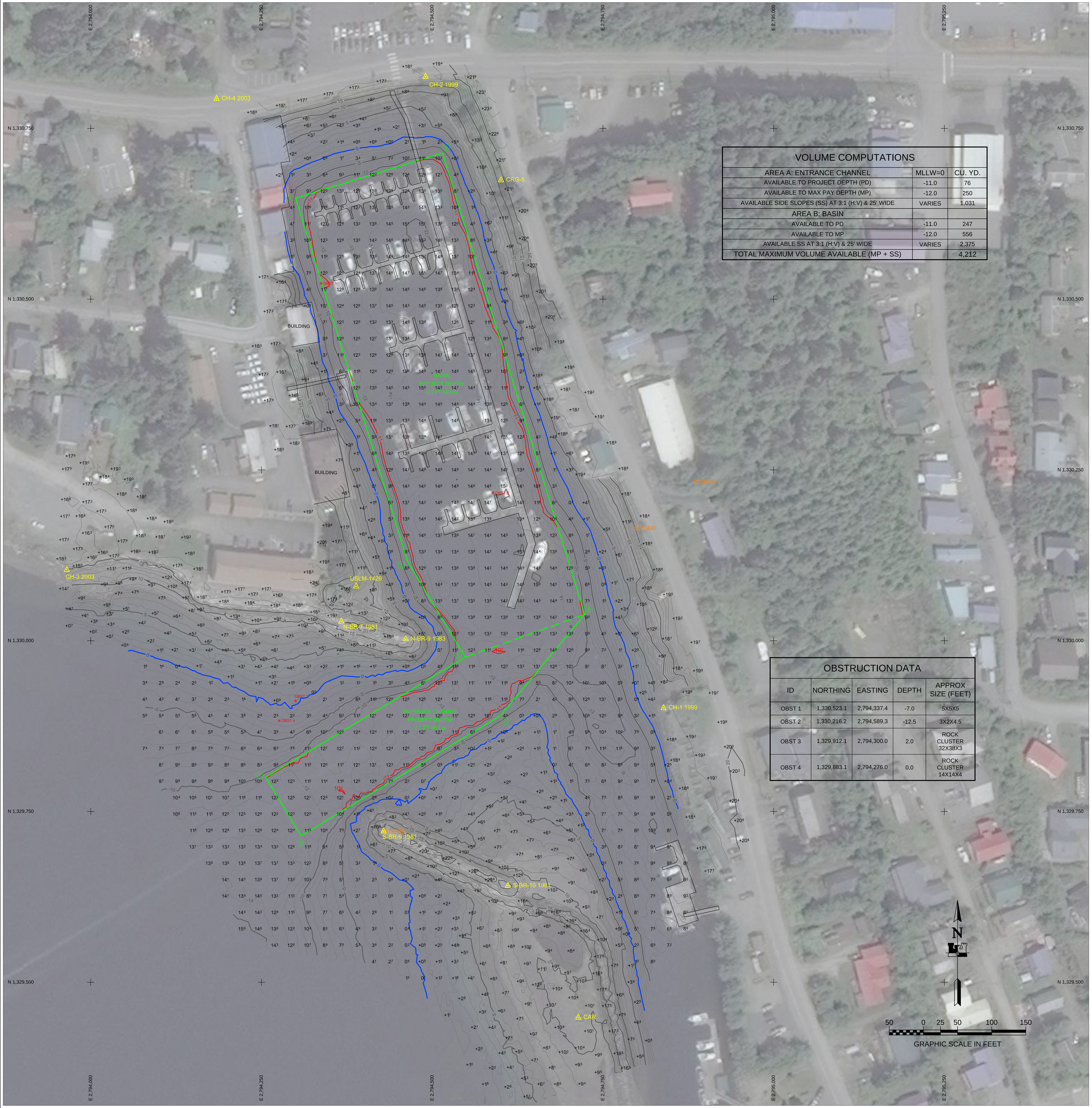
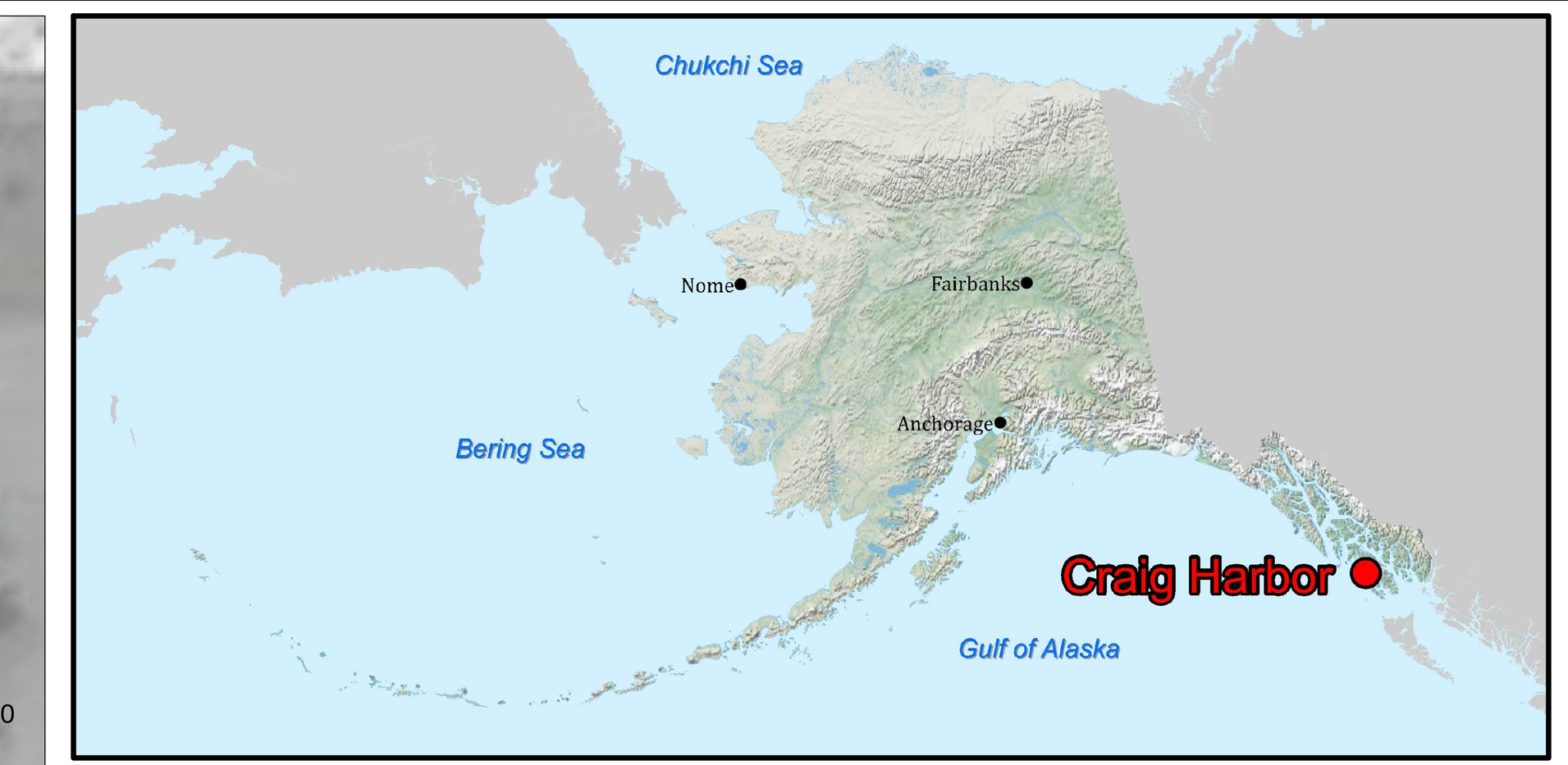




VOLUME COMPUTATIONS

AREA A: ENTRANCE CHANNEL	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-11.0	76
AVAILABLE TO MAX PAY DEPTH (MP)	-12.0	250
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	1,031
AREA B: BASIN		
AVAILABLE TO PD	-11.0	247
AVAILABLE TO MP	-12.0	556
AVAILABLE SS AT 3:1 (H:V) & 25' WIDE	VARIES	2,375
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		4,212

OBSTRUCTION DATA

ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBST 1	1,330,523.1	2,794,337.4	-7.0	5X5X5
OBST 2	1,330,216.2	2,794,589.3	-12.5	3X2X4.5
OBST 3	1,329,912.1	2,794,300.0	2.0	ROCK CLUSTER 32X38X3
OBST 4	1,329,883.1	2,794,276.0	0.0	ROCK CLUSTER 14X14X4

NOTES

1. 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 2011.00 EPOCH VALUES OF NGS CORS STATIONS: "JUNEAU WAAS 1 CORS ARP" (PID DF4367); "PORTALEXANAK2005 CORS ARP" (PID DL6695); "KLAWOCKAIRAK2006 CORS ARP" (PID DM7451).

   LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, IN US SURVEY FEET HOLDING "CH-1 1999" AS N 1,329,901.50', E 2,794,838.84' AND "945 0551 A" AS N 1,335,178.19', E 2,794,784.74'.

2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0 FT), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST "945 0551 CRAIG, KLAWOCK INLET, ALASKA", PUBLISHED 05/13/2008. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA/NOS TIDAL BENCH MARK "945 0551 A" (VM#18516) AS 16.19 FT.

3. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12B) ELEVATIONS HOLDING NOAA/USACE TIDAL BENCHMARK "945 0551 A " (PID BBFP37) AS 15.06 FT.

4. SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.

5. BATHYMETRY WAS COLLECTED MARCH 24-28, 2017. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2024 MULTIBEAM ECHOSOUNDER OPERATING AT 200 KHZ. 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 POS OCEANMASTER V5 SYSTEM. DATA WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING TECHINQUES.

6. TERRESTRIAL LASER SCANNING DATA COLLECTED MARCH 28, 2017. DATA WAS COLLECTED USING A RIEGL VZ400 LASER SCANNER AND RIEGL RISCAN PRO SOFTWARE.

7. THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.

8. MAP SOUNDINGS ARE BINNED AT 24 FEET AND ARE SHOAL BAISED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BAISED SOUNDINGS. VOLUME SOUNDINGS ARE BINNED AT 3 FEET AND ARE MEAN VALUE.

SURVEY CONTROL DATA

STATION	NORTHING	EASTING	MLLW	DESCRIPTION
0551 A 2007	1,335,178.19	2,794,784.74	16.19	3.5" DOMED NOS BC
CAR	1,329,448.33	2,794,714.09	12.34	3.5" DOMED USACE BC
CH-1 1999	1,329,901.50	2,794,838.84	18.48	3" DOMED SBC
CH-2 1999	1,330,825.88	2,794,490.37	18.52	3" UNMARKED DOMED BRASS CAP
CH-3 2003	1,330,103.67	2,793,965.14	14.67	3" DOMED SBC
CH-4 2003	1,330,793.31	2,794,184.34	18.2	3" UNMARKED DOMED BRASS CAP
CRG-5	1,330,674.26	2,794,600.86	17.24	3.5" DOMED USACE BC
N-BR-7 1981	1,330,028.22	2,794,366.97	20.14	3.5" DOMED USACE BC
N-BR-9 1983	1,330,002.18	2,794,461.18	20.12	3.5" DOMED USACE BC
S-BR-9 1981	1,329,721.04	2,794,428.89	20.67	3.5" DOMED USACE BC
S-BR-10 1981	1,329,641.14	2,794,610.91	20.93	3.5" DOMED USACE BC
USLM-1429	1,330,079.63	2,794,388.68	15.51	3.5" DOMED USACE BC

*Bench marks with elevation precision of 0.1' were measured by RTK GNSS.

NAVIGATION AIDS

USCG NO.	NORTHING	EASTING	DESCRIPTION
24485	1,329,722	2,794,432	BREAKWATER LIGHT 2 FI R 4S
24490	1,330,165	2,794,800	ENTRANCE RANGE FRONT DAYBEACON
24495	1,330,233	2,794,886	ENTRANCE RANGE REAR DAYBEACON

PROJECT LIMITS

CORNER#	NORTHING	EASTING
1	1,329,800.00	2,794,256.36
2	1,329,975.92	2,794,548.41
3	1,330,115.81	2,794,464.15
4	1,330,647.74	2,794,300.16

PROJECT LIMITS

CORNER#	NORTHING	EASTING
5	1,330,714.02	2,794,515.17
6	1,330,038.46	2,794,723.44
7	1,329,890.25	2,794,600.01
8	1,329,714.34	2,794,307.96

STATE OF ALASKA 49TH GREGORY W. GIBSON No. LS14824 REGISTERED PROFESSIONAL LAND SURVEYOR

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

David R. Neff C.H. (275)

US Army Corps of Engineers®
ALASKA DISTRICT

CONTRACT NO. W911KB-14-D-0013 / 0040
CONTRACTOR ETRAC INC.
CITY SAN RAFAEL STATE CALIFORNIA
Recommended: MICHAEL E. MUELLER PRIME CONTRACTOR
Approved: THOMAS A. SLOAN CHIEF GEOMATICS SECTION
Date: 05/12/2017

REVISION	DATE	DESCRIPTION	BY	APPVD

REVISION	DATE	DESCRIPTION	BY	APPVD

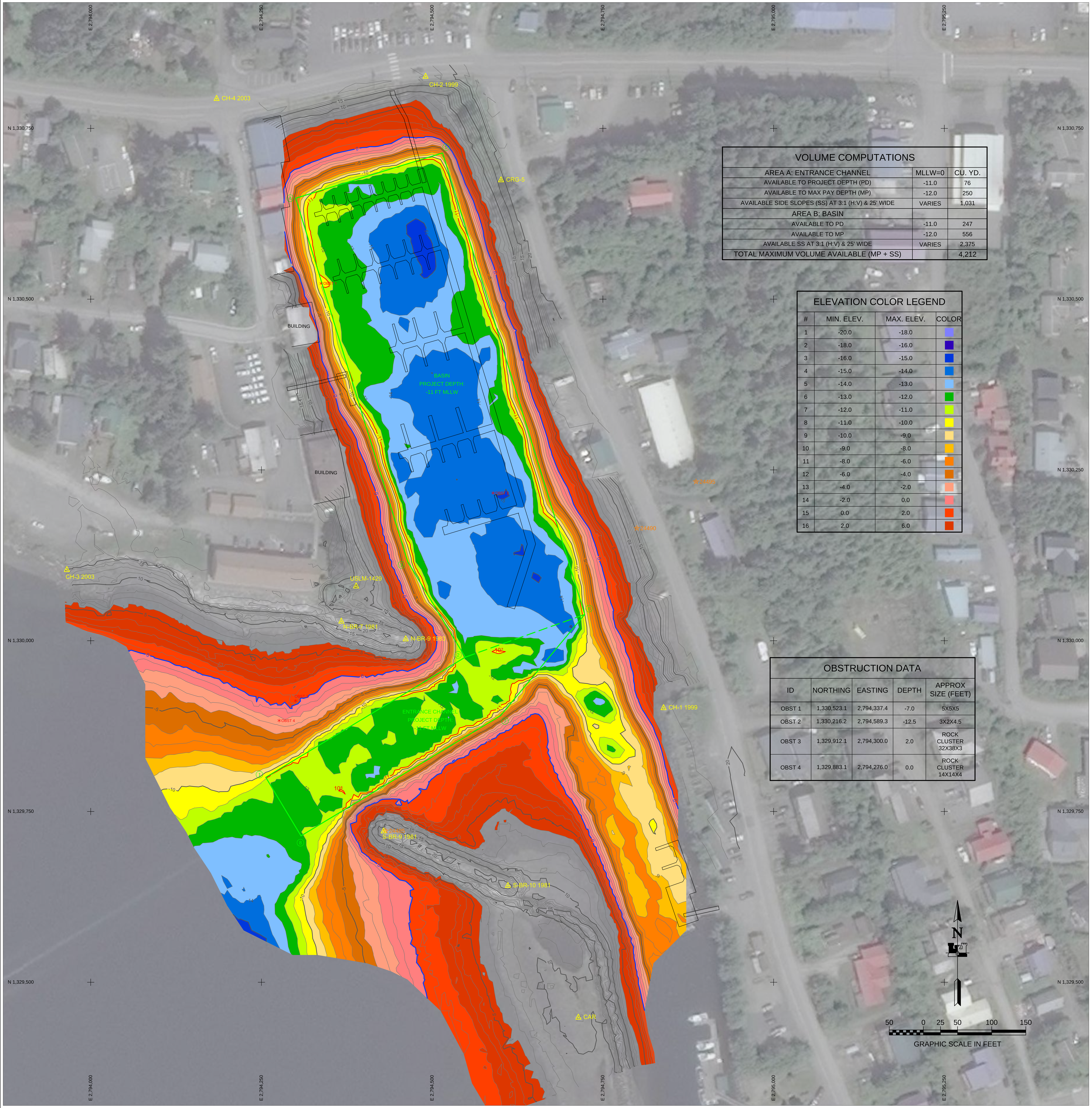
U.S. ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
P.O. BOX 6898
JBER, ALASKA 99506-0898

eTrac Inc.
617 S. Knik Goose-Bay Rd. Ste C.
Wasilla AK, 99654

SURVEYED BY: Gregory W. Gibson
DATE: 12 May 2017
DRAWN BY: RG
CHECKED BY: TAS/EHA/JBG/GWG
UPC: 087666
APPROVED BY: Thomas A. Sloan, Chief Geomatics Section
CONTRACT NO.: W911KB-14-D-0013 / 0040
SCALE: 1" = 50'
PLOT DATE: 05/12/2017
JOB NO.: 0717
SIZE: ANSI E
FILE NAME: 087666_VH01.DWG

CRAIG, ALASKA
CRAIG HARBOR
PROJECT CONDITION SURVEY
MARCH 24 - 28, 2017

SHEET IDENTIFICATION
1-CRA-92-07-12



VOLUME COMPUTATIONS

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AVAILABLE TO MAX PAY DEPTH (MP)	-12.0	250
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AVAILABLE TO MP	-12.0	556
AVAILABLE SS AT 3:1 (H:V) & 25' WIDE	VARIES	2,375
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		4,212

ELEVATION COLOR LEGEND

#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-20.0	-18.0	
2	-18.0	-16.0	
3	-16.0	-15.0	
4	-15.0	-14.0	
5	-14.0	-13.0	
6	-13.0	-12.0	
7	-12.0	-11.0	
8	-11.0	-10.0	
9	-10.0	-9.0	
10	-9.0	-8.0	
11	-8.0	-6.0	
12	-6.0	-4.0	
13	-4.0	-2.0	
14	-2.0	0.0	
15	0.0	2.0	
16	2.0	6.0	

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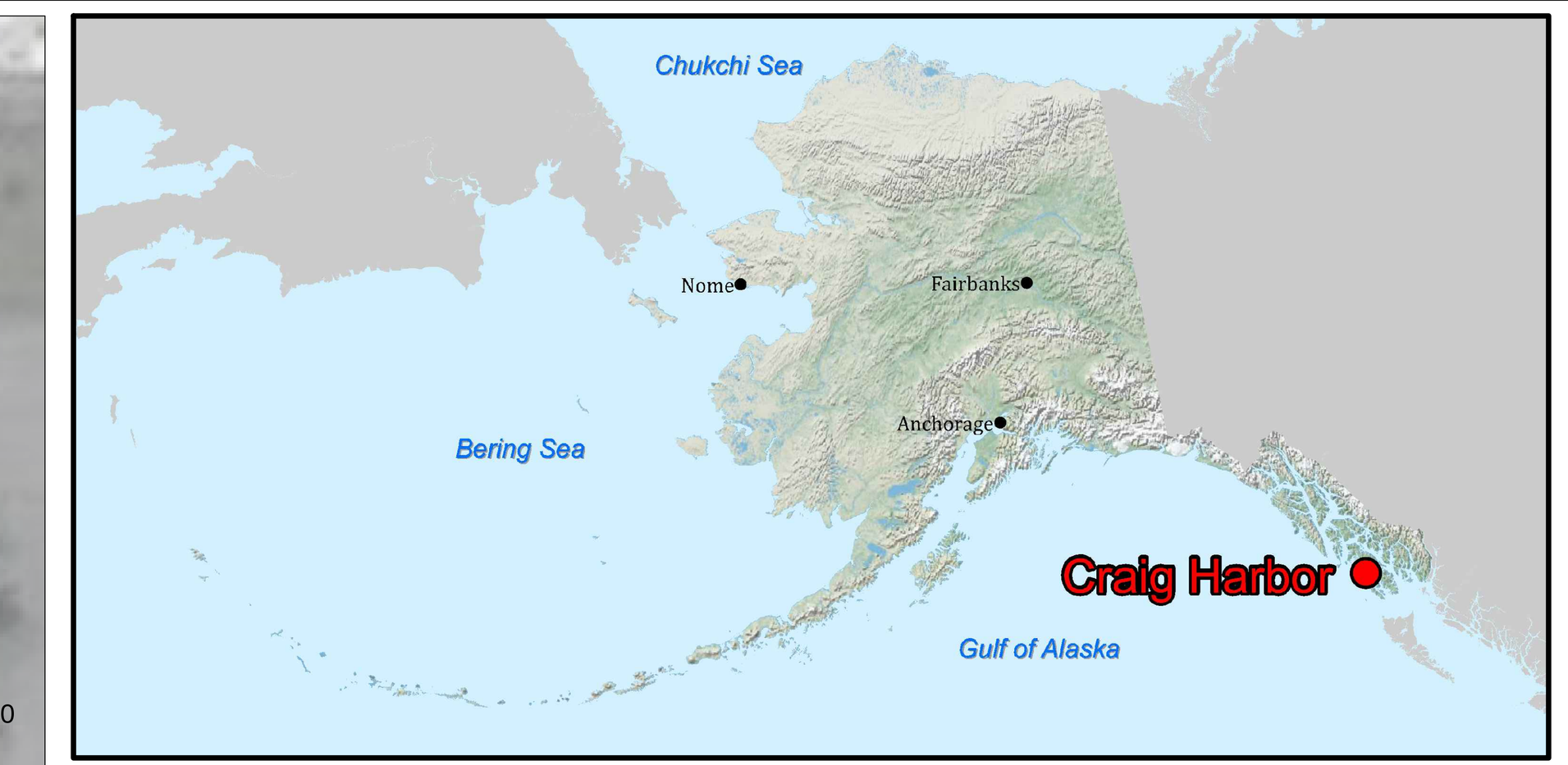

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David R. Neff C.H. (275)

US Army Corps of Engineers ®
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Recommended: MICHAEL E. MUELLER, PRIME CONTRACTOR
Approved: THOMAS A. SLOAN, CHIEF GEOMATICS SECTION
Date: 05/12/2017

REVISION	DATE	DESCRIPTION	BY	APPVD

SURVEYED BY: Gregory W. Gibson
DATE: 12 May 2017
DRAWN BY: RG
CHECKED BY: TAS/ENHJ/JBG/GWG
UPC: 087666
APPROVED BY: Thomas A. Sloan, Chief Geomatics Section
CONTRACT NO.: W911KB-14-D-0013 / 0040
SCALE: 1" = 50'
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SIZE: ANSI E
FILE NAME: 087666_VH01.DWG

U.S. ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
P.O. BOX 6898
JBER, ALASKA 99506-0898

eTrac Inc.
617 S. Knik-Goose Bay Rd. Ste C.
Wasilla AK, 99654

CRAIG, ALASKA
CRAIG HARBOR
PROJECT CONDITION SURVEY
MARCH 24 - 28, 2017

SHEET IDENTIFICATION
1-CRA-92-07-12