US Army Corps of Engineers®
New York District

Storm Surge Barrier Sub-Appendix

Annex G – Verrazzano Narrows Storm Surge Barrier Plan Set

DRAFT

New York – New Jersey Harbor and Tributaries Coastal Storm Risk Management Feasibility Study

Annex B2.G

September 2022

NEW YORK DISTRICT

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NEW YORK HARBOR
NY/NJ HARBOR AND TRIBUTARIES STUDY
VERRAZZANO NARROWS STORM SURGE BARRIER

SOLICITATION NO.: W912DS-19-F-0111
CONTRACT NO.: W912DS-18-D-0006
ISSUE DATE: APRIL 2020

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	G-102	VERRAZZANO NARROWS - ALTERNATE CHANNEL ALIGNMENT
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	C-102	VERRAZZANO NARROWS PLAN - COFFERDAMS AND CUT-OFF WALLS
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	R-005	VERRAZZANO NARROWS PHOTO REFERENCE - SECONDARY SECTOR GATE

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FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS COVER SHEET AND DRAWING INDEX

SHEET IDENTIFICATION
G-001
SHEET INDX OF ----

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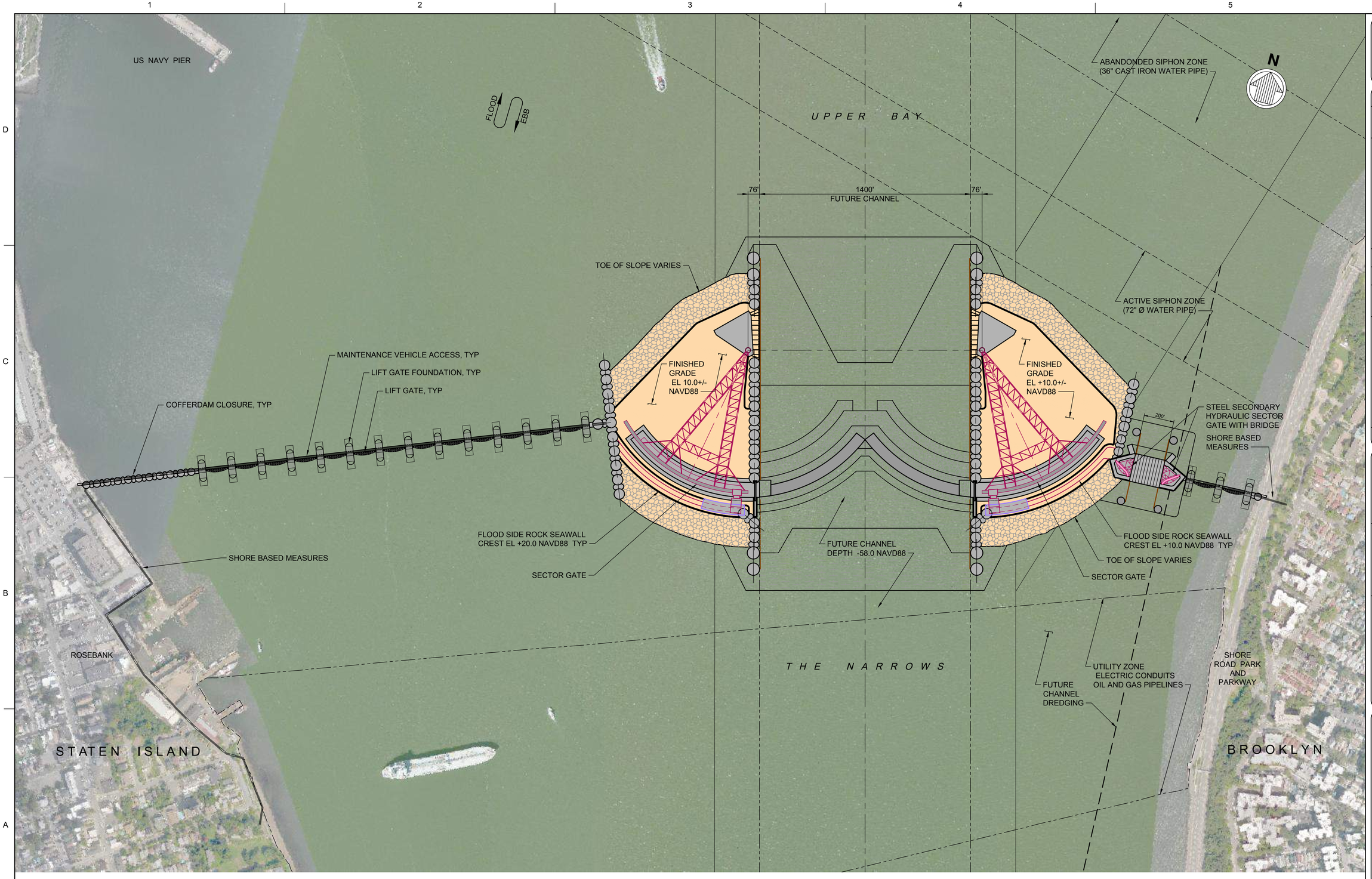

300' 0' 300' 600'

SCALE: 1"=300'

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NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS PLAN - OVERALL SITE

SHEET IDENTIFICATION
G-101
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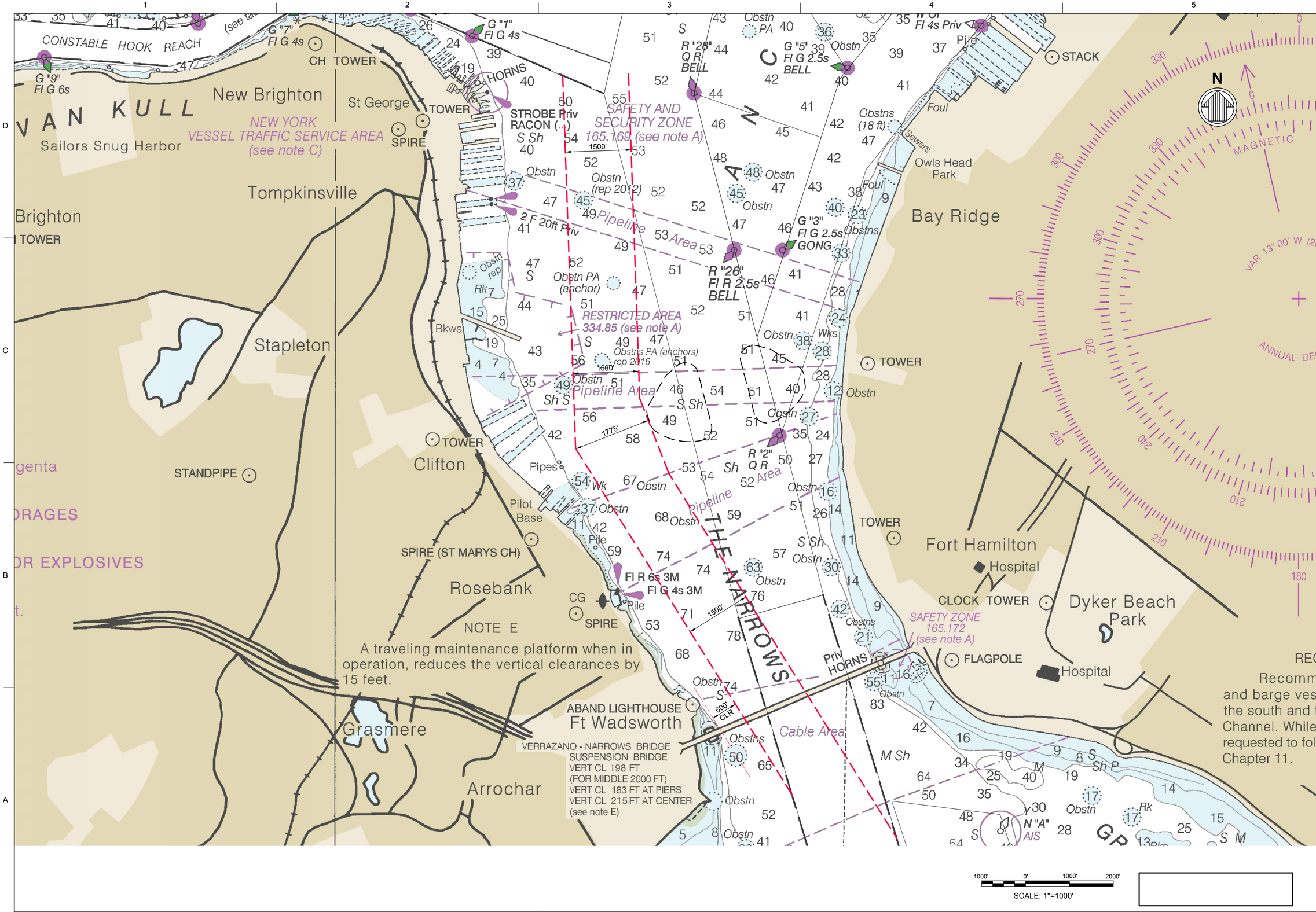

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VERRAZZANO NARROWS - ALTERNATE CHANNEL ALIGNMENT

SHEET IDENTIFICATION
G-102
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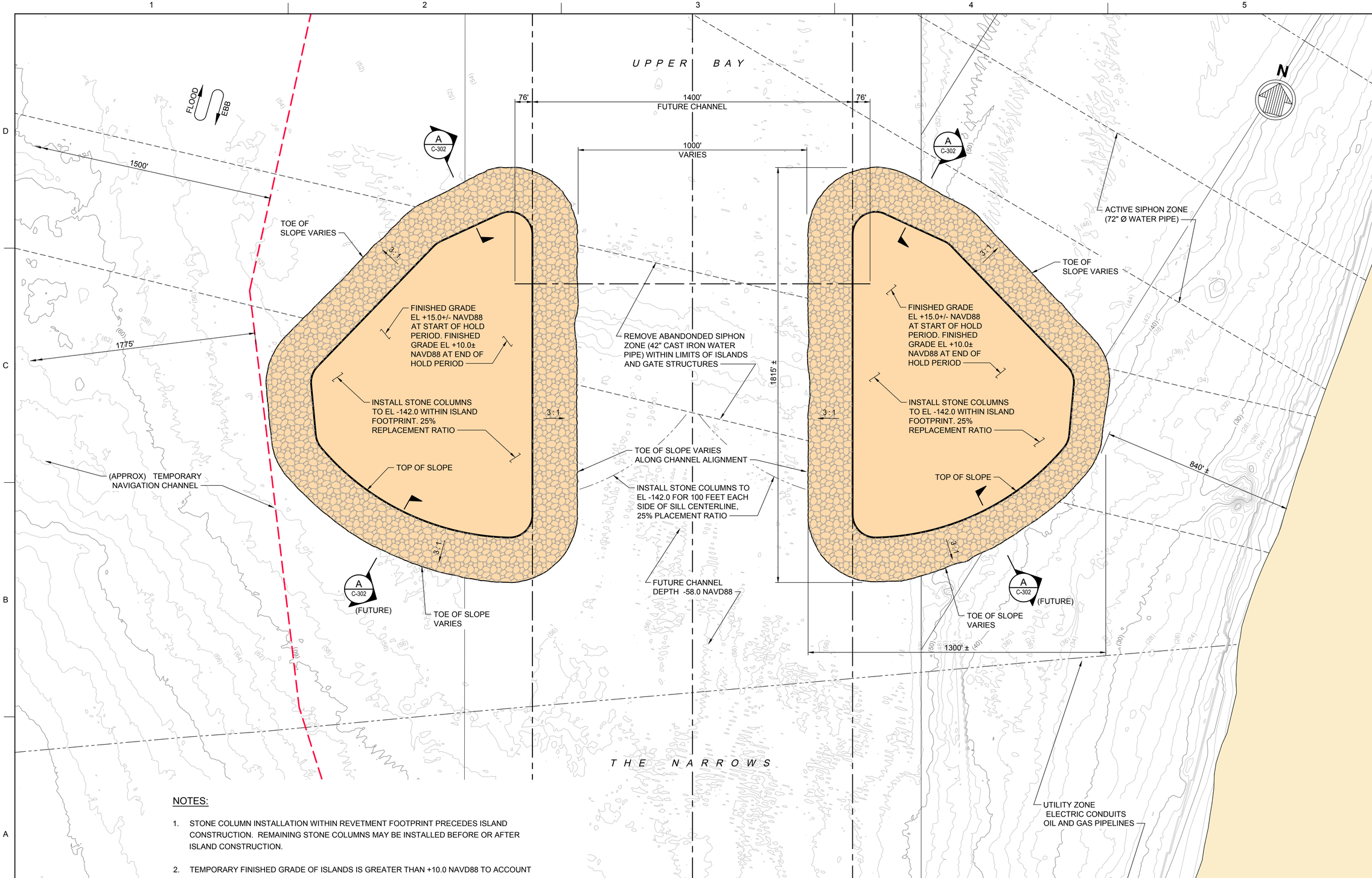

NOTES:

1. STONE COLUMN INSTALLATION WITHIN REVETMENT FOOTPRINT PRECEDES ISLAND CONSTRUCTION. REMAINING STONE COLUMNS MAY BE INSTALLED BEFORE OR AFTER ISLAND CONSTRUCTION.
2. TEMPORARY FINISHED GRADE OF ISLANDS IS GREATER THAN +10.0 NAVD88 TO ACCOUNT FOR ANTICIPATED SETTLEMENT.
3. FUTURE CHANNEL(S) CLOSED TO NAVIGATION DURING ALL PHASES OF ISLAND AND GATE CONSTRUCTION.

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CONTRACT NO.: W912DS-18-D-0006
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VERRAZZANO NARROWS PLAN - ISLAND FILL AND ARMOR STONE

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C-101
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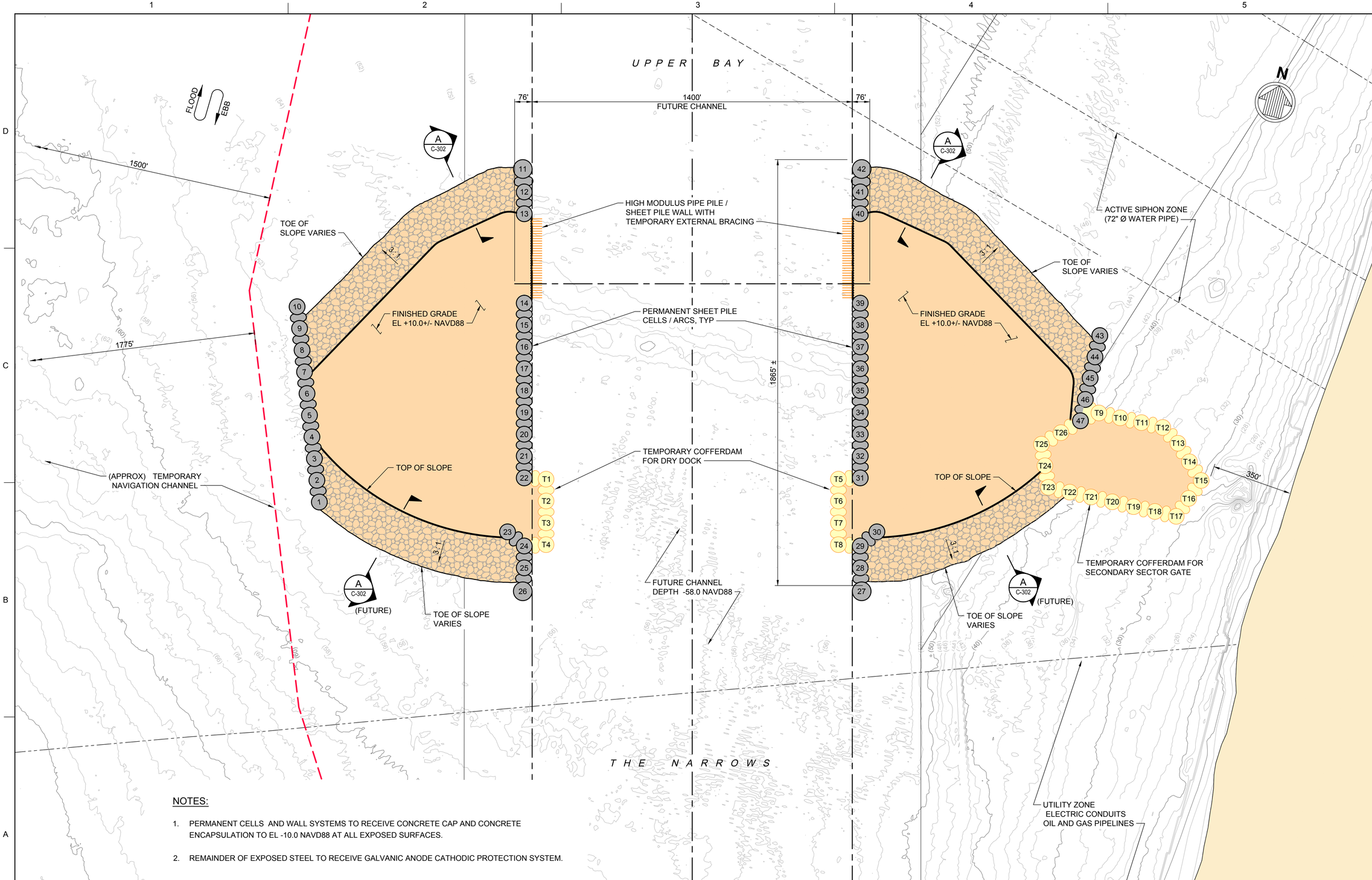

NOTES:

1. PERMANENT CELLS AND WALL SYSTEMS TO RECEIVE CONCRETE CAP AND CONCRETE ENCAPSULATION TO EL -10.0 NAVD88 AT ALL EXPOSED SURFACES.
2. REMAINDER OF EXPOSED STEEL TO RECEIVE GALVANIC ANODE CATHODIC PROTECTION SYSTEM.

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PLOT DATE: XXX
ISSUE DATE: XXX
FILE NUMBER: XXX
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FILE NAME: XXX

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VERRAZZANO NARROWS PLAN - COFFERDAMS AND CUT-OFF WALLS

SHEET IDENTIFICATION
C-102
SHEET INDX OF ----

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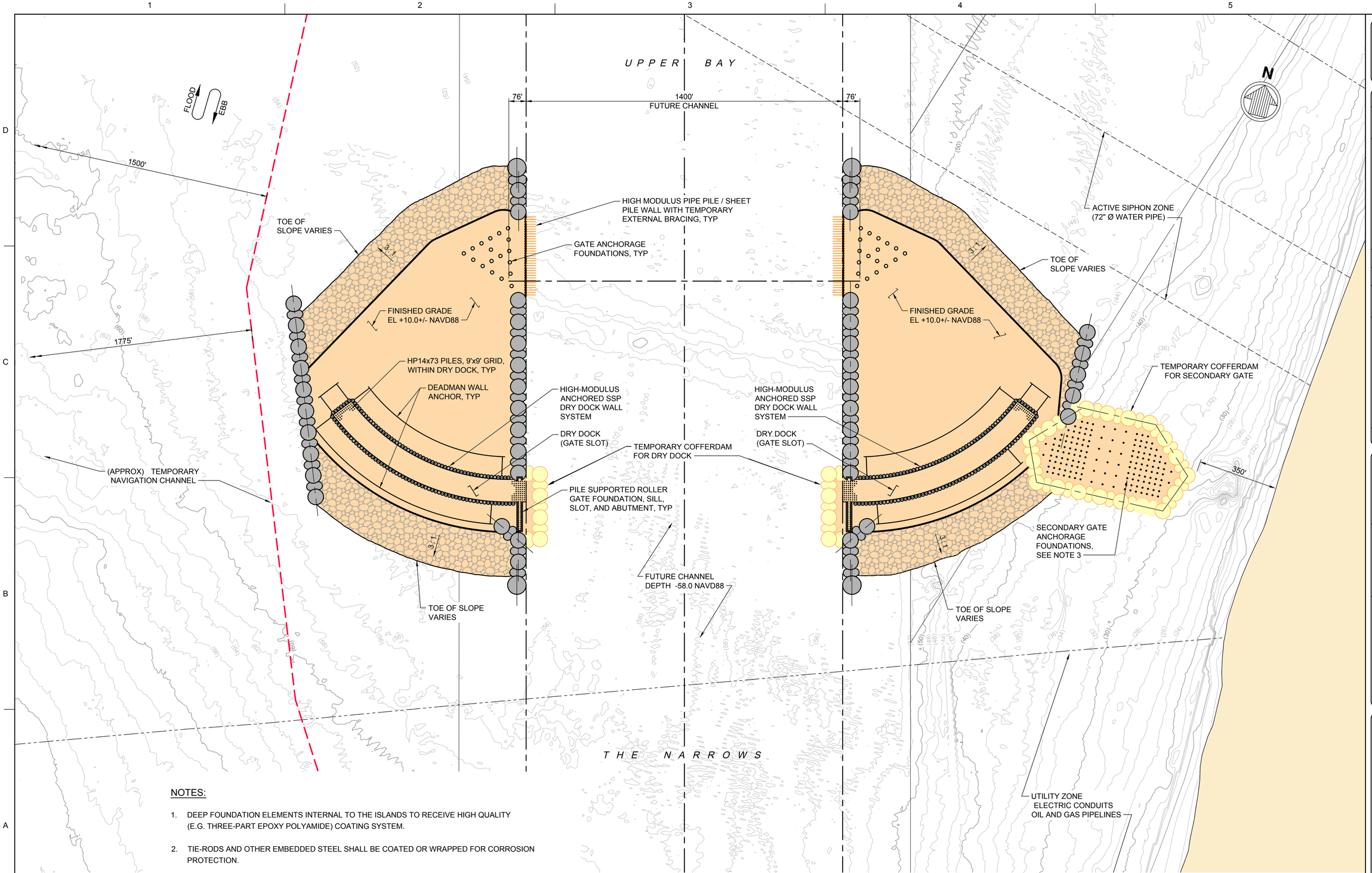

NOTES:

1. DEEP FOUNDATION ELEMENTS INTERNAL TO THE ISLANDS TO RECEIVE HIGH QUALITY (E.G. THREE-PART EPOXY POLYAMIDE) COATING SYSTEM.
2. TIE-RODS AND OTHER EMBEDDED STEEL SHALL BE COATED OR WRAPPED FOR CORROSION PROTECTION.
3. 36"Ø x3/4" STEEL PIPE PILES. TIP ELEVATION -175.0, TOP ELEVATION -45.0. 9'x9' GRID AT SECTOR GATE ABUTMENTS. 10'x15' GRID AT REMAINING TREMIE SEAL.

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ISSUE DATE: XXX
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VERRAZZANO NARROWS PLAN - DEEP FOUNDATION ELEMENTS

SHEET IDENTIFICATION
C-103
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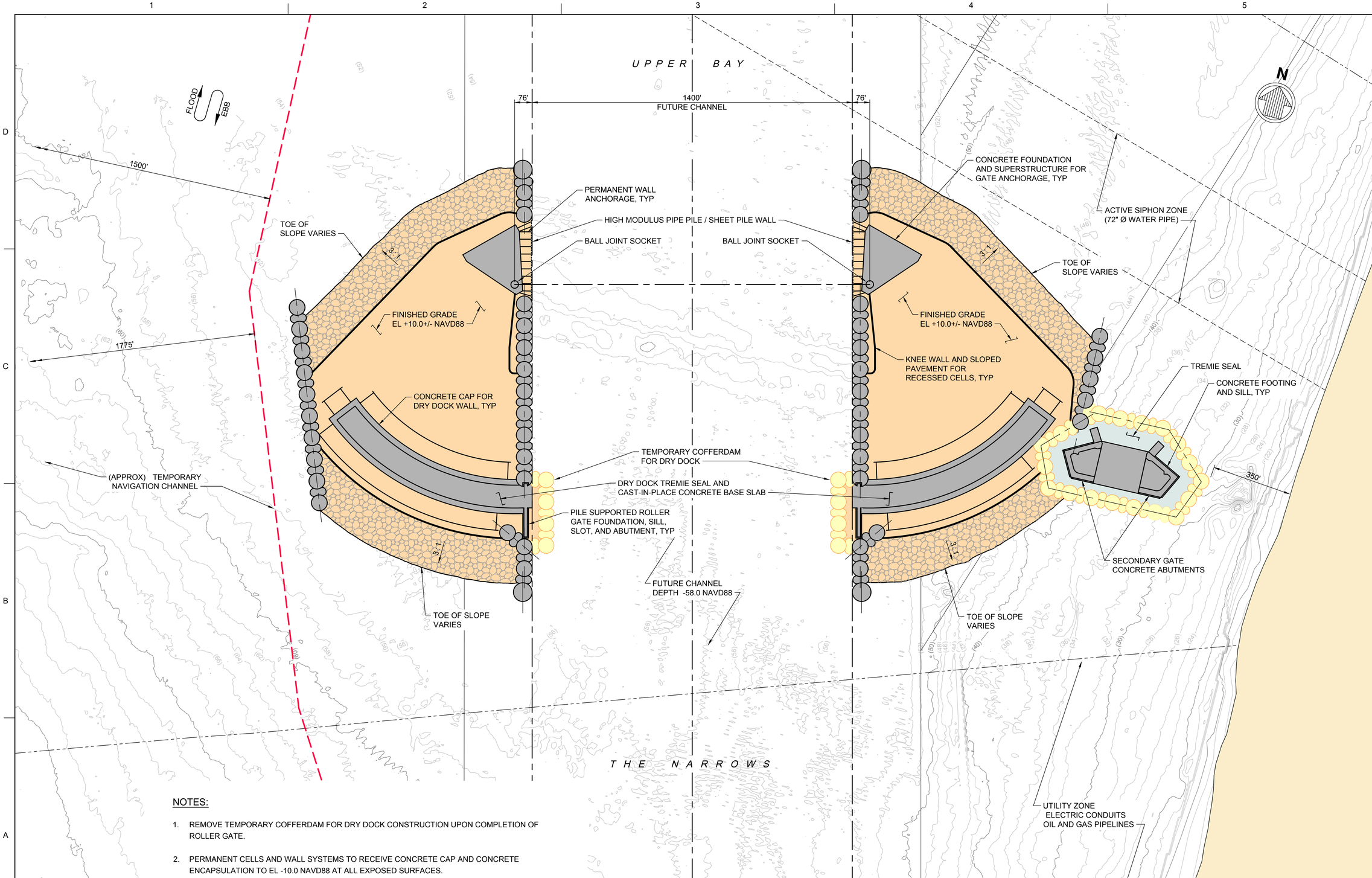

NOTES:

1. REMOVE TEMPORARY COFFERDAM FOR DRY DOCK CONSTRUCTION UPON COMPLETION OF ROLLER GATE.
2. PERMANENT CELLS AND WALL SYSTEMS TO RECEIVE CONCRETE CAP AND CONCRETE ENCAPSULATION TO EL -10.0 NAVD88 AT ALL EXPOSED SURFACES.

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FILE NAME: XXX

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VERRAZZANO NARROWS PLAN - STRUCTURAL CONCRETE WORK

SHEET IDENTIFICATION
C-104
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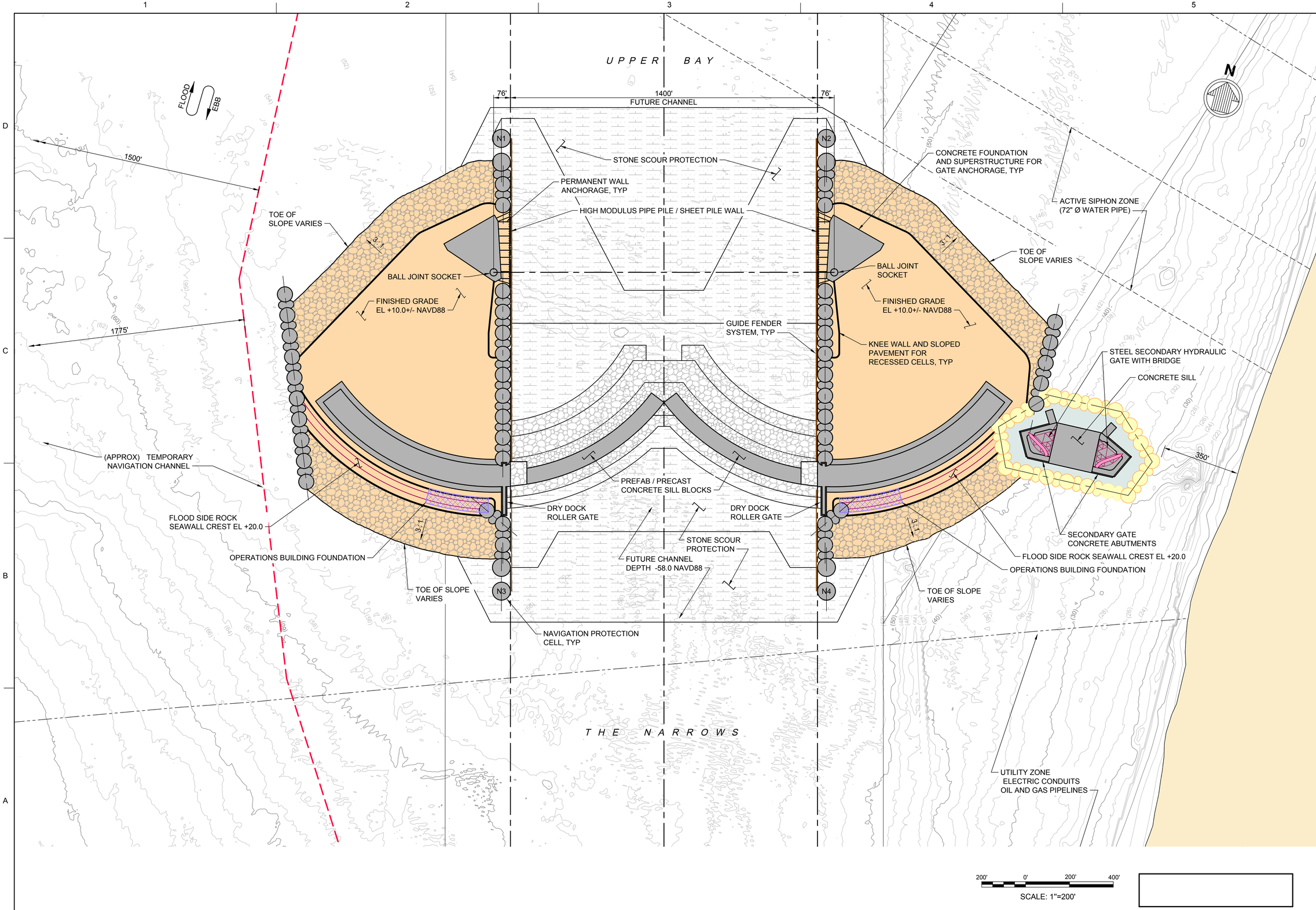

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VERRAZZANO NARROWS PLAN - GATE SILL AND ISLAND LEVEE

SHEET IDENTIFICATION
C-105
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UPPER BAY

FLOOD
EBB

76'
1400'
FUTURE CHANNEL
76'

STONE SCOUR PROTECTION

CONCRETE FOUNDATION AND SUPERSTRUCTURE FOR GATE ANCHORAGE, TYP

ACTIVE SIPHON ZONE (72" Ø WATER PIPE)

TOE OF SLOPE VARIES

3:1

BALL JOINT / TRUSS JUNCTION

FINISHED GRADE EL +10.0+/- NAVD88

PRE-FABRICATED GATE ARM TRUSS

PRE-FABRICATED SECTOR GATE

GUIDE FENDER SYSTEM, TYP

A
C-304

NAVIGATION PROTECTION CELL, TYP

200'

675'

N5

N6

48

STONE SCOUR PROTECTION

STEEL SECONDARY HYDRAULIC GATE WITH BRIDGE

N7

N8

SECONDARY GATE CONCRETE ABUTMENT, TYP

CONCRETE SILL

GUIDE FENDER SYSTEM, TYP

FLOOD SIDE ROCK SEAWALL CREST EL +20.0

OPERATIONS BUILDING FOUNDATION

PREFAB / PRECAST CONCRETE SILL BLOCKS

DRY DOCK ROLLER GATE

LOCOMOBILE

STONE SCOUR PROTECTION

FUTURE CHANNEL DEPTH -58.0 NAVD88

TOE OF SLOPE VARIES

NAVIGATION PROTECTION CELL, TYP

THE NARROWS

UTILITY ZONE
ELECTRIC CONDUITS
OIL AND GAS PIPELINES

N

200' 0' 200' 400'

SCALE: 1"=200'

20 LB

80 LB

400 LB

1,500 LB, TYP

1 - 3 TON

3 - 6 TON

10 - 15 TON, TYP

PREFAB PRECAST CONCRETE SILL BLOCKS

80 LB

20 LB

1,500 LB, TYP

400 LB, TYP

KEY PLAN - STONE SCOUR PROTECTION

SCALE: 1" = 300'

NOTE:

1. DRY DOCK ROLLER GATE IS CLOSED AND DRY DOCK DE-WATERED WHEN GATE IS IN THE STOWED POSITION.

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ISSUE DATE: XXX
FILE NUMBER: XXX
SIZE: ANSI D
FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS PLAN - SECTOR GATES (STOWED)

SHEET IDENTIFICATION
C-106
SHEET INDX OF ----

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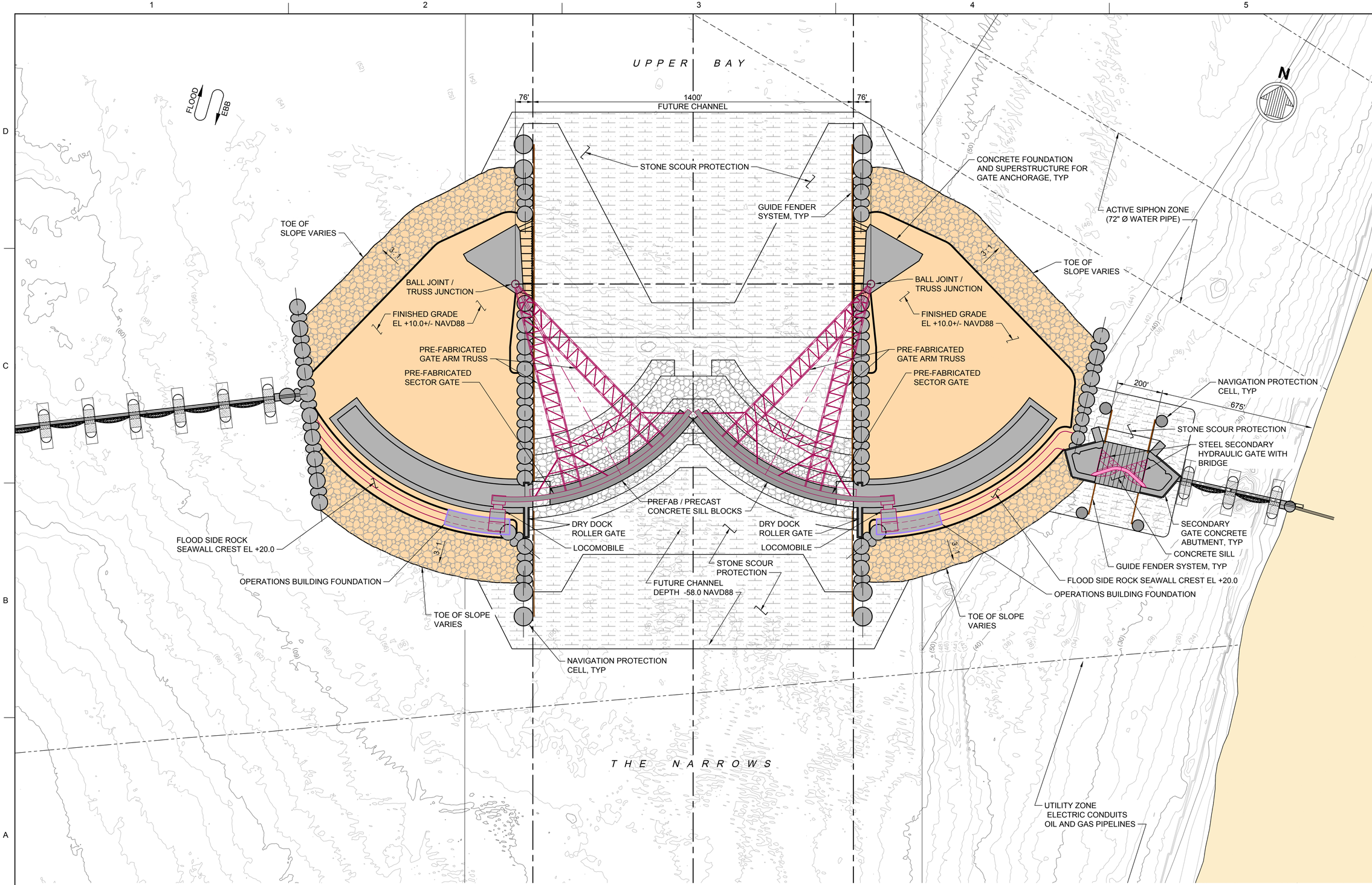

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SIZE: ANSI D	FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS PLAN - FLOOD EVENT OR TESTING (DEPLOYED)

SHEET IDENTIFICATION
C-107
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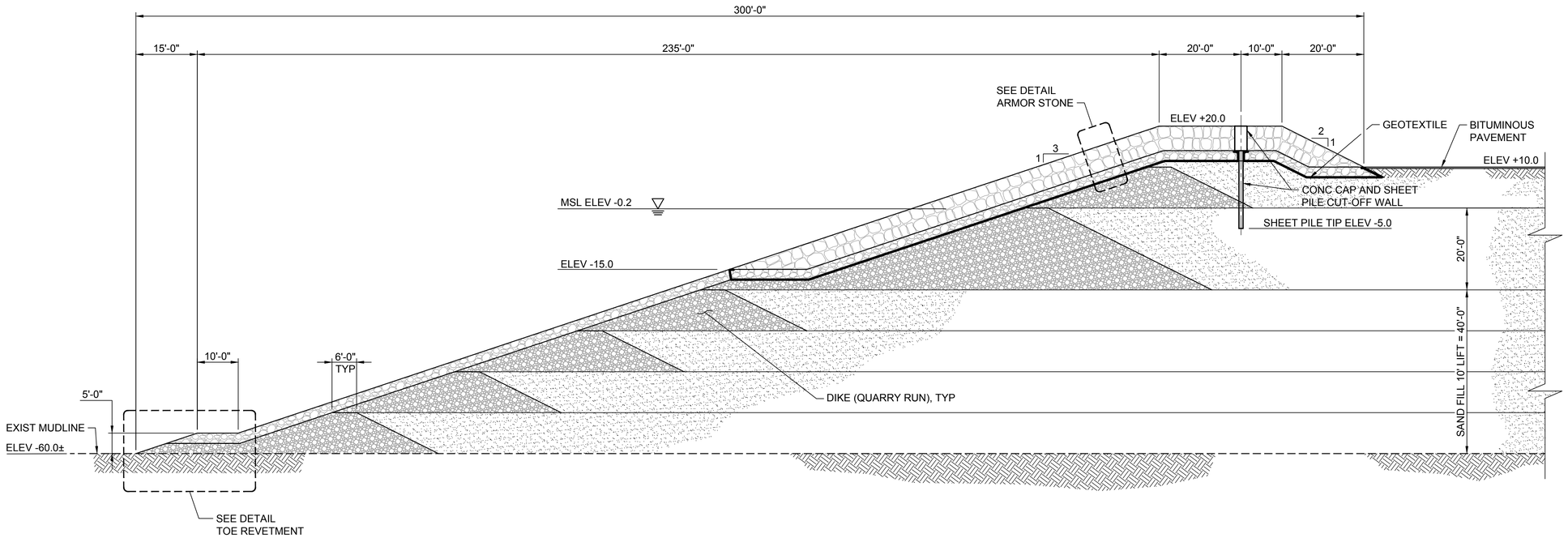
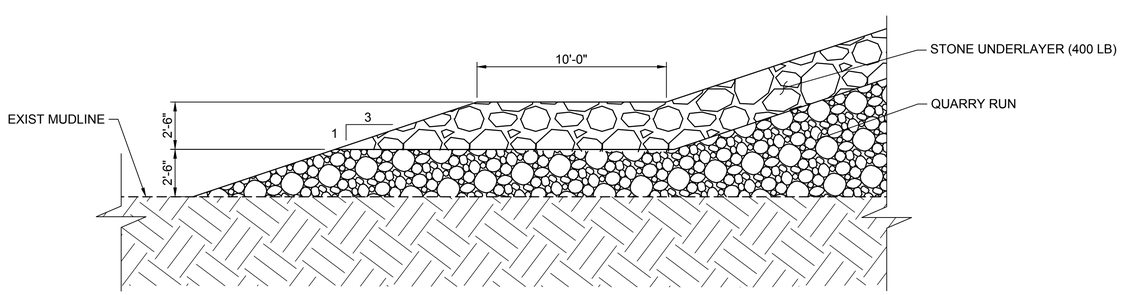


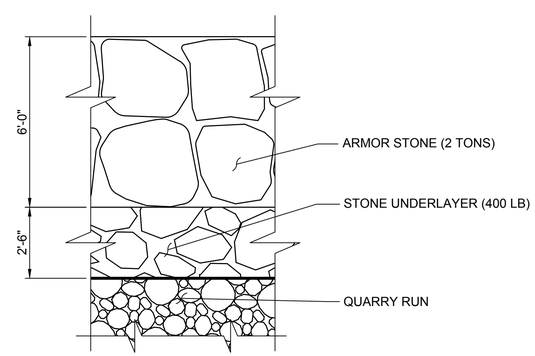
SECTION - TYPICAL REVETMENT - FLOOD SIDE

SCALE: 1" = 15'



DETAIL - TOE REVETMENT

SCALE: 1/4" = 1'-0"



DETAIL - ARMOR STONE

SCALE: 3/8" = 1'-0"

4'-0" 0'-0" 2'-0" 4'-0"
SCALE: 3/8"=1'-0"

4'-0" 0'-0" 4'-0" 8'-0"
SCALE: 1/4"=1'-0"

15'-0" 0'-0" 15'-0" 30'-0"
SCALE: 1"=15'

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FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS
SECTION - TYPICAL REVETMENT - FLOOD SIDE

SHEET IDENTIFICATION
C-301
SHEET INDX OF ----

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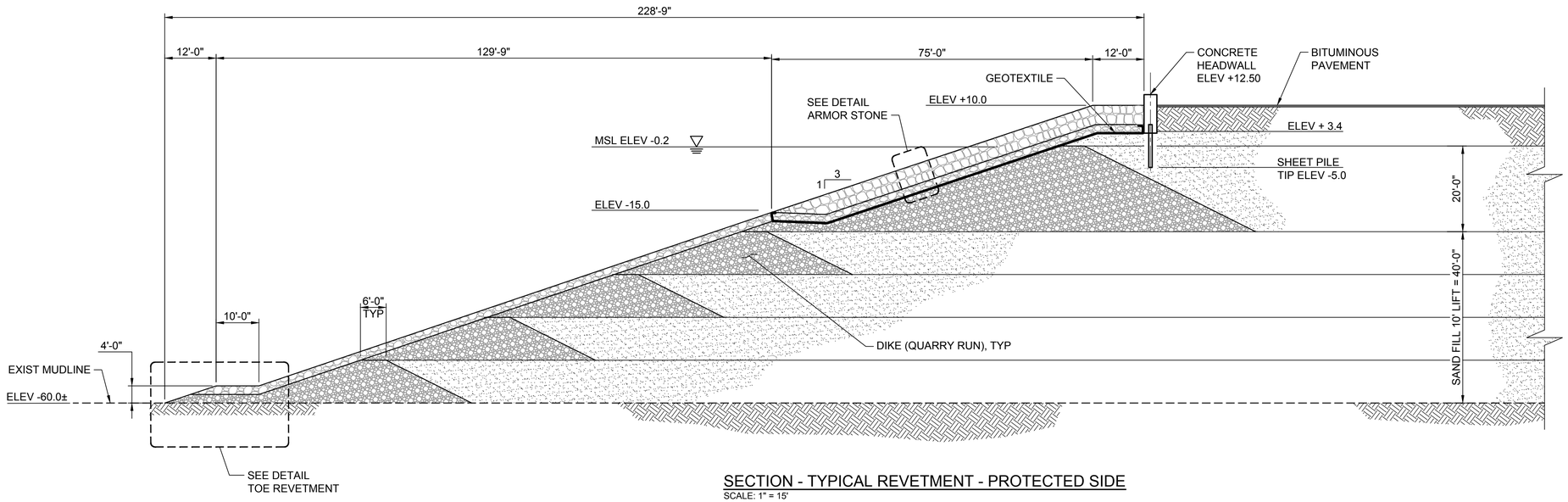
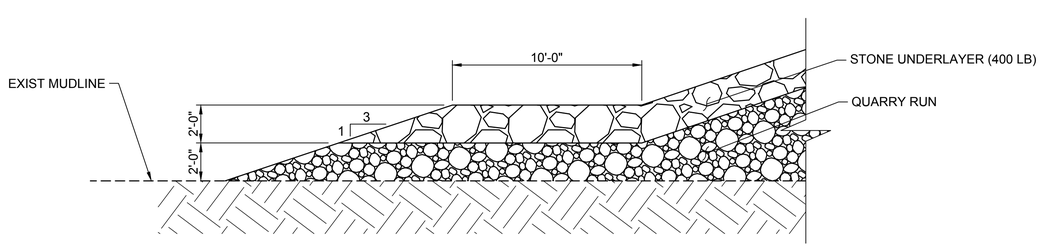


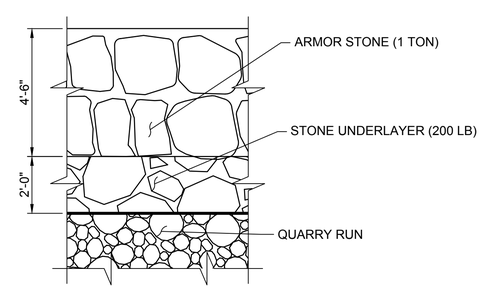
SECTION - TYPICAL REVETMENT - PROTECTED SIDE

SCALE: 1" = 15'



DETAIL - TOE REVETMENT

SCALE: 1/4" = 1'-0"



DETAIL - ARMOR STONE

SCALE: 3/8" = 1'-0"

4'-0" 0'-0" 2'-0" 4'-0"
SCALE: 3/8"=1'-0"

4'-0" 0'-0" 4'-0" 8'-0"
SCALE: 1/4"=1'-0"

15'-0" 0'-0" 15'-0" 30'-0"
SCALE: 1"=15'

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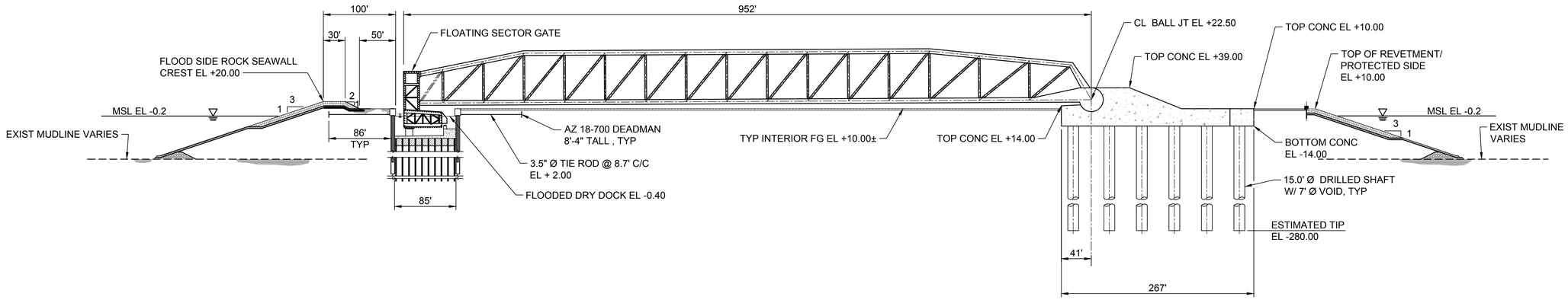
DWN BY: PGV | CKD BY: JCS | SOLICITATION NO.: W912DS-19-F-0111
SUBMITTED BY: MK | CONTRACT NO.: W912DS-18-D-0006
PLOT SCALE: XXX | ISSUE DATE: XXX | FILE NUMBER: XXX
SIZE: ANSI D | FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS
SECTION - TYPICAL REVETMENT - PROTECTED SIDE

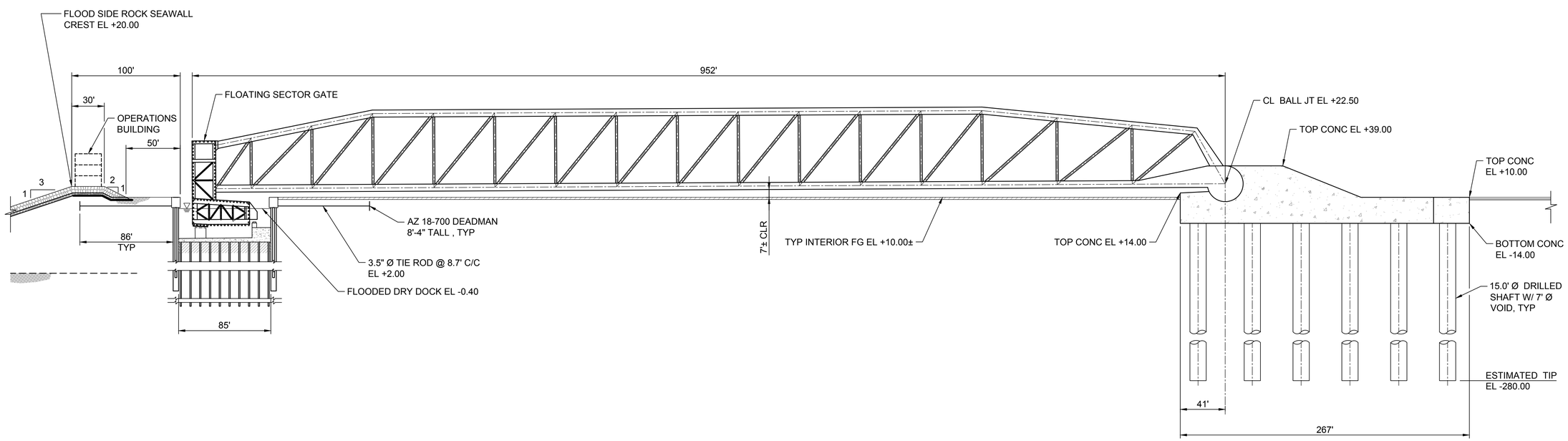
SHEET IDENTIFICATION
C-302
SHEET INDX OF ----

File: Q:\WY\10360-02\500_CADD_WN-Figures_SheetSet Figs\10380020-302_WN; Plotted: 4/17/2020 3:27 PM by VOELKER, PAUL; Saved: 4/16/2020 2:40 PM by PVOELKER



SECTION - VERRAZZANO NARROWS FLOATING SECTOR GATE - STOWED

SCALE: 1" = 80'



SECTION - VERRAZZANO NARROWS FLOATING SECTOR GATE - STOWED

SCALE: 1" = 50'

50' 0' 50' 100'

SCALE: 1"=50'

30' 0' 30' 60'

SCALE: 1"=30'

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CKD BY: JCS
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CONTRACT NO.: W912DS-18-D-0006
PLOT SCALE: XXX
PLOT DATE: XXX
SIZE: ANSI D
ISSUE DATE: XXX
FILE NUMBER: AXXX
FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS SECTIONS - FLOATING SECTOR GATE - STOWED

SHEET IDENTIFICATION

C-303

SHEET INDX OF ----

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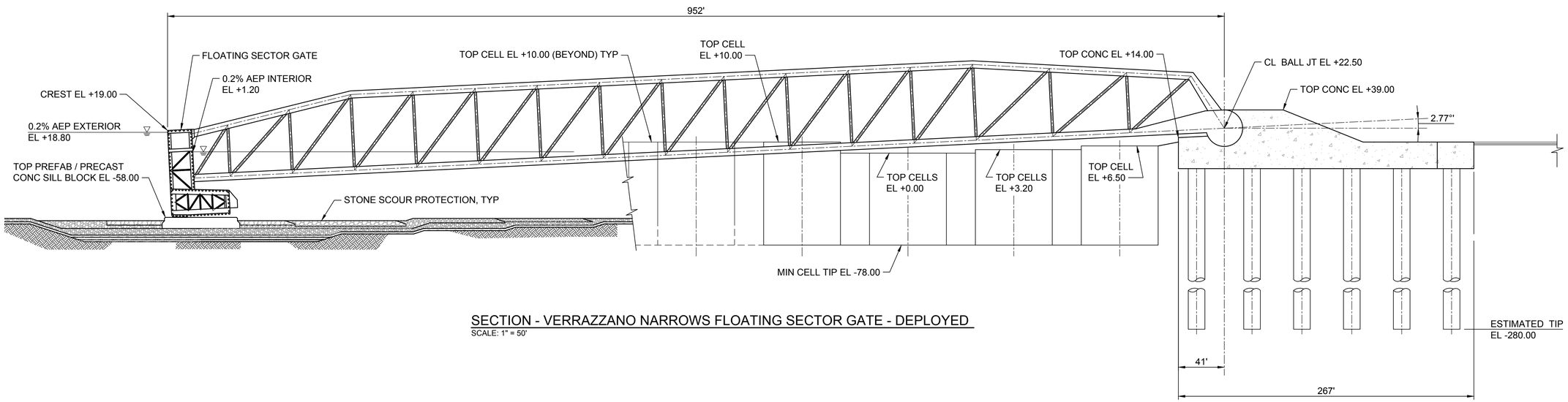
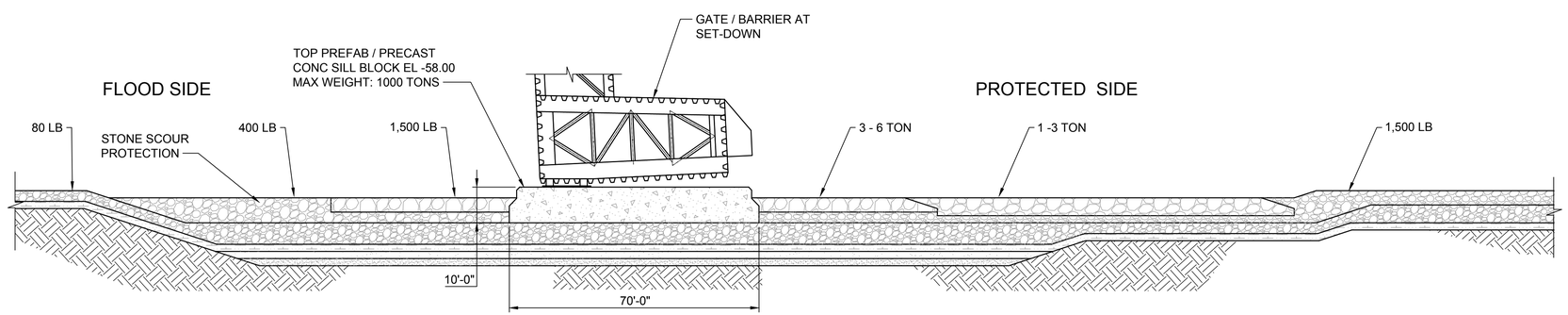


SECTION - VERRAZZANO NARROWS FLOATING SECTOR GATE - DEPLOYED

SCALE: 1" = 50'



DETAIL - SILL BLOCK AND SCOUR PROTECTION

SCALE: 1" = 20"

50' 0' 50' 100'

SCALE: 1"=50'

US Army Corps of Engineers

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A	DESCRIPTION						

U.S. ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT
NEW YORK, NEW YORK

DESIGNED BY: M&N
DWN BY: PGV
CKD BY: JCS
SUBMITTED BY: MK
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SOLICITATION NO.: W912DS-19-F-0111
CONTRACT NO.: W912DS-18-D-0006
FILE NUMBER: XXX
PLOT SCALE: XXX
PLOT DATE: XXX
SIZE: ANSI D
ISSUE DATE: XXX
FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS SECTION - FLOATING SECTOR GATE - DEPLOYED

SHEET IDENTIFICATION

C-304

SHEET INDX OF ----

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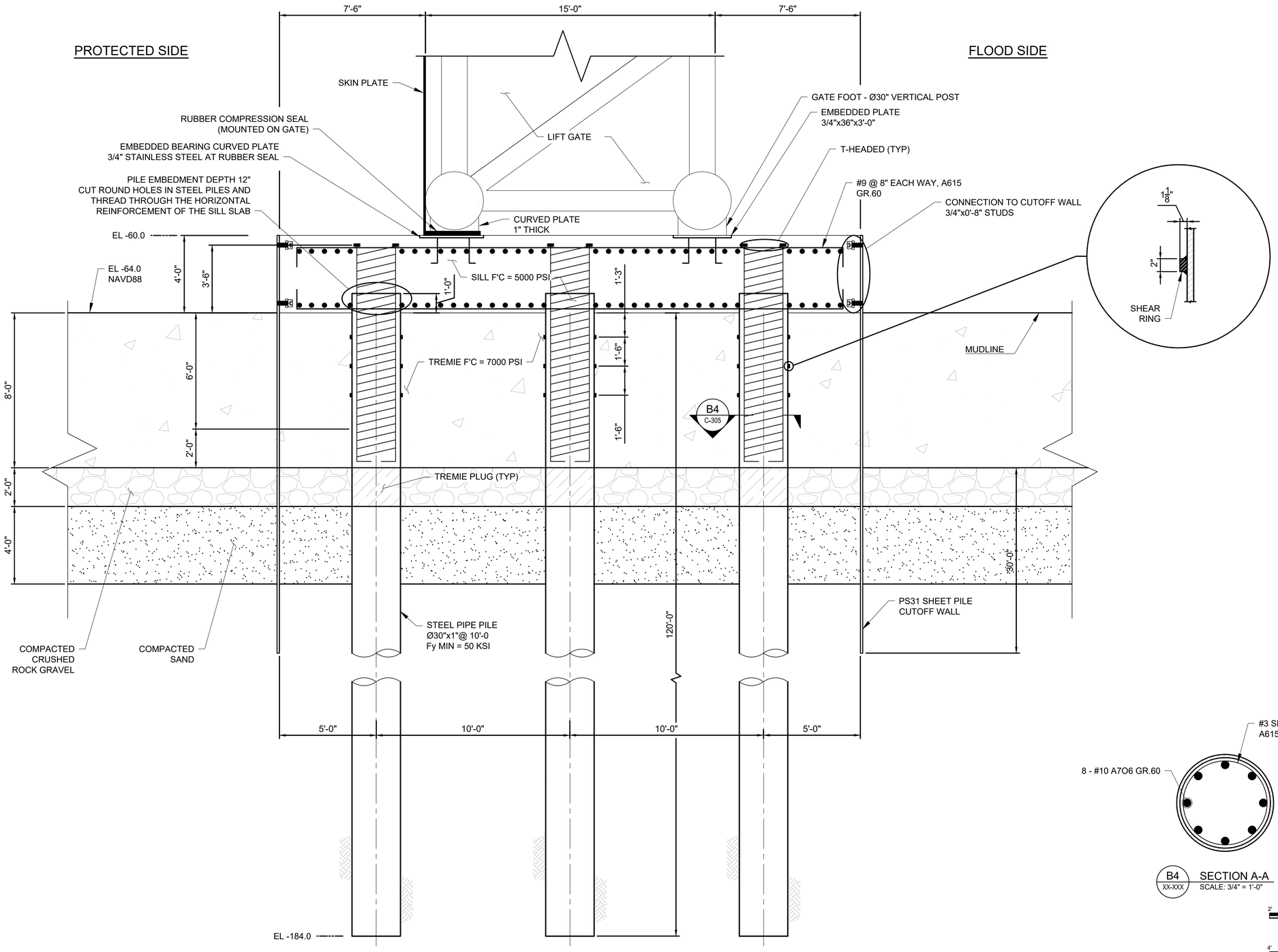

A2 XX-XXX SILL & TREMIE
SCALE: 3/8" = 1'-0"

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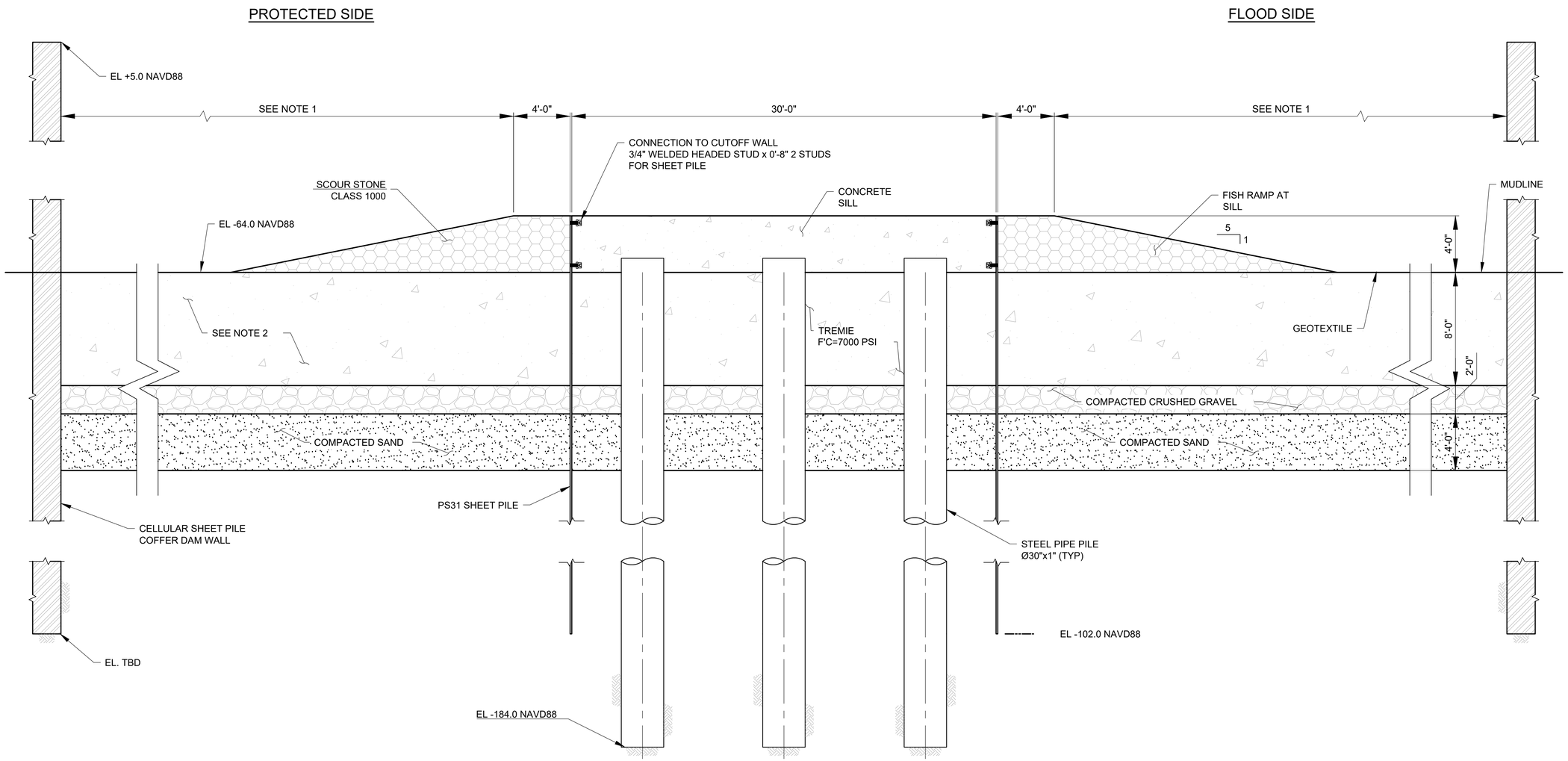
WF BAIRD & ASSOCIATES
2924 MARSH ROAD, SUITE 200
MADISON, WI 53729

DESIGNED BY: KJ / JB
DWN BY: SNL
CKD BY: M. WOODS
SUBMITTED BY: M. WOODS
PLOT SCALE:
SIZE: ANSI D
DATE: 2022-04-29
SOLICITATION NO.: W912DS-19-F-0111
CONTRACT NO.: W912DS-19-D-0006
ISSUE DATE:
FILE NUMBER:
FILE NAME:

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS - SILL & TREMIE

SHEET IDENTIFICATION
C-305



A2
XX-XXX
SCOUR STONE AT SILL
SCALE: 1/4" = 1'-0"

NOTES:

1. NOT TO SCALE. SEE PIER DRAWING FOR DISTANCE TO FACE OF COFFERDAM.
2. TEMPORARY TENSION H PILES SHALL PROVIDED FOR THE TREMIE. PILES SHALL BE HP16X141 ASTM A572 GR 50, Fy MIN = 50 KSI. PILES SHALL BE SPACED AT 10'-0" ALONG THE GATE AND 8'-6" PERPENDICULAR TO THE GATE. DISTANCE FROM H PILES TO SHEET PILE CUTOFF AND TO THE INTERIOR FACE OF COFFERDAM SHALL BE MIN 5'-0". ALL TENSION H PILES SHALL BE SOCKETED TO ROCK.

4' 2' 0' 4' 8'
SCALE: 1/4" = 1'-0"

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DESIGNED BY: KJ / JB
DATE: 2022-04-29
DWN BY: SNL
CKD BY: M. WOODS
SOLICITATION NO.: W912DS-19-F-0111
SUBMITTED BY: M. WOODS
CONTRACT NO.: W912DS-19-D-0006
PLOT SCALE:
ISSUE DATE:
FILE NUMBER:
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FILE NAME:

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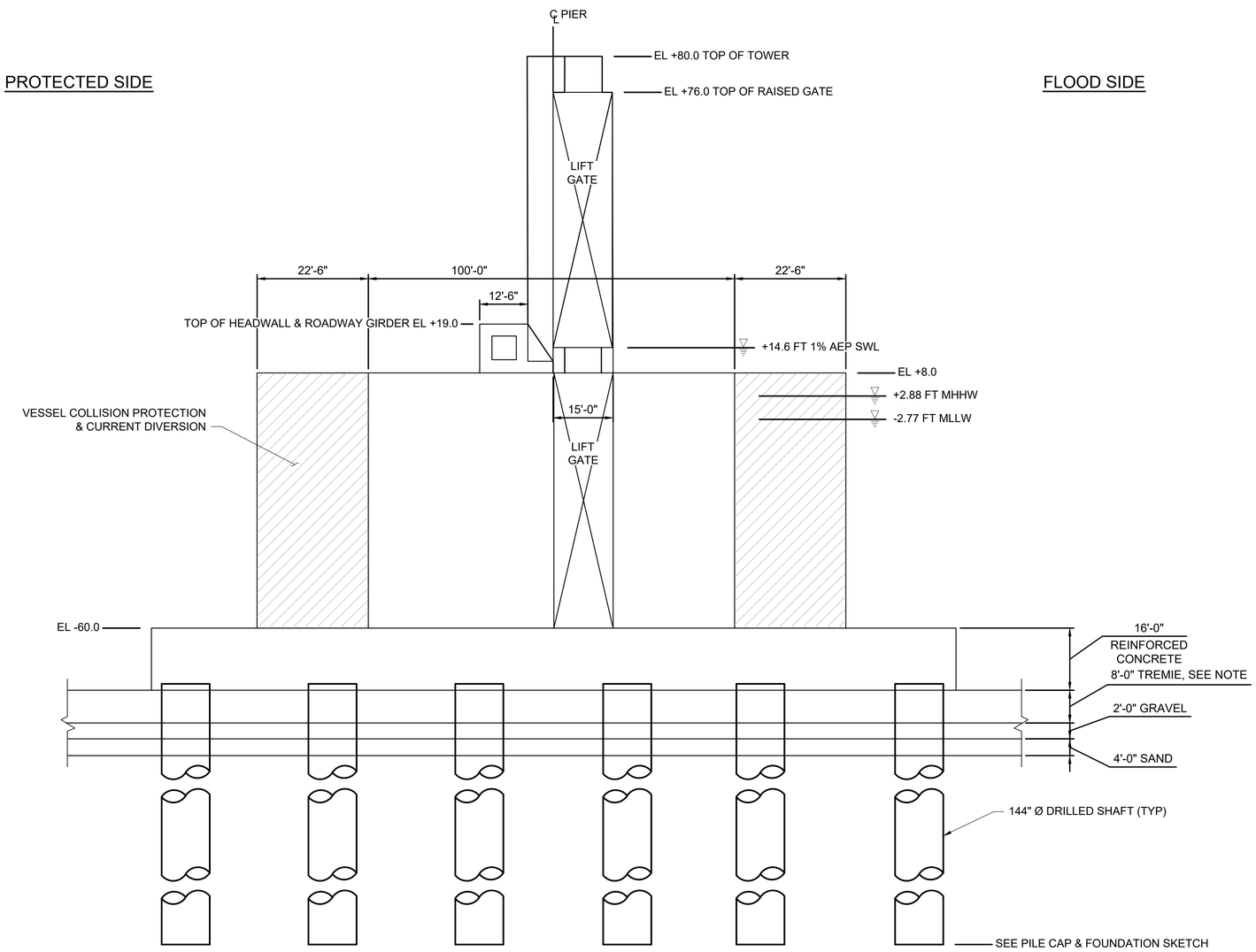
MADISON, WI 53729

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS - SCOUR STONE @ SILL

SHEET IDENTIFICATION
C-306



B3 TYPICAL PIER ELEVATION
SCALE: NTS

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DATE: 2022-04-29
SOLICITATION NO.: W912DS-19-F-0111
CONTRACT NO.: W912DS-18-D-2006
PLOT SCALE:
ISSUE DATE:
FILE NUMBER:
SIZE: ANSI D
FILE NAME:

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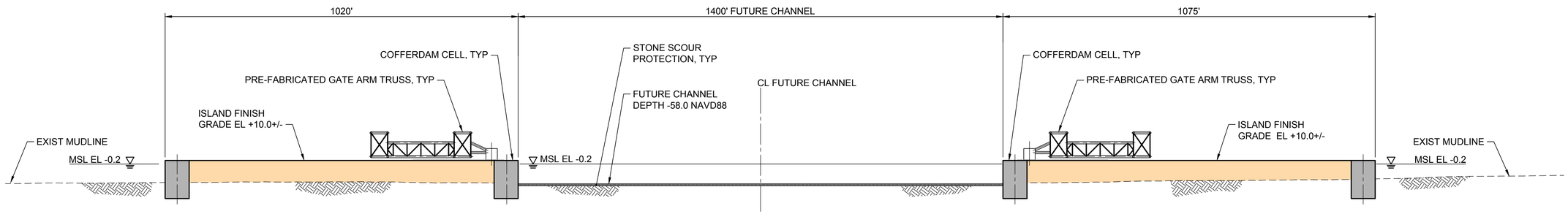
NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

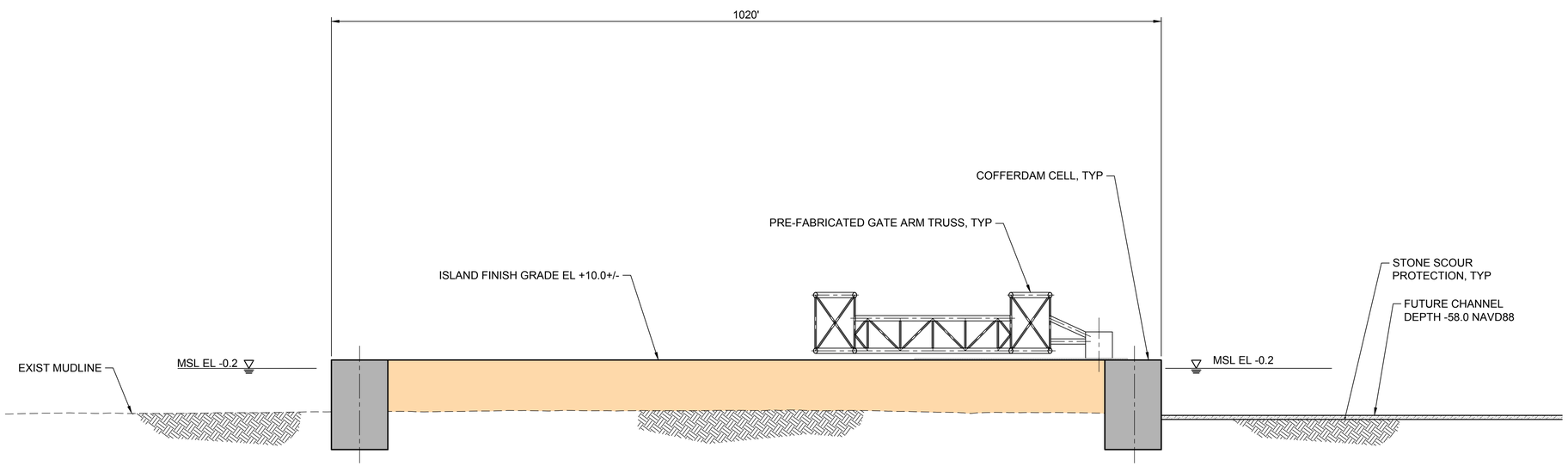
VERRAZZANO NARROWS - PIER ELEVATION

SHEET IDENTIFICATION
C-307



SECTION - CHANNEL AND FLOATING SECTOR GATE ISLAND

SCALE: 1" = 160'



DETAIL - FLOATING SECTOR GATE ISLAND

SCALE: 1" = 80'

80' 0' 80' 160'

SCALE: 1"=80'

160' 0' 160' 320'

SCALE: 1"=160'

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CKD BY: JCS
SUBMITTED BY: MK
DATE: 2020-04-17
SOLICITATION NO.: W912DS-19-F-0111
CONTRACT NO.: W912DS-18-D-0006
PLOT SCALE: XXX
PLOT DATE: XXX
ISSUE DATE: FILE NUMBER: XXX
SIZE: ANSI D
FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS SECTIONS - FLOATING SECTOR GATE ISLAND

SHEET IDENTIFICATION

C-401

SHEET INDX OF ----

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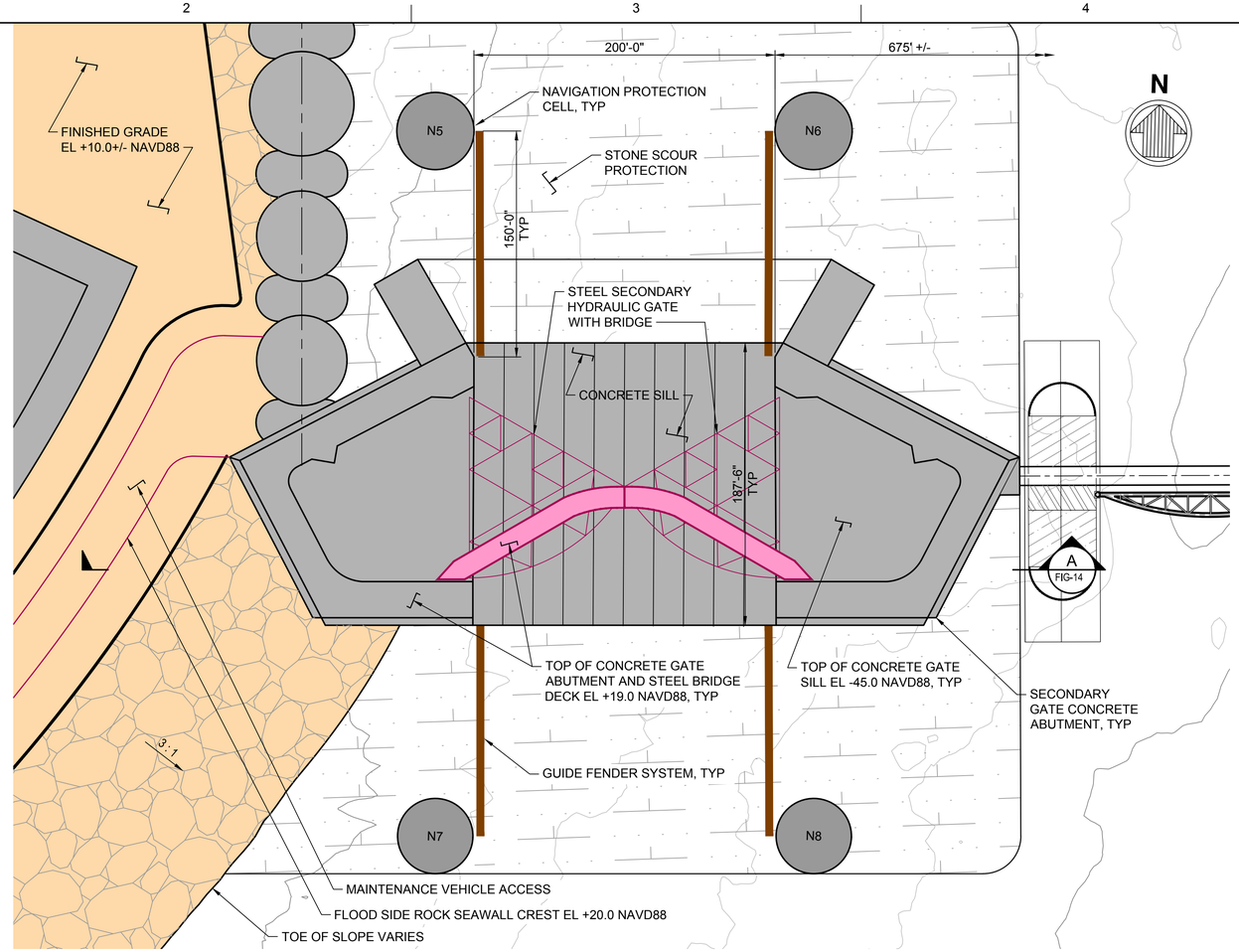
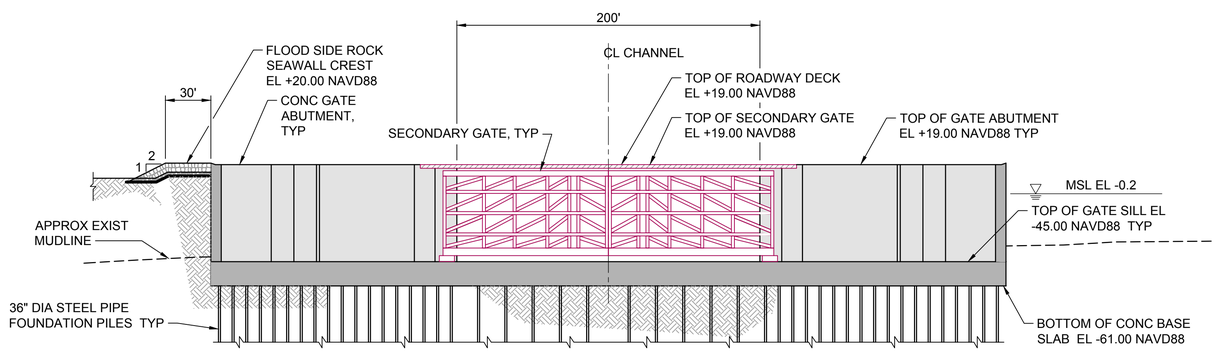


VERRAZZANO NARROWS - PARTIAL PLAN - SECONDARY SECTOR GATE

SCALE: 1" = 50'



NOTE: LIFT GATES BEYOND NOT SHOWN FOR CLARITY.

ELEVATION - SECONDARY SECTOR GATE

SCALE: 1" = 50'

50' 0' 50' 100'

SCALE: 1"=50'

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DWN BY: PGV	CKD BY: JCS	SOLICITATION NO.: W912DS-19-F-0111
SUBMITTED BY: MK		CONTRACT NO.: W912DS-18-D-0006
PLOT SCALE: AS NOTED	ISSUE DATE: XXX	FILE NUMBER: XXX
SIZE: ANSI D	FILE NAME: XXX	

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS PART PLAN & ELEVATION - SECONDARY SECTOR GATE

SHEET IDENTIFICATION

C-402

SHEET INDX OF ----

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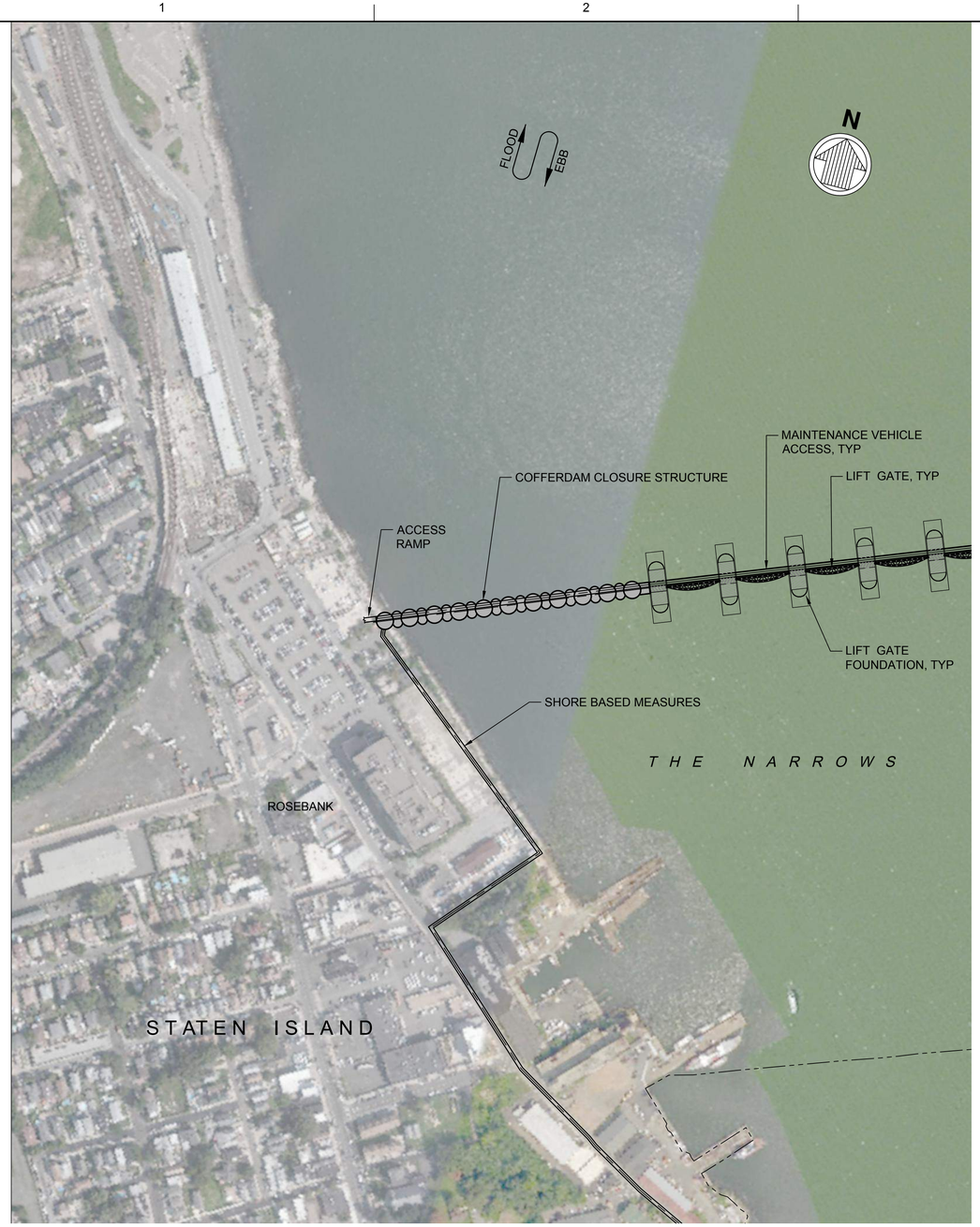
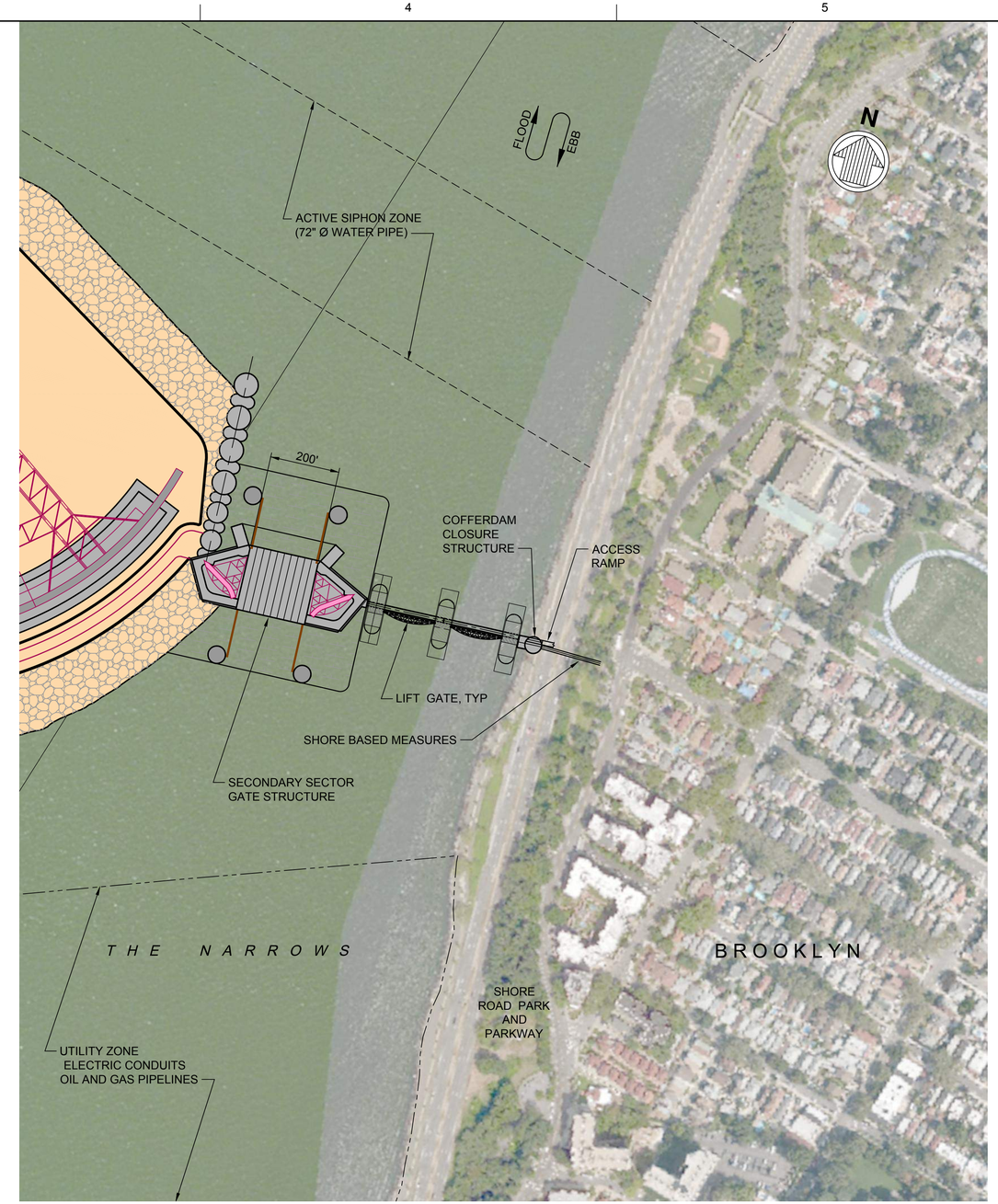


VERRAZZANO NARROWS - STATEN ISLAND - COFFERDAM CLOSURE STRUCTURE AND TRANSITION TO SHORE BASED MEASURES

SCALE: 1" = 200'



VERRAZZANO NARROWS - BROOKLYN - COFFERDAM CLOSURE STRUCTURE AND TRANSITION TO SHORE BASED MEASURES

SCALE: 1" = 200'

200' 0' 200' 400'

SCALE: 1"=200'

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SUBMITTED BY: MK	CONTRACT NO.: W912DS-18-D-0006
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PLOT DATE: XXX	FILE NUMBER: XXX
SIZE: ANSI D	FILE NAME: XXX

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS STORM SURGE BARRIER EAST AND WEST TRANSITIONS

SHEET IDENTIFICATION
C-403
SHEET INDX OF ----

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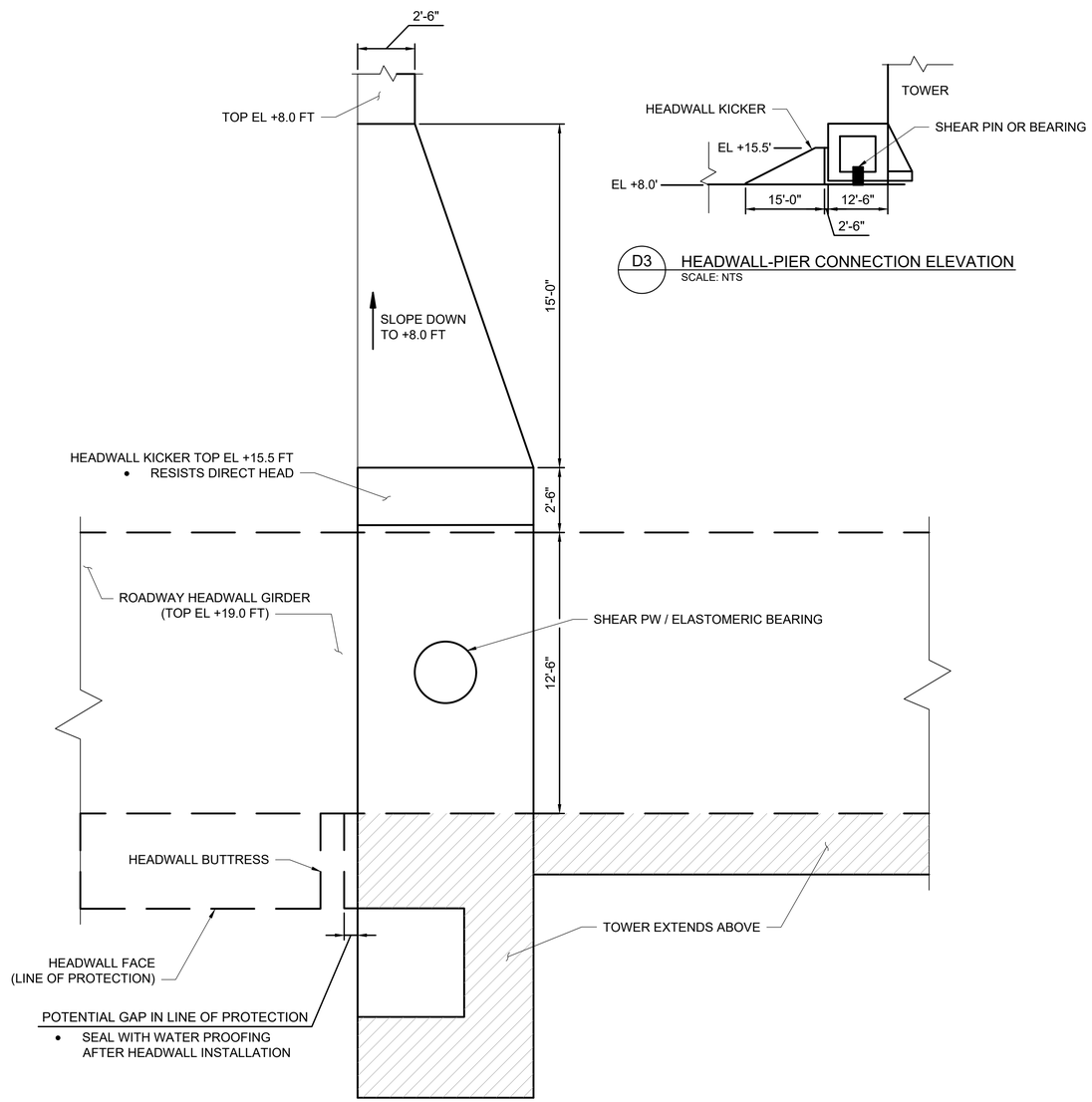

B2 HEADWALL-PIER CONNECTION PLAN
SCALE: NTS

D3 HEADWALL-PIER CONNECTION ELEVATION
SCALE: NTS

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US Army Corps of Engineers®

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MARK	DESCRIPTION	DATE	APPR.

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MADISON, WI 53729

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CKD BY: M. WOODS
SUBMITTED BY: M. WOODS
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FILE NAME:
PLOT SCALE:
ISSUE DATE:
DATE: 2022-04-29
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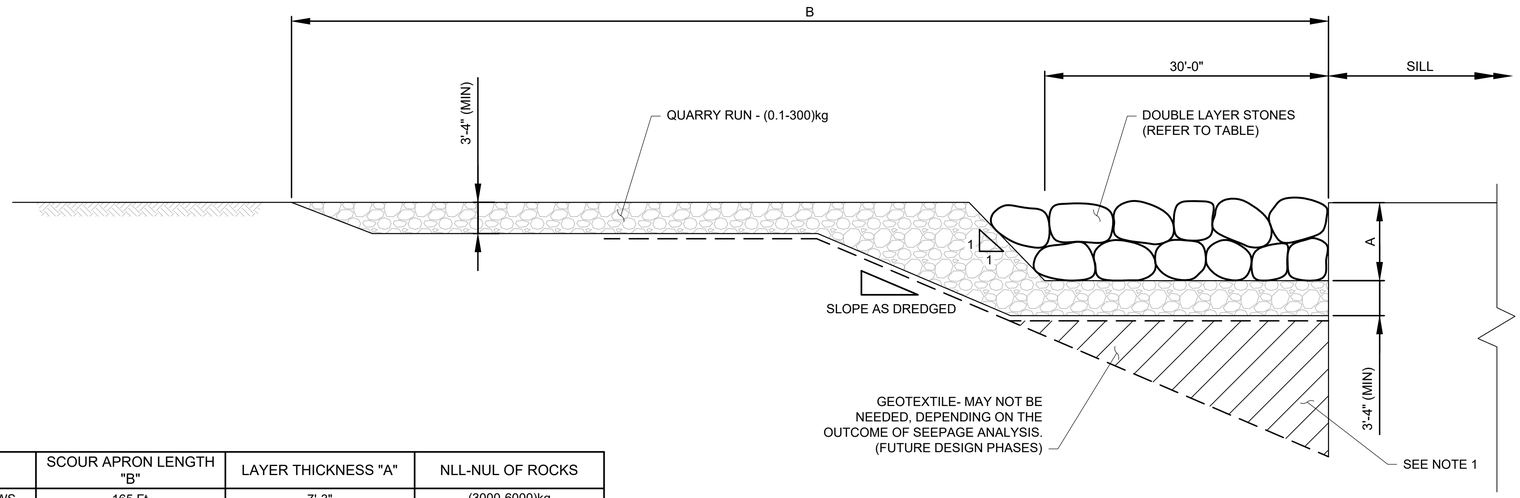
CONTRACT NO.: W912DS-19-D-0036
FILE NUMBER:

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS - HEADWALL-PIER CONNECTION PLAN

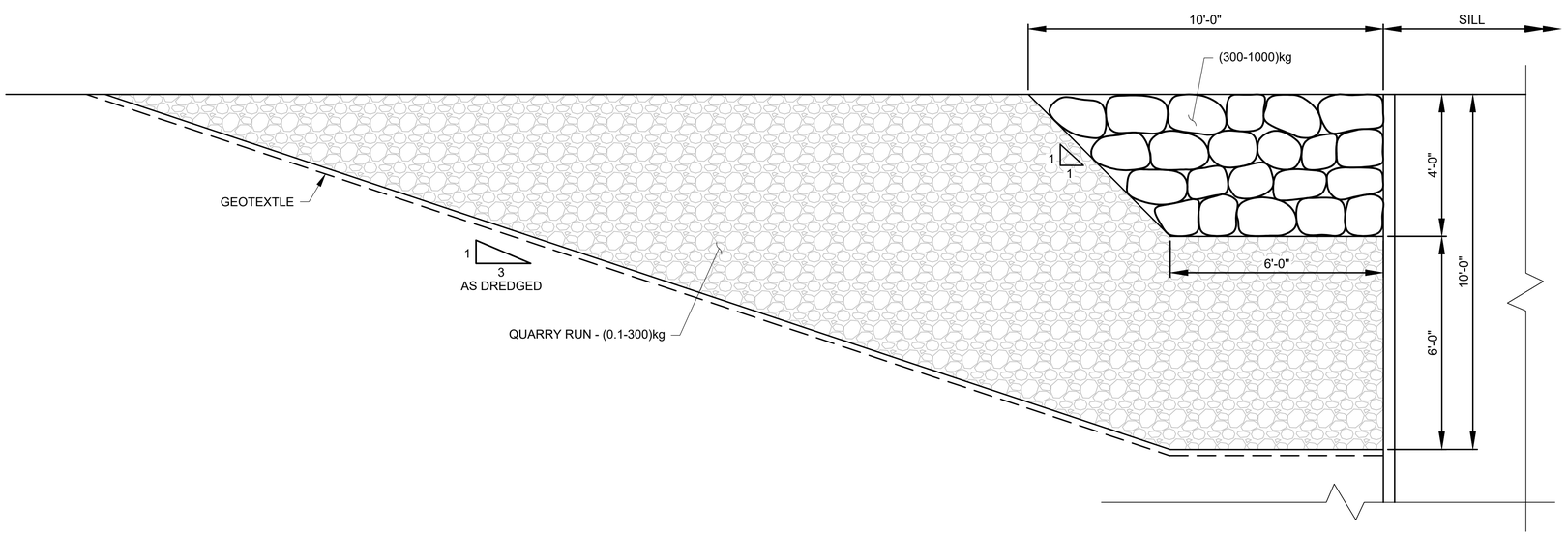
SHEET IDENTIFICATION
C-404



SSB	SCOUR APRON LENGTH "B"	LAYER THICKNESS "A"	NLL-NUL OF ROCKS
VARREZANO NARROWS	165 Ft	7'-3"	(3000-6000)kg
JAMAICA BAY	165 Ft	5'-7"	(1000-3000)kg
HACKENSACK RIVER	100 Ft	4'-0"	(300-1000)kg

NOTE:
1. DREDGED AREA TO BE BACKFILLED WITH QUARRY RUN. GEOTEXTILE TO BE PLACED ON DREDGED SLOPE PRIOR TO BACKFILLING.

C2 SCOUR PROTECTION @ LIFT GATES
SCALE: NTS



A2 SCOUR PROTECTION @ DAM
SCALE: NTS

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MARK	DESCRIPTION	DATE	APPR.

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MADISON, WI 53729

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DATE: 2022-04-29
DWN BY: SNL
CKD BY: M. WOODS
SOLICITATION NO.: W912DS-19-F-0111
SUBMITTED BY: M. WOODS
CONTRACT NO.: W912DS-19-D-0006
PLOT SCALE:
ISSUE DATE:
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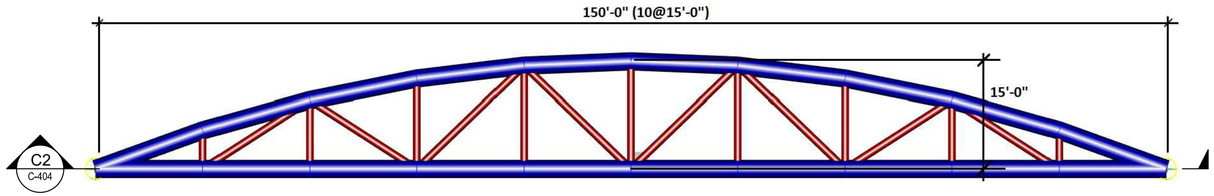
FILE NAME:

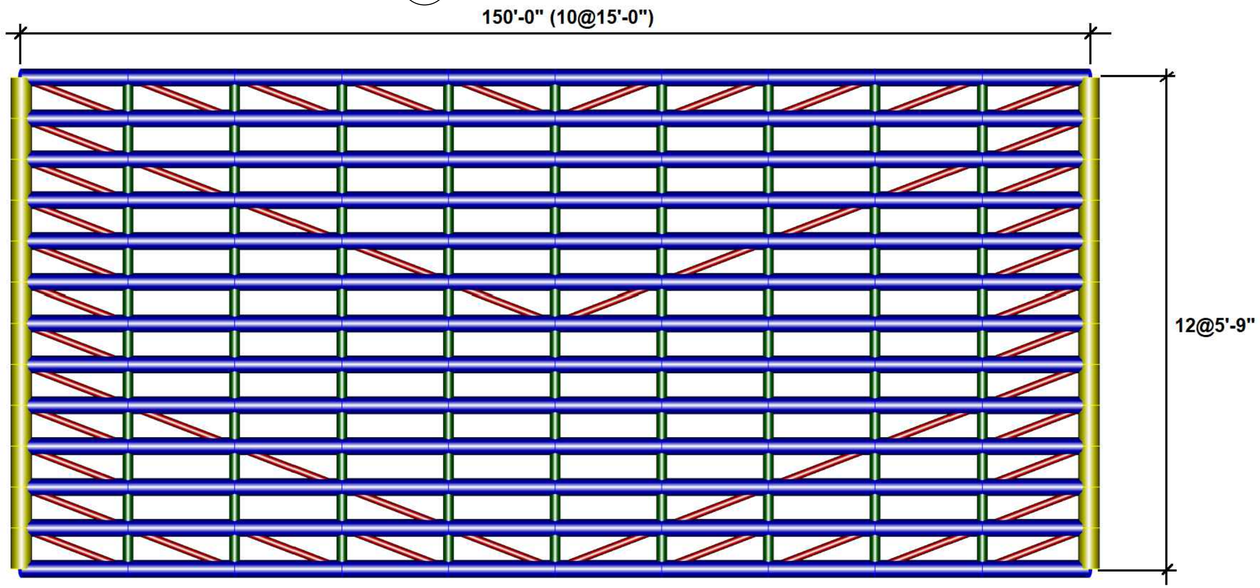
NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS - SCOUR PROTECTION DETAILS

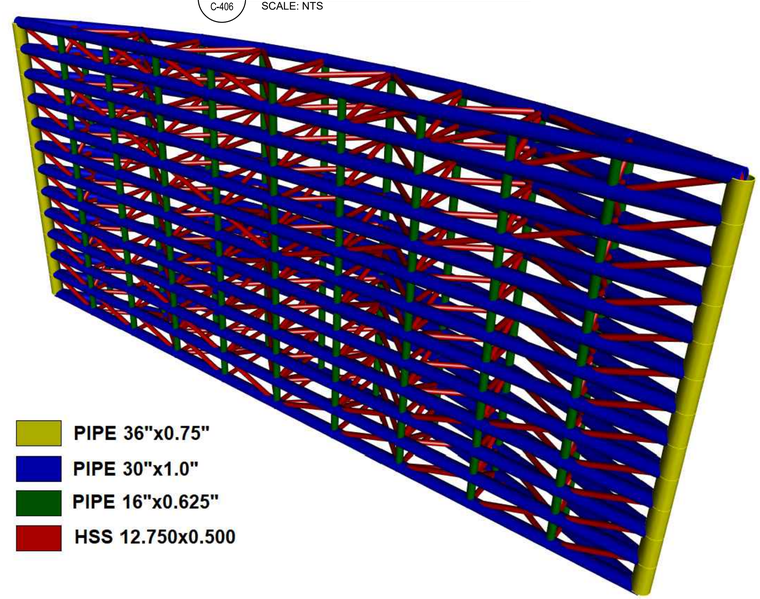
SHEET IDENTIFICATION
C-405



D2 C-406 VERTICAL LIFT GATE - PLAN
SCALE: NTS



C2 C-406 VERTICAL LIFT GATE - ELEVATION
SCALE: NTS



A2 C-406 VERTICAL LIFT GATE - ISOMETRIC
SCALE: NTS

NOTES:

1. SKIN PLATE: 3/8"X67"X15'-0" PLATE WITH INTERCOSTALS L4"X4"X5/16" AT 2'-4" (ORIENTED ON THE SHORT SIDE). WEIGHT PER AREA: 19 LBF/SQFT.
2. STEEL SECTIONS: ASTM A572 GR 50 OR ENGINEER-APPROVED EQUIVALENT OR BETTER
3. FRACTURE CRITICAL MEMBERS: THE ONLY ELEMENTS SUBJECT TO BE FRACTURE CRITICAL MEMBERS (FCM) ARE THE LIFTING EYES OF THE GATE USED FOR INSTALLATION (NOT INCLUDED AT THIS LEVEL OF DESIGN). NO OTHER ELEMENT IS CONSIDERED AS FCM, SINCE CRITICAL ELEMENTS (CURVED CHORDS OF THE TRUSSES) ARE IN COMPRESSION FOR THE CRITICAL CASES AND ADDITIONALLY, FAILURE OF THESE ELEMENTS DOES NOT IMPLY COLLAPSE OF THE GATE.
4. TOTAL WEIGHT: 1949 KIP
5. COUNTERWEIGHTS (CTWT.) ARE ASSUMED TO BE STACKS OF 1 OR 2" STEEL PLATE.
6. IT IS ANTICIPATED THAT CTWT. WILL REQUIRE EITHER A CTWT. PIT BELOW EL. 0 OR WILL REQUIRE A PULLEY SYSTEM TO ALLOW 1" OF VERT. CTWT. TRAVEL FOR MORE THAN 1" OF VERT. GATE TRAVEL.

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U.S. ARMY CORPS OF ENGINEERS
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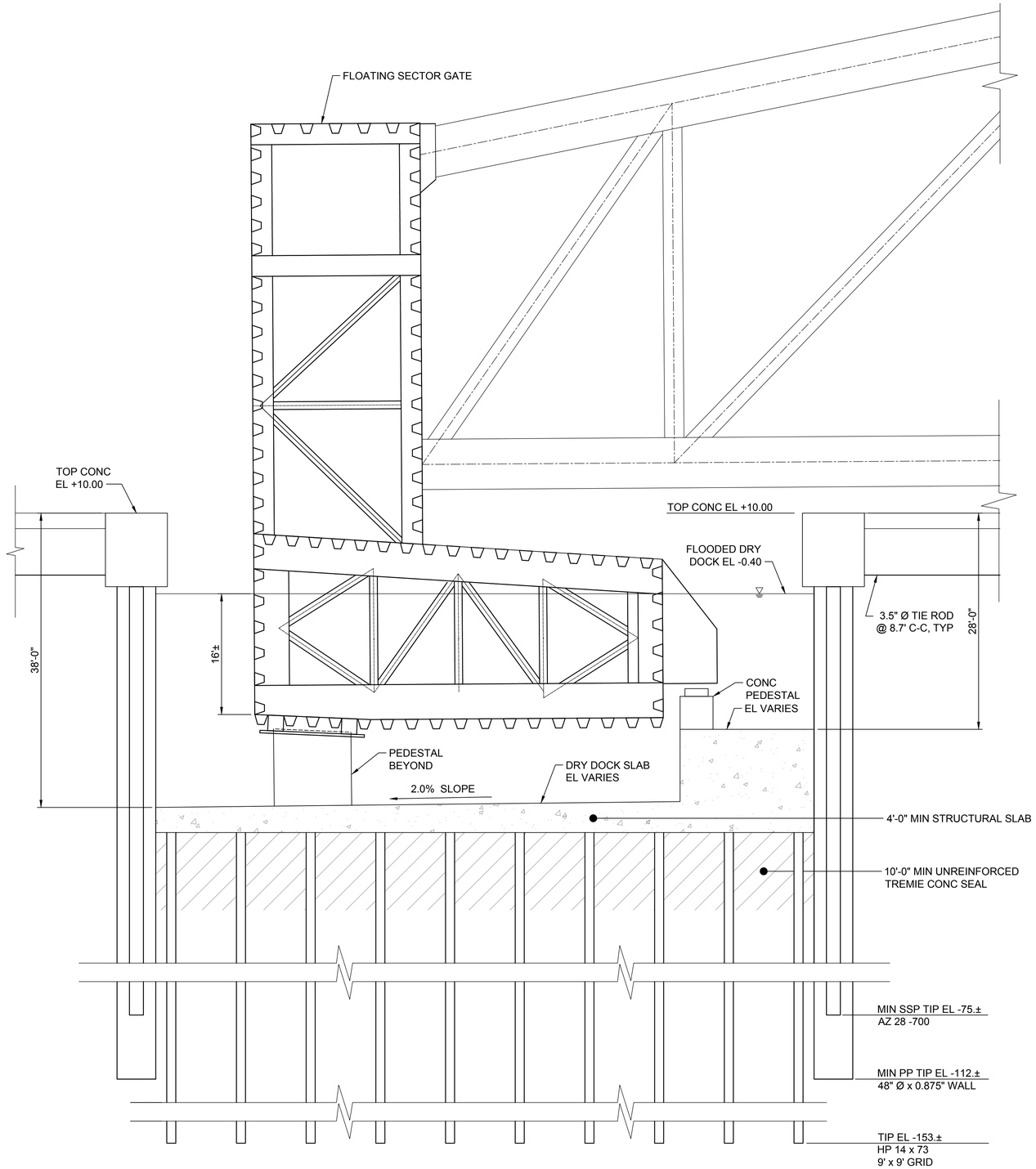
2924 MARKET AVE, STE 200
MADISON, WI 53729

DESIGNED BY: KJ / JB
DWN BY: SNL
CKD BY: M. WOO
SUBMITTED BY: M. WOO
PLOT SCALE:
ISSUE DATE:
SIZE: ANSI D
FILE NAME:
DATE: 2022-04-29
SOLICITATION NO.: W912DS-19-F-0111
CONTRACT NO.: W912DS-19-D-0006
FILE NUMBER:

NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

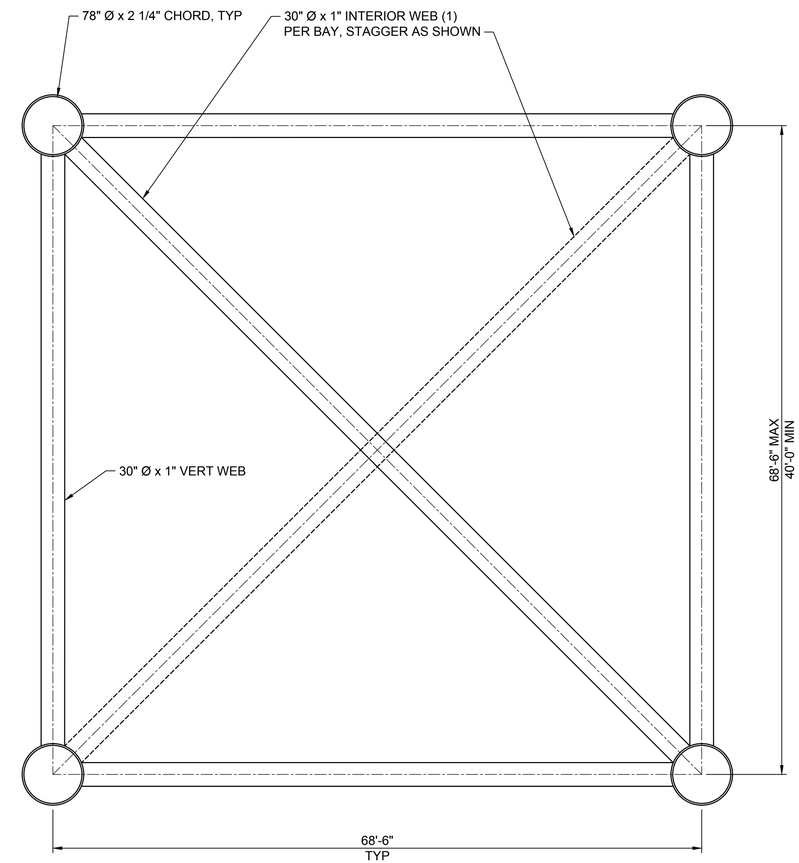
VERRAZZANO NARROWS - GATE PLAN & PROFILE

SHEET IDENTIFICATION
C-406



SECTION - FLOATING SECTOR GATE STOWED IN DRY-DOCK

SCALE: 1/8" = 1'-0"



SECTION - SPACE TRUSS SUPPORT ARM

SCALE: 1/8" = 1'-0"

8'-0" 0'-0" 8'-0" 16'-0"

SCALE: 1/8"=1'-0"

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NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS DETAILS - FLOATING SECTOR GATE ARM

SHEET IDENTIFICATION
C-501
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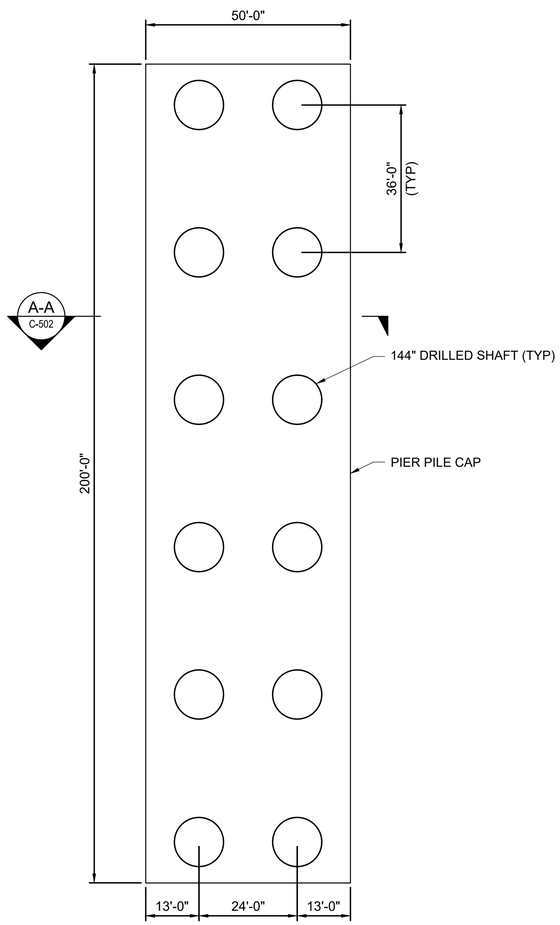
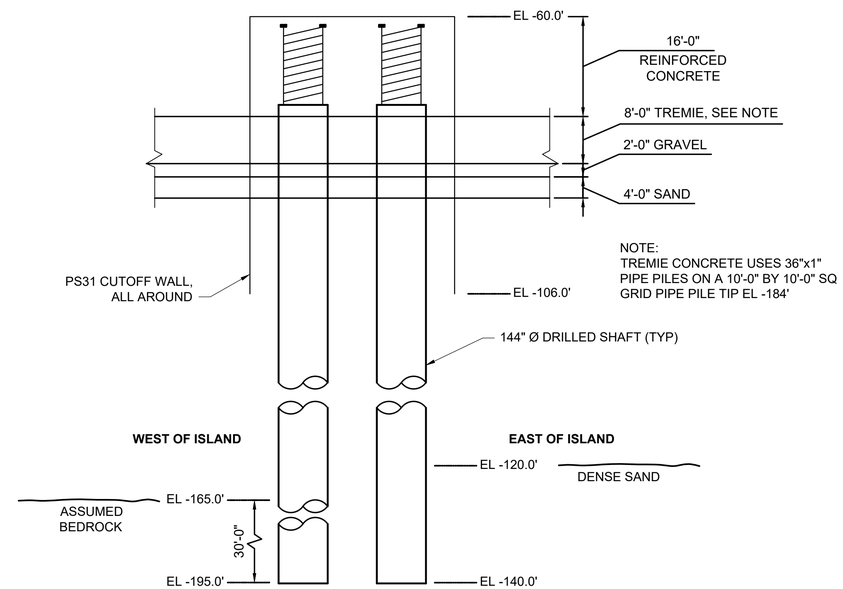
File: Q:\NY\10380-02\500_CADD_VN-Figures_SheetSet Figs\10380202C-501_VN; Plotted: 4/17/2020 3:28 PM by VOELKER, PAUL; Saved: 4/16/2020 2:41 PM by PVOELKER



B2 TYPICAL PIER FOUNDATION
SCALE: NTS



B3 TYPICAL PIER FOUNDATION SECTION A-A
SCALE: NTS

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VERRAZZANO NARROWS - PIER FOUNDATION DETAILS

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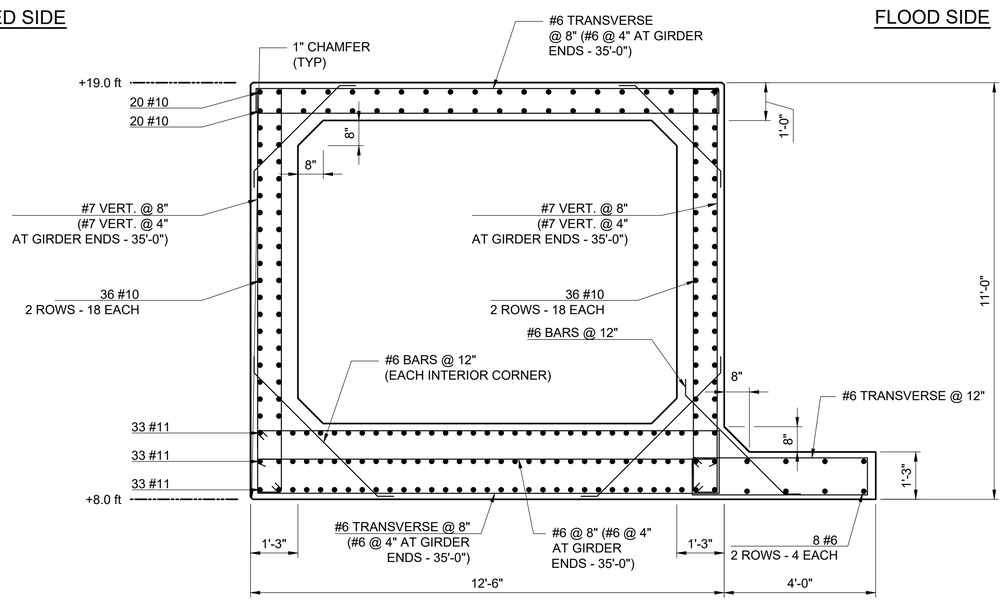
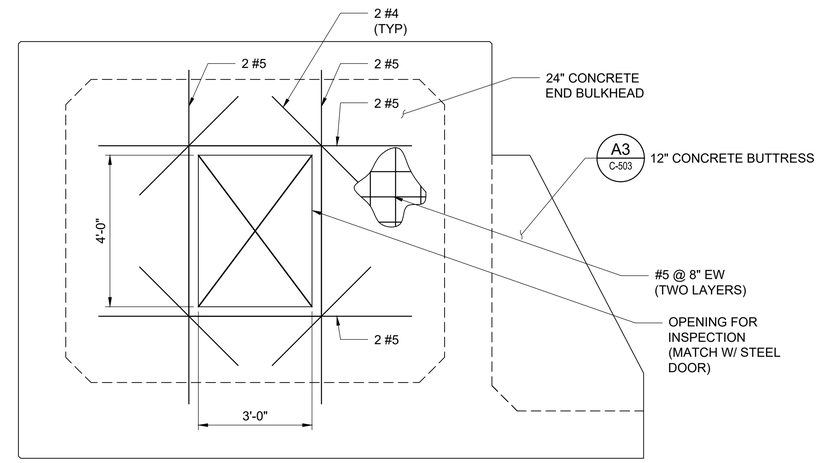
C-502

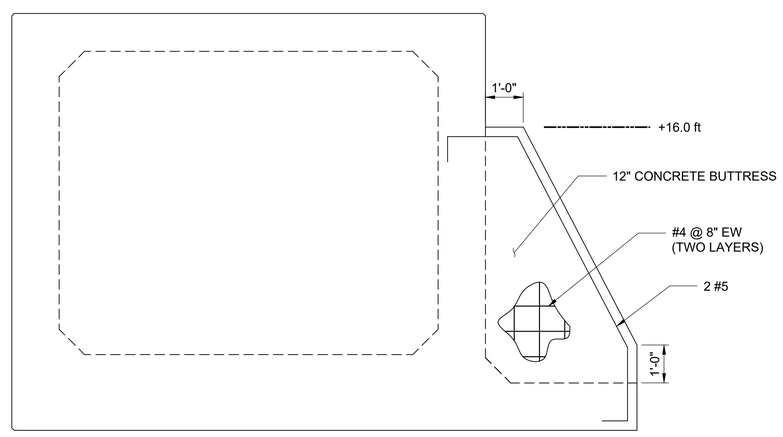


NOTE:
1. FACE-MOUNTED VEHICLE GUARDRAIL AT EACH FACE (NOT SHOWN).
2. 10 FT SPACING BETWEEN BUTTRESSES.

B2 / XX-XXX — TYPICAL SECTION
SCALE: 1/2" = 1'-0"



B4 / XX-XXX — CROSS SECTION AT HEADWALL END
SCALE: 1/2" = 1'-0"



B4 / XX-XXX — TYPICAL BUTTRESS REINFORCEMENT DETAIL
SCALE: 1/2" = 1'-0"

2' 1' 0' 2' 4'
SCALE: 1/2" = 1'-0"

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VERRAZZANO NARROWS - HEADWALL DETAILS

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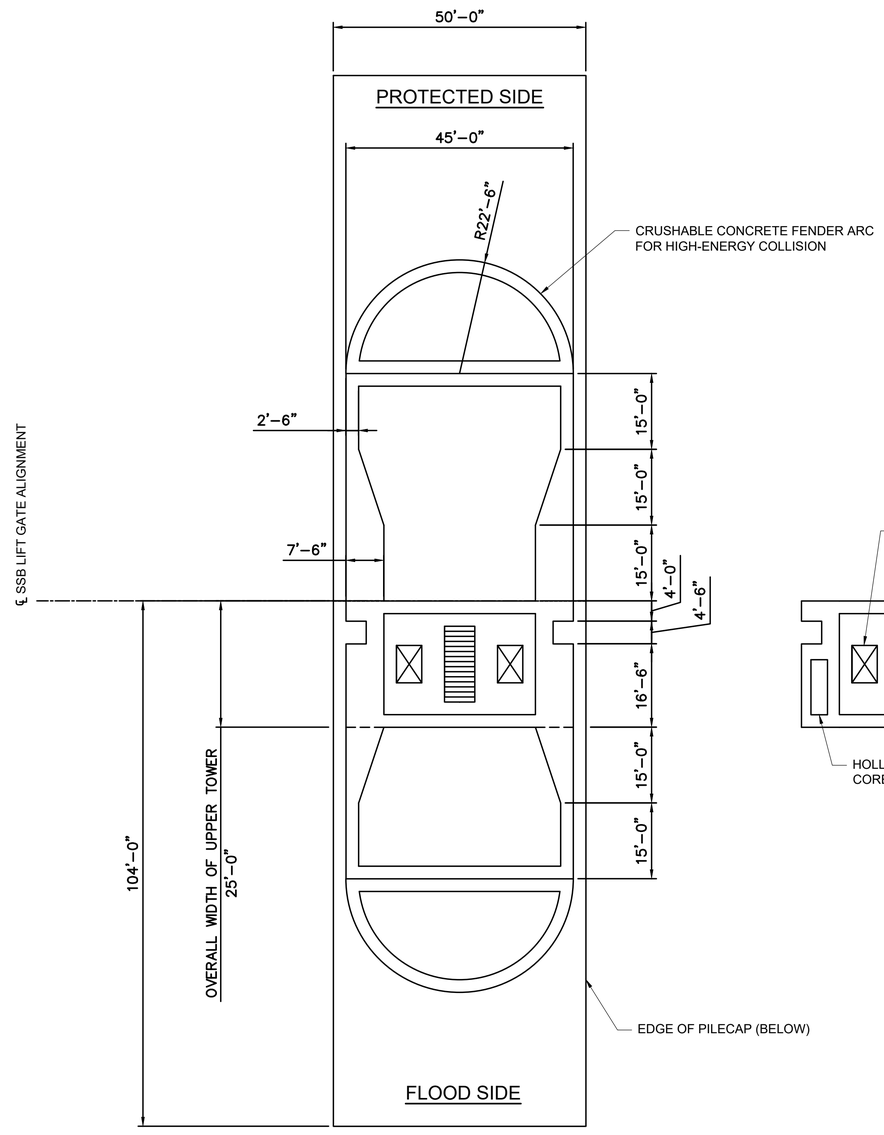

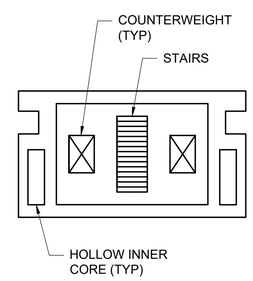

A2 UPPER & LOWER TOWER SECTION DETAILS
SCALE: NTS

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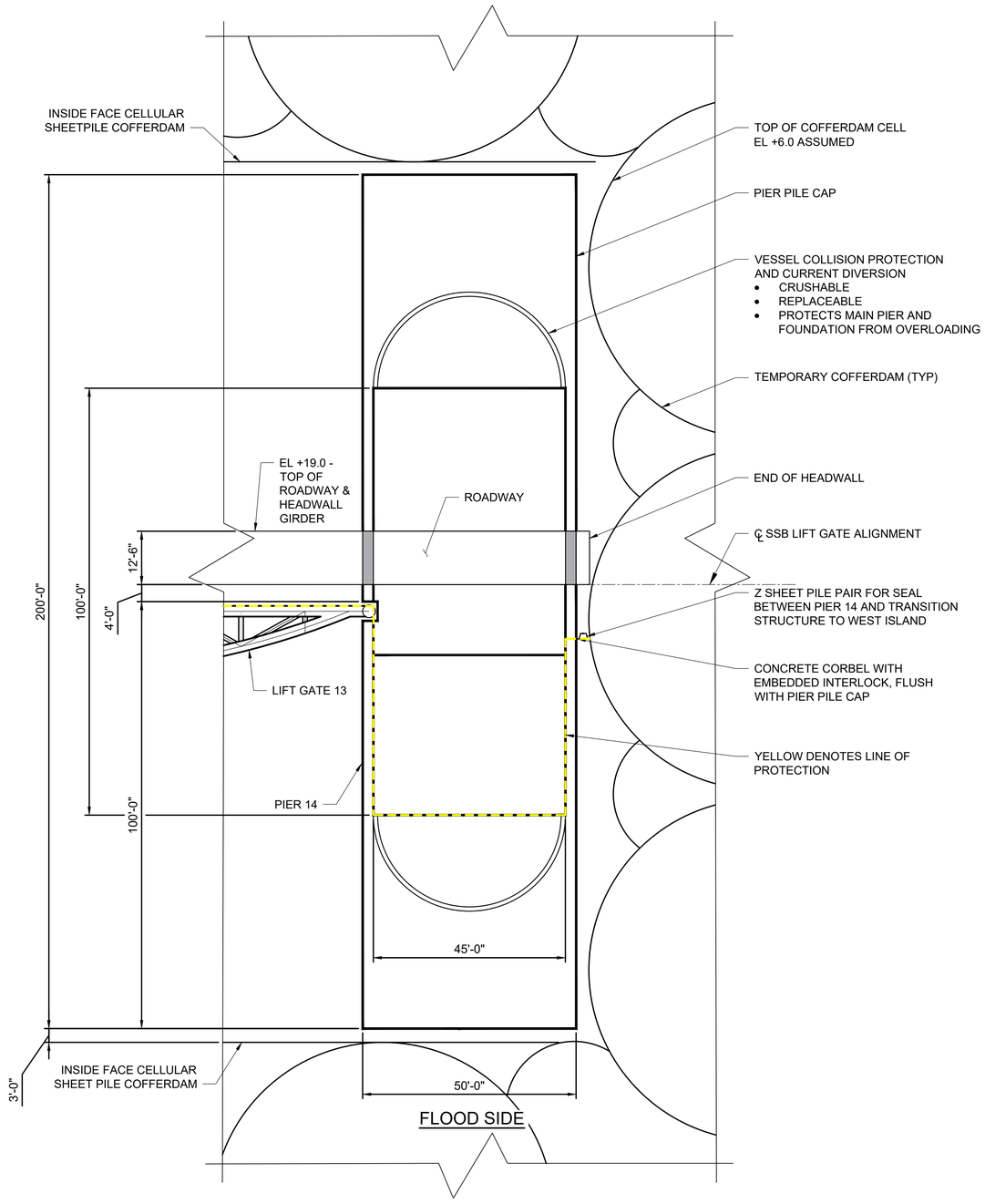
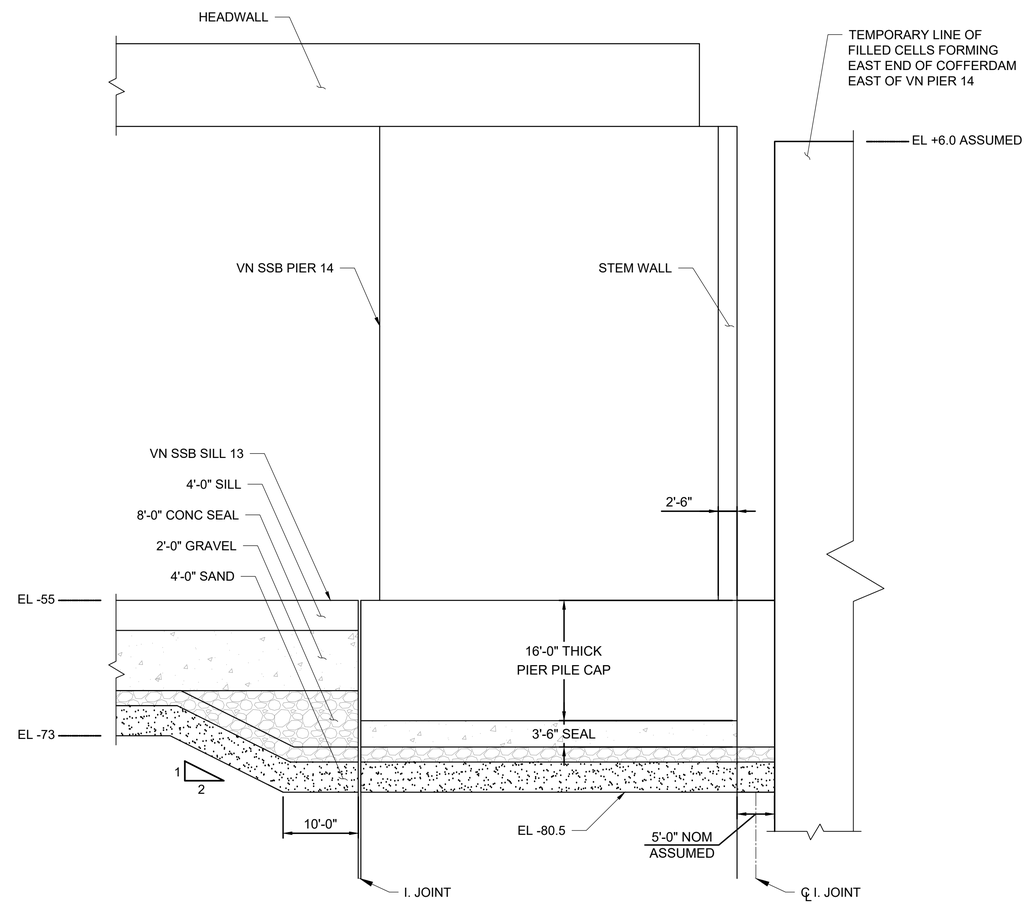
VERRAZZANO NARROWS - PIER TOWER DETAILS

SHEET IDENTIFICATION
C-504



A1 PIER 14 CONSTRUCTION WITHIN TEMPORARY COFFERDAM
SCALE: NTS



A3 ELEVATION LOOKING NORTH
SCALE: NTS

NOT SHOWN: DRILLED SHAFTS, PILES

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CKD BY: M. WOODS
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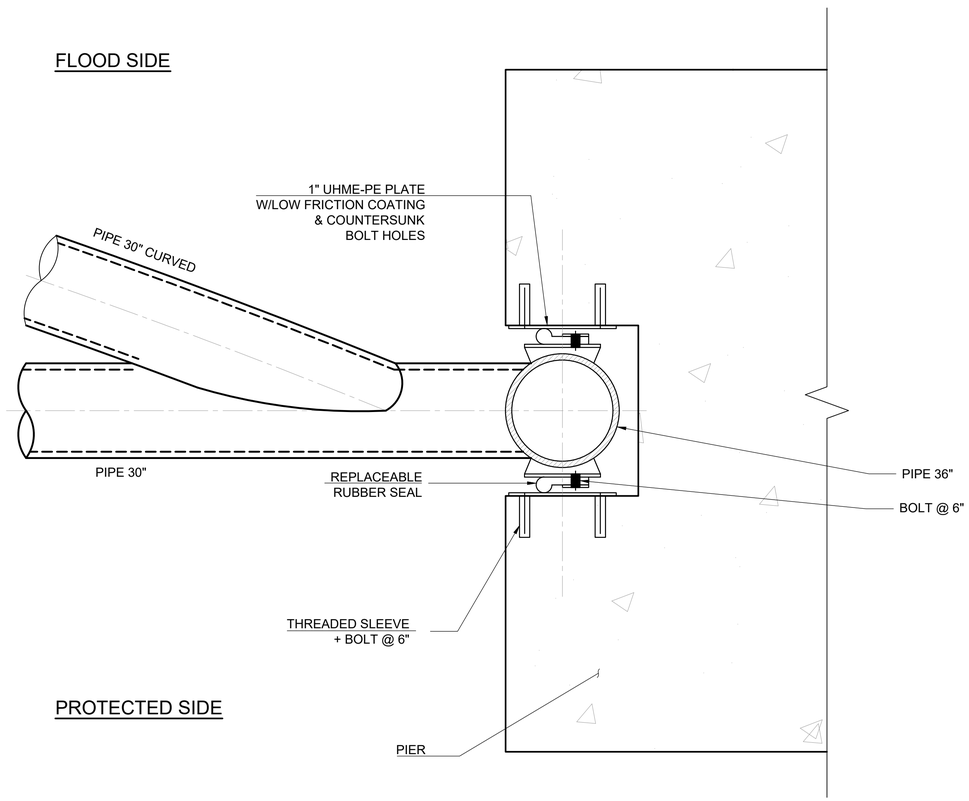
NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS - PIER TO ISLAND INTERFACE DETAILS

SHEET IDENTIFICATION
C-505



B1 GATE RECESS AT PIER DETAIL
SCALE: 1/2" = 1'-0"

2' 1' 0' 2' 4'
SCALE: 1/2" = 1'-0"

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VERRAZZANO NARROWS - GATE DETAIL

SHEET IDENTIFICATION
C-506

VERRAZANO-NARROWS AUXILIARY GATE ELEVATIONS AND HEIGHTS																
PIER	SILL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
1	1	42.0	+19.0	+8.0	-25.0	-41.0	-44.5	-50.5	-165.0	-173.0	-195	-25.0	-29.0	-37.0	-165.0	-173.0
2	2	67.0	+19.0	+8.0	-50.0	-66.0	-69.5	-75.5	-165.0	-173.0	-195	-50.0	-54.0	-62.0	-165.0	-173.0
3	3	75.0	+19.0	+8.0	-58.0	-74.0	-77.5	-83.5	-165.0	-173.0	-195	-58.0	-62.0	-70.0	-165.0	-173.0
4-11	4-10	79.0	+19.0	+8.0	-62.0	-78.0	-81.5	-87.5	-165.0	-173.0	-195	-62.0	-66.0	-74.0	-165.0	-173.0
12-13	11-12	77.0	+19.0	+8.0	-60.0	-76.0	-79.5	-85.5	-165.0	-173.0	-195	-60.0	-64.0	-72.0	-165.0	-173.0
14	13	72.0	+19.0	+8.0	-55.0	-71.0	-74.5	-80.5	-165.0	-173.0	-195	-55.0	-59.0	-67.0	-165.0	-173.0
15-17	14-15	42.0	+19.0	+8.0	-25.0	-41.0	-44.5	-50.5	TBD	TBD	TBD	-25.0	-29.0	-37.0	TBD	-149.0

NOTES:
1. SEE SHEETS C-301, C-303 & C-402 IN HACKENSACK RIVER SSB FOR MORE INFORMATION.
2. IT IS ANTICIPATED THAT THERE WILL BE A STEEL-FRAMED MACHINE HOUSE ON TOP OF EACH PIER, WHOSE ROOF WILL BE 20 TO 25 FEET ABOVE “A”, THE TOP OF CONCRETE TOWER ELEVATION. IT IS ASSUMED THAT EACH MACHINE HOUSE WILL CONTAIN APPROXIMATELY 15-FOOT DIAMETER SHEAVES.

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CKD BY: M. WOODS
SUBMITTED BY: M. WOODS
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SOLICITATION NO.: W912DS-19-F-0111
CONTRACT NO.: W912DS-19-D-0006
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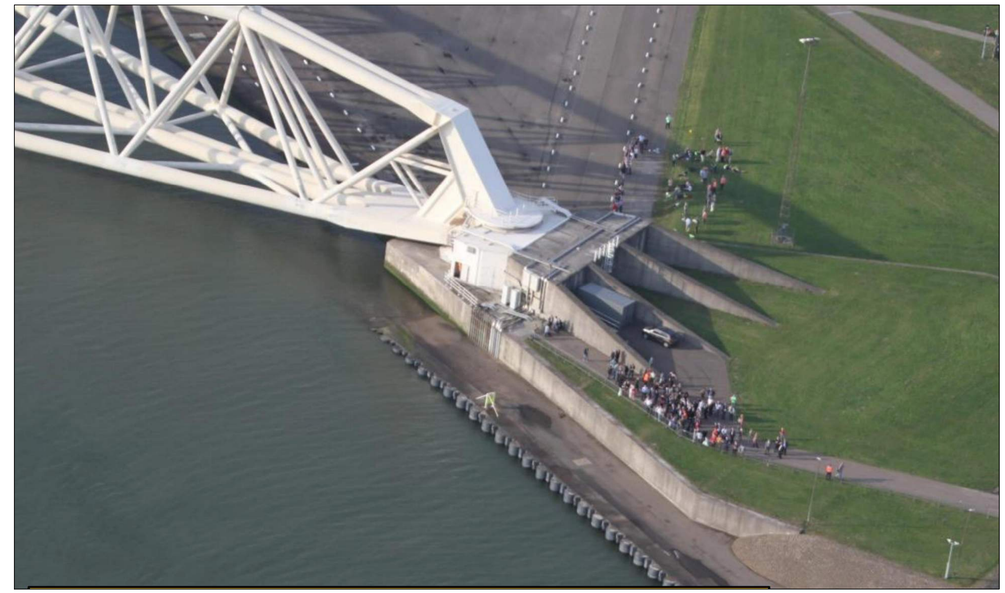
NEW YORK / NEW JERSEY HARBOR & TRIBUTARIES STUDY (HATS)

VERRAZZANO NARROWS - ELEVATIONS SCHEDULES

SHEET IDENTIFICATION
C-601

D1 R-001 PHOTO REFERENCE - BALL JOINT SOCKET INTERFACE
NTS



D4 R-001 PHOTO REFERENCE - BALL JOINT SUPPORT STRUCTURE
NTS

A1 R-001 PHOTO REFERENCE - BALL JOINT FOUNDATION
NTS

A4 R-001 PHOTO REFERENCE - PRE-FABRICATED BALL JOINT
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VERRAZZANO NARROWS PHOTO REFERENCE - BALL JOINT

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C1 R-002 PHOTO REFERENCE - LOCOMOBILE INTERFACE AT STORM SURGE BARRIER
NTS

C4 R-002 PHOTO REFERENCE - GENERAL LOCATION - LOCOMOBILE
NTS

A1 R-002 PHOTO REFERENCE - DRY DOCK
NTS

C1 R-002 PHOTO REFERENCE - GATE ARM TRUSS
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VERRAZZANO NARROWS PHOTO REFERENCE - LOCOMOBILE

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C1 R-003 PHOTO REFERENCE - GENERAL LOCATION - SILL BLOCK
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D4 R-003 PHOTO REFERENCE - PRE-FABRICATED SILL BLOCK
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VERRAZZANO NARROWS PHOTO REFERENCE - SILL

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R-003
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D1 R-004 PHOTO REFERENCE - GUIDE FENDER SYSTEM
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D3 R-004 PHOTO REFERENCE - GUIDE FENDER SYSTEM
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VERRAZZANO NARROWS PHOTO REFERENCE - GUIDE FENDER SYSTEM

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R-004
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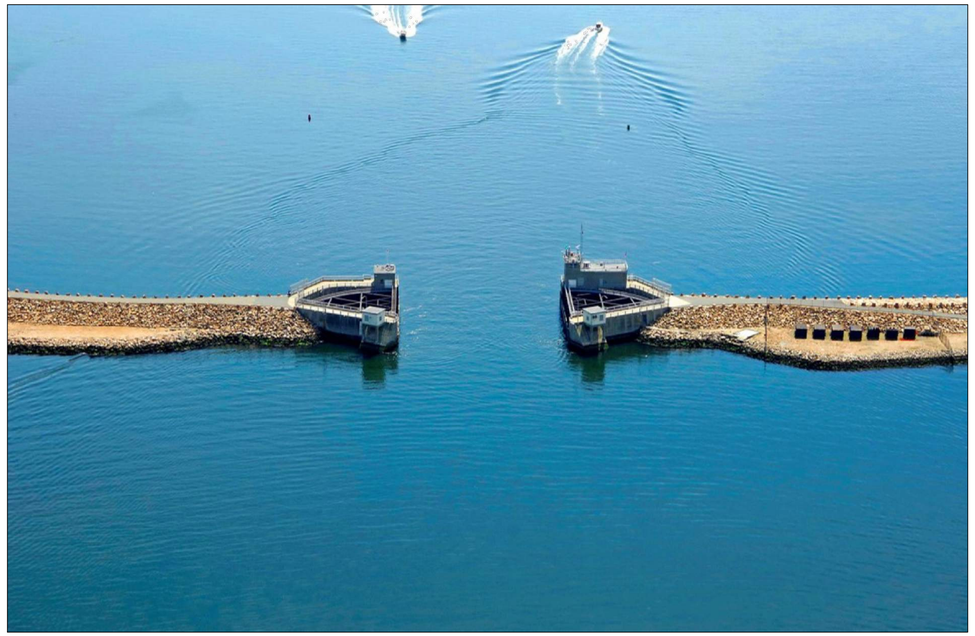
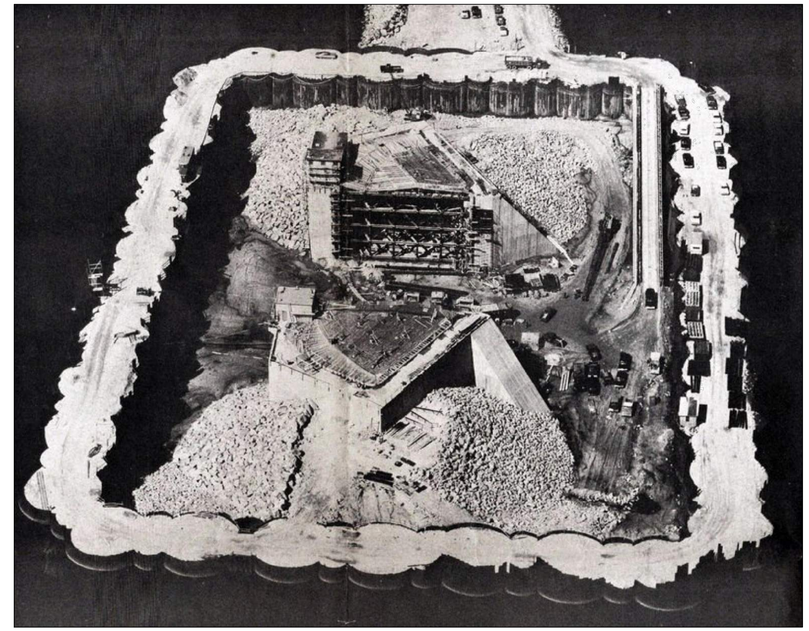


C1 R-005 PHOTO REFERENCE - SECTOR GATES
NTS



C4 R-005 PHOTO REFERENCE - COFFERDAMS AND FILL
NTS

A1 R-005 PHOTO REFERENCE - GATE BRACING
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VERRAZZANO NARROWS PHOTO REFERENCE - SECONDARY SECTOR GATE

SHEET IDENTIFICATION
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