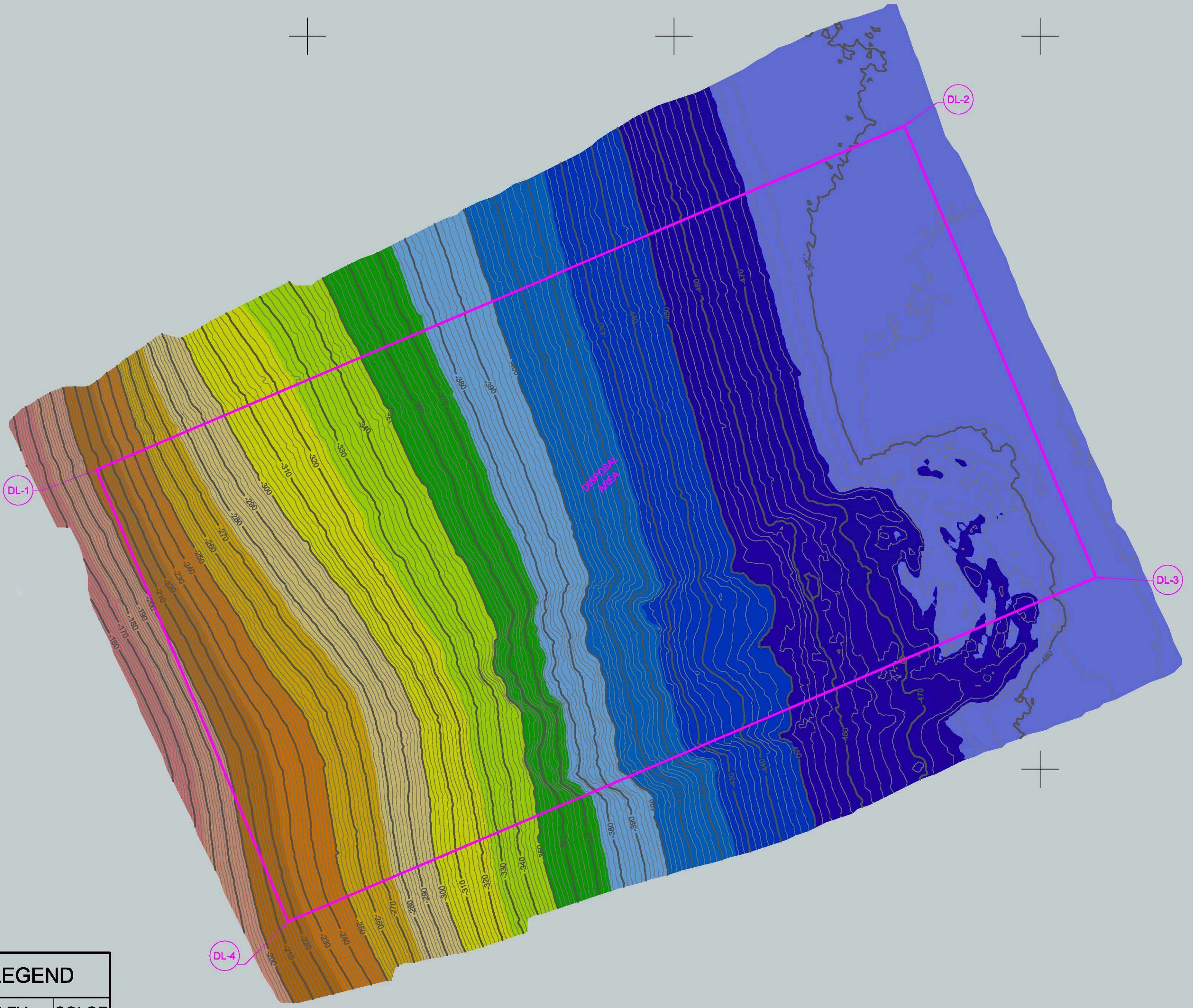
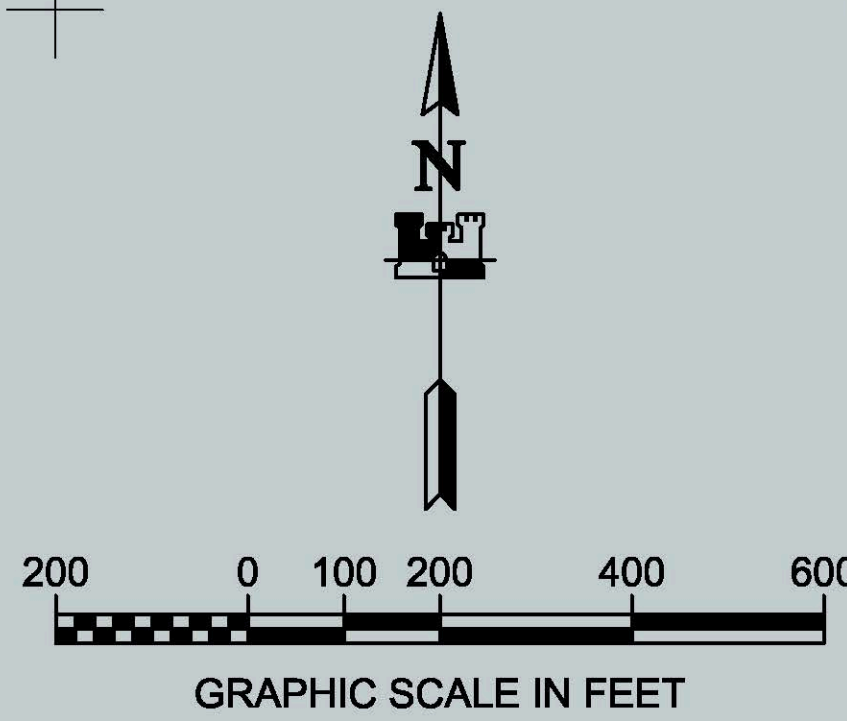


USCG NO.	NORTHING	EASTING	DESCRIPTION
23205	1,824,213	2,832,673	CHANNEL LIGHTED BUOY 62



#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-500.0	-475.0	
2	-475.0	-450.0	
3	-450.0	-425.0	
4	-425.0	-400.0	
5	-400.0	-375.0	
6	-375.0	-350.0	
7	-350.0	-325.0	
8	-325.0	-300.0	
9	-300.0	-275.0	
10	-275.0	-250.0	
11	-250.0	-225.0	
12	-225.0	-200.0	
13	-200.0	-175.0	
14	-175.0	-150.0	
15	-150.0	-125.0	
16	-125.0	-100.0	




1. PRIMARY HORIZONTAL CONTROL FOR THE PROJECT IS ALASKA STATE PLANE, ZONE 1, NAD83(CORS96) EPOCH 2000.0, IN US SURVEY FEET, BASED ON A STATIC GPS NETWORK HOLDING THE NGS EPS 2000.00 CORS AP 1700000 FOR "JUNEAU" WAS 1" NGS ID P7-4887, BIKINA ISLAND 1" NGS ID P1A5023) AND "LEVEL ISLAND 1" NGS ID P1A4303).
2. LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83(CORS96) EPOCH 2000.0, IN US SURVEY FEET HOLDING "N 101929" AS N 1,726,216.212 + 2,826,988.398 \* 1/371 2000.0 AS N 1,745,576.870 + 2,834,781.591 \* 1/346 C 0000" AS N 1,769,016.072 + 2,833,260.116 \* 1/344 C 0000" AS N 1,181,925.320 + 2,927,135.91"
3. FOR ALL AREAS VERTICAL CONTROL, IS REFERENCED TO MEAN LOWER LOW WATER (MLLW=0 FT).
4. AREA 1 AND DISPOSAL AREA: MLLW IS BASED ON THE NOAA'S TIDAL BENCHMARK SLIP "945 1434 TURN POINT, TIDE GAUGE" PUBLISHED ON JUNE 29, 2009 BASED ON THE 1984 TIDAL EPOCH, HOLDING NOAA'S TIDAL BENCH MARK "945 1434 TIDAL A" (VMF18106PDBBBBCE2) AS 27.14 FT.
5. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (EPOCH 128) ELEVATIONS HOLDING NOAA/TIDAL BENCH MARKS: "945 1434 TIDAL A" (VMF18106PDBBBBCE2) AS 23.83 FT, "945 1434 TIDAL B" (VMF18106PDBBBBCE2) AS 11.99 FT, "945 1434 TIDAL C" (VMF18106PDBBBBCE2) AS 13.79 FT, "945 1283 TIDAL A" (VMF17243) AS 13.76 FT, AND "945 1263 TIDAL A" (VMF17235PDBBBF21) AS 14.37 FT.
6. SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. BATHYMETRY WAS COLLECTED MAY 4 - MAY 10, 2016. SOUNDINGS WERE COLLECTED USING AN RS20NC 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 DETERMINED USING AN AML BASE X POSNAV OCEANMASTER SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE SP5865 GPS RECEIVER SET AT CONTROL STATION "N44 2000", "1346 C 2003", "1371 2003" AND "N 11925". A TIDAL DATA WAS COLLECTED USING QINSY 8.1 AND PROCESSED USING QIMERA 1.5.1, BATHYWARE. HORIZONTAL CONTROL WAS COLLECTED USING STATIC GNSS EQUIPMENT AND TECHNIQUES: VERTICAL CONTROL WAS OBTAINED USING DIFFERENTIAL LEVELING.
8. THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
9. MAP SOUNDINGS ARE BINNED AT 46 FEET AND ARE SHAL-BASED, CONTOURS ARE BINNED AT 12 FEET BINNED SHAL-BASED SOUNDINGS.

STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1434 A 2006	1,814,207.81	2,823,232.54	27.14	NOAA/NOS BENCHMARK SBC
NH-4 2000	1,818,325.29	2,827,135.91	25.21	BRASS DISK
WN-1A 1999	1,821,893.61	2,830,057.14	24.19	USACE DOMED BC

DISPOSAL AREA		
NAME	NORTHING	EASTING
DL-1	1,824,817.19	2,834,422.30
DL-2	1,825,755.19	2,836,629.30
DL-3	1,824,523.19	2,837,153.30
DL-4	1,823,584.19	2,834,946.30



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

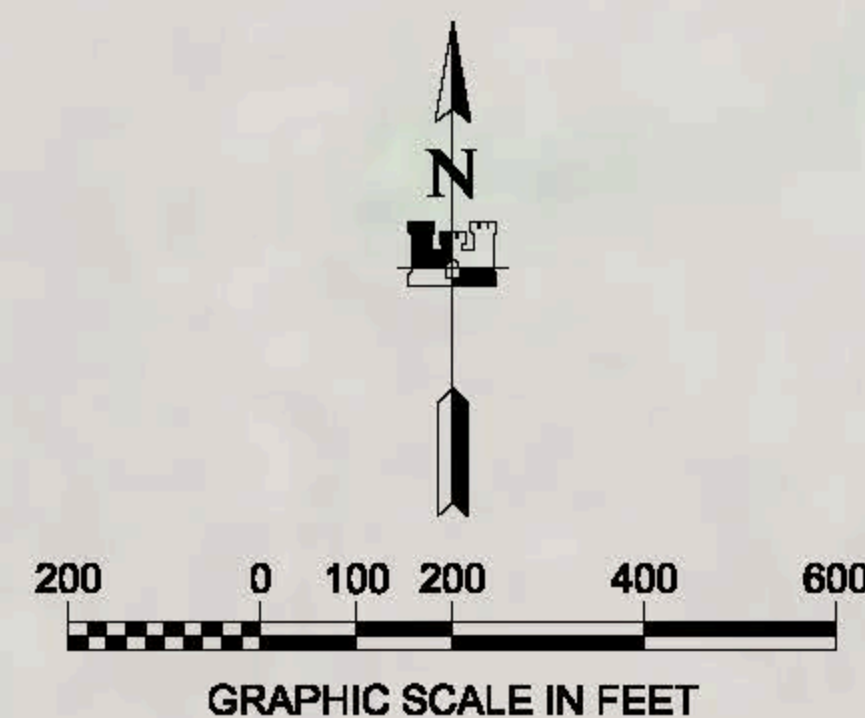


Greg Gibson C.H. (317)

[illegible]



VOLUME COMPUTATIONS: AREA 1		
AREA A	MLLW=0	C.U. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	5,584
AREA B		
AVAILABLE TO PROJECT DEPTH (PD)	-27.0	50,990
AREA C		
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	4,211



- [illegible]


SURVEY CONTROL DATA: AREA 1				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1434 A 2006	1,814,207.81	2,823,232.54	27.14	NOAA/INS BRANCHMARK SBC
NH-4 2000	1,816,325.29	2,827,136.91	25.21	BRASS DISK
WN-1A 1998	1,821,883.61	2,830,057.14	24.19	USACE DOME BC

PROJECT LIMITS AREA 1		
NAME	NORTHING	EASTING
CL-1	1,824,026.19	2,832,075.30
CL-2	1,816,481.11	2,824,180.54
CL-3	1,817,329.34	2,822,539.30
CL-4	1,816,354.00	2,822,109.73
CL-5	1,814,531.73	2,822,344.25
CL-6	1,807,398.66	2,823,262.24
CL-7	1,804,702.84	2,824,446.70
PL-1	1,823,903.44	2,832,161.52
PL-2	1,818,358.36	2,824,266.78
PL-3	1,817,733.13	2,823,376.59
PL-4	1,815,462.83	2,822,375.86

PROJECT LIMITS AREA 1		
NAME	NORTHING	EASTING
PL-5	1,814,550.88	2,822,493.02
PL-6	1,807,439.23	2,823,406.26
PL-7	1,804,763.18	2,824,564.03
PL-8	1,804,642.50	2,824,309.37
PL-9	1,807,358.08	2,823,116.22
PL-10	1,814,512.58	2,822,196.48
PL-11	1,816,619.48	2,821,924.33
PL-12	1,817,286.14	2,822,218.24
PL-13	1,818,903.86	2,824,094.32
PL-14	1,824,148.94	2,831,989.08



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

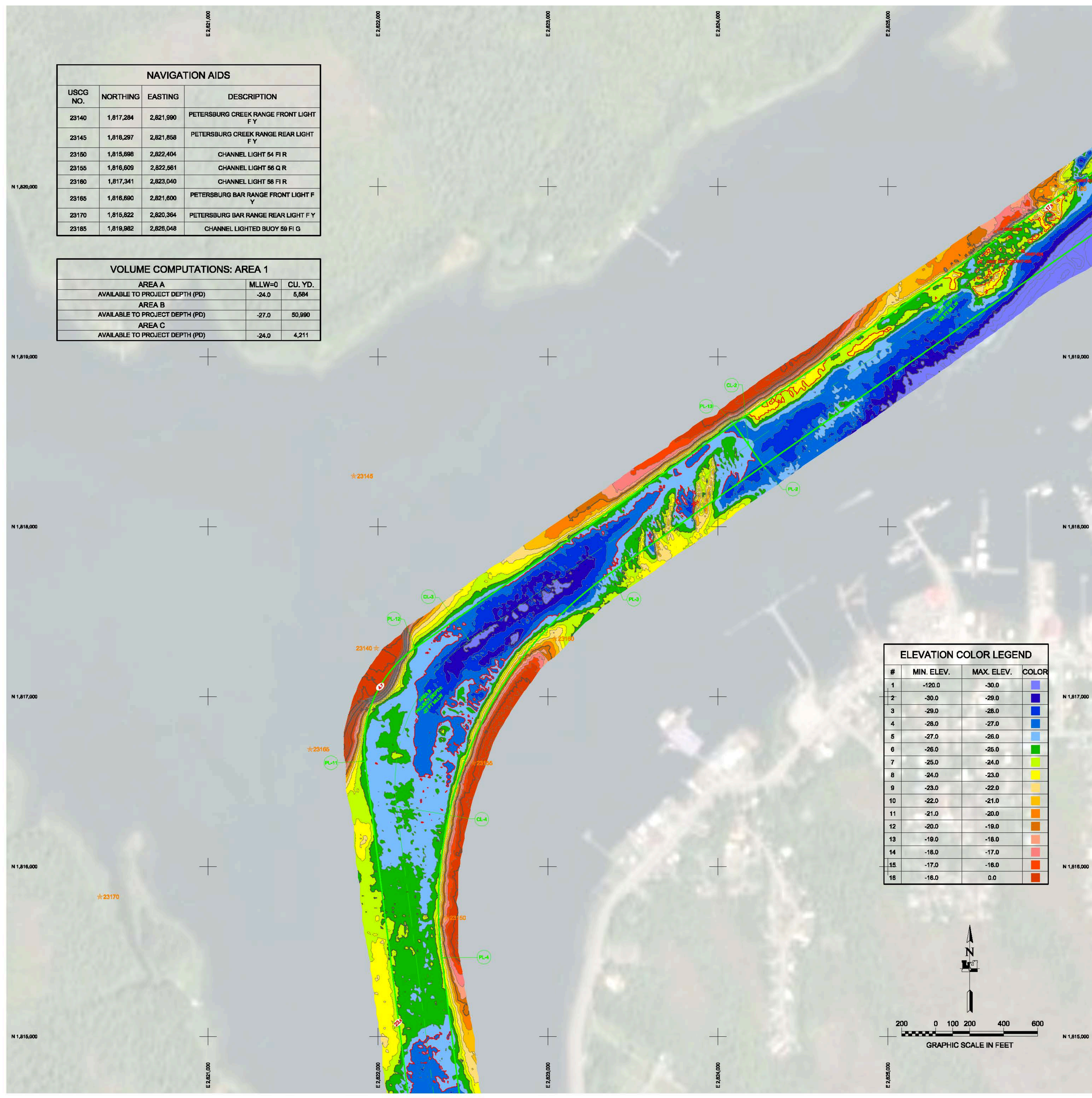


Greg Gibson C.H. (317)



NAVIGATION AIDS			
USCG NO.	NORTHING	EASTING	DESCRIPTION
23140	1,817,284	2,821,990	PETERSBURG CREEK RANGE FRONT LIGHT F Y
23145	1,818,297	2,821,858	PETERSBURG CREEK RANGE REAR LIGHT F Y
23150	1,815,898	2,822,404	CHANNEL LIGHT 54 FI R
23155	1,816,609	2,822,561	CHANNEL LIGHT 56 Q R
23160	1,817,341	2,823,040	CHANNEL LIGHT 58 FI R
23165	1,816,690	2,821,600	PETERSBURG BAR RANGE FRONT LIGHT F Y
23170	1,815,822	2,820,364	PETERSBURG BAR RANGE REAR LIGHT F Y
23185	1,819,982	2,826,048	CHANNEL LIGHTED BUOY 59 FI G

VOLUME COMPUTATIONS: AREA 1		
AREA A	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	5,584
AREA B		
AVAILABLE TO PROJECT DEPTH (PD)	-27.0	50,990
AREA C		
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	4,211



#### NOTES

1. PRIMARY HORIZONTAL CONTROL FOR THE PROJECT IS ALASKA STATE PLANE, ZONE 1, NAD83(CORR88) EPOCH 2003.00, IN US SURVEY FEET, BASED ON A STATIC GPS NETWORK HOLDING THE NOS EPOCH 2003.00 CORRS ARP VALUES FIXED FOR "JUNEAU WAAS 1" (NOS PID 0F4367), "BIORKA ISLAND 1" (NOS PID A0522) AND "LEVEL ISLAND 1" (NOS PID A4400).
2. LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83(CORR88) EPOCH 2003.00, IN US SURVEY FEET, HOLDING "NO 1 1927" AS N 1,726,219.22; E 2,858,698.37; "1317 C 2003" AS N 1,755,576.70; E 2,824,761.59; "1346 C 2003" AS N 1,768,819.08; E 2,833,280.18; AND "NH-4 2000" AS N 1,818,328.29; E 2,827,136.91.
3. FOR ALL AREAS VERTICAL CONTROL IS REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0 FT).
4. AREA 1 AND DISPOSAL AREA: MLLW IS BASED ON THE NOAA'S TIDAL BENCHMARK LIST "945 1434 TURN POINT, ALASKA" PUBLISHED 06 JUNE 2009 BASED ON THE 1983-2001 TIDAL EPOCH, HOLDING NOAA'S TIDAL BENCH MARK "945 1434 TIDAL A" (VMM18106/PIDB8B0C2) AS 27.14 FT.
5. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (GEOID 128) ELEVATIONS HOLDING NOAA'S TIDAL BENCHMARKS: "945 1434 TIDAL A" (VMM18106/PIDB8B0C2) AS 23.39 FT, "945 1346 C" (VMM17255/PIDB8BZ17) AS 11.99 FT, "945 1317 C" (VMM17246/PIDB8B0C9) AS 13.76 FT, "945 1287 A" (VMM17243) AS 13.78 FT, AND "945 1283 TIDAL 1" (VMM17235/PIDB8BZ1) AS 14.37 FT.
6. SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. BATHYMETRY WAS COLLECTED MAY 4 - MAY 10, 2018. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2022 MULTIBEAM ECHOSOUNDER OPERATING AT 200KHZ. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML 5463 X SOUND VELOCITY PROBE. PORTIONING AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER VS SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE R SP8860 GPS RECEIVER SET AT CONTROL STATION "NH-4 2000" "1346 C 2003" "1317 C 2003" AND "NO 1 1927". SURVEY DATA WAS COLLECTED USING QINSY 8.1.1 AND PROCESSED USING QINSY 8.1.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING.
8. THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
9. MAP SOUNDINGS ARE BINNED AT 48 FEET AND ARE SHOAL BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS.

#### SURVEY CONTROL DATA: AREA 1

STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1434 A 2006	1,814,207.81	2,823,232.54	27.14	NOAA'S BENCHMARK SBC
NH-4 2000	1,818,325.29	2,827,135.91	25.21	BRASS DISK
WN-1A 1999	1,821,893.61	2,830,057.14	24.19	USACE DOMED BC

#### PROJECT LIMITS AREA 1

NAME	NORTHING	EASTING
CL-1	1,824,026.19	2,832,075.30
CL-2	1,818,481.11	2,824,180.54
CL-3	1,817,328.34	2,822,539.30
CL-4	1,816,354.00	2,822,109.73
CL-5	1,814,531.73	2,822,344.25
CL-6	1,807,398.66	2,823,262.24
CL-7	1,804,702.84	2,824,446.70
PL-1	1,823,903.44	2,832,161.52
PL-2	1,818,358.36	2,824,266.76
PL-3	1,817,733.13	2,823,376.59
PL-4	1,815,462.83	2,822,375.68

#### PROJECT LIMITS AREA 1

NAME	NORTHING	EASTING
PL-5	1,814,550.88	2,822,493.02
PL-6	1,807,439.23	2,823,408.26
PL-7	1,804,763.18	2,824,584.03
PL-8	1,804,642.50	2,824,309.37
PL-9	1,807,358.08	2,823,116.22
PL-10	1,814,512.68	2,822,195.48
PL-11	1,816,619.48	2,821,924.33
PL-12	1,817,286.14	2,822,218.24
PL-13	1,818,603.86	2,824,064.32
PL-14	1,824,148.94	2,831,969.08

ELEVATION COLOR LEGEND			
#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-120.0	-30.0	Blue
2	-30.0	-29.0	Blue
3	-29.0	-28.0	Blue
4	-28.0	-27.0	Blue
5	-27.0	-26.0	Blue
6	-26.0	-25.0	Blue
7	-25.0	-24.0	Blue
8	-24.0	-23.0	Blue
9	-23.0	-22.0	Blue
10	-22.0	-21.0	Blue
11	-21.0	-20.0	Blue
12	-20.0	-19.0	Blue
13	-19.0	-18.0	Blue
14	-18.0	-17.0	Blue
15	-17.0	-16.0	Blue
16	-16.0	0.0	Blue

US Army Corps of Engineers  
of Engineers •  
ALASKA DISTRICT

CONTRACT NO. W72852-07-0000

CONTRACTOR ETAC INC.

CITY WASILLA

APPROVED FOR CONSTRUCTION

DATE 05/10/2018

BY [Signature]

DATE 24 June 2018

DESIGNED BY [Signature]

APPROVED BY [Signature]

SCALE 1"=200'

FILE NAME 072852-07-0000

ART 11 072852-07-0000

U.S. ARMY CORPS OF ENGINEERS  
ALASKA DISTRICT  
P.O. BOX 6888  
JBER, ALASKA 99506-0688

eTAC Inc.  
617 S. Kook-Groar Bay Rd. Suite C  
Wasilla, AK 99684

PETERSBURG, ALASKA

072852 - WRANGELL NARROWS

PROJECT CONDITION SURVEY

MAY 04 - MAY 10, 2018

SHEET IDENTIFICATION

1-WRA-92-07-54

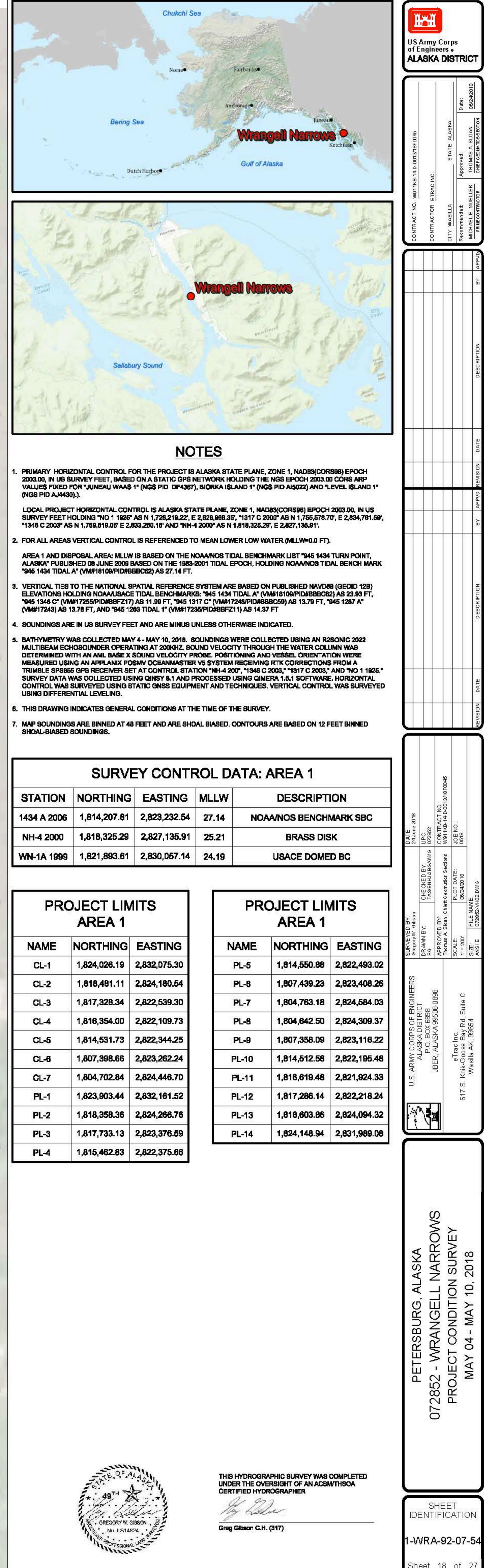
Sheet 17 of 27



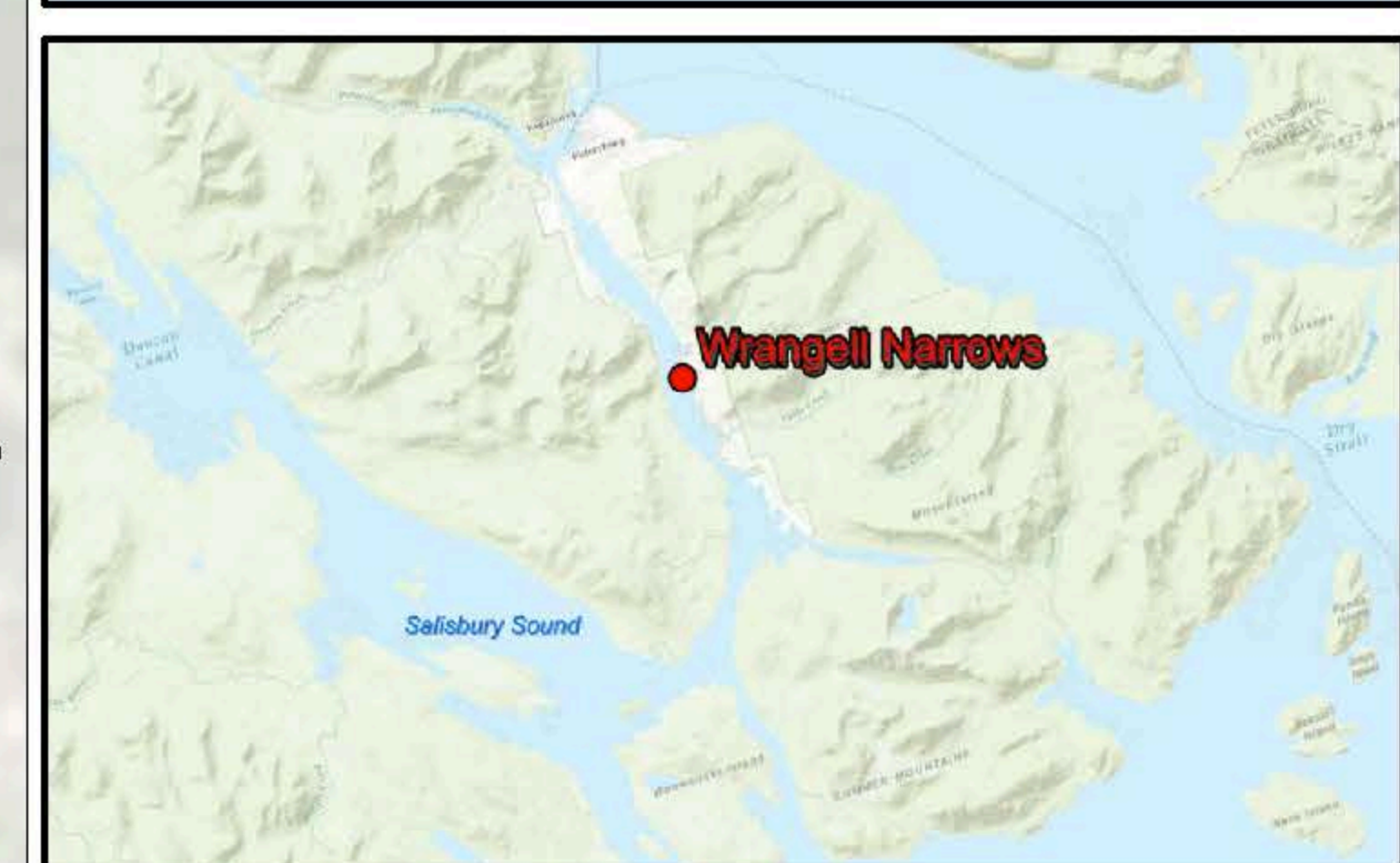
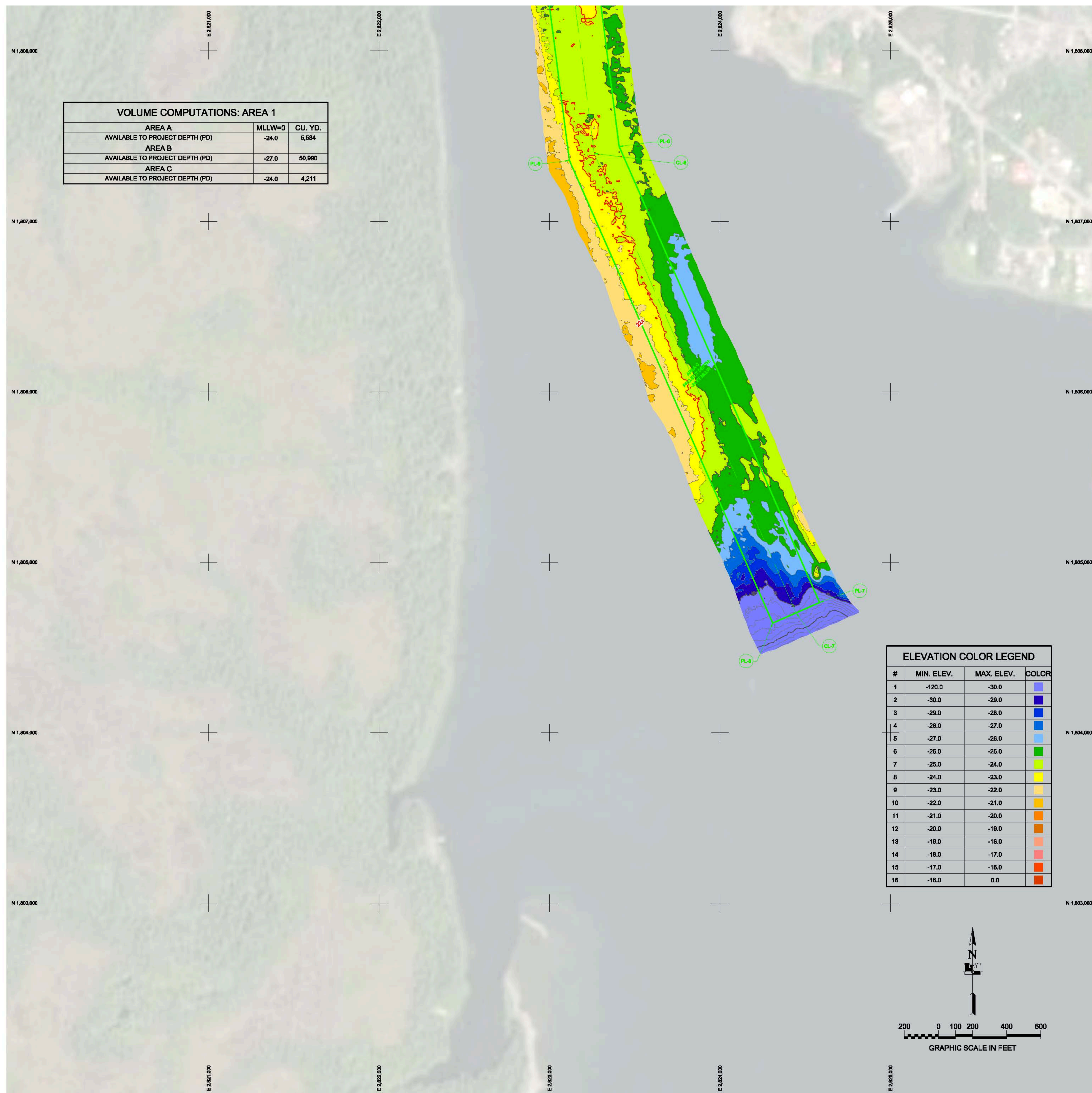
THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN ACREDITED CERTIFIED HYDROGRAPHER

Greg Gibson C.H. (317)









## NOTES

- [illegible]

**SURVEY CONTROL DATA: AREA 1**


STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1434 A 2006	1,814,207.81	2,823,232.54	27.14	NOAA/NOS BENCHMARK SBC
NH-4 2000	1,818,325.29	2,827,135.91	25.21	BRASS DISK
WN-1A 1998	1,821,893.61	2,830,057.14	24.19	USACE DOMED BC

PROJECT LIMITS  
AREA 1

	NAME	NORTHING	EASTING
	CL-1	1,824,026.19	2,832,075.30
	CL-2	1,818,481.11	2,824,180.54
	CL-3	1,817,328.34	2,822,539.30
	CL-4	1,816,354.00	2,822,109.73
	CL-5	1,814,531.73	2,822,344.28
	CL-6	1,807,398.66	2,823,262.24
	CL-7	1,804,702.84	2,824,446.70
	PL-1	1,823,903.44	2,832,161.52
	PL-2	1,818,359.36	2,824,266.78
	PL-3	1,817,733.13	2,823,378.55
	PL-4	1,815,462.83	2,822,375.66

PROJECT LIMITS  
AREA 1

NAME	NORTHING	EASTING
PL-5	1,814,550.88	2,822,493.02
PL-6	1,807,439.23	2,823,408.26
PL-7	1,804,763.18	2,824,584.03
PL-8	1,804,642.50	2,824,309.37
PL-9	1,807,358.09	2,823,116.22
PL-10	1,814,512.58	2,822,196.48
PL-11	1,816,619.46	2,821,924.33
PL-12	1,817,286.14	2,822,218.24
PL-13	1,818,803.86	2,824,084.32
PL-14	1,824,143.94	2,831,989.08




**US Army Corps  
of Engineers**

**ALASKA DISTRICT**

CONTRACT NO. <u>W912HB-144-00131F67-0-06</u>  CONTRACTOR <u>ETRIC INC.</u>	CITY <u>WASILLA</u> STATE <u>ALASKA</u>	Date: <u>06/04/2015</u>  Approved: <u>THOMAS A. SLOAN</u>  Recommended: <u>MICHAEL E. MUELLER</u>
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[illegible]

 U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT P.O. BOX 6880 JBER, ALASKA 99506-0880	SERIALIZED BY: JACOBSON, J. G. 03/27/2018 INDEXED BY: JACOBSON, J. G. 03/27/2018 REASON: TALENSHUS (WV) 07/26/22		DATE: 03/27/2018
	APPROVED BY: JACOBSON, J. G. 03/27/2018 SPECIAL AGENT IN CHARGE: JACOBSON, J. G. 03/27/2018		CONTRACT NO.: 15-0037070040 CASE NO.: 15-0037070040 FILE NO.: 15-0037070040 FILE NAME: 15-0037070040
SIZ.: 11x17 SIZ.: 11x17 SIZ.: 11x17		FILE NAME: 15-0037070040	

PETERSBURG, ALASKA  
072852 - WRANGELL NARROWS  
PROJECT CONDITION SURVEY  
MAY 04 - MAY 10, 2018


SHEET  
IDENTIFICATION

1-WRA-92-07-5

Sheet 19 of 27

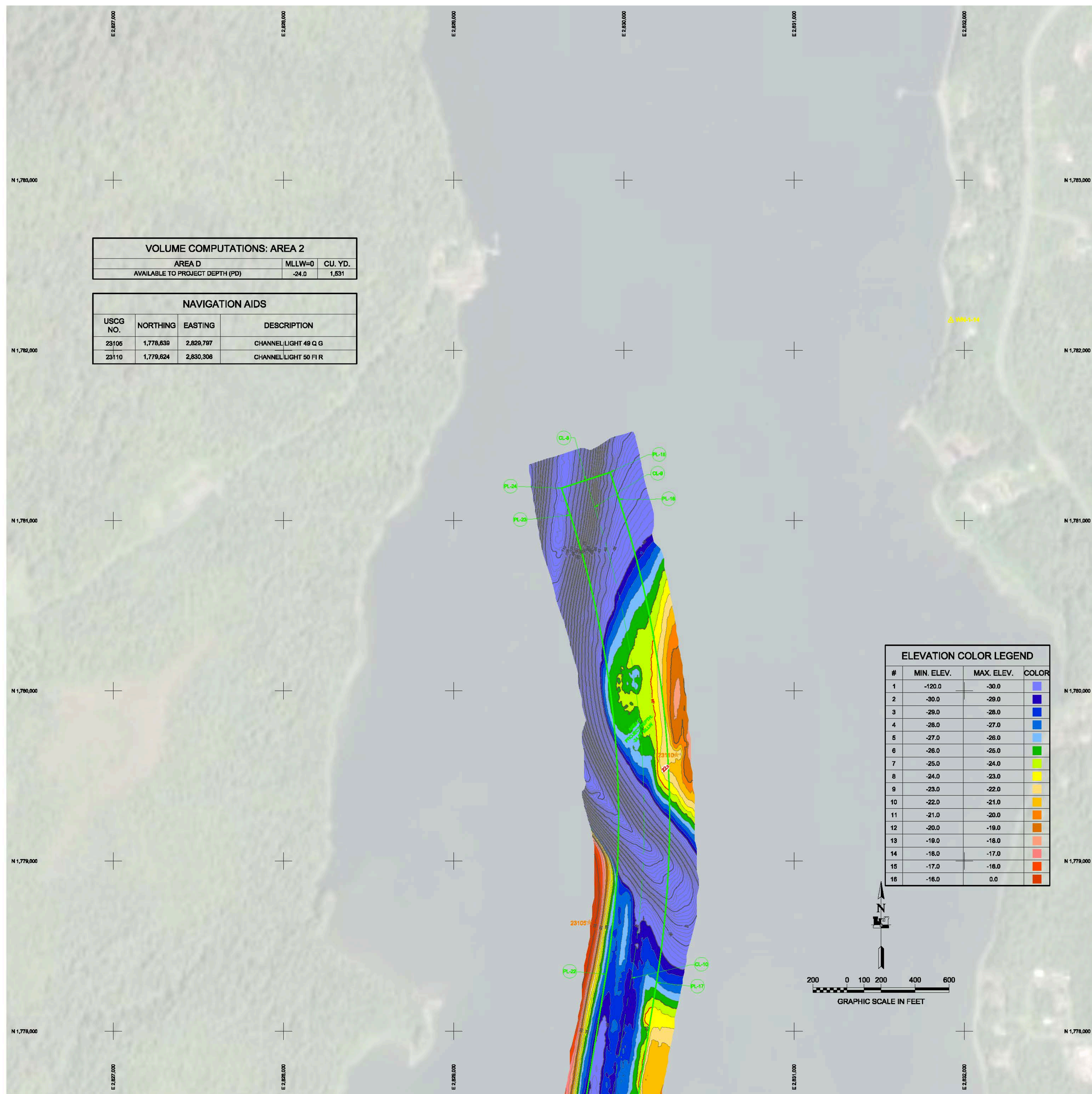


THIS HYDROGRAPHIC SURVEY WAS COMPLETED  
UNDER THE OVERSIGHT OF AN ACSM/THSOA  
CERTIFIED HYDROGRAPHER



Greg Gibson C.H. (317)





## NOTES

1. PRIMARY HORIZONTAL CONTROL FOR THE PROJECT IS ALASKA STATE PLANE, ZONE 1, NAD83(CORS89) EPOCH 2003.00, IN US SURVEY FEET, BASED ON A STATIC GPS NETWORK HOLDING THE NGSB EPOCH 2003.00 CORS ARP VALLADARIS POINT "JUNEAU WAAS 1" (NGS ID #F4307), BICKRA ISLAND 1 (NGS ID #A5522) AND LEVEL ISLAND 1 (NGS ID #A4430).
2. LOCAL PEG POINT HORIZONTAL CONTROL FOR ALASKA STATE PLANE, ZONE 1, NAD83(CORS89) EPOCH 2003.00, IN US SURVEY FEET, BASED ON THE 1988-2001 TIDAL BENCHMARK SET, 2.628,989.35", 1.517,2 C2000" AS 1,755,757.07", 2,243,784.71", 1546 C2007" AS 1,759,819.05", 1,269,255.10" AND 7014 C2000" AS 1,816,232.92", 2,287,135.91".
3. FOR ALL AREAS VERTICAL CONTROL IS REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0) FT.
4. AREA 2: MLLW IS BASED ON THE NOAA/NTS TIDAL BENCHMARK SLT# 1346 PAPER'S LANDING, WRANGELL, NARROWS, ALASKA PUBLISHED 13 NOVEMBER 2000 BASED ON THE 1983-2001 TIDAL CONTROL, HOLDING NOAA/NTS TIDAL BENCHMARK SET, 1,041,672.64 C2000" AS 1,041,672.64".
5. VERTICAL TIE5 TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NOAA/NTS (GEOD 129) ELEVATIONS HOLDING NOAA/NTS TIDAL BENCHMARKS: "453 1434 TIDAL" (VNM18106)PUBLISHED AS 23.93 FT, "456 1346 C" (VNM17255)PUBLISHED AS 11.59 FT, "456 1317 C" (VNM17246)PUBLISHED AS 13.79 FT, "456 1282 A" (VNM1744) AS 12.78 FT, AND "1546 1283 TIDAL" (VNM17246)PUBLISHED AS 14.37 FT.
6. SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. BATHYMETRY WAS COLLECTED MAY 4 - MAY 16, 2018. SOUNDINGS WERE COLLECTED USING AN RSBN202 MULTI-BEAM SONAR SYSTEM COLLECTED AT 200KHZ 870 KHZ 16.7 FT. DEPTH THROUGH THE WATER COLUMN WAS DETERMINED WITH AN IMU BASE Z SOUNDING VOLUME PROBE. POSITIONING AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV OCEANMASTER VS SYSTEM RECEIVING RTK CORRECTIONS FROM A REAL TIME KINEMATIC GPS SYSTEM. DATA WAS COLLECTED AT 100 HZ. DATA WAS COLLECTED AT 100 HZ AND 1100°.
8. SURVEY DATA WAS COLLECTED USING QINSY 8.1 AND PROCESSED USING GIMERA 1.5.1 SOFTWARE. HORIZONTAL CONTROL WAS BASED ON STATIC GPS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING.
9. THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
- 7 MAP SOUNDINGS ARE BINNED AT 40 FEET AND ARE SPREAD SLABS. CONTOURS ARE BASED ON 12 FEET BINNED SOUNDING-BASED SOUNDINGS.


SURVEY CONTROL DATA: AREA 2				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1346 C 2003	1,769,619.06	2,833,260.16	15.17	NOAA/NOS BENCHMARK SBC
WN-1-14	1,782,176.39	2,831,921.02	15.74	USACE DOMED BC
WN-2-14	1,773,422.26	2,833,579.89	17.73	USACE DOMED BC

PROJECT LIMITS AREA 2		
NAME	NORTHING	EASTING
CL-8	1,781,237.07	2,829,777.06
CL-9	1,781,078.86	2,829,828.71
CL-10	1,778,311.32	2,830,044.28
CL-11	1,776,235.48	2,829,709.12
CL-12	1,774,399.37	2,829,983.95
PL-15	1,781,283.62	2,829,919.85
PL-16	1,781,125.41	2,829,971.30
PL-17	1,778,287.41	2,830,192.37

PROJECT LIMITS AREA 2			
	NAME	NORTHING	EASTING
	PL-18	1,776,211.57	2,828,857.20
	PL-19	1,774,404.34	2,830,119.15
	PL-20	1,774,274.40	2,828,848.75
	PL-21	1,778,259.39	2,829,561.04
	PL-22	1,778,335.22	2,829,898.20
	PL-23	1,781,032.31	2,829,886.12
	PL-24	1,781,190.42	2,829,634.47



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



Greg Gibson C.H. (317)



US Army Corps  
of Engineers •  
**ALASKA DISTRICT**

CONTRACT NO. W0111B-140-001316870045		
CONTRACTOR ETRAC INC.		
CITY WASILLA	STATE ALASKA	
Recommended	Approved:	Date:
MICHAEL MUELLER	THOMAS A. SLOAN	09-02-2018
PRIME CONTRACTOR	CHIEF GEOMATICS SECTION	

[illegible]

	U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT P.O. BOX 6898 JBER, ALASKA 99506-0898	SUPERVISED BY: SUPERVISOR'S DESIGNATION DATE	24-JUNE-2078
		DRAWN BY: DRAWING NUMBER DATE	07562
		CHECKED BY: CHECKER'S DESIGNATION DATE	07562
		APPROVED BY:	
		THOMAS A. SUMM, Chief of Facilities Section	
		CONTRACT NO.	W91386-14-D-0017H-F0406
		JOB NO.	(SWS)
		FILE NAME	07562-VHS2.DWG
		PLOT DATE	12-NOV-2007
		PROJECT NAME	Kirk-Costello Bay Rd., Suite C Wasilla, AK, 99564

PETERSBURG, ALASKA  
072852 - WRANGELL NARROWS  
PROJECT CONDITION SURVEY  
MAY 04 - MAY 10, 2018

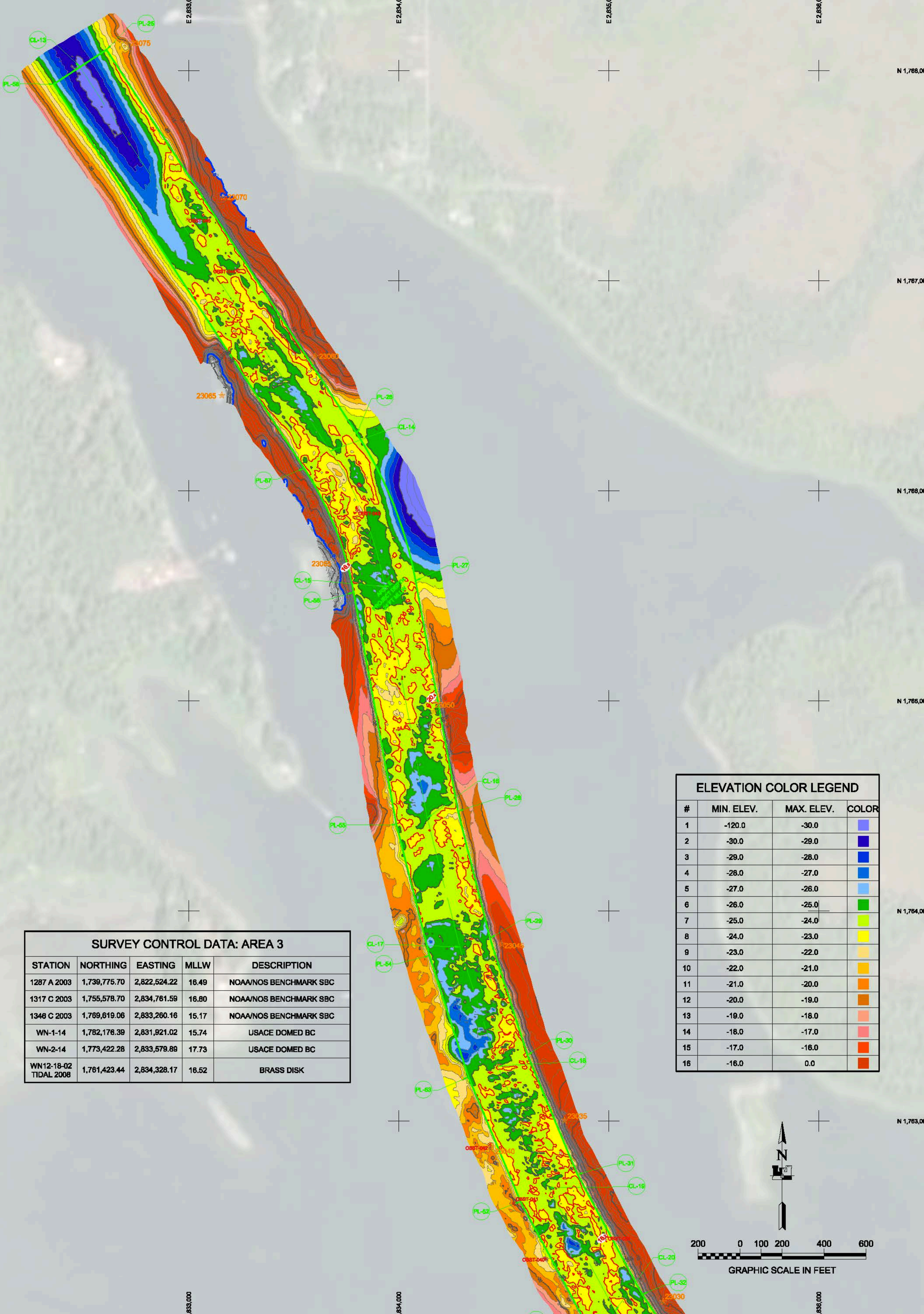
SHEET  
IDENTIFICATION  
1-WRA-92-07-54  
Sheet 20 of 27





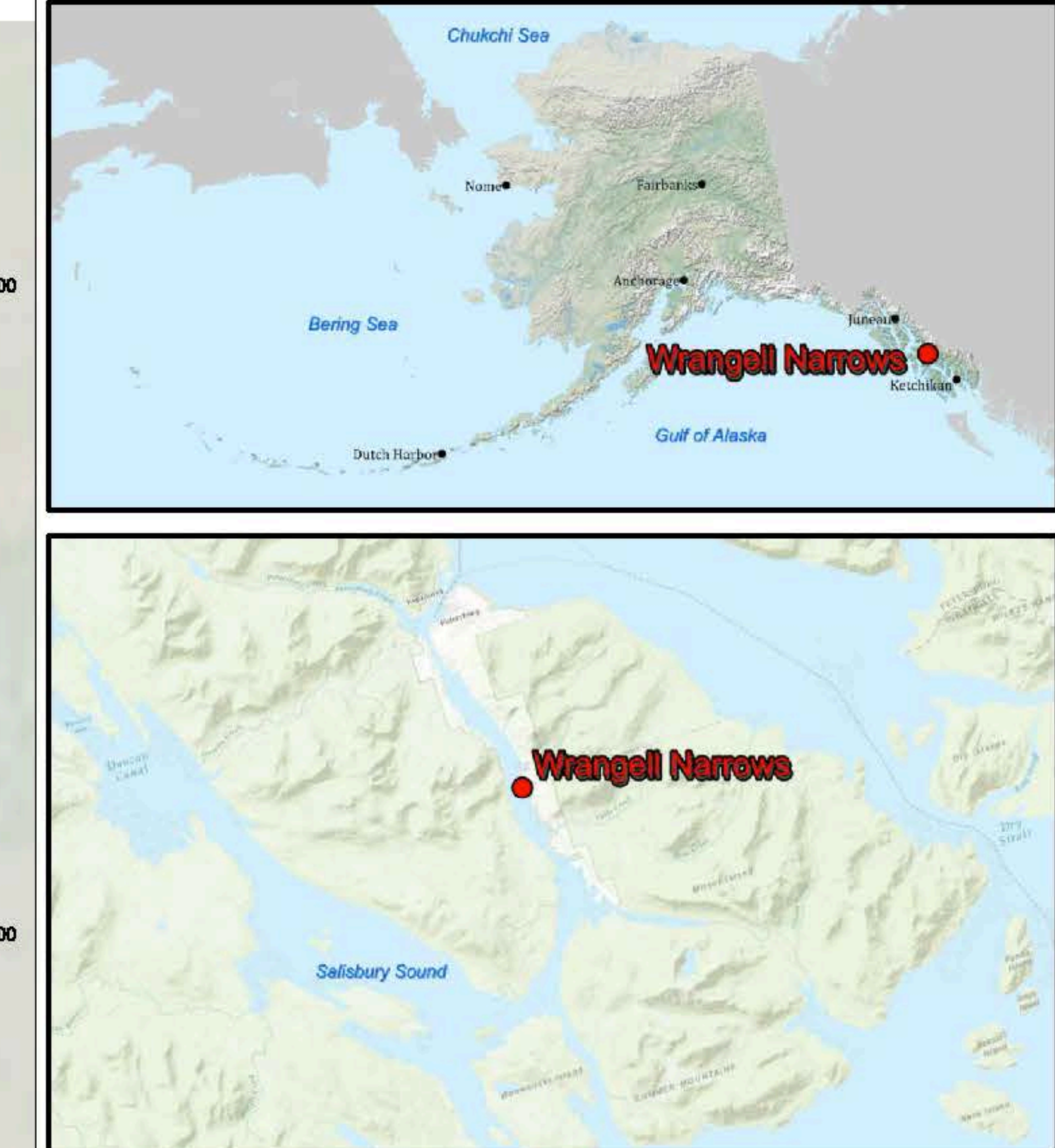


VOLUME COMPUTATIONS: AREA 3		
AREA E	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	46,542
ANCHORAGE AREA		
AVAILABLE TO PROJECT DEPTH (PD)	-26.0	861



	PROJECT LIMITS AREA 3		
	NAME	NORTHING	EASTING
30	CL-13	1,768,017.97	2,632,482.73
	CL-14	1,766,189.96	2,633,674.79
	CL-15	1,765,544.44	2,633,932.84
30	CL-16	1,764,442.97	2,634,135.50
	CL-17	1,763,829.49	2,634,290.41
	CL-18	1,763,282.21	2,634,472.23
30	CL-19	1,762,882.04	2,634,715.01
	CL-20	1,762,096.55	2,635,030.36
	CL-21	1,761,486.69	2,635,444.25
30	CL-22	1,759,073.96	2,636,030.75
	CL-23	1,756,516.67	2,634,867.39
	CL-24	1,752,947.26	2,630,537.48
30	CL-25	1,749,994.41	2,628,276.34
	CL-26	1,745,636.20	2,625,894.45
	CL-27	1,742,232.10	2,624,998.11
30	CL-28	1,740,851.80	2,625,139.35
	CL-29	1,738,845.23	2,625,230.15
	PL-25	1,768,099.90	2,632,606.38
30	PL-26	1,766,271.89	2,633,800.44
	PL-27	1,765,571.62	2,634,080.16
	PL-28	1,764,474.95	2,634,282.13
30	PL-29	1,763,870.78	2,634,434.69
	PL-30	1,763,314.15	2,634,813.10
	PL-31	1,762,748.71	2,634,950.55
30	PL-32	1,762,174.55	2,635,168.72
	PL-33	1,761,573.44	2,635,568.22

PROJECT LIMITS AREA 3		
NAME	NORTHING	EASTING
PL-34	1,758,055.78	2,836,179.84
PL-35	1,756,403.18	2,834,765.48
PL-36	1,752,844.08	2,830,847.49
PL-37	1,749,883.09	2,828,402.92
PL-38	1,745,480.27	2,826,034.69
PL-39	1,742,219.75	2,825,148.20
PL-40	1,740,882.94	2,825,289.00
PL-41	1,738,852.01	2,825,380.00
PL-42	1,738,838.45	2,825,080.30
PL-43	1,740,840.86	2,824,989.70
PL-44	1,742,244.45	2,824,844.02
PL-45	1,745,592.13	2,825,754.21
PL-46	1,750,045.73	2,828,149.76
PL-47	1,753,050.44	2,830,427.47
PL-48	1,756,830.16	2,834,589.30
PL-49	1,758,092.15	2,835,881.88
PL-50	1,761,404.54	2,836,320.28
PL-51	1,762,018.55	2,834,902.00
PL-52	1,762,617.37	2,834,579.47
PL-53	1,763,210.27	2,834,331.36
PL-54	1,763,788.20	2,834,148.13
PL-55	1,764,410.99	2,833,988.86
PL-56	1,765,517.28	2,833,785.12
PL-57	1,766,108.03	2,833,549.14
PL-58	1,767,936.04	2,832,357.08



- [illegible]

**PETERSBURG, ALASKA**

**072852 - WRANGELL NARROWS**

**PROJECT CONDITION SURVEY**

**MAY 04 - MAY 10, 2018**

SHEET IDENTIFICATION

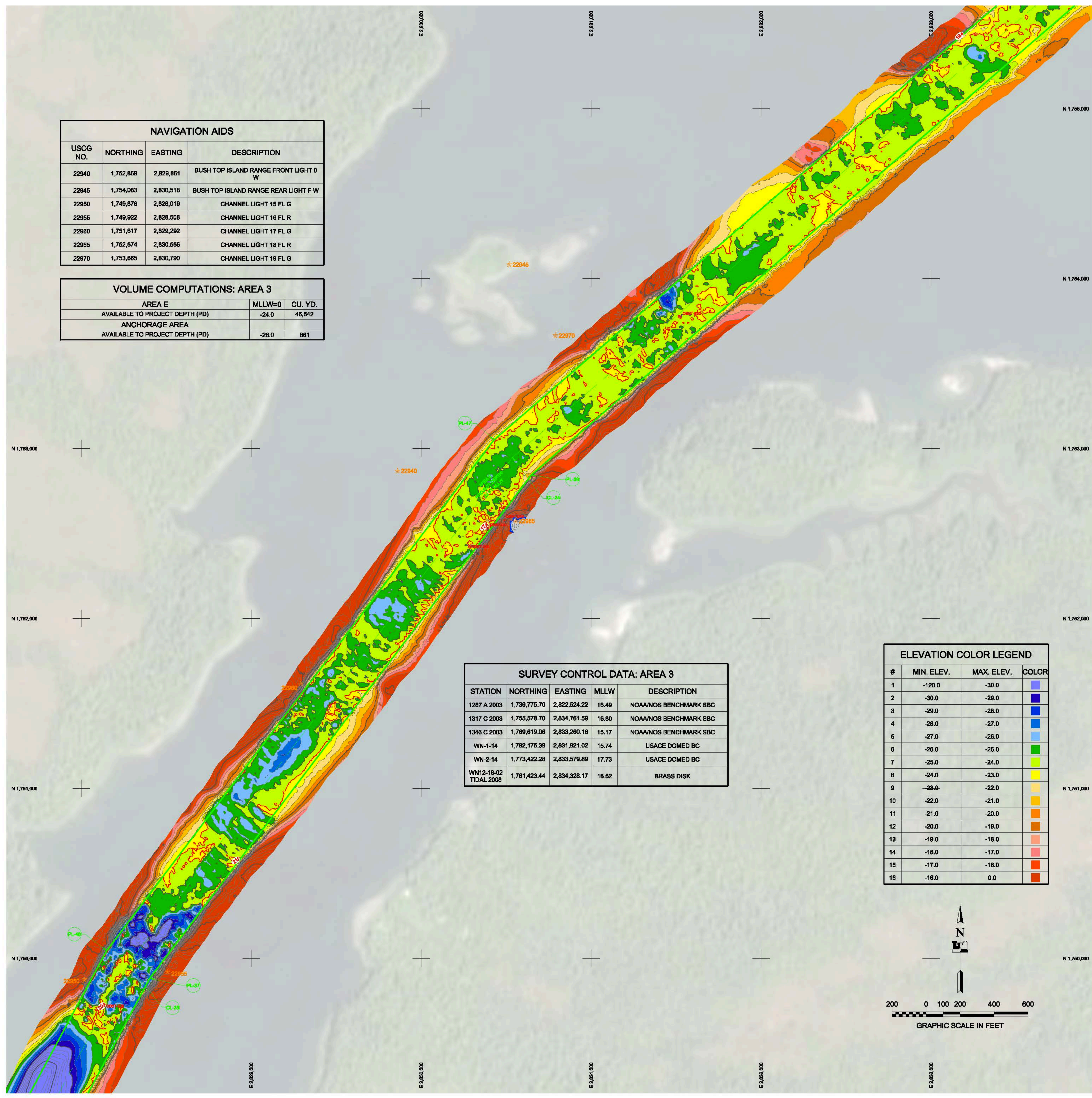
1-WRA-92-07-54

Sheet 22 of 27









NAVIGATION AIDS			
USCG NO.	NORTHING	EASTING	DESCRIPTION
22940	1,752,869	2,828,861	BUSH TOP ISLAND RANGE FRONT LIGHT 0 W
22945	1,754,083	2,830,518	BUSH TOP ISLAND RANGE REAR LIGHT F W
22950	1,749,876	2,828,019	CHANNEL LIGHT 15 FL G
22955	1,749,922	2,828,508	CHANNEL LIGHT 16 FL R
22960	1,751,617	2,828,292	CHANNEL LIGHT 17 FL G
22965	1,752,574	2,830,556	CHANNEL LIGHT 18 FL R
22970	1,753,865	2,830,790	CHANNEL LIGHT 19 FL G

VOLUME COMPUTATIONS: AREA 3		
AREA E	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	46,542
ANCHORAGE AREA		
AVAILABLE TO PROJECT DEPTH (PD)	-26.0	861

SURVEY CONTROL DATA: AREA 3				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1267 A 2003	1,739,775.70	2,822,524.22	16.49	NOAA/NOS BENCHMARK SBC
1317 C 2003	1,755,578.70	2,834,761.59	16.80	NOAA/NOS BENCHMARK SBC
1346 C 2003	1,769,619.06	2,833,260.16	15.17	NOAA/NOS BENCHMARK SBC
WN-1-14	1,782,176.39	2,831,921.02	15.74	USACE DOMED BC
WN-2-14	1,773,422.28	2,833,579.89	17.73	USACE DOMED BC
WN12-18-02 TIDAL 2008	1,761,423.44	2,834,326.17	16.52	BRASS DISK

ELEVATION COLOR LEGEND			
#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-120.0	-30.0	
2	-30.0	-29.0	
3	-29.0	-28.0	
4	-28.0	-27.0	
5	-27.0	-26.0	
6	-26.0	-25.0	
7	-25.0	-24.0	
8	-24.0	-23.0	
9	-23.0	-22.0	
10	-22.0	-21.0	
11	-21.0	-20.0	
12	-20.0	-19.0	
13	-19.0	-18.0	
14	-18.0	-17.0	
15	-17.0	-16.0	
16	-16.0	0.0	



**NOTES**

1. PRIMARY HORIZONTAL CONTROL FOR THE PROJECT IS ALASKA STATE PLANE, ZONE 1, NAD83(CORS98) EPOCH 2003.00, IN US SURVEY FEET, BASED ON A STATIC GPS NETWORK HOLDING THE NOS EPOCH 2003.00 CORRS ARE VALUES FIXED FOR "JUNEAU WAAS 1" (NOS PID 0F4367), "BIORKA ISLAND 1" (NOS PID A05022) AND "LEVEL ISLAND 1" (NOS PID A44303).
2. FOR ALL AREAS VERTICAL CONTROL IS REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0 FT).
3. AREA 3: MLLW IS A TILTED PLANE MLLW DATUM BASED ON THE LINEAR INTERPOLATION OF THE DIFFERENCES BETWEEN NAVD83 (GEOID 128) AND MLLW (1983-2001 EPOCH) AT NOAA/NOS TIDAL STATIONS "945 1346 PAPER'S LANDING WRANGELL NARROWS, ALASKA" PUBLISHED 13 NOVEMBER 2003 HOLDING NOAA/NOS TIDAL BENCHMARK "945 1346 C" (VMH17256PDI08B271) AS 15.17 FT, "945 1317 ANCHOR POINT, WRANGELL NARROWS, ALASKA" PUBLISHED 13 NOVEMBER 2003 HOLDING NOAA/NOS TIDAL BENCHMARK "945 1317 C" (VMH17246PDI08B260) AS 13.79 FT, "945 1267 A" (VMH17243) AS 13.78 FT, AND "945 1285 TIDAL 1" (VMH17256PDI08B271) AS 14.37 FT.
4. ELEVATIONS HOLDING NOAA/NOS TIDAL BENCHMARKS: "945 1346 TIDAL A" (VMH1810BPI08B262) AS 23.93 FT, "945 1346 C" (VMH17256PDI08B271) AS 15.17 FT, "945 1317 C" (VMH17246PDI08B260) AS 13.79 FT, "945 1267 A" (VMH17243) AS 13.78 FT, AND "945 1285 TIDAL 1" (VMH17256PDI08B271) AS 14.37 FT.
5. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (GEOID 128) ELEVATIONS HOLDING NOAA/NOS TIDAL BENCHMARKS: "945 1346 TIDAL A" (VMH1810BPI08B262) AS 23.93 FT, "945 1346 C" (VMH17256PDI08B271) AS 15.17 FT, "945 1317 C" (VMH17246PDI08B260) AS 13.79 FT, "945 1267 A" (VMH17243) AS 13.78 FT, AND "945 1285 TIDAL 1" (VMH17256PDI08B271) AS 14.37 FT.
6. SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. BATHYMETRY WAS COLLECTED MAY 4 - MAY 10, 2018. SOUNDINGS WERE COLLECTED USING AN RESONIC 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 APPLIX POSMV OCEANMASTER V6 SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE BRIDGE GPS RECEIVER SET AT CONTROL STATION "945 1346 C" (VMH17246PDI08B260) AND "945 1267 A" (VMH17243) SURVEY DATA WAS COLLECTED USING ONSY 8.1 AND PROCESSED USING ONSY 8.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING.
8. THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
9. MAP SOUNDINGS ARE BINNED AT 48 FEET AND ARE SHOAL BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS.

PROJECT LIMITS AREA 3		
NAME	NORTHING	EASTING
CL-13	1,768,017.97	2,832,482.73
CL-14	1,766,189.96	2,833,574.79
CL-15	1,765,544.44	2,833,932.64
CL-16	1,764,442.97	2,834,135.50
CL-17	1,763,829.49	2,834,290.41
CL-18	1,763,282.21	2,834,472.23
CL-19	1,762,882.04	2,834,715.01
CL-20	1,762,096.55	2,835,030.36
CL-21	1,761,468.88	2,835,444.25
CL-22	1,759,073.86	2,836,030.75
CL-23	1,756,516.67	2,834,867.39
CL-24	1,752,947.26	2,830,537.48
CL-25	1,749,984.41	2,828,276.34
CL-26	1,745,536.20	2,825,894.45
CL-27	1,742,232.10	2,824,998.11
CL-28	1,740,851.80	2,825,139.35
CL-29	1,738,845.23	2,825,230.15
PL-25	1,768,089.90	2,832,608.38
PL-26	1,766,271.89	2,833,800.44
PL-27	1,765,571.82	2,834,080.16
PL-28	1,764,474.95	2,834,282.13
PL-29	1,763,870.78	2,834,434.69
PL-30	1,763,314.15	2,834,613.10
PL-31	1,762,748.71	2,834,850.55
PL-32	1,762,174.55	2,835,158.72
PL-33	1,761,573.44	2,835,568.22

PROJECT LIMITS AREA 3		
NAME	NORTHING	EASTING
PL-34	1,769,055.78	2,836,179.84
PL-35	1,766,403.18	2,834,765.46
PL-36	1,762,844.08	2,830,847.49
PL-37	1,749,883.09	2,828,402.82
PL-38	1,745,480.27	2,826,034.89
PL-39	1,742,219.75	2,825,148.20
PL-40	1,740,882.84	2,825,289.00
PL-41	1,738,852.01	2,825,380.00
PL-42	1,738,838.45	2,825,080.30
PL-43	1,740,840.86	2,824,989.70
PL-44	1,742,244.45	2,824,844.02
PL-45	1,745,592.13	2,825,754.21
PL-46	1,750,045.73	2,828,149.76
PL-47	1,753,050.44	2,830,427.47
PL-48	1,756,630.16	2,834,569.30
PL-49	1,759,092.15	2,836,881.86
PL-50	1,761,404.54	2,836,320.26
PL-51	1,762,018.55	2,834,902.00
PL-52	1,762,617.37	2,834,579.47
PL-53	1,763,210.27	2,834,331.36
PL-54	1,763,788.20	2,834,146.13
PL-55	1,764,410.99	2,833,988.86
PL-56	1,765,517.26	2,833,785.12
PL-57	1,766,108.03	2,833,549.14
PL-58	1,767,836.04	2,832,357.08



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN ACBMT/ISOA CERTIFIED HYDROGRAPHER

Greg Gibson C.H. (317)

U.S. Army Corps of Engineers  
Alaska District

CONTRACT NO. WRA-92-07-54  
CONTRACTOR: ETAC INC.  
CITY: WASILLA  
STATE: ALASKA  
APPROVED: [Signature]  
DATE: MAY 10, 2018

DATE: 24 June 2018  
DESIGNED BY: [Signature]  
CHECKED BY: [Signature]  
APPROVED BY: [Signature]  
SCALE: 1"=200'  
PLOT DATE: 6/20/2018  
FILE NAME: 072852-01.dwg  
PLOT FILE: 072852-01.dwg

U.S. ARMY CORPS OF ENGINEERS  
ALASKA DISTRICT  
P.O. BOX 6888  
JBER, ALASKA 99506-0688  
eTAC Inc.  
617 S. Kook-Gear Bay Rd. Suite C  
Wasilla, AK 99684

PETERSBURG, ALASKA  
072852 - WRANGELL NARROWS  
PROJECT CONDITION SURVEY  
MAY 04 - MAY 10, 2018

SHEET IDENTIFICATION  
1-WRA-92-07-54  
Sheet 24 of 27



NAVIGATION AIDS			
USCG NO.	NORTHING	EASTING	DESCRIPTION
22900	1,744,027	2,824,870	BURNT ISLAND RANGE FRONT LIGHT F W
22905	1,745,086	2,824,782	BURNT ISLAND RANGE REAR LIGHT F W
22916	1,742,865	2,825,348	WRANGELL NARROWS DAYBEACON 10A
22920	1,744,044	2,825,192	CHANNEL LIGHT 11 FL G
22925	1,744,972	2,825,584	CHANNEL BUOY 13 GREEN CAN
22930	1,745,514	28,257,700	CHANNEL BUOY 13A GREEN CAN
22935	1,745,477	2,826,084	CHANNEL LIGHT 14 FL R

VOLUME COMPUTATIONS: AREA 3		
AREA E	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	46,542
ANCHORAGE AREA		
AVAILABLE TO PROJECT DEPTH (PD)	-26.0	861

SURVEY CONTROL DATA: AREA 3				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1267 A 2003	1,739,775.70	2,822,524.22	16.49	NOAA/NOS BENCHMARK SBC
1317 C 2003	1,755,578.70	2,834,781.59	18.80	NOAA/NOS BENCHMARK SBC
1346 C 2003	1,769,819.06	2,833,260.16	15.17	NOAA/NOS BENCHMARK SBC
WN-1-14	1,782,176.39	2,831,921.02	15.74	USACE DOMED BC
WN-2-14	1,773,422.28	2,833,579.89	17.73	USACE DOMED BC
WN12-19-02 TIDAL 2008	1,761,423.44	2,834,328.17	16.52	BRASS DISK

ELEVATION COLOR LEGEND			
#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-120.0	-30.0	
2	-30.0	-29.0	
3	-29.0	-28.0	
4	-28.0	-27.0	
5	-27.0	-26.0	
6	-26.0	-25.0	
7	-25.0	-24.0	
8	-24.0	-23.0	
9	-23.0	-22.0	
10	-22.0	-21.0	
11	-21.0	-20.0	
12	-20.0	-19.0	
13	-19.0	-18.0	
14	-18.0	-17.0	
15	-17.0	-16.0	
16	-16.0	0.0	

PROJECT LIMITS AREA 3		
NAME	NORTHING	EASTING
CL-13	1,768,017.97	2,832,482.73
CL-14	1,766,189.96	2,833,574.79
CL-15	1,765,544.44	2,833,932.84
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CL-17	1,763,829.49	2,834,290.41
CL-18	1,763,282.21	2,834,472.23
CL-19	1,762,882.04	2,834,715.01
CL-20	1,762,096.55	2,835,030.35
CL-21	1,761,488.89	2,835,444.25
CL-22	1,759,073.86	2,836,030.75
CL-23	1,756,516.67	2,834,867.39
CL-24	1,752,947.26	2,830,537.48
CL-25	1,749,984.41	2,828,276.34
CL-26	1,745,536.20	2,825,894.45
CL-27	1,742,232.10	2,824,998.11
CL-28	1,740,851.80	2,825,139.35
CL-29	1,738,845.23	2,825,230.15
PL-25	1,768,089.90	2,832,608.38
PL-26	1,766,271.89	2,833,800.44
PL-27	1,765,571.82	2,834,080.16
PL-28	1,764,474.95	2,834,282.13
PL-29	1,763,870.78	2,834,434.69
PL-30	1,763,314.15	2,834,613.10
PL-31	1,762,748.71	2,834,850.55
PL-32	1,762,174.55	2,835,158.72
PL-33	1,761,573.44	2,835,568.22

PROJECT LIMITS AREA 3		
NAME	NORTHING	EASTING
PL-34	1,769,055.78	2,836,179.84
PL-35	1,766,403.18	2,834,765.46
PL-36	1,762,844.08	2,830,847.49
PL-37	1,749,883.09	2,828,402.82
PL-38	1,745,480.27	2,826,034.89
PL-39	1,742,219.75	2,825,148.20
PL-40	1,740,882.04	2,825,289.00
PL-41	1,738,852.01	2,825,380.00
PL-42	1,738,838.45	2,825,080.30
PL-43	1,740,840.86	2,824,989.70
PL-44	1,742,244.45	2,824,844.02
PL-45	1,745,592.13	2,825,754.21
PL-46	1,750,045.73	2,828,149.76
PL-47	1,753,050.44	2,830,427.47
PL-48	1,756,630.16	2,834,569.30
PL-49	1,759,092.15	2,836,881.86
PL-50	1,761,404.54	2,835,320.26
PL-51	1,762,018.55	2,834,902.00
PL-52	1,762,617.37	2,834,579.47
PL-53	1,763,210.27	2,834,331.36
PL-54	1,763,788.20	2,834,146.13
PL-55	1,764,410.99	2,833,988.86
PL-56	1,765,517.26	2,833,785.12
PL-57	1,766,108.03	2,833,549.14
PL-58	1,767,836.04	2,832,357.08

- NOTES**
- PRIMARY HORIZONTAL CONTROL FOR THE PROJECT IS ALASKA STATE PLANE, ZONE 1, NAD83(CORS86) EPOCH 2003.00, IN US SURVEY FEET, BASED ON A STATIC GPS NETWORK HOLDING THE NOS EPOCH 2003.00 CORRS ARE VALUES FIXED FOR "JUNEAU WAAS 1" (NOS PID 0F367), "BIOKKA ISLAND 1" (NOS PID A0522) AND "LEVEL ISLAND 1" (NOS PID A4430).
  - LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83(CORS86) EPOCH 2003.00, IN US SURVEY FEET HOLDING "NO 1 1987" AS N 1,726,219.22, E 2,828,698.32, "1317 C 2003" AS N 1,755,578.70, E 2,834,781.59, "1346 C 2003" AS N 1,769,819.06, E 2,833,260.16 AND "WN-1 2000" AS N 1,818,328.29, E 2,827,136.91.
  - FOR ALL AREAS VERTICAL CONTROL IS REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0 FT).
  - AREA 3: MLLW IS A TILTED PLANE MLLW DATUM BASED ON THE LINEAR INTERPOLATION OF THE DIFFERENCES BETWEEN NAVD83 (GEOID 128) AND MLLW (1983-2001 EPOCH) AT NOAA/NOS TIDAL STATIONS "945 1346 PAPKES LANDING, WRANGELL NARROWS, ALASKA" PUBLISHED 13 NOVEMBER 2003 HOLDING NOAA/NOS TIDAL BENCHMARK "945 1346 C" (VMF17256PDI08BSC27) AS 15.17 FT, "945 1317 ANCHOR POINT, WRANGELL NARROWS, ALASKA" PUBLISHED 13 NOVEMBER 2003 HOLDING NOAA/NOS TIDAL BENCHMARK "945 1317 C" (VMF17246PDI08BSC05) AS 16.80 FT, AND "945 1387 A BEECHER PASS, WRANGELL NARROWS, ALASKA" PUBLISHED 13 NOVEMBER 2003 HOLDING NOAA/NOS TIDAL BENCHMARK "945 1287 A" (VMF17243) AS 18.49 FT.
  - VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (GEOID 128) ELEVATIONS HOLDING NOAA/NOS TIDAL BENCHMARKS: "945 1346 TIDAL A" (VMF1810BPI08BSC02) AS 23.93 FT, "945 1346 C" (VMF17256PDI08BSC27) AS 15.17 FT, "945 1317 C" (VMF17246PDI08BSC05) AS 13.79 FT, "945 1287 A" (VMF17243) AS 13.78 FT, AND "945 1285 TIDAL 1" (VMF17235PDI08BSC11) AS 14.37 FT.
  - SOUNDINGS ARE IN US SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
  - BATHYMETRY WAS COLLECTED MAY 4 - MAY 10, 2018. SOUNDINGS WERE COLLECTED USING AN RESONIC 2027 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 V6 SYSTEM RECEIVING RTX CORRECTIONS FROM A TRIMBLE BRIDGE GPS RECEIVER SET AT CONTROL STATION "945 1346 C 2003", "1346 C 2003", "1317 C 2003", AND "NO 1 1987". SURVEY DATA WAS COLLECTED USING ONSY 8.1 AND PROCESSED USING CIMAERA 1.5.1 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING STATIC GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING.
  - THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
  - MAP SOUNDINGS ARE BINNED AT 48 FEET AND ARE SHOAL BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS.



US Army Corps of Engineers  
ALASKA DISTRICT

CONTRACT NO. WRA-92-07-54  
CONTRACTOR: ETAC INC.  
CITY: WASILLA  
APPROVED: [Signature]  
DATE: MAY 10, 2018

DATE: 24 June 2018  
DESIGNED BY: [Signature]  
CHECKED BY: [Signature]  
APPROVED BY: [Signature]  
SCALE: AS SHOWN  
PLOT DATE: 6/20/2018  
FILE NAME: 072852-PL-01.dwg  
PLOT FILE: 072852-PL-01.pdf

U.S. ARMY CORPS OF ENGINEERS  
ALASKA DISTRICT  
JBER, ALASKA 99506-0098  
eTAC Inc.  
617 S. Kook-Groar Bay Rd, Suite C  
Wasilla, AK 99684

PETERSBURG, ALASKA  
072852 - WRANGELL NARROWS  
PROJECT CONDITION SURVEY  
MAY 04 - MAY 10, 2018

SHEET IDENTIFICATION  
1-WRA-92-07-54  
Sheet 25 of 27



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN ACREDITED/ISA CERTIFIED HYDROGRAPHER

[Signature]  
Greg Gibson C.H. (317)




VOLUME COMPUTATIONS: AREA 3		
AREA E	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	46,542
ANCHORAGE AREA		
AVAILABLE TO PROJECT DEPTH (PD)	-28.0	861



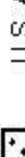
PROJECT LIMITS AREA 3		
NAME	NORTHING	EASTING
PL-34	1,758,055.78	2,836,179.84
PL-35	1,756,403.18	2,834,765.46
PL-36	1,752,844.08	2,830,647.49
PL-37	1,749,883.09	2,828,402.82
PL-38	1,745,480.27	2,826,034.89
PL-39	1,742,219.75	2,825,148.21
PL-40	1,740,882.94	2,825,289.00
PL-41	1,738,852.01	2,825,380.00
PL-42	1,738,838.45	2,825,060.30
PL-43	1,740,840.86	2,824,989.70
PL-44	1,742,244.45	2,824,844.02
PL-45	1,745,592.13	2,825,754.21
PL-46	1,750,045.73	2,828,149.76
PL-47	1,753,050.44	2,830,427.47
PL-48	1,756,830.18	2,834,569.30
PL-49	1,759,092.15	2,835,881.88
PL-50	1,761,404.54	2,835,320.28
PL-51	1,762,016.55	2,834,902.00
PL-52	1,762,617.37	2,834,579.47
PL-53	1,763,210.27	2,834,331.36
PL-54	1,763,786.20	2,834,146.13
PL-55	1,764,410.99	2,833,988.86
PL-56	1,765,517.28	2,833,785.12
PL-57	1,766,106.03	2,833,549.14
PL-58	1,767,936.04	2,832,357.08



- [illegible]

 <p><b>US Army Corps of Engineers •</b> <b>ALASKA DISTRICT</b></p>	
CONTRACT NO. <u>W6192B-14L-000319107-0006</u>	
CONTRACTOR <u>ETAC INC.</u>	
CITY <u>WASILLA</u>	STATE <u>ALASKA</u>
Recommended Approved: <u>MICHAEL E. MUELLER</u>	Date: <u>06/27/2015</u>
PRIME CONTRACTOR	CDR/CDR/CDR/SECTION

[illegible]

	U.S. ARMY CORPS OF ENGINEERS		DESIGNED BY: _____ DRAWN BY: _____ CHECKED BY: _____ APPROVED BY: _____ DATE: _____ SCALE: _____ SIZE: _____ FILE NAME: _____ ADR # _____	
	617 S. Virginia Hwy, Suite C Williams AFB, 59654		CONTRACT NO.: W91974-01-D-0018/H9060 ADR # _____	

PETERSBURG, ALASKA  
2852 - WRANGELL NARROWS  
PROJECT CONDITION SURVEY  
MAY 04 - MAY 10, 2018

07

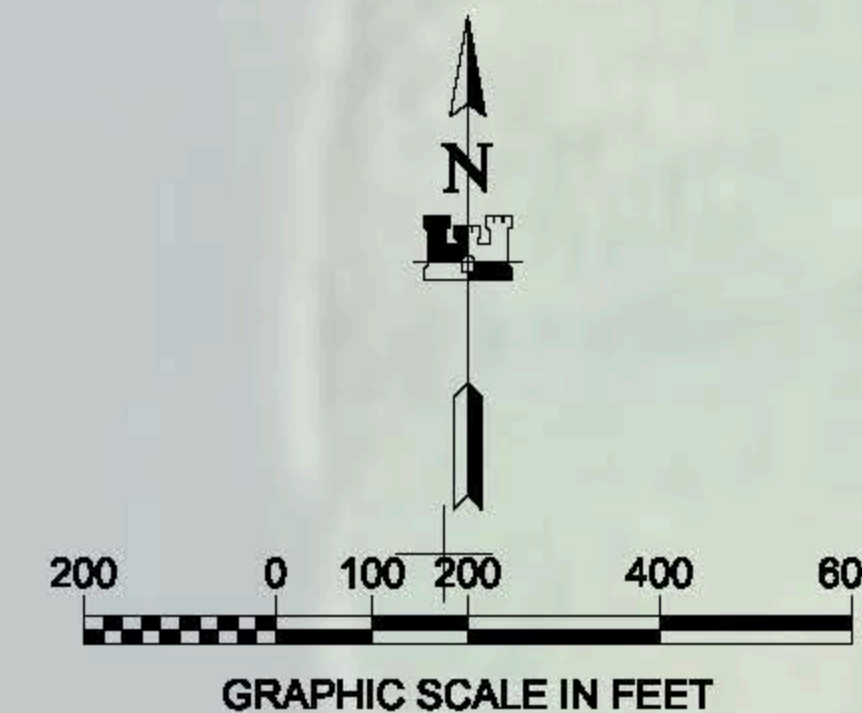
SHEET  
IDENTIFICATION

















1-WRA-92-07-54

Sheet 26 of 27



VOLUME COMPUTATIONS: AREA 4		
AREA F	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-24.0	314



ELEVATION-COLOR LEGEND			
#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-120.0	-30.0	
2	-30.0	-29.0	
3	-29.0	-28.0	
4	-28.0	-27.0	
5	-27.0	-26.0	
6	-26.0	-25.0	
7	-25.0	-24.0	
8	-24.0	-23.0	
9	-23.0	-22.0	
10	-22.0	-21.0	
11	-21.0	-20.0	
12	-20.0	-19.0	
13	-19.0	-18.0	
14	-18.0	-17.0	
15	-17.0	-16.0	
16	-16.0	0.0	




- [illegible]

SURVEY CONTROL DATA: AREA 4				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
NO 1 1925	1,726,219.22	2,826,988.35	17.12	USC&GS BRASS DISK
USE 54 1910	1,728,028.19	2,826,548.78	18.02	USC&GS BRASS DISK
WN 20-05	1,733,533.58	2,826,162.75	14.14	BRASS DISK

PROJECT LIMITS AREA 4		
NAME	NORTHING	EASTING
CL-30	1,730,461.97	2,825,781.43
CL-31	1,728,480.06	2,827,295.29
PL-59	1,730,553.02	2,825,900.83
PL-60	1,728,571.11	2,827,414.46
PL-61	1,728,389.01	2,827,178.09
PL-62	1,730,370.82	2,825,662.23



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



Grog Gibson C.H. (317)