

DREDGE LIMITS CURVE DATA (FT)

| CURVE | RADIUS | ARC LENGTH | DELTA ANGLE | CHORD BEARING | CHORD LENGTH |
|-------|--------|------------|-------------|---------------|--------------|
| C1 | 125.02 | 202.40 | 92°45'31" | N00°04'18"W | 181.01 |
| C2 | 75.00 | 123.38 | 94°15'21" | N00°40'26"E | 109.93 |

ALIGNMENT DATA (FT)

| NUMBER | LENGTH | LINE/CHORD BEARING | ARC LENGTH | RADIUS | DELTA ANGLE | CHORD LENGTH |
|--------|--------|--------------------|------------|--------|-------------|--------------|
| L1 | 491.35 | N40° 39' 57"E | ----- | ----- | ----- | ----- |
| C3 | ----- | N44° 15' 53.00"E | 25.13 | 200.00 | 7°11'52" | 25.11 |
| L2 | ----- | N00° 42' 17.31"E | 164.62 | 100.00 | 94°19'04" | 146.65 |
| C4 | ----- | N47° 51' 49"E | ----- | ----- | ----- | ----- |
| L3 | 622.68 | N46° 27' 15"W | ----- | ----- | ----- | ----- |

OBSTRUCTION DATA

| ID | NORTHING | EASTING | DEPTH |
|--------|-------------|-------------|-------|
| OBST-1 | 2,215,340.7 | 1,336,102.8 | -5.0 |
| OBST-2 | 2,215,310.4 | 1,336,077.7 | -4.0 |
| OBST-3 | 2,215,250.2 | 1,336,024.2 | -4.5 |
| OBST-4 | 2,215,125.9 | 1,335,917.9 | -3.4 |



- ### NOTES
- PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 (CORS) 2010.00 EPOCH VALUES OF NGS CORS STATIONS: "SOLDOTNA_AK007 CORS ARP (AC23 - PID DM7481)" AND "SEALROCKSAK2007 CORS ARP" (AC43 - PID DM7486).
 - LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83, IN US SURVEY FEET HOLDING BRASS CAP SET IN ARMOR STONE "NINIL-2" AS N 2,215,653.51, E 1,336,081.03.
 - VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0) U.S. SURVEY FEET, BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST "945 5653 NINILCHIK, ALASKA" PUBLISHED 07/14/2014. THIS TIDAL DATUM IS BASED ON THE 2007-2011 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA/NOS TIDAL BENCH MARK "5653 F 2011" (PID BBCM32VM20000) AS 29.50' AND NOAA/NOS TIDAL BENCH MARK "945 5653 E" (VMB14160) AS 30.62'.
 - VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD83 (GEOID12A) ELEVATIONS HOLDING NOAA/USACE TIDAL BENCHMARK "5653 F 2011" (PID BBCM32VM20000) AS 23.27'.
 - SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
 - BATHYMETRY WAS COLLECTED APRIL 26, 2018. SOUNDINGS WERE COLLECTED USING AN RSONIC 2022 MULTIBeam ECHOSOUNDER OPERATING AT 400 KHZ. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLAN POSMV WAVE MASTER SYSTEM. RTK CORRECTIONS WERE BROADCAST FROM A LOCAL BASE STATION OCCUPYING "NINIL-2". DATA WAS COLLECTED AND PROCESSED USING HYPOACK 2018 SOFTWARE. HORIZONTAL CONTROL WAS SURVEYED USING RTK GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING TECHNIQUES. TIDE ELEVATIONS WERE MEASURED USING A TRIMBLE R10 RTK SYSTEM.
 - THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
 - MAP SOUNDINGS ARE BINNED AT 15 FEET AND ARE SHOAL-BASED. CONTOURS ARE BASED ON 3 FEET BINNED SHOAL-BASED SOUNDINGS. VOLUME SOUNDINGS ARE BINNED AT 3 FEET AND ARE MEAN VALUE SOUNDINGS.

SURVEY CONTROL DATA

| STATION | NORTHING | EASTING | MLLW | DESCRIPTION |
|-----------|--------------|--------------|-------|----------------------|
| 9455653 E | 2,215,592.06 | 1,336,145.04 | 30.62 | METAL ROD IN BW ROCK |
| 9455653 F | 2,214,548.53 | 1,335,413.68 | 29.50 | METAL ROD IN GROUND |
| 9455653 G | 2,214,391.31 | 1,335,295.69 | 29.78 | METAL ROD IN GROUND |
| DL | 2,215,518.12 | 1,336,349.90 | 25.38 | ALUMINUM CAP |
| NINIL-2 | 2,215,653.51 | 1,336,081.03 | 29.53 | USACE SBC |

PROJECT LIMITS

| CORNER# | NORTHING | EASTING |
|---------|--------------|--------------|
| 1 | 2,215,380.30 | 1,336,164.37 |
| 2 | 2,215,425.79 | 1,336,111.41 |
| 3 | 2,215,123.35 | 1,335,851.63 |
| 4 | 2,215,058.05 | 1,335,927.64 |
| 5 | 2,215,045.59 | 1,335,954.77 |
| 6 | 2,215,074.98 | 1,335,968.27 |
| 7 | 2,215,347.60 | 1,336,202.44 |

PROJECT LIMITS

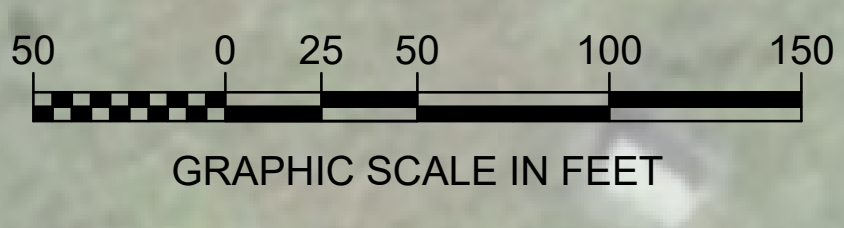
| CORNER# | NORTHING | EASTING |
|---------|--------------|--------------|
| 8 | 2,215,407.15 | 1,336,268.37 |
| 9 | 2,215,588.16 | 1,336,268.15 |
| 10 | 2,216,017.64 | 1,335,816.29 |
| 11 | 2,215,980.40 | 1,335,782.90 |
| 12 | 2,215,551.92 | 1,336,233.70 |
| 13 | 2,215,442.00 | 1,336,232.41 |

NAVIGATION AIDS

| USCG NO. | NORTHING | EASTING | DESCRIPTION |
|----------|-----------|-----------|---------------------------|
| 26255 | 2,215,714 | 1,336,165 | CHANNEL ENTRANCE LIGHT |
| 26260 | 2,215,636 | 1,336,257 | ROCK SILL NORTH DAYBEACON |
| 26265 | 2,215,696 | 1,336,042 | ROCK SILL SOUTH DAYBEACON |

VOLUME COMPUTATIONS

| AREA | AVAILABLE TO PROJECT DEPTH (PD) | MLLW=0 | CU. YD. |
|--------------------------|--|--------|---------|
| AREA A: BASIN | AVAILABLE TO MAX PAY DEPTH (MP) | +3.3 | 4,954 |
| | AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE | VARIES | 1,601 |
| | AVAILABLE TO PROJECT DEPTH | +9.3 | 1,014 |
| AREA B: ENTRANCE CHANNEL | AVAILABLE TO MAX PAY DEPTH (MP) | +8.3 | 2,192 |
| | AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE | VARIES | 3,472 |
| | TOTAL MAXIMUM VOLUME AVAILABLE (MP) | | 13,994 |



THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN ASGM/THOSGA CERTIFIED HYDROGRAPHER
 Cory Hughes
 CORY S. HUGHES, CH. (245)

US Army Corps of Engineers - ALASKA DISTRICT

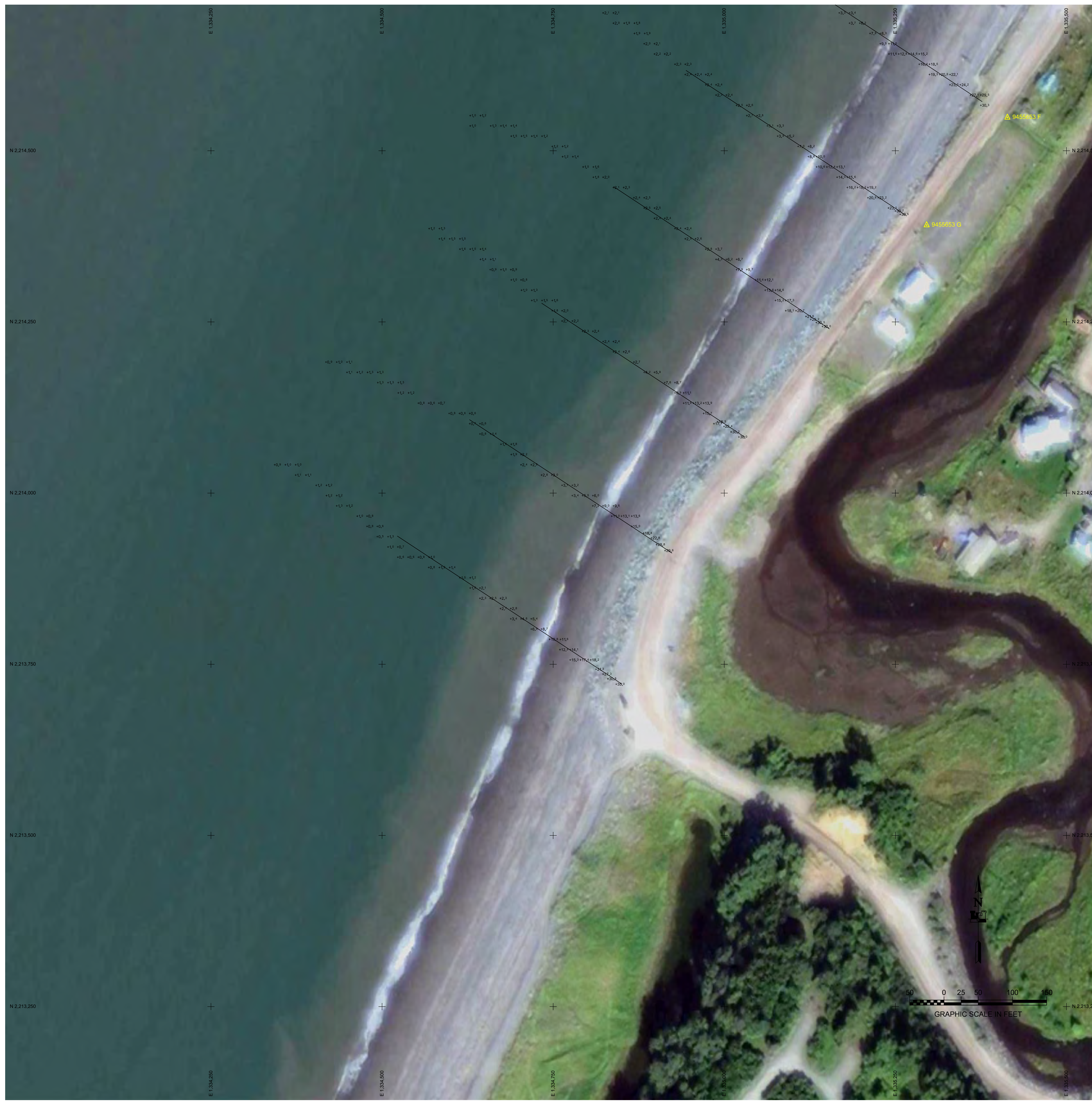
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 CONTRACTOR: ALASKA MARINE EDUCATION
 CITY: ANCHORAGE
 STATE: ALASKA
 USER: []
 APPROVED: []
 DRAWN: []
 CHECKED: []
 DATE: []

DATE: May 16, 2018
 DESIGNED BY: []
 CHECKED BY: []
 APPROVED BY: []
 SCALE: 1" = 50'
 FILE NAME: []
 PROJECT: NINILCHIK SMALL BOAT HARBOR PRE DREDGE SURVEY APRIL 26 & 27, 2018

U.S. ARMY CORPS OF ENGINEERS
 49th DISTRICT
 P.O. BOX 6808
 JBER, ALASKA 99506-8808
 HUGHES & ASSOCIATES
 2910 COTTLE LOOP
 WASILLA, ALASKA 99684

NINILCHIK, ALASKA
NINILCHIK SMALL BOAT HARBOR
PRE DREDGE SURVEY
APRIL 26 & 27, 2018

SHEET IDENTIFICATION
 2-NIN-92-07-51
 Sheet 1 of 3



- NOTES**
- PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 (CORS) 2010.00 EPOCH VALUES OF NOS CORS STATIONS: "SOLDOTNA_AK2007 CORS ARP" (AC23 - PID DM7487), "DRIFTRIVERAK2006 CORS ARP" (AC17 - PID DM7481) AND "SEALROCKSAK2007 CORS ARP" (AC43 - PID DM7496).
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 CORY S. HUGHES C.H. (245)

US Army Corps of Engineers
ALASKA DISTRICT

CONTRACT NO. W17H12C007
 CONTRACTOR ALASKA MARINE EXCAVATION
 CITY ANCHORAGE
 STATE ALASKA
 APPROVED: _____ DATE: _____
 DRAWN BY: _____ DATE: _____
 CHECKED BY: _____ DATE: _____
 DATE: 04/27/2018
 LMC: JIBER, ALASKA 8904-0888
 SCALE: AS SHOWN
 FILE NAME: NINILCHIKPRE-DREDGE_20180426.DWG

NINILCHIK, ALASKA
NINILCHIK SMALL BOAT HARBOR
PRE DREDGE SURVEY
APRIL 26 & 27, 2018

SHEET IDENTIFICATION
 2-NIN-92-07-51
 Sheet 2 of 3