

NOTES

- PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, (2011)(2010.00), IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 2011 EPOCH VALUES OF NGS CORS STATIONS: "SITKA CORS ARP" (PID D07572) "PORTALEXANAK2005 CORS ARP" (PID DL6695) AND "LEVEL ISLAND 5 CORS ARP" (PID DJ3033).
- LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, IN US SURVEY FEET HOLDING "1349 5 2006" AS N 1,770,667.32; E 2,672,034.89 AND "DE-3 2001" AS N 1,753,633.79; E 2,681,681.77.
- VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW = 0.0), BASED ON THE NOAA/NOS TIDAL BENCHMARK LIST: "945 1349 THE SUMMIT, N.W. SUMMIT ISLAND, ALASKA" PUBLISHED 09/17/2008. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA-USCGS TIDAL BENCHMARK "945 1349 TIDAL 1" (PID B8B628/VM18116) AS 18.12.
- VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID12B) ELEVATIONS HOLDING NOAA-USCGS TIDAL BENCHMARK "1349 5 2006" (PID BBF208/VM18120) AS 13.37.
- SOUNDINGS ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
- BATHYMETRY WAS COLLECTED MAY 2, 2018. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2022 MULTIBEAM ECHOSOUNDER OPERATING AT 200KHZ SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITIONING AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER VS SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE SP5855 GPS RECEIVER SET AT CONTROL STATION "1349 5 2006" SURVEY DATA WAS COLLECTED USING QINSY 8.1 AND PROCESSED USING CIMERA 1.5.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING STATIC GNSS AND DIFFERENTIAL LEVELING EQUIPMENT AND TECHNIQUES.
- TERRESTRIAL LASER SCANNING DATA COLLECTED MAY 2, 2018. DATA WAS COLLECTED USING A RIEGL VZ-400 LASER SCANNER. MOBILE SCANNING WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER VS SYSTEM.
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PROJECT CENTERLINE

CORNER#	NORTHING	EASTING
12	1,754,086.70	2,679,694.00
13	1,753,921.00	2,681,828.30
14	1,753,231.80	2,682,369.40
15	1,752,239.30	2,682,308.60
16	1,751,974.70	2,682,362.80

SURVEY CONTROL DATA

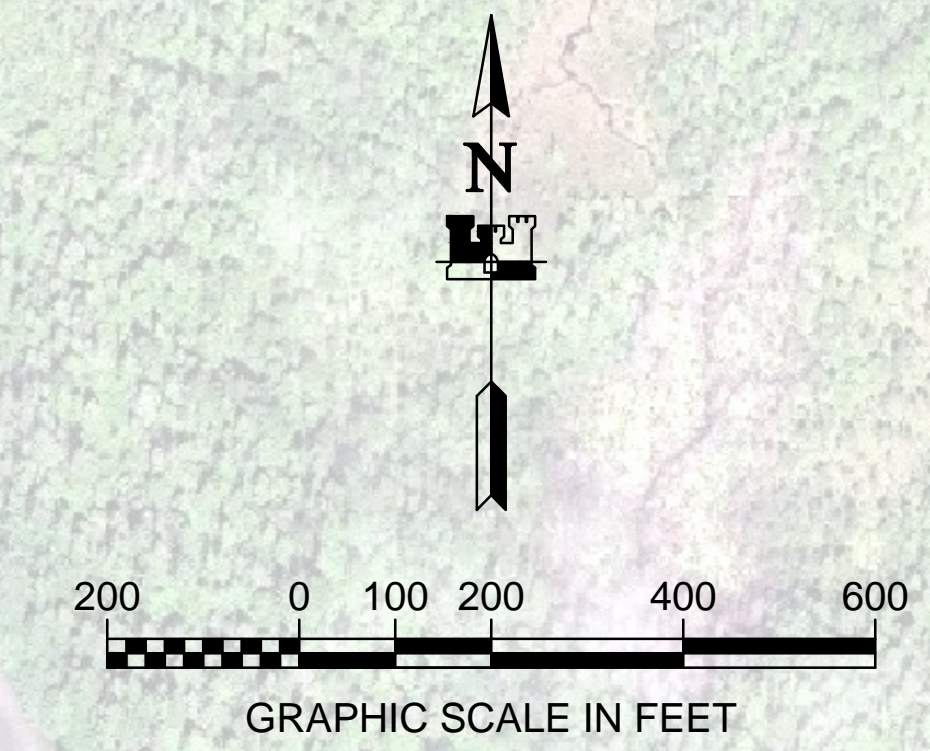
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1349 5 2006	1,770,667.32	2,672,034.89	16.61	NOAA/NOS BRASS CAP
D-1 1977	1,753,036.94	2,681,889.48	17.50	USACE SBC
D-2 1977	1,752,365.26	2,683,162.63	13.34	USACE SBC
DE-1 2001	1,754,921.58	2,681,006.61	21.06	USACE SBC
DE-3 2001	1,753,633.79	2,681,681.77	18.61	BRASS CAP
SPIKE	1,753,445.74	2,681,616.48	18.25	IRON SPIKE

VOLUME COMPUTATIONS

AREA A: 200' WIDE CHANNEL	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-5.0	208
AVAILABLE TO MAX PAY DEPTH (MP)	-6.0	1,289
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	40
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		1,329

NAVIGATION AIDS

USCG NO.	NORTHING	EASTING	DESCRIPTION
23306	1,753,730	2,681,812	DAY BEACON 15
23306.1	1,753,865	2,680,309	DAY BEACON 17



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN NSPS/THSOA CERTIFIED HYDROGRAPHER

Gregory W. Gibson

Gregory W. Gibson (317)

US Army Corps of Engineers - ALASKA DISTRICT

CONTRACT NO. W11HE14-01-019000

CONTRACTOR: ETIMC, INC.

CITY: WASILLA STATE: ALASKA

APPROVED BY: MICHAEL E. MEYER, District Engineer

DATE: 02/02/2018

BY: [Signature]

PROJECT CENTERLINE

CORNER#	NORTHING	EASTING
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U.S. ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
JBER, ALASKA 99506-0888

DATE: 04/30/2018

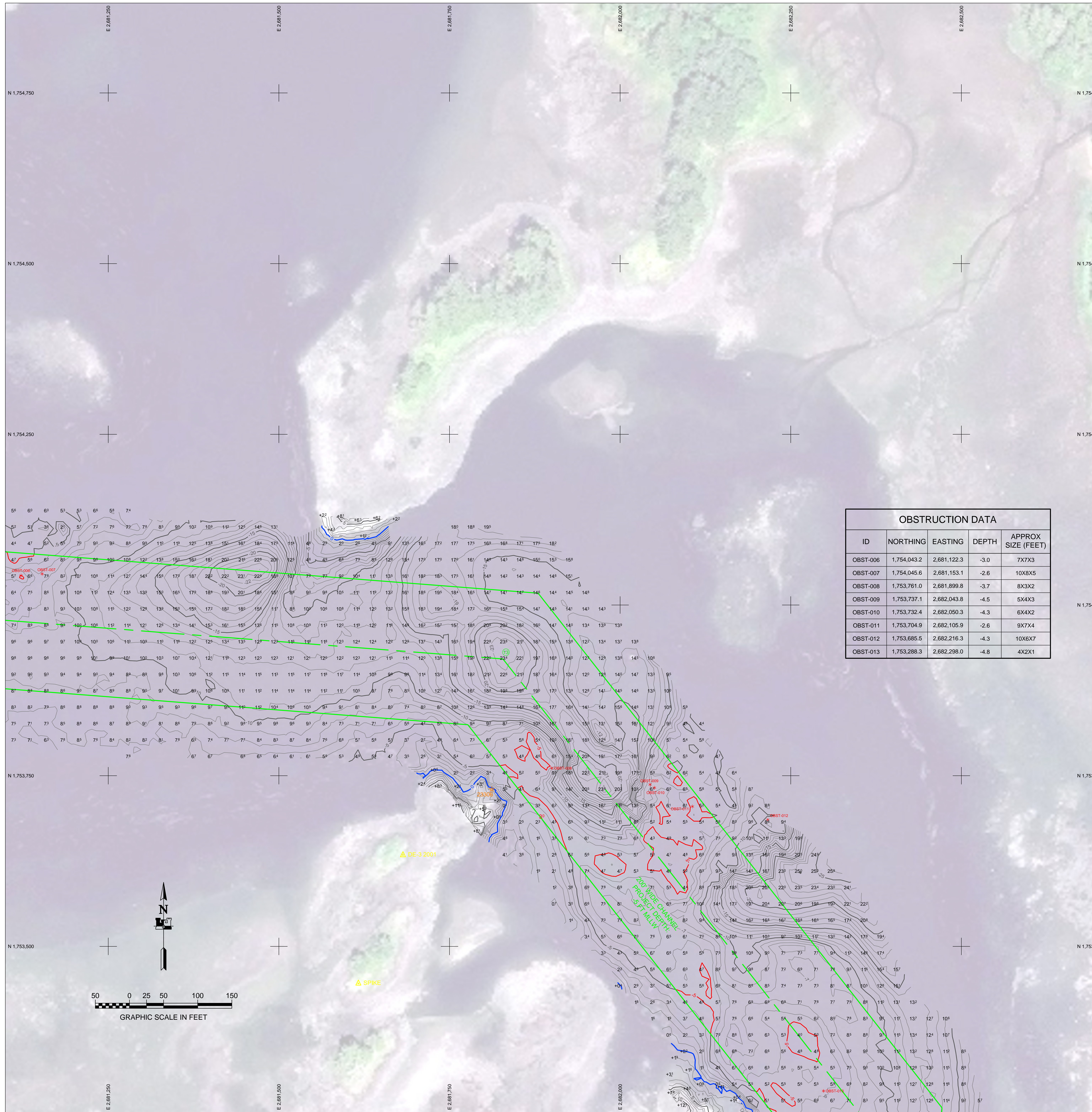
FILE NAME: 04302018

SCALE: 1" = 200'

TABLE: SOUNDINGS

KEKU STRAIT, ALASKA
072762 - ROCKY PASS; DEVIL'S ELBOW
PROJECT CONDITION SURVEY
APRIL 30 - MAY 3, 2018

SHEET IDENTIFICATION
1-ROC-92-07-04
Sheet 1 of 7



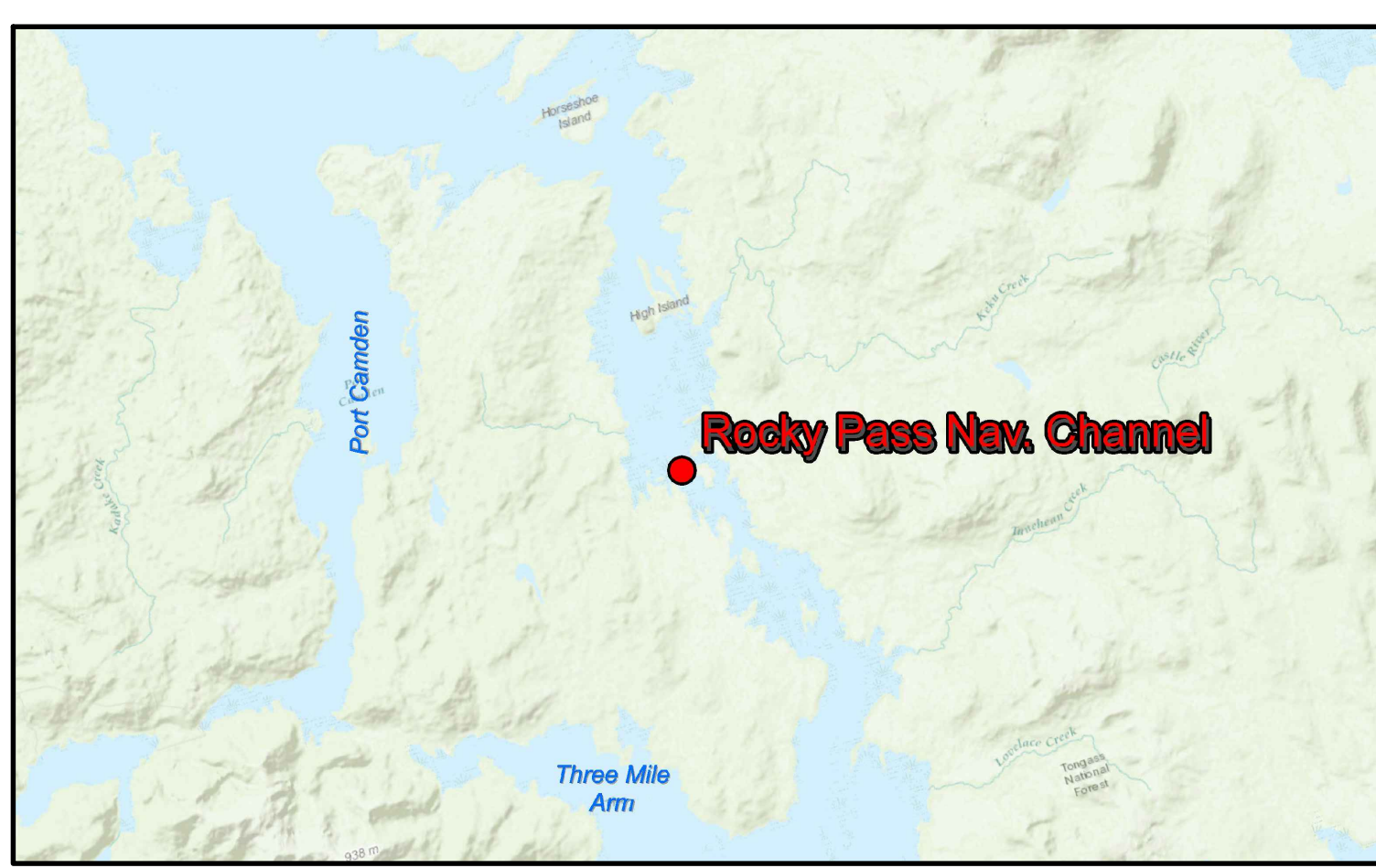
OBSTRUCTION DATA				
ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBST-006	1,754,043.2	2,681,122.3	-3.0	7X7X3
OBST-007	1,754,045.6	2,681,153.1	-2.6	10X8X5
OBST-008	1,753,761.0	2,681,899.8	-3.7	8X3X2
OBST-009	1,753,737.1	2,682,043.8	-4.5	5X4X3
OBST-010	1,753,732.4	2,682,050.3	-4.3	6X4X2
OBST-011	1,753,704.9	2,682,105.9	-2.6	9X7X4
OBST-012	1,753,685.5	2,682,216.3	-4.3	10X6X7
OBST-013	1,753,288.3	2,682,298.0	-4.8	4X2X1

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CONTRACT NO. W011861442001900000
 CONTRACTOR ETIMC, INC.
 CITY WASILLA STATE ALASKA
 RECOMMENDATION Approved THOMAS A. BLONN
 MICHAEL E. WHEELER THOMAS A. BLONN
 DATE 02/02/2018

NO.	DATE	DESCRIPTION	BY	APP'D

DATE: 04/30/2018
 FILE NAME: 072762-ROCKY PASS-DEVILS ELBOW
 FILE SIZE: 10,000,000
 FILE TYPE: DWG
 PROJECT: 072762-ROCKY PASS-DEVILS ELBOW
 CONTRACT NO.: W011861442001900000
 DRAWN BY: JBER, ALASKA 98506-0898
 CHECKED BY: Thomas A. Blonn, Chief Estimator/Estimator
 U.S. ARMY CORPS OF ENGINEERS
 ALASKA DISTRICT
 617 S. Walk-Gooden Road, Suite C
 Wasilla, AK, 98584

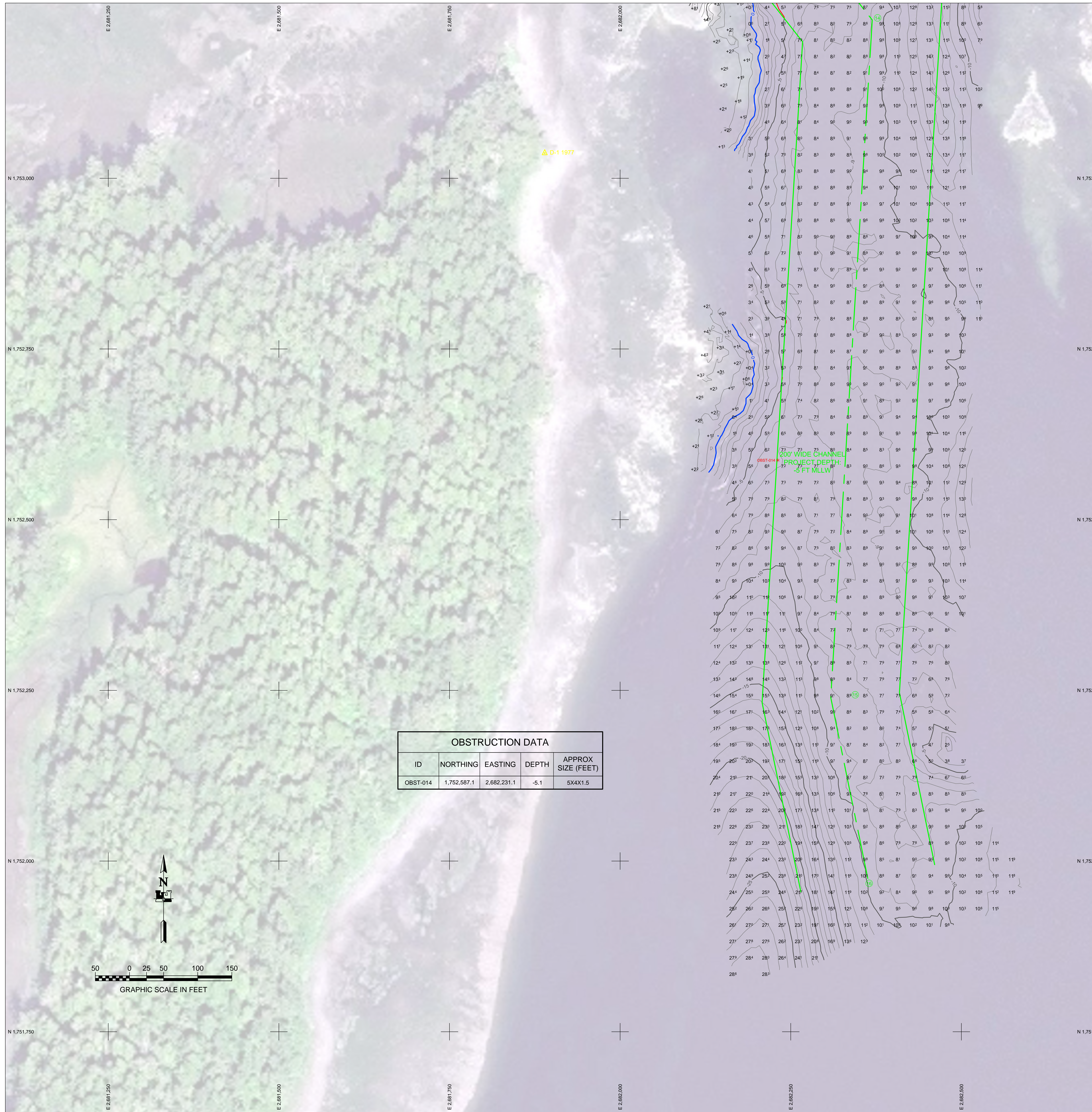
KEKU STRAIT, ALASKA
 072762 - ROCKY PASS; DEVIL'S ELBOW
 PROJECT CONDITION SURVEY
 APRIL 30 - MAY 3, 2018

SHEET IDENTIFICATION
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 Sheet 3 of 7

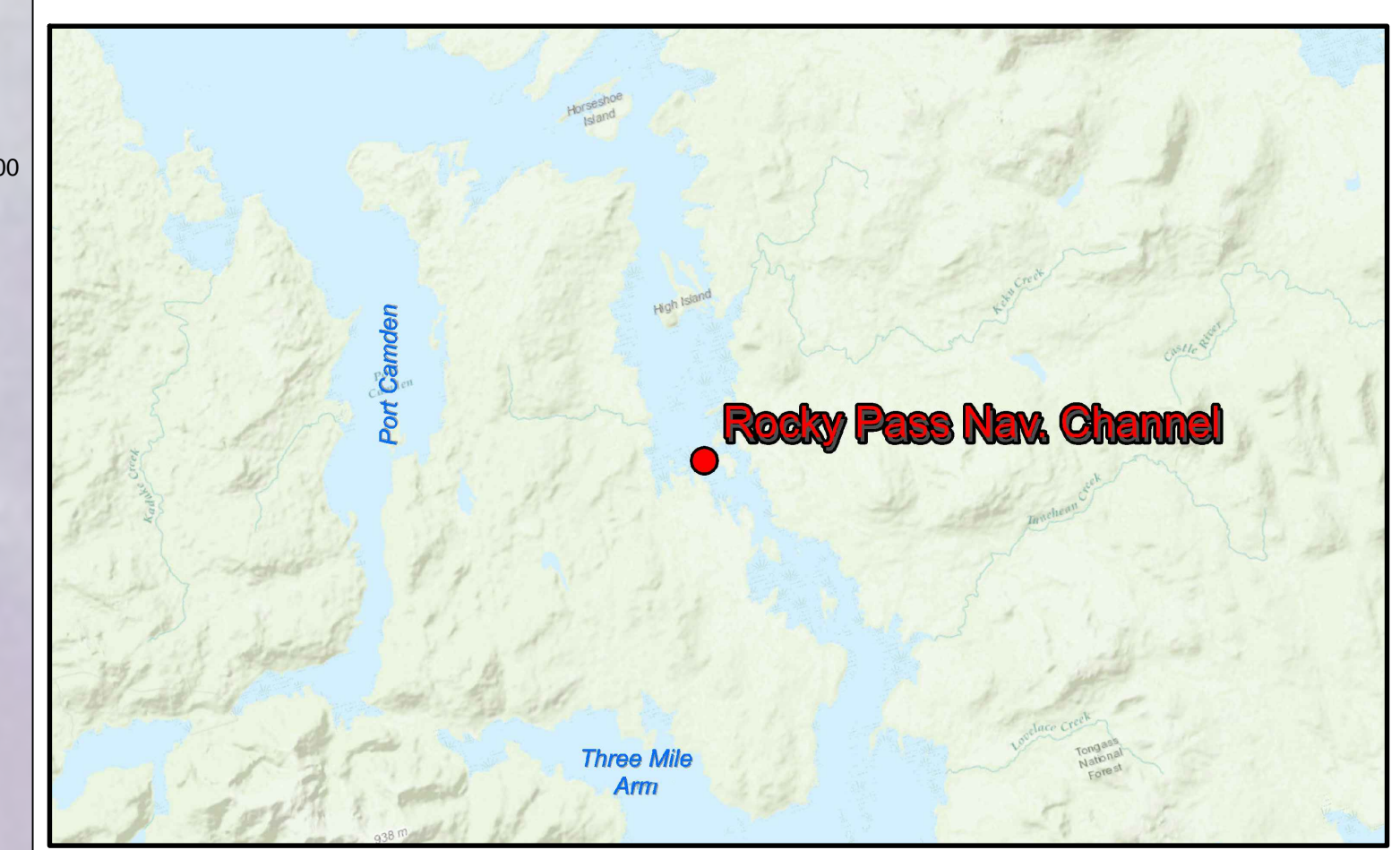
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Gregory W. Gibson

Gregory W. Gibson (317)



OBSTRUCTION DATA				
ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBST-014	1,752,587.1	2,682,231.1	-5.1	5X4X1.5



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US Army Corps of Engineers - ALASKA DISTRICT

CONTRACT NO. W11H614400190000
 CONTRACTOR: ETIMC, INC.
 CITY: WASILLA
 STATE: ALASKA
 PROJECT: 072762 - ROCKY PASS; DEVIL'S ELBOW PROJECT CONDITION SURVEY
 SHEET: 4 OF 7

DATE: 03/03/2018
 DRAWN BY: MICHAEL E. MUELLER
 CHECKED BY: THOMAS A. BLONN
 APPROVED BY: MICHAEL E. MUELLER
 TITLE: PROJECT CENTERLINE

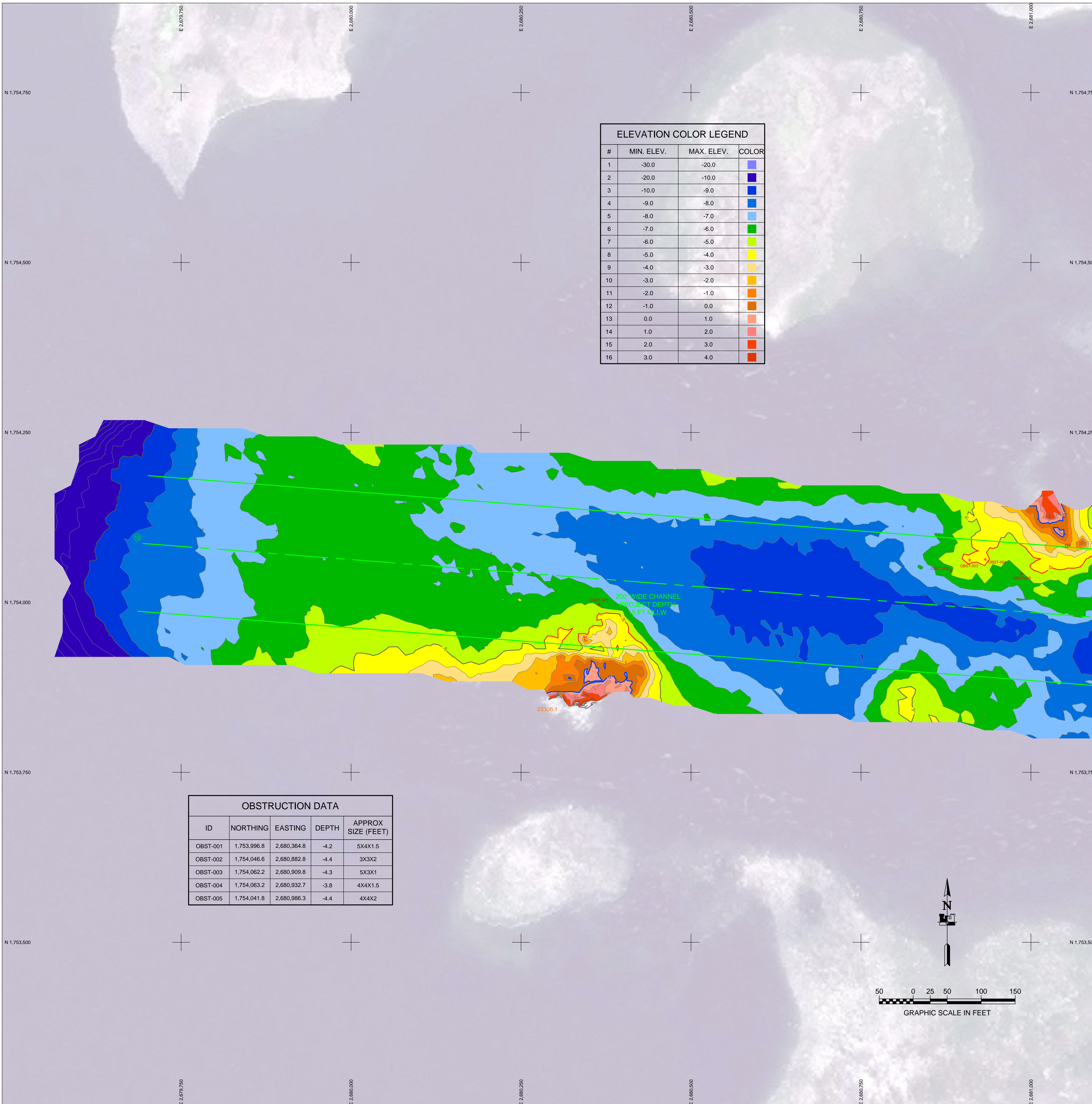
NO.	DATE	DESCRIPTION	BY	APP'D	DATE

DATE: 04/03/2018
 FILE NAME: 072762-014
 SIZE: 11" x 17"
 SCALE: 1" = 300'

U.S. ARMY CORPS OF ENGINEERS
 ALASKA DISTRICT
 JBER, ALASKA 99506-0888
 617 S. Walk-Gordon Blvd., Road Station C
 Wasilla, AK 99654

KEKU STRAIT, ALASKA
072762 - ROCKY PASS; DEVIL'S ELBOW
PROJECT CONDITION SURVEY
APRIL 30 - MAY 3, 2018

SHEET IDENTIFICATION
 1-ROC-92-07-04
 Sheet 4 of 7

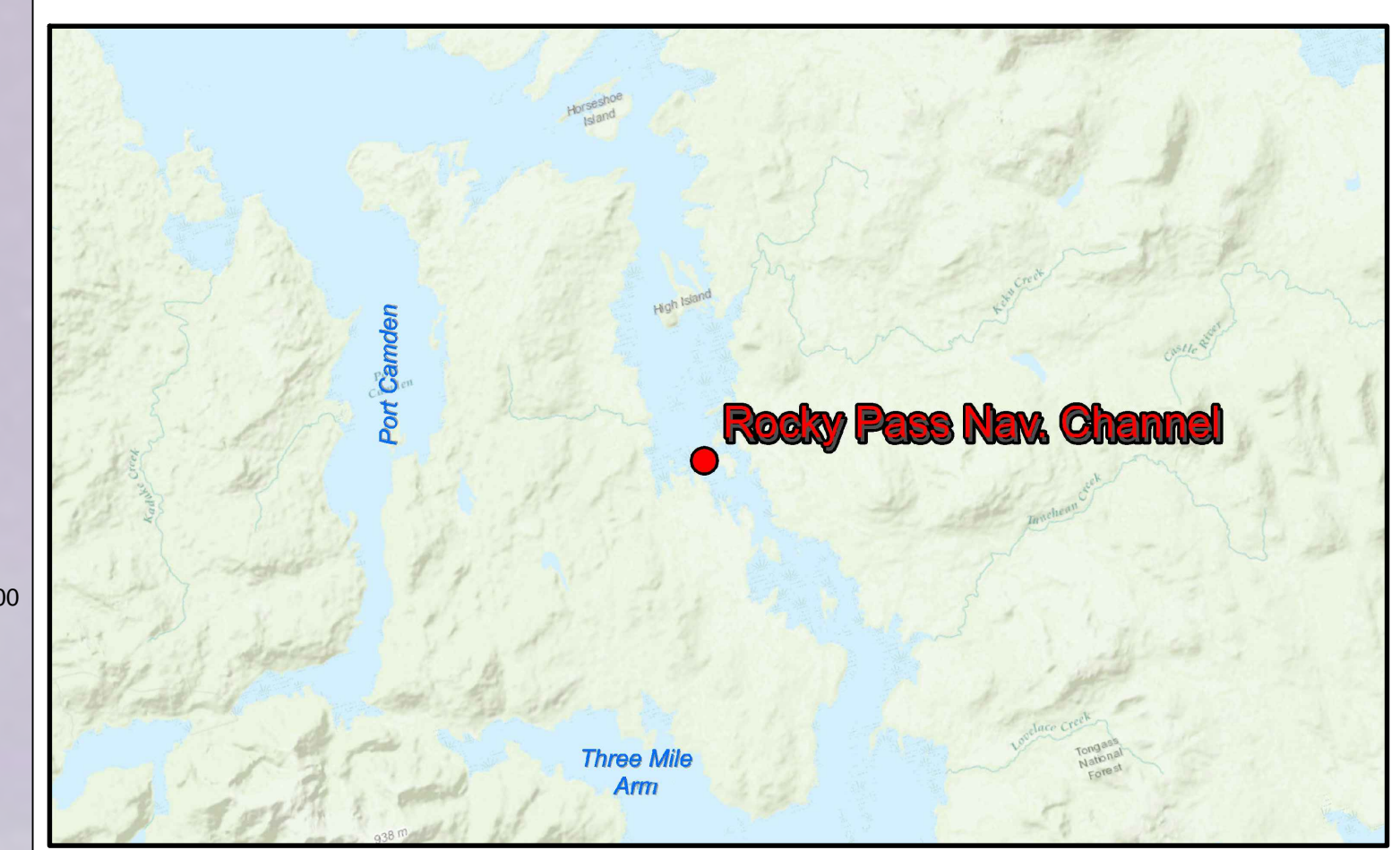
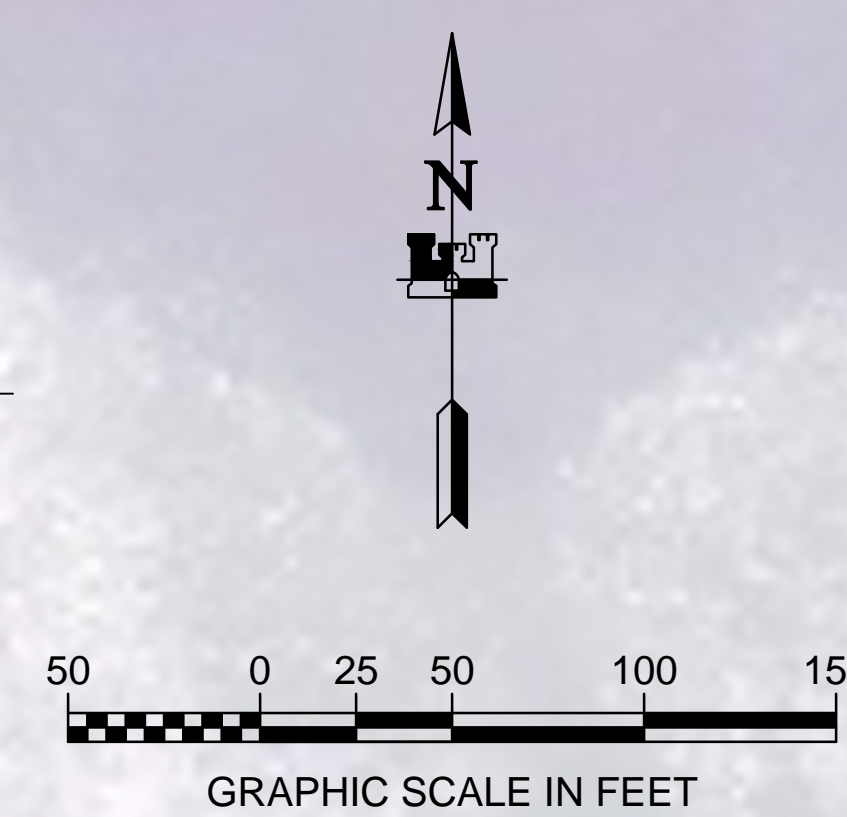


ELEVATION COLOR LEGEND

#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-30.0	-20.0	Dark Blue
2	-20.0	-10.0	Blue
3	-10.0	-9.0	Light Blue
4	-9.0	-8.0	Light Green
5	-8.0	-7.0	Green
6	-7.0	-6.0	Yellow-Green
7	-6.0	-5.0	Yellow
8	-5.0	-4.0	Light Yellow
9	-4.0	-3.0	Yellow
10	-3.0	-2.0	Orange
11	-2.0	-1.0	Light Orange
12	-1.0	0.0	Orange
13	0.0	1.0	Red-Orange
14	1.0	2.0	Red
15	2.0	3.0	Dark Red
16	3.0	4.0	Dark Red

OBSTRUCTION DATA

ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBST-001	1,753,996.8	2,680,364.8	-4.2	5X4X1.5
OBST-002	1,754,046.6	2,680,882.8	-4.4	3X3X2
OBST-003	1,754,062.2	2,680,909.8	-4.3	5X3X1
OBST-004	1,754,063.2	2,680,932.7	-3.8	4X4X1.5
OBST-005	1,754,041.8	2,680,986.3	-4.4	4X4X2



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PROJECT CENTERLINE

CORNER#	NORTHING	EASTING
12	1,754,086.70	2,679,694.00
13	1,753,921.00	2,681,828.30
14	1,753,231.80	2,682,369.40
15	1,752,239.30	2,682,308.60
16	1,751,974.70	2,682,362.80

SURVEY CONTROL DATA

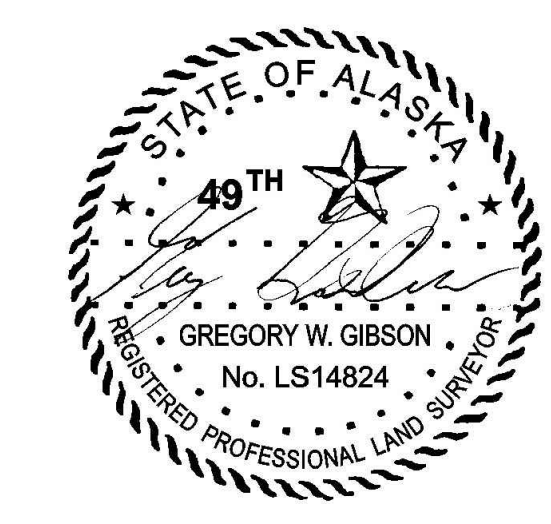
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1349 5 2006	1,770,667.32	2,672,034.89	16.61	NOAA/NOS BRASS CAP
D-1 1977	1,753,036.94	2,681,889.48	17.50	USACE SBC
D-2 1977	1,752,365.26	2,683,162.63	13.34	USACE SBC
DE-1 2001	1,754,921.58	2,681,006.61	21.06	USACE SBC
DE-3 2001	1,753,633.79	2,681,681.77	18.61	BRASS CAP
SPIKE	1,753,445.74	2,681,616.48	18.25	IRON SPIKE

VOLUME COMPUTATIONS

AREA A: 200' WIDE CHANNEL	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-5.0	208
AVAILABLE TO MAX PAY DEPTH (MP)	-6.0	1,289
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	40
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		1,329

NAVIGATION AIDS

USCG NO.	NORTHING	EASTING	DESCRIPTION
23306	1,753,730	2,681,812	DAY BEACON 15
23306.1	1,753,865	2,680,309	DAY BEACON 17



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN NSPS/THSOA CERTIFIED HYDROGRAPHER

Gregory W. Gibson (317)

CONTRACT NO. W11H61442019190000
 CONTRACTOR: ETI/MC INC.
 CITY: WASILLA
 STATE: ALASKA
 PROJECT: ROCKY PASS NAR. CHANNEL
 SHEET: 317 OF 317
 DATE: 04/30/2018
 DRAWN BY: MICHAEL E. WIELLER
 CHECKED BY: THOMAS A. BLONN
 APPROVED BY: [Signature]

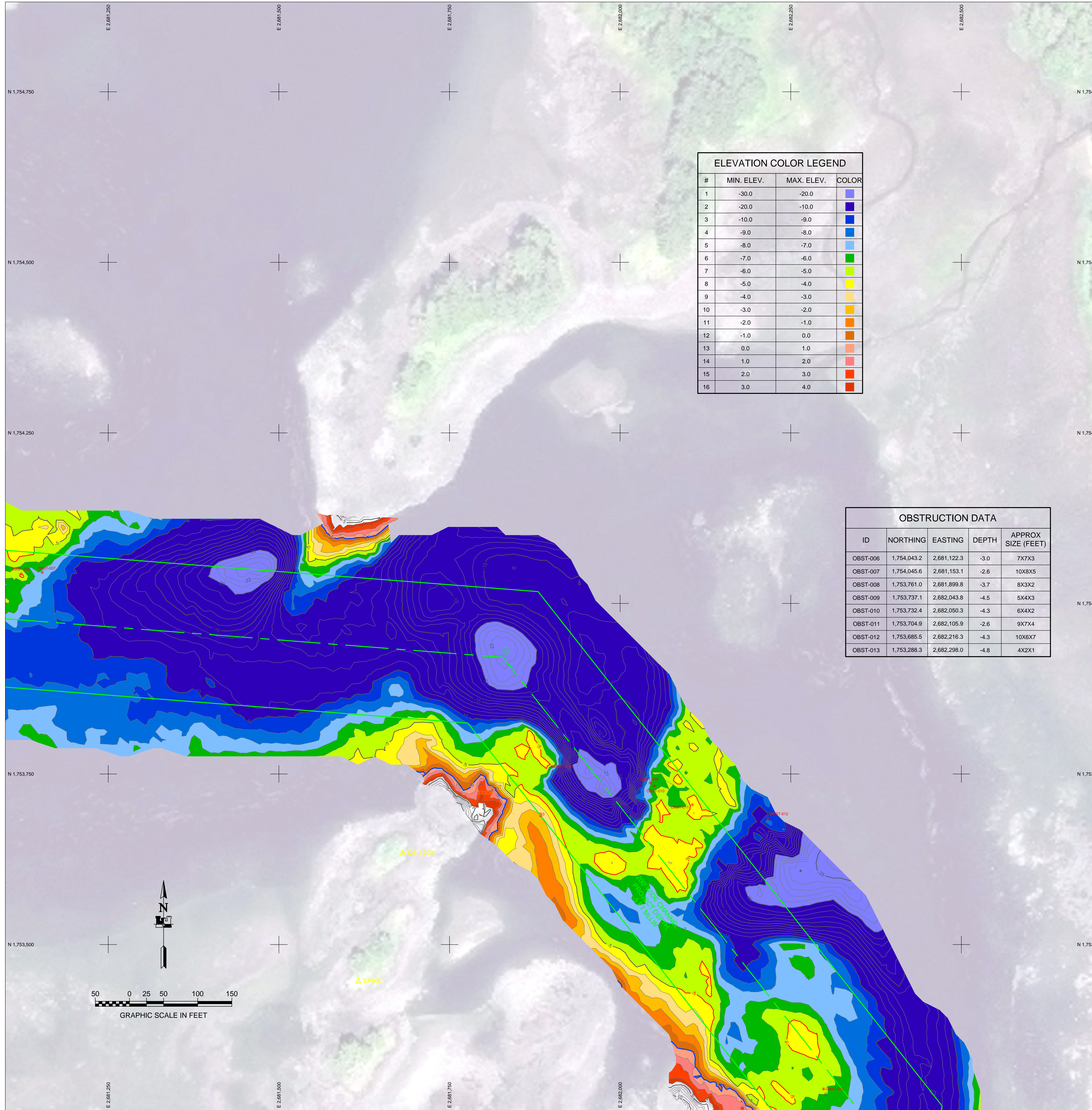
NO.	DESCRIPTION	DATE	BY	APP'D

DATE: 04/30/2018
 DRAWN BY: MICHAEL E. WIELLER
 CHECKED BY: THOMAS A. BLONN
 APPROVED BY: [Signature]
 FILE NAME: 04022018
 SIZE: 1" = 30'
 SCALE: 04022018

U.S. ARMY CORPS OF ENGINEERS
 ALASKA DISTRICT
 JBER, ALASKA 99506-0988
 617 S. Walk Gena Hwy, Road Sta# C
 Wasilla AK, 99654

KEKU STRAIT, ALASKA
 072762 - ROCKY PASS; DEVIL'S ELBOW
 PROJECT CONDITION SURVEY
 APRIL 30 - MAY 3, 2018

SHEET IDENTIFICATION
 1-ROC-92-07-04
 Sheet 5 of 7



ELEVATION COLOR LEGEND

#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-30.0	-20.0	Light Blue
2	-20.0	-10.0	Blue
3	-10.0	-9.0	Dark Blue
4	-9.0	-8.0	Blue-Green
5	-8.0	-7.0	Light Green
6	-7.0	-6.0	Green
7	-6.0	-5.0	Yellow-Green
8	-5.0	-4.0	Yellow
9	-4.0	-3.0	Light Orange
10	-3.0	-2.0	Orange
11	-2.0	-1.0	Dark Orange
12	-1.0	0.0	Red-Orange
13	0.0	1.0	Red
14	1.0	2.0	Dark Red
15	2.0	3.0	Orange-Red
16	3.0	4.0	Red

OBSTRUCTION DATA

ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBST-006	1,754,043.2	2,681,122.3	-3.0	7X7X3
OBST-007	1,754,045.6	2,681,153.1	-2.6	10X8X5
OBST-008	1,753,761.0	2,681,899.8	-3.7	8X3X2
OBST-009	1,753,737.1	2,682,043.8	-4.5	5X4X3
OBST-010	1,753,732.4	2,682,050.3	-4.3	6X4X2
OBST-011	1,753,704.9	2,682,105.9	-2.6	9X7X4
OBST-012	1,753,685.5	2,682,216.3	-4.3	10X6X7
OBST-013	1,753,288.3	2,682,288.0	-4.8	4X2X1



NOTES

- PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, (2011)(2010.00), IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 2011 EPOCH VALUES OF NGS CORS STATIONS: "SITKA CORS ARP" (PID D07572) "PORTALEXANAK2005 CORS ARP" (PID DL6695) AND "LEVEL ISLAND 5 CORS ARP" (PID DJ3033).
- LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, IN US SURVEY FEET HOLDING "1349 5 2006" AS N 1,770,667.32; E 2,672,034.89 AND "DE-3 2001" AS N 1,753,633.79; E 2,681,681.77.
- VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW = 0.0), BASED ON THE NOAA/NOS TIDAL BENCHMARK LIST: "945 1349 THE SUMMIT, N.W. SUMMIT ISLAND, ALASKA" PUBLISHED 09/17/2008. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA-USCGS TIDAL BENCHMARK "945 1349 TIDAL 1" (PID B88628/VM18116) AS 18.12.
- VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID12B) ELEVATIONS HOLDING NOAA-USCGS TIDAL BENCHMARK "1349 5 2006" (PID BBF208/VM18120) AS 13.37.
- SOUNDINGS ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
- BATHYMETRY WAS COLLECTED MAY 2, 2018. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2022 MULTIBeam ECHOSOUNDER OPERATING AT 200KHZ. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITIONING AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER VS SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE SP5855 GPS RECEIVER SET AT CONTROL STATION "1349 5 2006." SURVEY DATA WAS COLLECTED USING GINSY 8.1 AND PROCESSED USING OIMERA 1.5.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING STATIC GNSS AND DIFFERENTIAL LEVELING EQUIPMENT AND TECHNIQUES.
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PROJECT CENTERLINE

CORNER#	NORTHING	EASTING
12	1,754,086.70	2,679,694.00
13	1,753,921.00	2,681,828.30
14	1,753,231.80	2,682,369.40
15	1,752,239.30	2,682,308.60
16	1,751,974.70	2,682,362.80

SURVEY CONTROL DATA

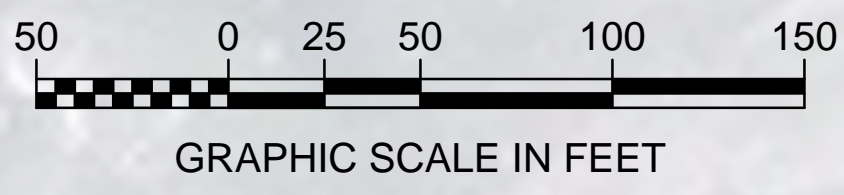
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1349 5 2006	1,770,667.32	2,672,034.89	16.61	NOAA/NOS BRASS CAP
D-1 1977	1,753,036.94	2,681,899.48	17.50	USACE SBC
D-2 1977	1,752,365.26	2,683,162.63	13.34	USACE SBC
DE-1 2001	1,754,921.58	2,681,006.61	21.06	USACE SBC
DE-3 2001	1,753,633.79	2,681,681.77	18.61	BRASS CAP
SPIKE	1,753,445.74	2,681,616.48	18.25	IRON SPIKE

VOLUME COMPUTATIONS

AREA A: 200' WIDE CHANNEL	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-5.0	208
AVAILABLE TO MAX PAY DEPTH (MP)	-6.0	1,289
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	40
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		1,329

NAVIGATION AIDS

USCG NO.	NORTHING	EASTING	DESCRIPTION
23306	1,753,730	2,681,812	DAY BEACON 15
23306.1	1,753,865	2,680,309	DAY BEACON 17



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN NSPS/THSOA CERTIFIED HYDROGRAPHER
 Gregory W. Gibson (317)

US Army Corps of Engineers - ALASKA DISTRICT

CONTRACT NO. W11H6144001919000
 CONTRACTOR: ETIMC, INC.
 CITY: WASILLA, ALASKA
 STATE: ALASKA
 APPROVED: MICHAEL E. MUELLER
 RECOMMENDED: THOMAS A. BLONN
 DATE: 02/02/2018

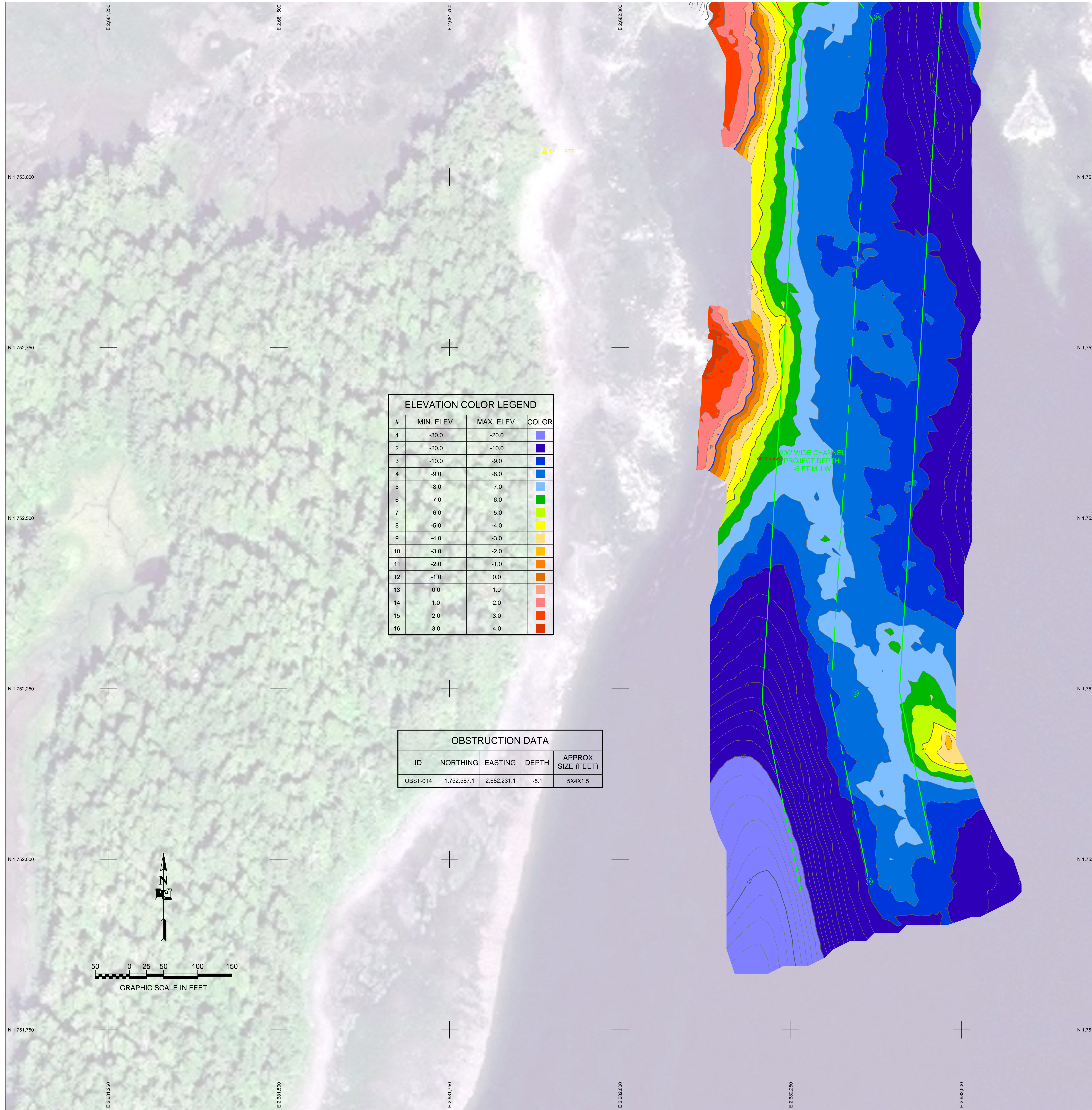
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 BY: [Signature]
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 SCALE: [Blank]
 DATE: [Blank]

DATE: 02/02/2018
 FILE NAME: 072762-18
 SIZE: 11" x 17"
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U.S. ARMY CORPS OF ENGINEERS
 ALASKA DISTRICT
 JBER, ALASKA 99506-0888
 617 S. Walk-Gordon Road, Ste 100 C
 Wasilla, AK 99654

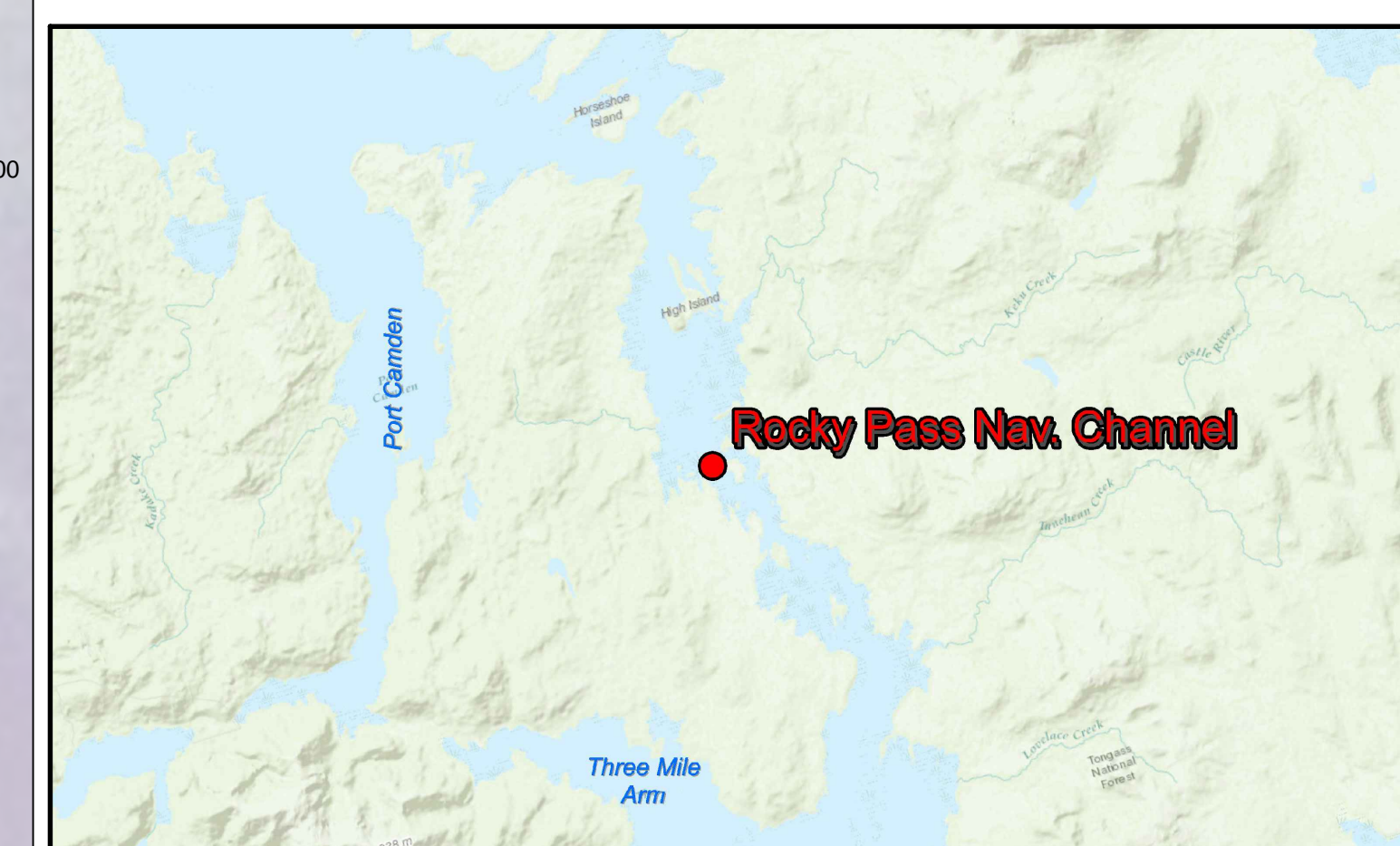
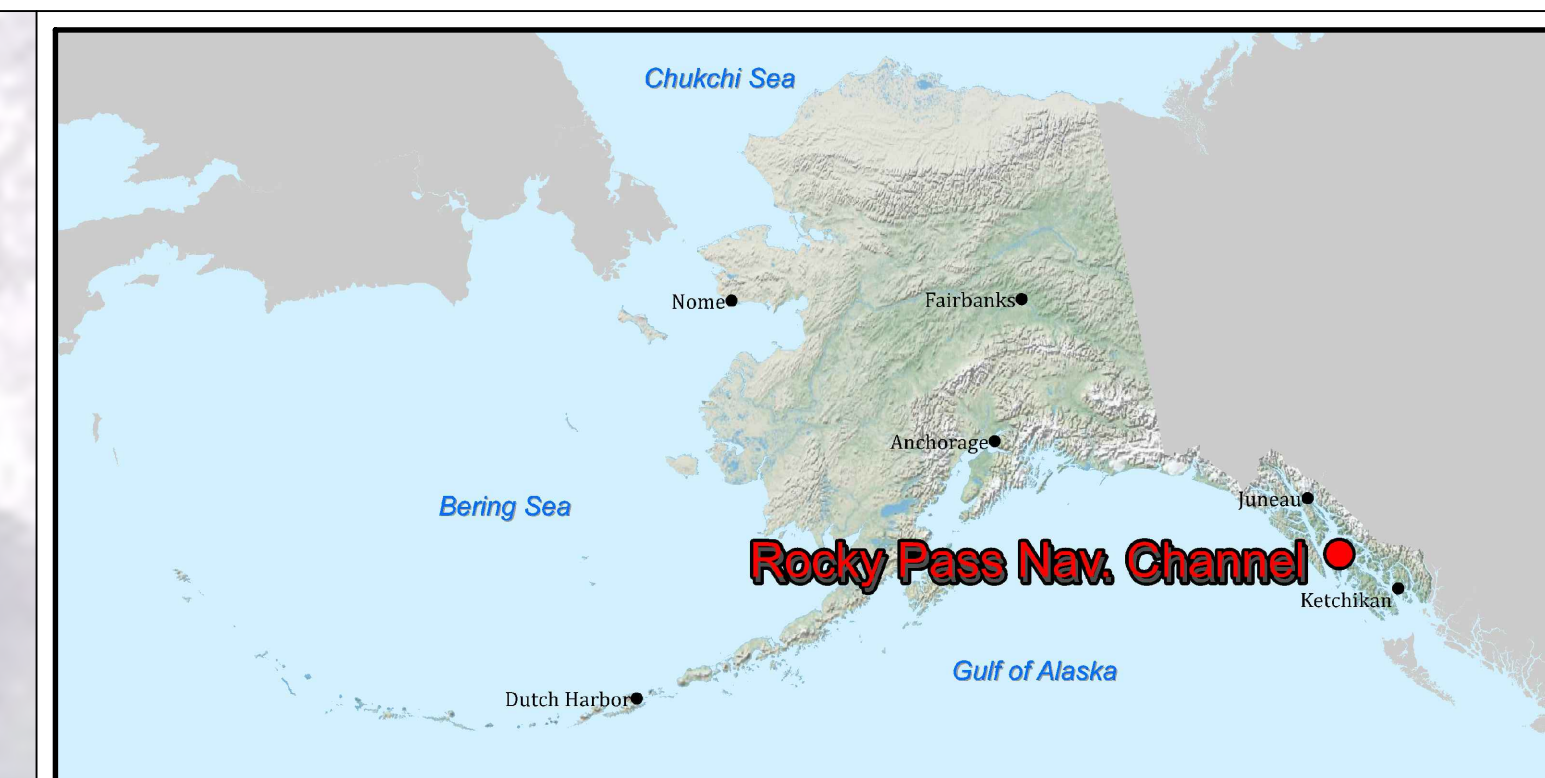
KEKU STRAIT, ALASKA
072762 - ROCKY PASS; DEVIL'S ELBOW
PROJECT CONDITION SURVEY
APRIL 30 - MAY 3, 2018

SHEET IDENTIFICATION
 1-ROC-92-07-04
 Sheet 6 of 7



ELEVATION COLOR LEGEND			
#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-30.0	-20.0	Light Blue
2	-20.0	-10.0	Dark Blue
3	-10.0	-9.0	Blue
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6	-7.0	-6.0	Green
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13	0.0	1.0	Light Red
14	1.0	2.0	Red
15	2.0	3.0	Dark Red
16	3.0	4.0	Dark Red

OBSTRUCTION DATA				
ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBST-014	1,752,587.1	2,682,231.1	-5.1	5X4X1.5



US Army Corps of Engineers - ALASKA DISTRICT
 CONTRACT NO. W11H6144-010190000
 CONTRACTOR: EITM, INC.
 CITY: WASILLA
 STATE: ALASKA
 APPROVED BY: THOMAS A. SLOAN
 RECOMMENDED BY: MICHAEL E. MUELLER
 DATE: 02/03/2018

NO.	DATE	DESCRIPTION	BY	APP'D	DATE

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- VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (GEOID12B) ELEVATIONS HOLDING NOAA-USCGS TIDAL BENCHMARK "1349 5 2006" (PID BFB208/VMH18120) AS 13.37.
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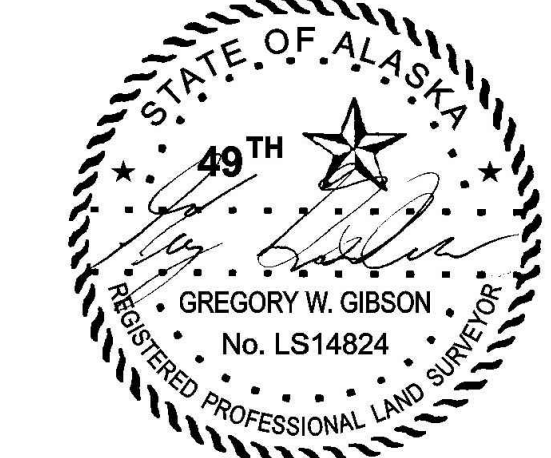
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THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN NSPS/THSOA CERTIFIED HYDROGRAPHER
 Gregory W. Gibson (317)

DATE: 04/30/2018
 DRAWN BY: JBER, ALASKA 99506-0898
 CHECKED BY: Thomas A. Sloan, Chief Estimator/Designer
 FILE NAME: 00202018
 SIZE: 11" x 17"
 U.S. ARMY CORPS OF ENGINEERS
 ALASKA DISTRICT
 617 S. Walk-Gordon Hwy, Road, Suite C
 Wasilla, AK, 99564

KEKU STRAIT, ALASKA
 072762 - ROCKY PASS; DEVIL'S ELBOW
 PROJECT CONDITION SURVEY
 APRIL 30 - MAY 3, 2018
 SHEET IDENTIFICATION
 1-ROC-92-07-04
 Sheet 7 of 7