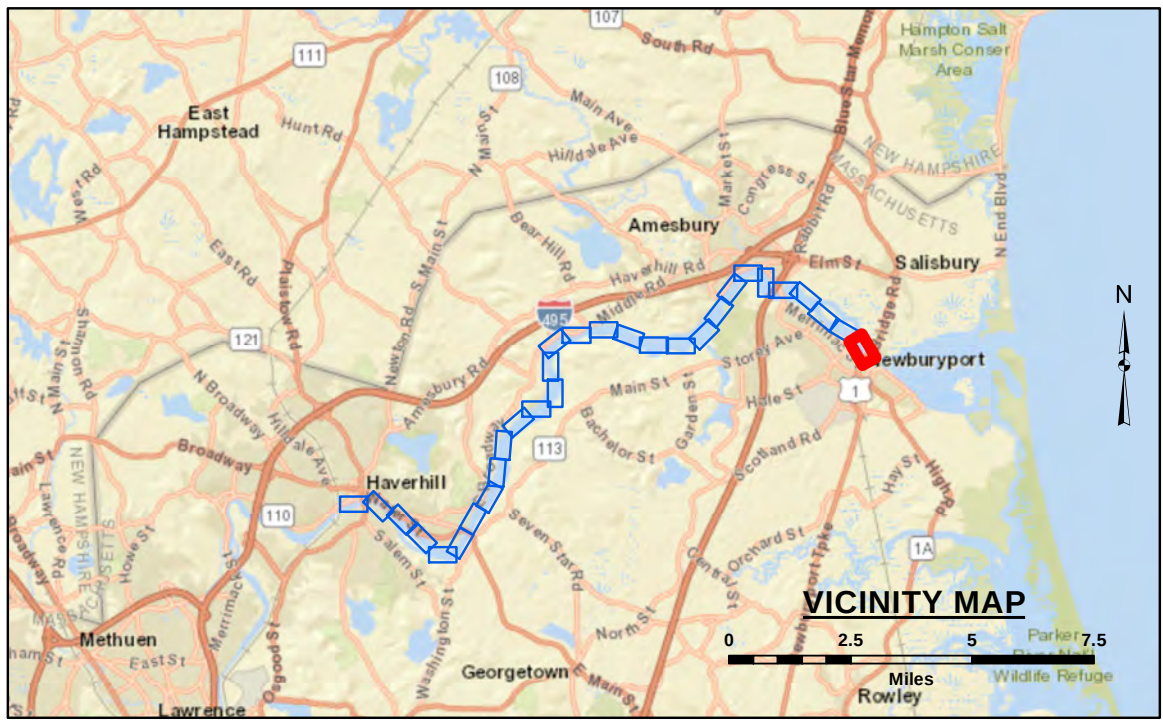
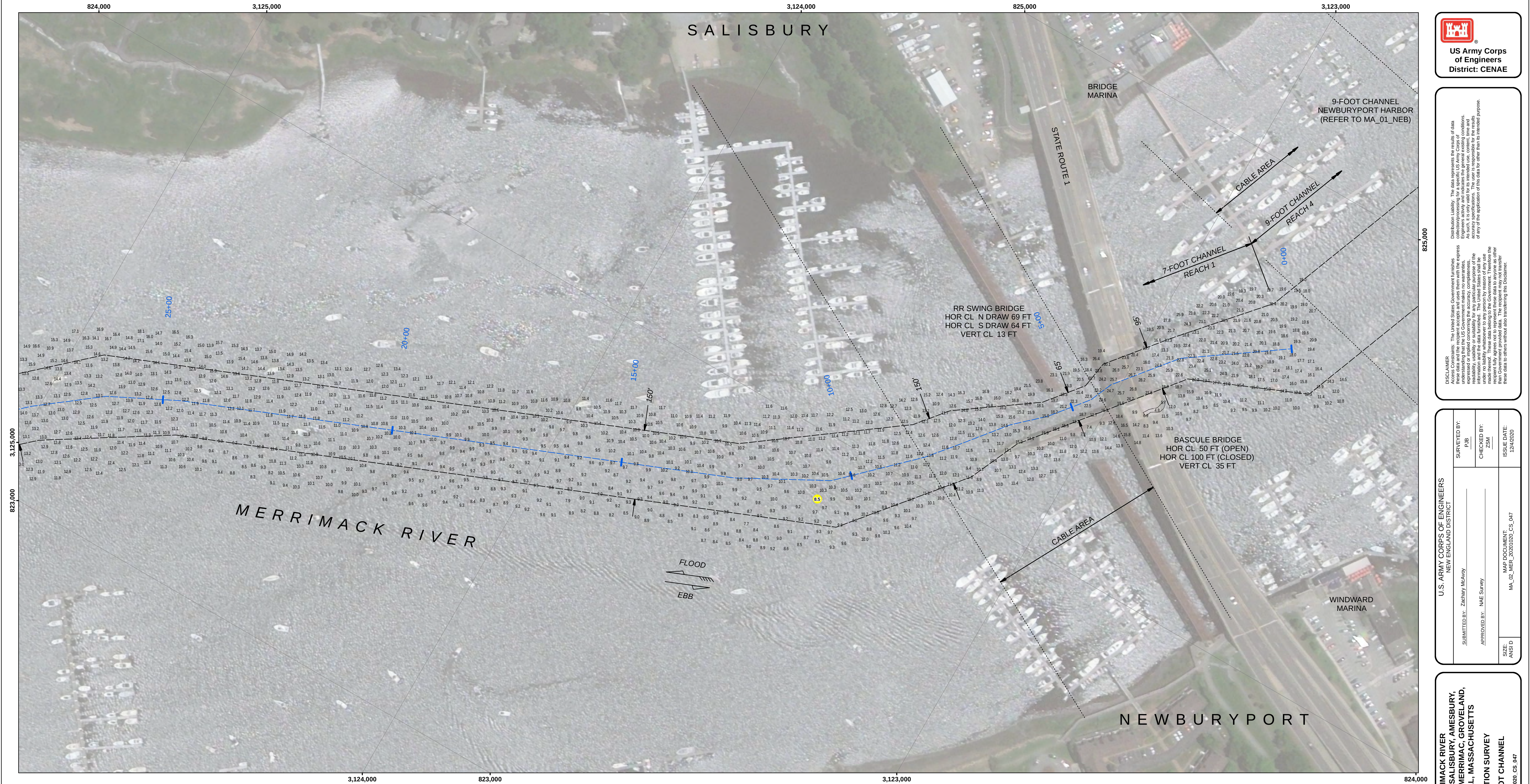




**LEGEND**

--- Federal Navigation Channel

..... Cable or Pipe Areas

- - - Channel Center Line

— Contour Line

⊗ Obstruction Point

✱ Fixed Navigation Aids

🚩 Red Navigation Buoy

🟢 Green Navigation Buoy

🔴 Shoaling Area

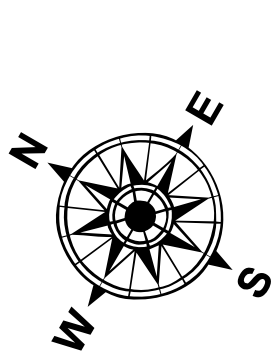
🟡 Shoalest Sounding\*\*

**GRAPHIC SCALE**

1" = 100'

0 100 0 100 200 Feet

\*\* Shoalest Sounding per Quarter per Reach



**Notes:**  
Horizontal Datum: Mass Mainland, MA-2001 NAD 83  
Distance Units: U.S. Survey Feet  
Vertical Datum: MLLW  
Depth Units: U.S. Survey Feet  
Vessel Name: KEEGAN  
Sonar System: Reson TS60 (Multibeam Sonar)  
Sounding Frequency: 400 kHz  
Survey Method: RTK GPS Tides  
GPS System: Trimble SPS 855 (RTK)  
RTK Base Station: MTS Smartnet Max  
Software Used: Hypack  
Sounding Sort Distance: 20'  
Field Books: R&H 4386  
Survey No.: MA\_02\_MER\_20201020\_CS\_047  
Reference NOAA Chart No.: 13274

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**Project Remarks**  
Federal navigation project not surveyed in its entirety.

**Water Level Information**  
Tides were recorded using RTK GPS. The MLLW to NAVD88 corrections for this project range from 3.90 feet to 4.22 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.0. ME/NE/HMA region Version 2.3 in the vicinity of Merrimack River, Newburyport, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.



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|                                                      |                     |                                           |                          |
|------------------------------------------------------|---------------------|-------------------------------------------|--------------------------|
| U.S. ARMY CORPS OF ENGINEERS<br>NEW ENGLAND DISTRICT |                     | MAP DOCUMENT<br>MA_02_MER_20201020_CS_047 |                          |
| SUBMITTED BY:<br>Zachary McAvoy                      | SURVEYED BY:<br>PJB | CHECKED BY:<br>ZSM                        | ISSUE DATE:<br>12/4/2020 |
| APPROVED BY:<br>NAE Survey                           | SIZE:<br>A1S1D      |                                           |                          |

**MERRIMACK RIVER  
NEWBURYPORT, SALISBURY, AMESBURY,  
WEST NEWBURY, MERRIMAC, GROVELAND,  
AND HAVERHILL, MASSACHUSETTS**

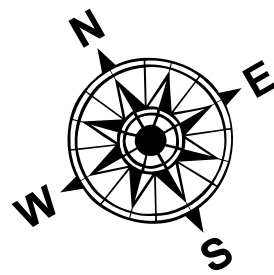
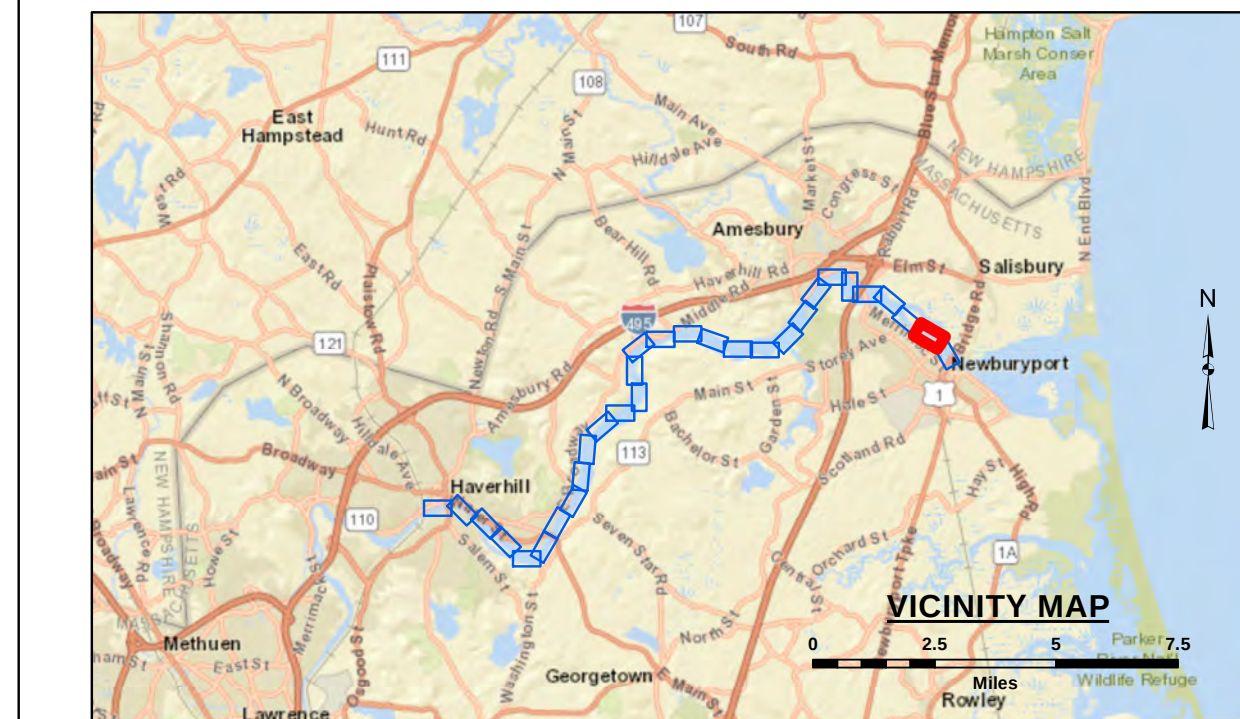
**CONDITION SURVEY  
7-FOOT CHANNEL**

File Name: MA\_02\_MER\_20201020\_CS\_047

**SHEET  
IDENTIFICATION  
Merrimack River**

Sheet 1 of 30





The information depicted on these charts represents the results of surveys made on the dates indicated, and can only be considered as indicating the conditions existing at that time.

Project Remarks  
Federal navigation project not surveyed in its entirety

Water Level Information

Tides were recorded using RTK GPS. The MLLW to NAVD88 corrections for this project range from 3.90 feet to 4.22 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.0, ME/NH/MA region Version 2.3 in the vicinity of Merrimack River, Newburyport, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.



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MERRIMACK RIVER  
NEWBURYPORT, SALISBURY, AMESBURY,  
WEST NEWBURY, MERRIMAC, GROVELAND,  
AND HAVERHILL, MASSACHUSETTS

CONDITION SURVEY

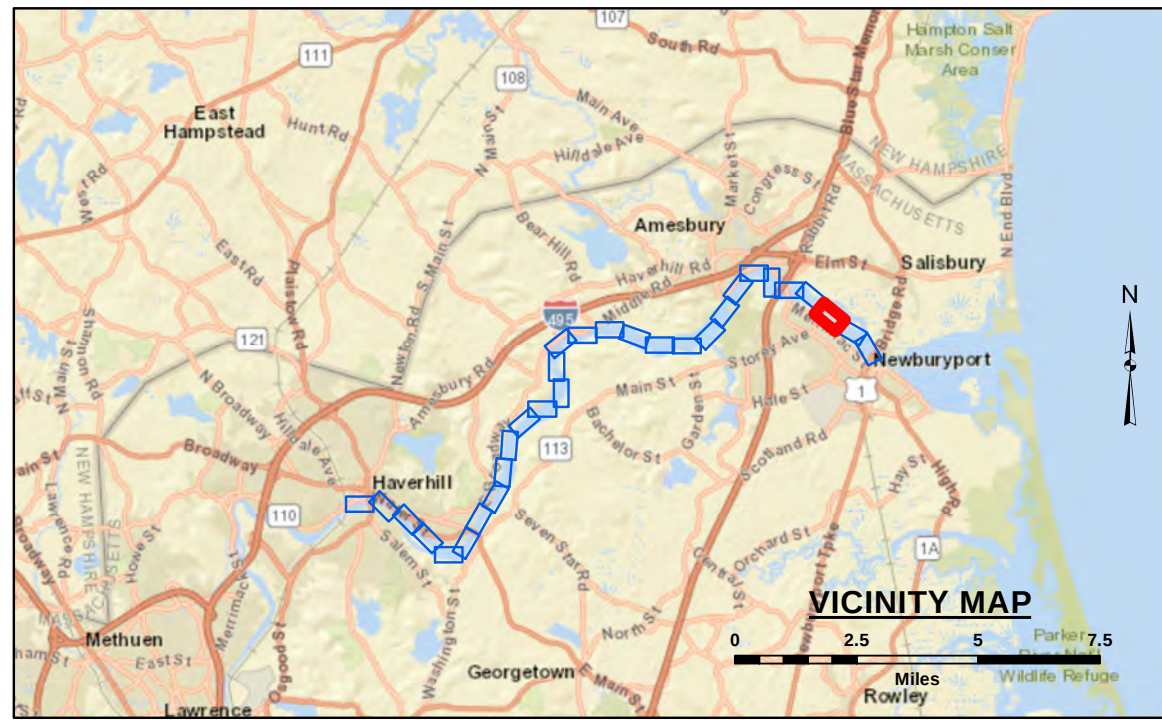
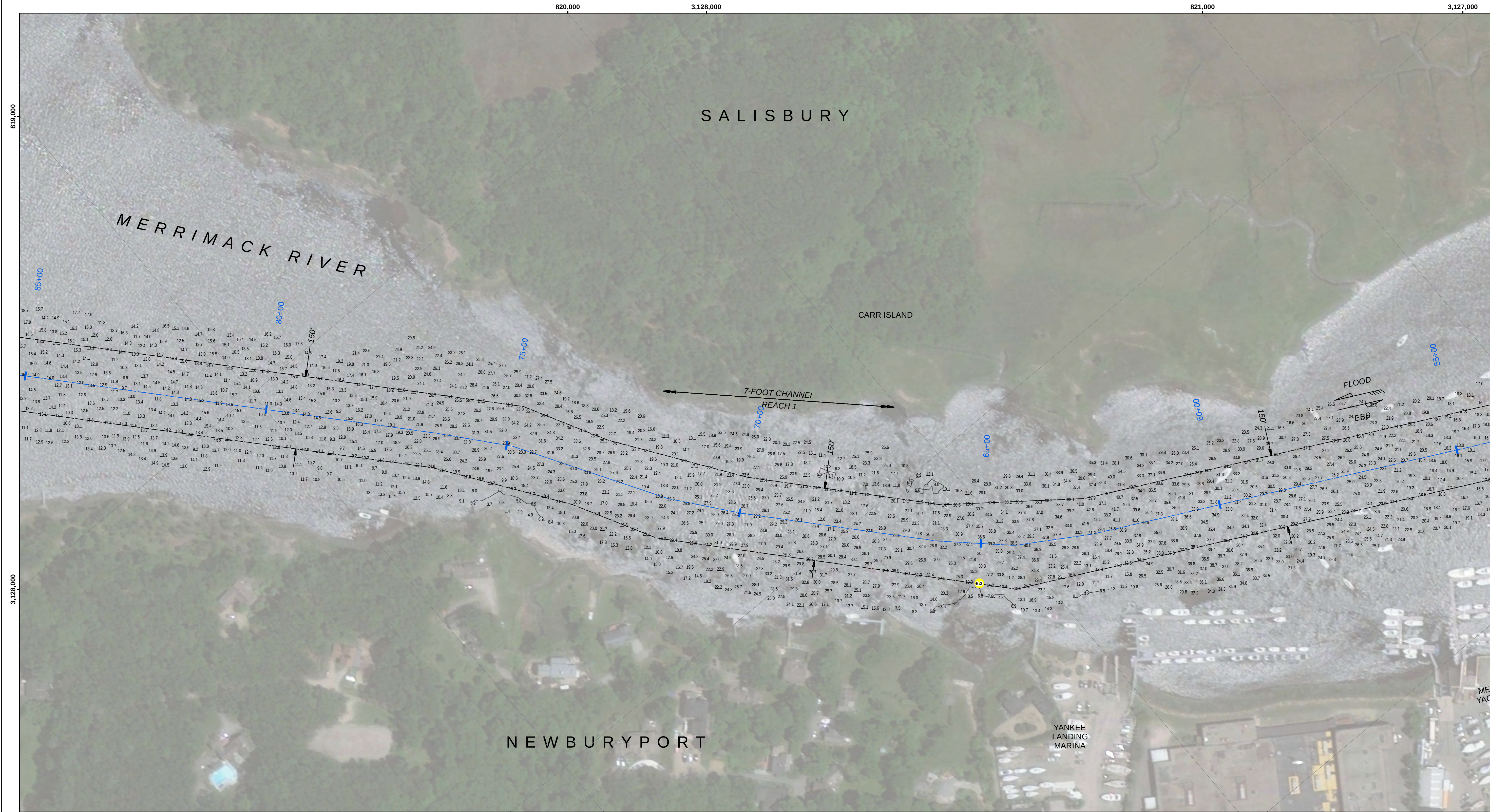
7-FOOT CHANNEL

File Name: MA\_02\_MER\_20201020\_CS\_047

**SHEET  
IDENTIFICATION  
Merrimack River**

**Sheet 2 of 30**





**LEGEND**

--- Federal Navigation Channel

..... Cable or Pipe Areas

- - - Channel Center Line

— Contour Line

⊗ Obstruction Point

⊗ Fixed Navigation Aids

🚩 Red Navigation Buoy

🚩 Green Navigation Buoy

■ Shoaling Area

● Shoalest Sounding\*\*

**GRAPHIC SCALE**

1" = 100'

0 100 0 100 200 Feet

\*\* Shoalest Sounding per Quarter per Reach

**Notes:**  
Horizontal Datum: Mass Mainland, MA-2001 NAD 83  
Distance Units: U.S. Survey Feet  
Vertical Datum: MLLW  
Depth Units: U.S. Survey Feet  
Vessel Name: KEEGAN  
Sonar System: Reson TS0 (Multibeam Sonar)  
Sounding Frequency: 400 kHz  
Survey Method: RTK GPS Tides  
GPS System: Trimble SPS 855 (RTK)  
RTK Base Station: MTS Smartnet Max  
Software Used: Hypack  
Sounding Sort Distance: 20'  
Field Books: R&H 4386  
Survey No.: MA\_02\_MER\_20201020\_CS\_047  
Reference NOAA Chart No.: 13274

**General Notes**  
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**Project Remarks**  
Federal navigation project not surveyed in its entirety.

The information depicted on these charts represents the results of surveys made on the dates indicated, and can only be considered as indicating the conditions existing at that time.

**Water Level Information**  
Tides were recorded using RTK GPS. The MLLW to NAVD88 corrections for this project range from 3.90 feet to 4.22 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.0. ME/NH/MA region Version 2.3 in the vicinity of Merrimack River, Newburyport, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.

**US Army Corps of Engineers**  
District: CENAE

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|                                                      |                            |                          |                                           |
|------------------------------------------------------|----------------------------|--------------------------|-------------------------------------------|
| U.S. ARMY CORPS OF ENGINEERS<br>NEW ENGLAND DISTRICT | SURVEYED BY:<br>PJB        | CHECKED BY:<br>ZSM       | MAP DOCUMENT<br>MA_02_MER_20201020_CS_047 |
|                                                      | APPROVED BY:<br>NAE Survey | ISSUE DATE:<br>12/4/2020 |                                           |
| SIZE:<br>A151 D                                      |                            |                          |                                           |

**MERRIMACK RIVER  
NEWBURYPORT, SALISBURY, AMESBURY,  
WEST NEWBURY, MERRIMAC, GROVELAND,  
AND HAVERHILL, MASSACHUSETTS**

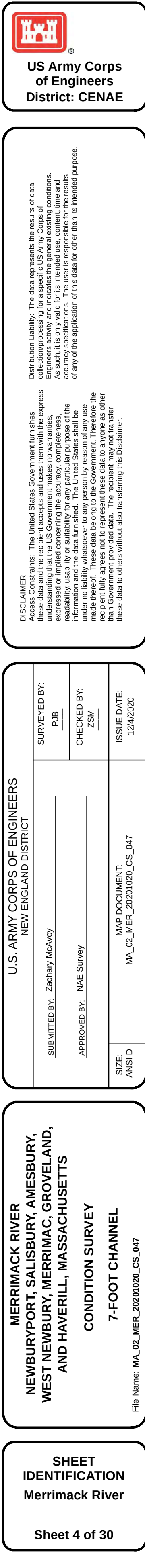
**CONDITION SURVEY  
7-FOOT CHANNEL**

**SHEET  
IDENTIFICATION  
Merrimack River**

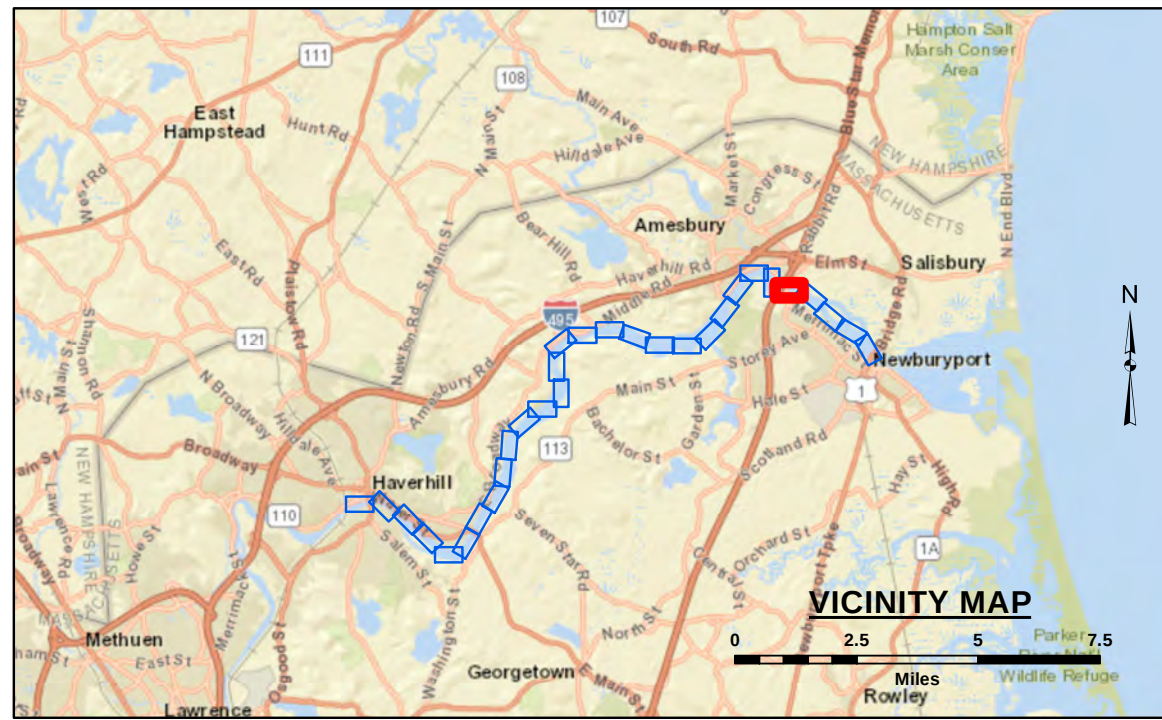
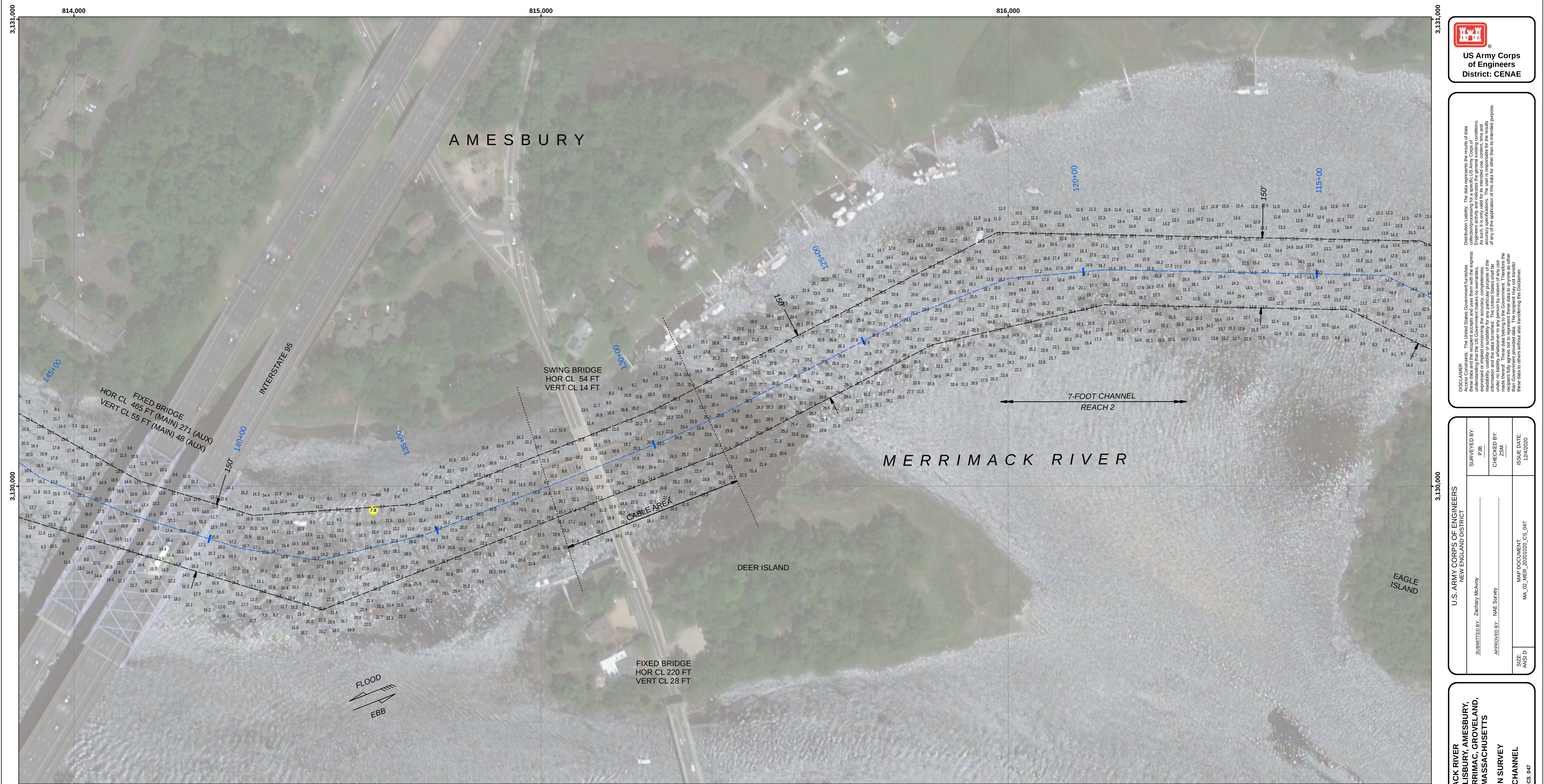
Sheet 3 of 30

Revision Number: 4.1-20191105



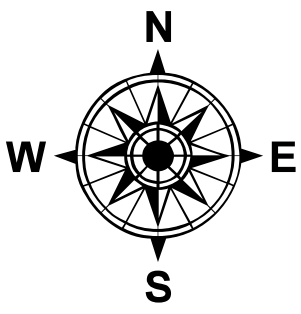
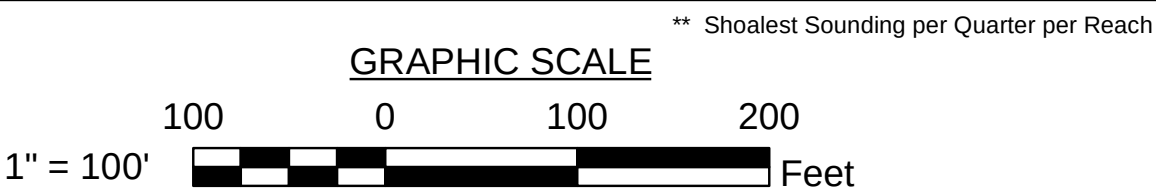






**LEGEND**

|                                |                         |
|--------------------------------|-------------------------|
| --- Federal Navigation Channel | ✱ Fixed Navigation Aids |
| ..... Cable or Pipe Areas      | 🚩 Red Navigation Buoy   |
| - - - Channel Center Line      | 🚩 Green Navigation Buoy |
| — Contour Line                 | 🔴 Shoaling Area         |
| ⊗ Obstruction Point            | 🟡 Shoalest Sounding**   |



**Notes:**  
 Horizontal Datum: Mass Mainland, MA-2001 NAD 83  
 Distance Units: U.S. Survey Feet  
 Vertical Datum: MLLW  
 Depth Units: U.S. Survey Feet  
 Vessel Name: KEEGAN  
 Sonar System: Reson TS0 (Multibeam Sonar)  
 Sounding Frequency: 400 kHz  
 Survey Method: RTK GPS Tides  
 GPS System: Trimble SPS 855 (RTK)  
 RTK Base Station: MTS Smartnet Max  
 Software Used: Hypack  
 Sounding Sort Distance: 20'  
 Field Books: R&H 4386  
 Survey No.: MA\_02\_MER\_20201020\_CS\_047  
 Reference NOAA Chart No.: 13274

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**Project Remarks**  
 Federal navigation project not surveyed in its entirety.

**Water Level Information**  
 Tides were recorded using RTK GPS. The MLLW to NAVD88 corrections for this project range from 3.90 feet to 4.22 feet. These corrections are referenced from NOAA's V-Datum Model Version 4.0. ME/NH/MA region Version 2.3 in the vicinity of Merrimack River, Newburyport, Massachusetts. NAVD88 is above MLLW; therefore the correction should be added to NAVD88 to convert to MLLW. No tide gauges were used on this project.



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|                                                      |                     |                                           |                          |
|------------------------------------------------------|---------------------|-------------------------------------------|--------------------------|
| U.S. ARMY CORPS OF ENGINEERS<br>NEW ENGLAND DISTRICT |                     | MAP DOCUMENT<br>MA_02_MER_20201020_CS_047 |                          |
| SUBMITTED BY:<br>Zachary McAvoy                      | SURVEYED BY:<br>PJB | CHECKED BY:<br>ZSM                        | ISSUE DATE:<br>12/4/2020 |
| APPROVED BY:<br>NAE Survey                           | SIZE<br>A151 D      |                                           |                          |

**MERRIMACK RIVER  
 NEWBURYPORT, SALISBURY, AMESBURY,  
 WEST NEWBURY, MERRIMACK, GROVELAND,  
 AND HAVERHILL, MASSACHUSETTS**

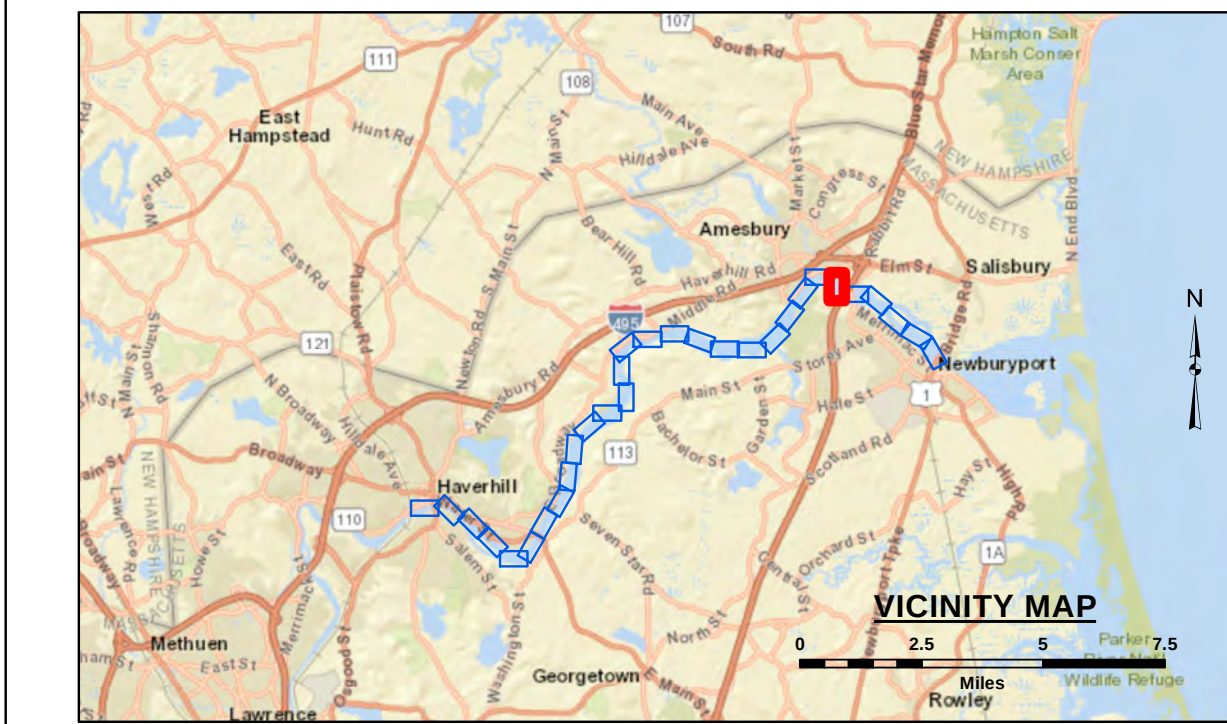
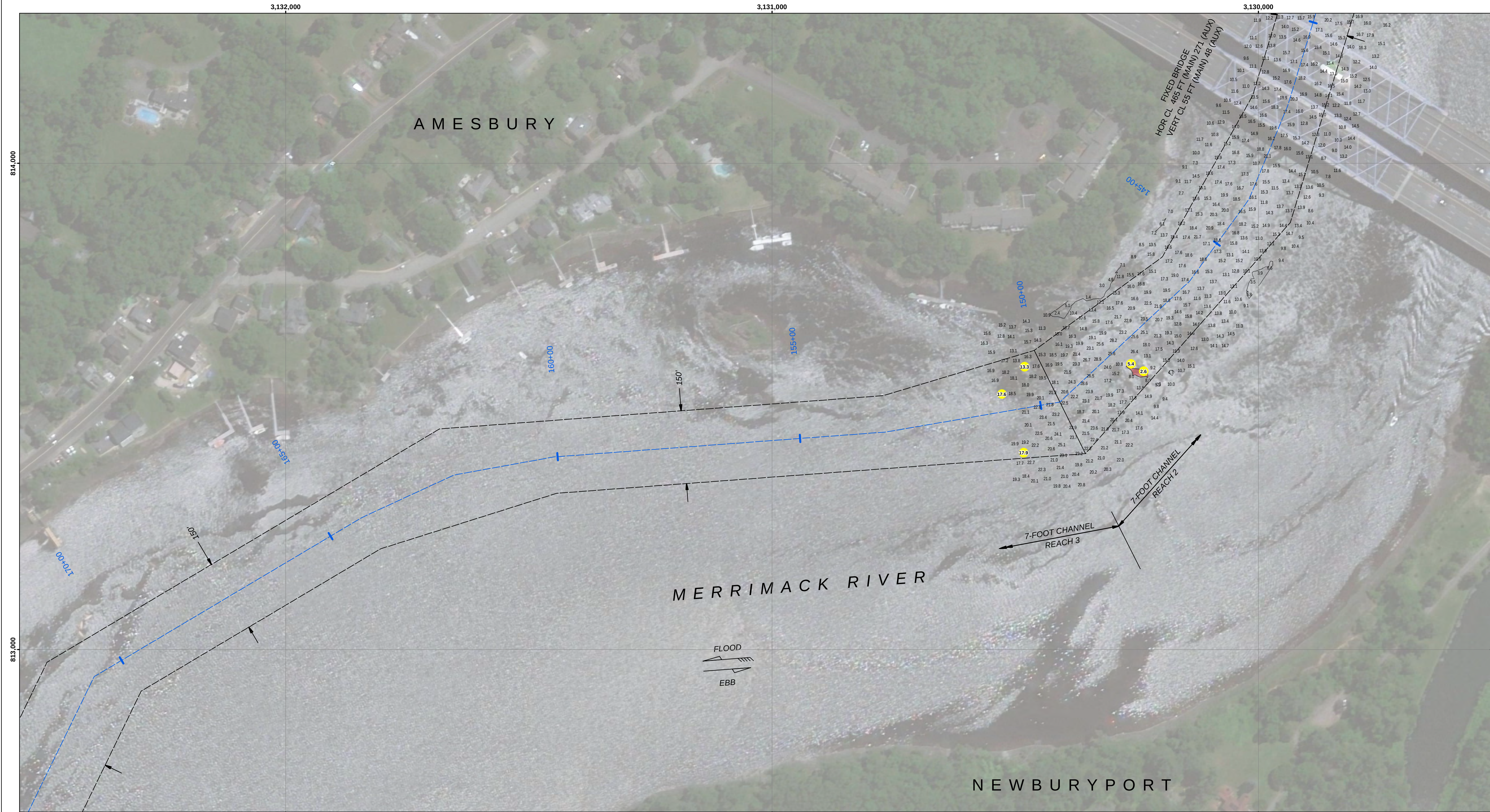
**CONDITION SURVEY  
 7-FOOT CHANNEL**

File Name: MA\_02\_MER\_20201020\_CS\_047

**SHEET  
 IDENTIFICATION**  
 Merrimack River

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**LEGEND**

--- Federal Navigation Channel

..... Cable or Pipe Areas

--- Channel Center Line

— Contour Line

⊗ Obstruction Point

✱ Fixed Navigation Aids

📍 Red Navigation Buoy

📍 Green Navigation Buoy

🔴 Shoaling Area

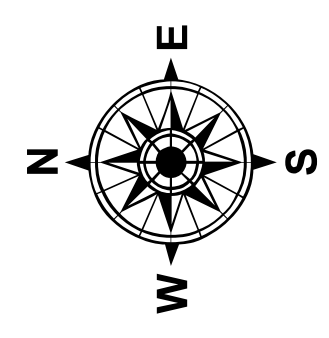
🟡 Shoalest Sounding\*\*

**GRAPHIC SCALE**

1" = 100'

0 100 0 100 200 Feet

\*\* Shoalest Sounding per Quarter per Reach



**Notes:**  
Horizontal Datum: Mass Mainland, MA-2001 NAD 83  
Distance Units: U.S. Survey Feet  
Vertical Datum: MLLW  
Depth Units: U.S. Survey Feet  
Vessel Name: KEEGAN  
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|                                                      |                     |                                           |                          |
|------------------------------------------------------|---------------------|-------------------------------------------|--------------------------|
| U.S. ARMY CORPS OF ENGINEERS<br>NEW ENGLAND DISTRICT |                     | MAP DOCUMENT<br>MA_02_MER_20201020_CS_047 |                          |
| SUBMITTED BY:<br>Zachary McAvoy                      | SURVEYED BY:<br>PJB | CHECKED BY:<br>ZSM                        | ISSUE DATE:<br>12/4/2020 |
| APPROVED BY:<br>NAE Survey                           | SIZE<br>ANSI D      |                                           |                          |

**MERRIMACK RIVER  
NEWBURYPORT, SALISBURY, AMESBURY,  
WEST NEWBURY, MERRIMAC, GROVELAND,  
AND HAVERHILL, MASSACHUSETTS**

**CONDITION SURVEY  
7-FOOT CHANNEL**

File Name: MA\_02\_MER\_20201020\_CS\_047

**SHEET  
IDENTIFICATION  
Merrimack River**

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