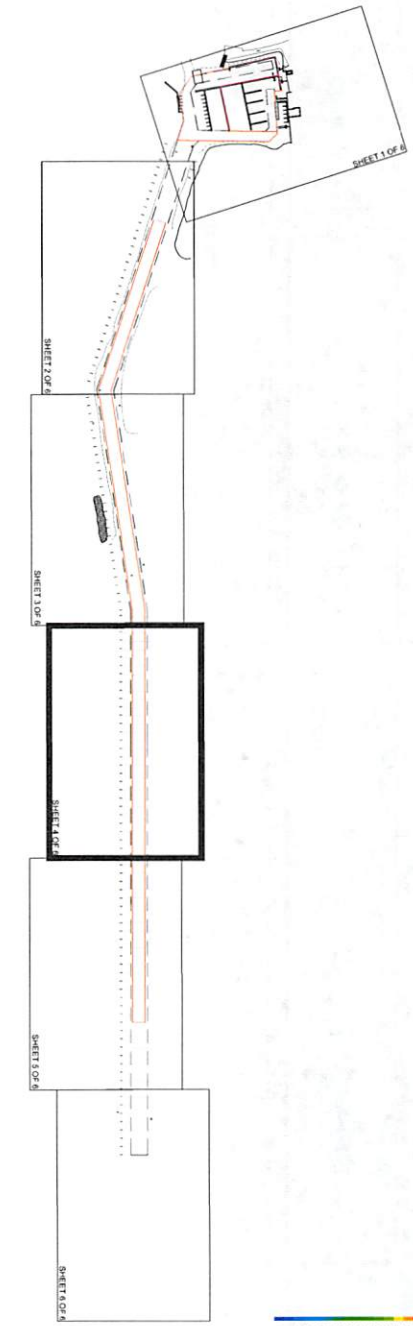


MILTON HARBOR

COLOR BAR



NOTE: MEASURING POINT FOR INDIVIDUAL SOUNDINGS IS LOCATED AT THE CHANNEL CENTER



SHEET INDEX MAP

Costline Consulting & Development
 57-B East Industrial Road, Branford, CT 06405
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HYDROGRAPHIC SURVEY

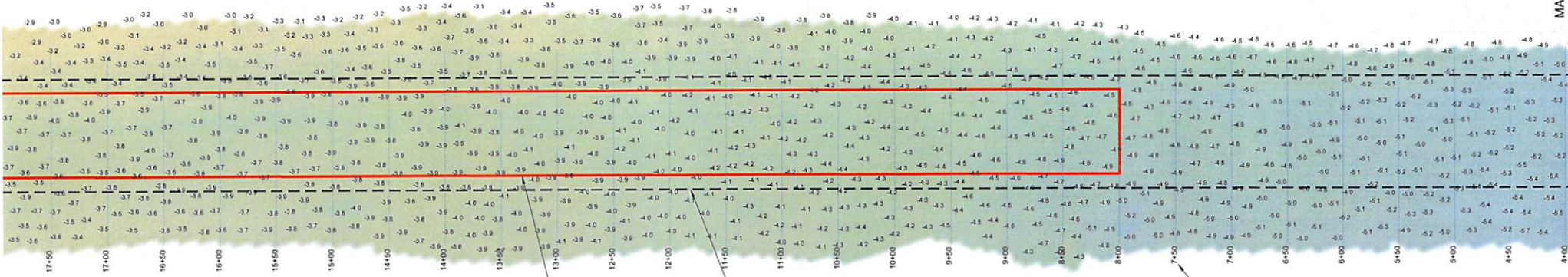
MILTON HARBOR NAVIGATION CHANNEL & RYE BOAT BASIN
 RYE, NEW YORK

SURVEY DATE: JUNE 9, 2021

SHEET 4 OF 6

SCALE 1" = 40'

NY STATE PLANE COORDINATE SYSTEM (NAD 83)



PROPOSED CHANNEL TO -5.0' MLLW DATUM

FEDERAL NAVIGATION CHANNEL TO -6.0' MLLW DATUM

CHANNEL STATION LINE (TYP)

MATCH BORDER TO SHEET 4

MATCH BORDER TO SHEET 6

MILTON $\xleftarrow{\text{FLOOD}}$ HARBOR $\xrightarrow{\text{EBB}}$

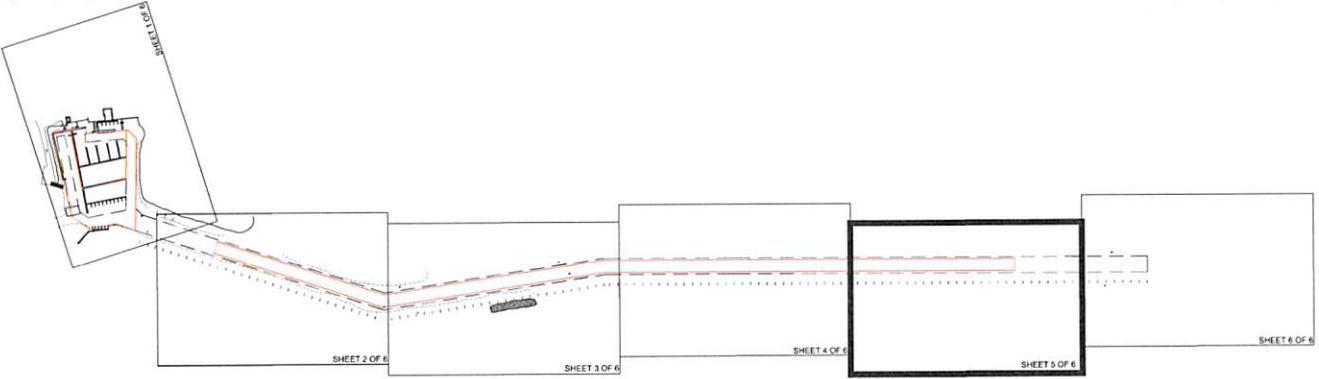
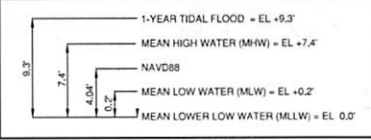
COLOR BAR



SOUNDING

NOTE: MEASURING POINT FOR INDIVIDUAL SOUNDINGS IS LOCATED AT THE DECIMAL POINT

TIDAL DATUM PLANE



SHEET INDEX MAP

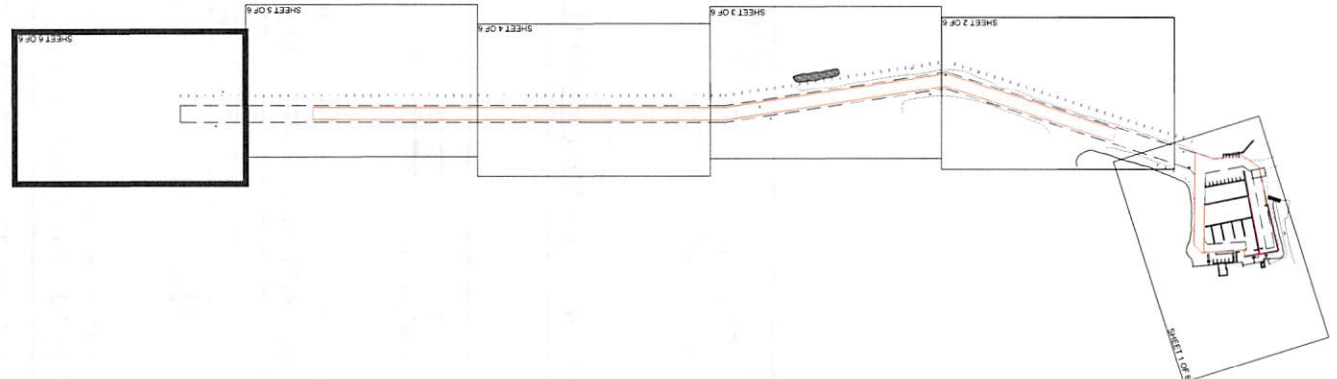
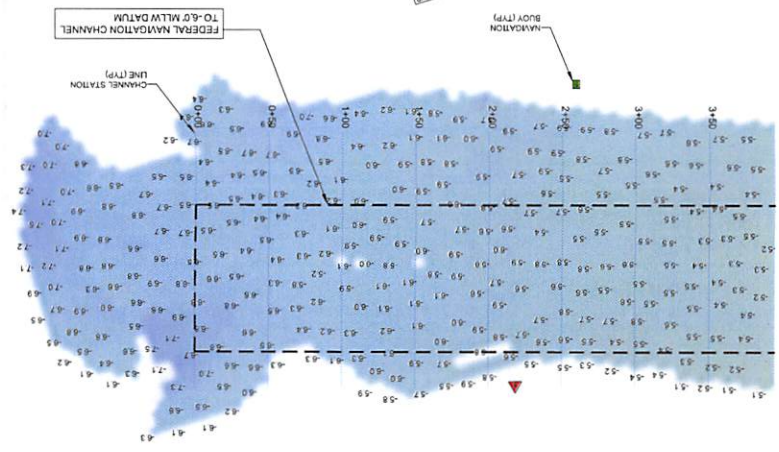
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HYDROGRAPHIC SURVEY

MILTON HARBOR NAVIGATION CHANNEL & RYE BOAT BASIN
 RYE, NEW YORK

SURVEY DATE: JUNE 9, 2021 SHEET 5 OF 6 SCALE 1" = 40'

MILTON HARBOR FLOOD EBB



SHEET INDEX MAP

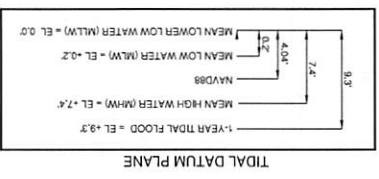
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HYDROGRAPHIC SURVEY

MILTON HARBOR NAVIGATION CHANNEL & RYE BOAT BASIN RYE, NEW YORK

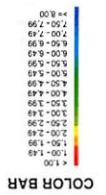
SHEET 6 OF 6 SCALE 1" = 40'

SURVEY DATE: JUNE 9, 2021



NOTE: MEASURING POINT FOR REFERENCE SCHEMATIC IS LOCATED AT THE DECIMAL POINT

SOUNDING



Milton Harbor Dredging Project City of Rye

prepared 9 September 2021

Fill Volume Estimates 2015-2019		
Volume computations are based on November 16, 2015 (baseline) and June 5, 2019 survey data and were performed using Hypack Version 20.1.15.0, Tin Model		
Footprint	Dredge Depth	Volume (y ³)
Basin	-6.0 + 1.0	10,011
75' Channel	-5.0	7,776
Fill Volume Estimates 2019-2020		
Volume Computations are based on the difference between 2015-2020 fill totals and 2015-2019 fill totals		
Footprint	Dredge Depth	Volume (y ³)
Basin	-6.0 + 1.0	936
75' Channel	-5.0	1,565
Fill Volume Estimates 2020-2021		
Volume computations are based on the difference between 2015-2020 fill totals and 2015-2021 fill totals		
Footprint	Dredge Depth	Volume (y ³)
Basin	-6.0 + 1.0	1,961
75' Channel	-5.0	2,899

ESTIMATED ANNUAL SILTATION RATE		
Volume computations are based on fill totals from November 2015 to June 2021 (5.5 years)		
Footprint	Dredge Depth	Volume (y ³)
Basin	-6.0 + 1.0	2,347
75' Channel	-5.0	2,225

