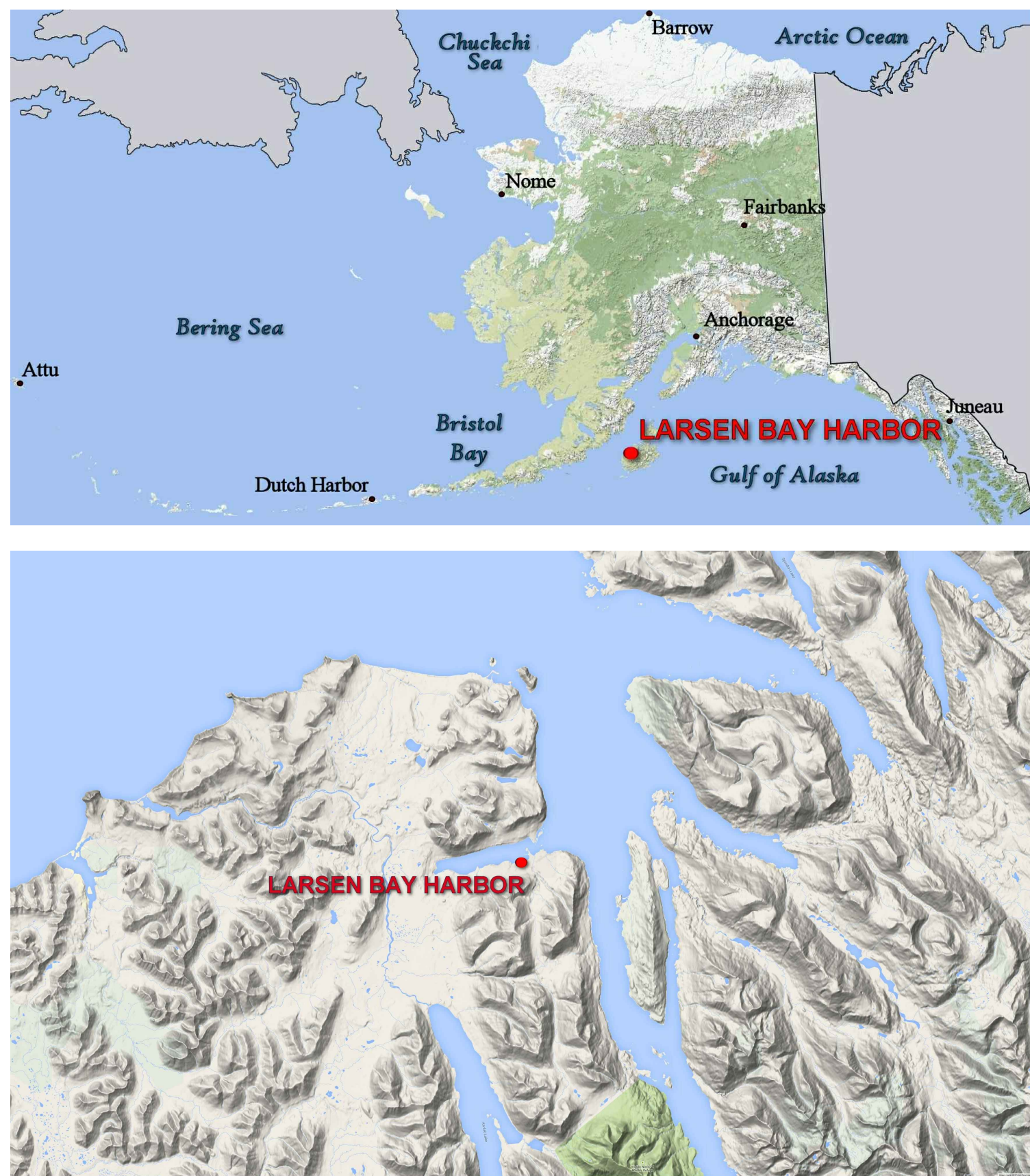


PROJECT LIMITS CURVE DATA			
CURVE	RADIUS	ARC LENGTH	DELTA ANGLE
C1	300.02'	122.38'	023°22'18.2"
C2	287.68'	75.77'	015°05'24.8"
C3	286.95'	131.03'	026°09'48.9"
C4	100.01'	157.08'	089°59'34.0"
C5	100.00'	157.08'	090°00'05.0"
C6	99.99'	73.32'	042°00'43.0"

VOLUME COMPUTATIONS		
AREA A: ENTRANCE CHANNEL		MLLW=0
AVAILABLE TO PROJECT DEPTH (PD)	-14.0	16
AVAILABLE TO MAX PAY DEPTH (MP)	-15.0	135
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	199
AREA B: MOORING BASIN (WESTERN)		
AVAILABLE TO PROJECT DEPTH (PD)	-14.0	163
AVAILABLE TO MAX PAY DEPTH (MP)	-15.0	620
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	668
AREA C: MOORING BASIN (EASTERN)		
AVAILABLE TO PROJECT DEPTH (PD)	-12.0	43
AVAILABLE TO MAX PAY DEPTH (MP)	-13.0	297
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	487
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		2,406



NOTES

- PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83 (COR596) IN U.S. SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE 2003 EPOCH VALUES OF OPUS DB DERIVED STATIONS "H-1 1985" (PID BBBL31) AS NORTHING 1,289,708.22; EASTING 1,639,996.34; "7724 D 2009" (PID BBBL07) AS NORTHING 1,293,105.33; EASTING 1,644,578.89.
- LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83, IN U.S. SURVEY FEET HOLDING DOMED NOAA/NOS BC 7724 D 2009 AS NORTHING 1,293,105.33; EASTING 1,644,578.89 AND AK DOT FLAT ALCAP "H-1 1985" AS NORTHING 1,289,708.22; EASTING 1,639,996.34.
- VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST 1945 7724, LARSEN BAY, KODIAK ISLAND, ALASKA PUBLISHED 5/19/2010. THIS TIDAL DATUM IS BASED ON THE 1985-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA/NOS TIDAL BENCH MARK 7724 D 2009 (VM#19453) AS 20.02'.
- VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12A) ELEVATIONS HOLDING NOAA/NOS TIDAL BENCHMARK 7724 D 2009 (PID BBBL07/VM#19453) AS 16.31'.
- SOUNDINGS ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
- BATHYMETRY WAS COLLECTED APRIL 10, 12-13, 2015. SOUNDINGS WERE COLLECTED USING AN RZSONIC 2022 MULTIBeam ECHOSOUNDER OPERATING AT 200 KHZ. SOUND VELOCITY THOUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV 320 V4 SYSTEM. DATA WAS COLLECTED AND PROCESSED USING QINSY 8.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC AND RTK GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING TECHNIQUES.
- THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
- MAP SOUNDINGS ARE BINNED AT 24 FEET AND ARE SHOAL-BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS. VOLUME SOUNDINGS ARE BINNED AT 3 FEET AND ARE MEAN VALUE SOUNDINGS.

SURVEY CONTROL DATA

STATION	NORTHING	EASTING	MLLW	DESCRIPTION
7724 C 1995	1,292,017.52	1,641,797.49	19.88	3-1/2" DOMED NOAA/NOS BC
7724 D 2009	1,293,105.33	1,644,578.89	20.02	3-1/2" DOMED NOAA/NOS BC
H-1 1985	1,289,708.22	1,639,996.34	26.16	2" FLAT STAMPED ALCAP
H-2 1985	1,290,360.25	1,639,253.91	21.84	2" FLAT STAMPED ALCAP
H-4 1985	1,290,410.97	1,638,909.55	21.58	2" FLAT STAMPED ALCAP
LB-01 2009	1,289,502.57	1,639,378.38	40.39	3-1/4" DOMED SBC
LB-02 2009	1,290,340.82	1,639,365.06	17.37	3-1/4" DOMED SBC
LB-03 2015	1,290,124.18	1,639,806.40	20.85	3-1/2" DOMED USACE BC
LB-04 2015	1,290,072.99	1,638,839.53	22.20	3-1/2" DOMED USACE BC
S31 MC AMC 1963	1,290,438.03	1,638,844.23	19.21	3-1/2" DOMED BLM BC

NAVIGATION AIDS

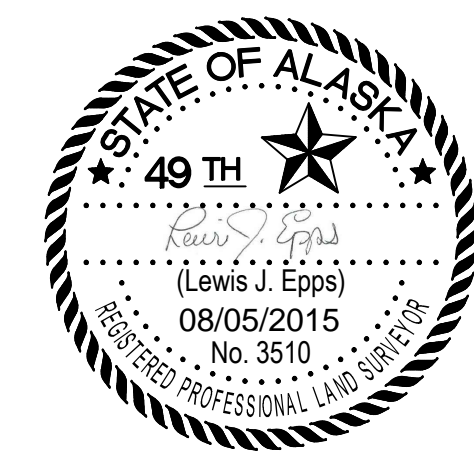
USCG NO.	NORTHING	EASTING	DESCRIPTION
26986	1,290,565	1,638,458	LARSEN BAY REEF BUOY 5
26988	1,290,070	1,638,840	LARSEN BAY HARBOR LIGHT 4

PROJECT LIMITS

CORNER#	NORTHING	EASTING
1	1,290,497.94	1,638,513.57
2	1,290,264.76	1,638,710.49
3	1,290,188.57	1,639,052.53
4	1,290,166.64	1,639,150.97
5	1,290,164.79	1,639,272.49
6	1,290,177.17	1,639,337.31
7	1,290,181.46	1,639,408.91
8	1,290,181.39	1,639,419.34
9	1,290,142.49	1,639,543.28
10	1,290,084.09	1,639,644.70

PROJECT LIMITS

CORNER#	NORTHING	EASTING
11	1,289,947.53	1,639,681.47
12	1,289,725.47	1,639,553.64
13	1,289,688.70	1,639,417.08
14	1,289,810.36	1,639,205.75
15	1,289,813.36	1,639,200.55
16	1,289,921.51	1,639,012.69
17	1,289,977.17	1,638,967.51
18	1,290,142.69	1,638,913.54
19	1,290,197.05	1,638,669.50
20	1,290,449.55	1,638,456.27



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

*David R. Neff*

David R. Neff C.H. (275)

US Army Corps of Engineers  
ALASKA DISTRICT

CONTRACT NO. W11H614-14-0011.0018

CONTRACTOR: ETIEME INC.

CITY: SAN RAFAEL STATE: CALIFORNIA

APPROVED: MICHAEL E. NEFFER

DATE: 08/05/2015

BY: JACOB

DESCRIPTION

DATE

BY

DATE

DESCRIPTION

DATE

BY

DATE

U.S. ARMY CORPS OF ENGINEERS  
ALASKA DISTRICT  
JBER, ALASKA 99505-0988

DESIGNED BY: Thomas R. Blain, Chief, Hydrographic Section

DRAWN BY: Thomas R. Blain, Chief, Hydrographic Section

CHECKED BY: Thomas R. Blain, Chief, Hydrographic Section

FILE NAME: 15-07

SIZE: 11" x 17"

SCALE: AS SHOWN

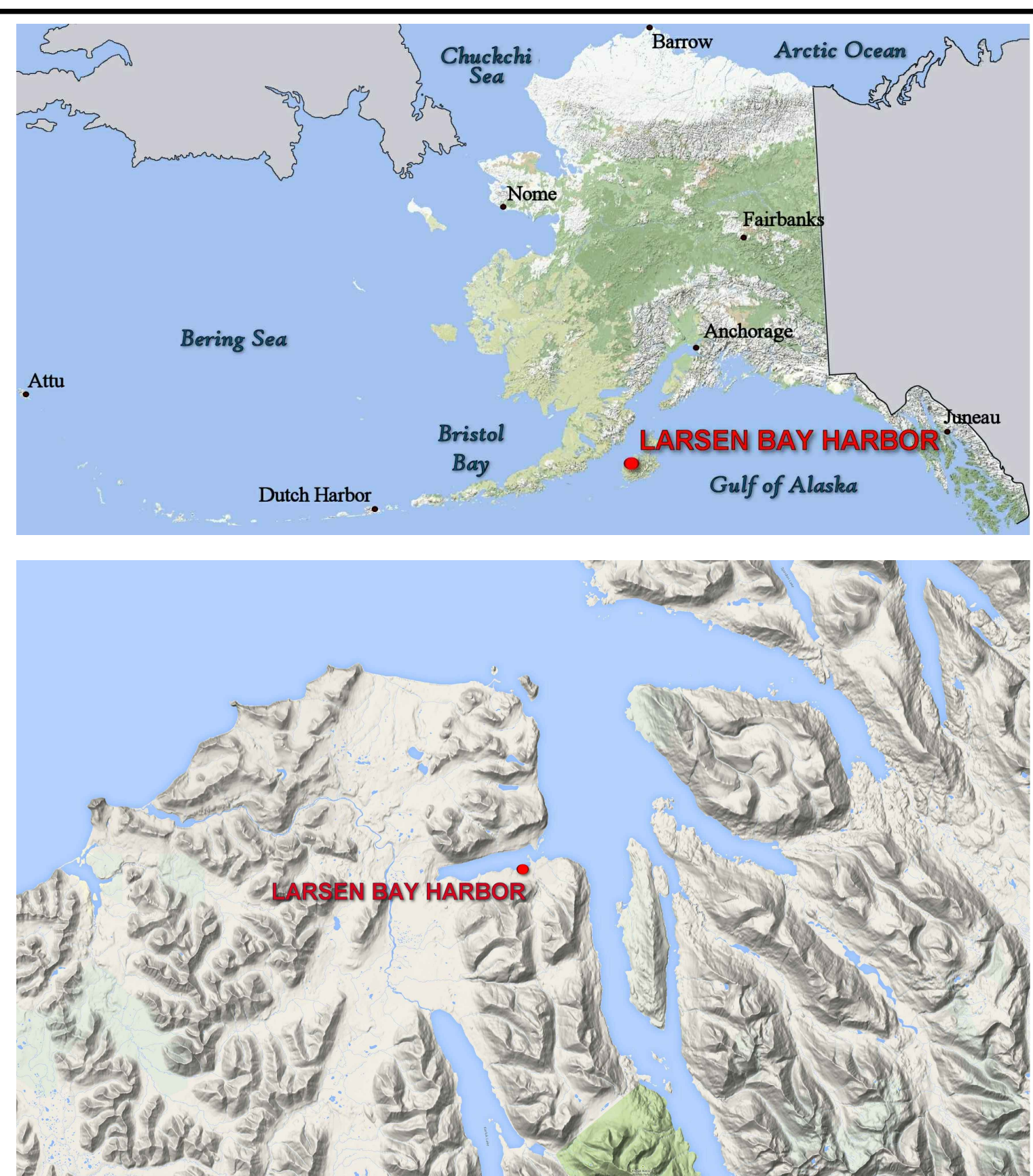
KODIAK, ALASKA  
LARSEN BAY HARBOR  
PROJECT CONDITION SURVEY  
APRIL 20-13, 2015

SHEET IDENTIFICATION

5-LAR-92-07-01

Sheet 1 of 2





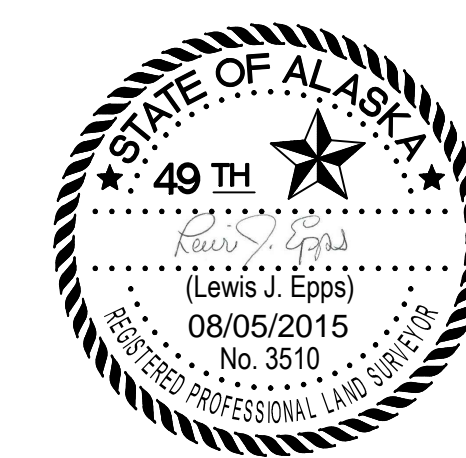
1. PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83 (CORS96) IN SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE 2003 EPOCH VALUES OF THE NORTH AMERICAN DATUM 1983 (NAD83) AT 11° 18' 00" N, 158° 00' 00" W, EASTING 1,630,996.34; 7724.0 2009" (PP BBL07) AS NORTHING 1,293,105.33; EASTING 1,644,578.89.
2. LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83, IN SURVEY FEET HOLDING DATED 1983 NORTHINGS 80: 7724.0 2009" AS NORTHING 1,293,105.33; EASTING 1,644,578.89 AND AK DOT FLAT MAP DATED 1988, 1:62,500, LASEKIN-KODIAK LAKES, EASTKOP, KODIAK BAY, ALASKA.
3. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0'), BASED ON NOAA'S TIDAL BENCH MARK "L124" 724.0 2009" LASEKIN-KODIAK LAKES, EASTKOP, KODIAK BAY, ALASKA. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA'S TIDAL BENCH MARK "7724.0 2009" (VMS119M545) AS 20.02'.
4. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 124) ELEVATIONS HOLDING NOAA'S TIDAL BENCHMARK "7724.0 2009" (VMS119M545) AS 16.31'.
5. SOUNDINGS ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
6. BATHYMETRY WAS COLLECTED APRIL 10-12, 2013. SOUNDINGS WERE COLLECTED USING AN RESONIC CHIRP SONAR SYSTEM. SOUNDINGS WERE COLLECTED AT 100 METERS ALTHOUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X-SOUND VELOCITY PROFILE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APLINK POSMV 320 V4 SYSTEM. DATA WAS COLLECTED AND PROCESSED USING APLINK 3.0 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC AND RTK GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING TECHNIQUES.
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USCG NO.	NORTHING	EASTING	DESCRIPTION
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9	1,290,142.49	1,639,543.28
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