CORPS OF ENGINEERS — U. S. ARMY

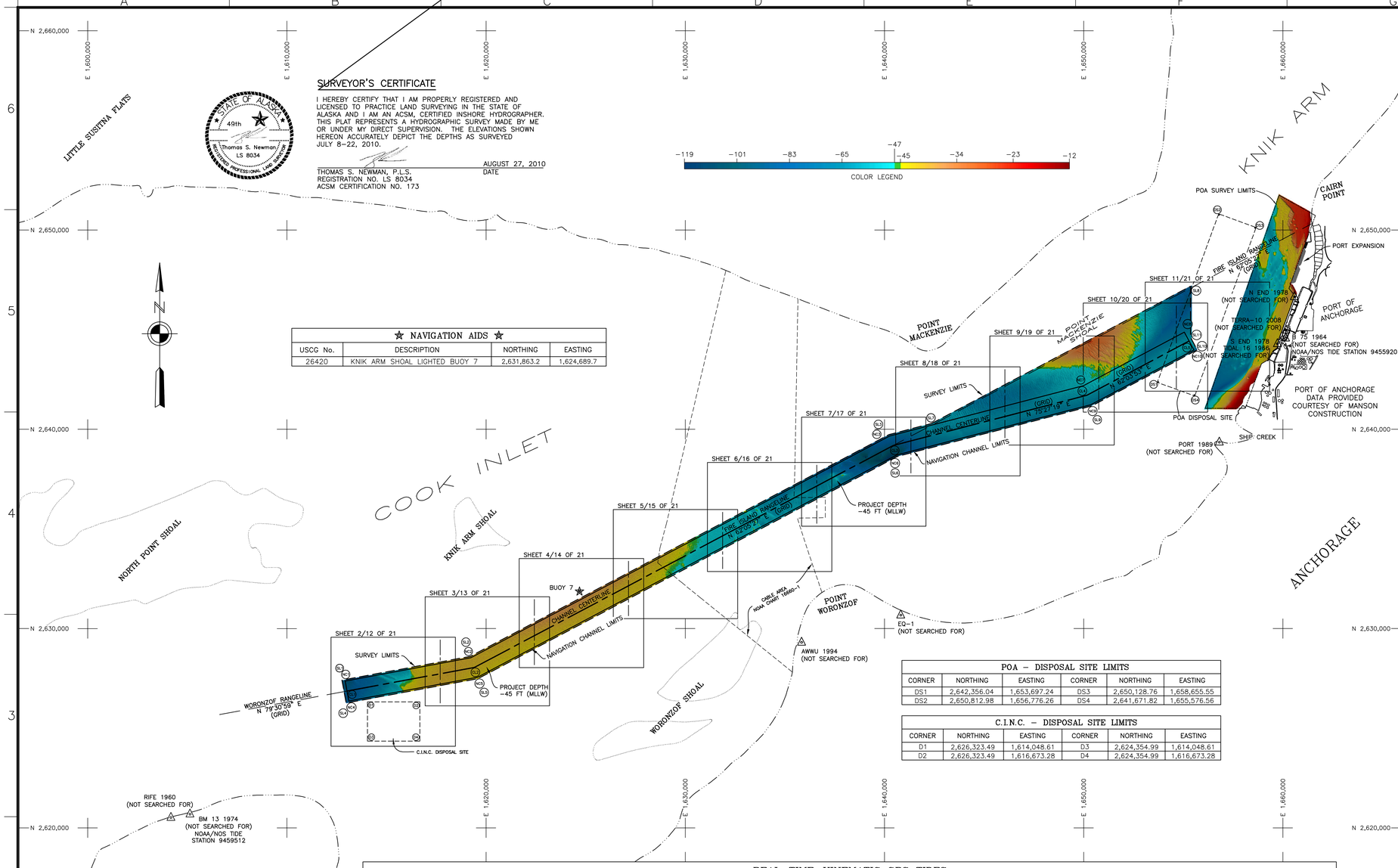
SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT I AM PROPERLY REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA AND I AM AN ACSM, CERTIFIED INSHORE HYDROGRAPHER. THIS PLAT REPRESENTS A HYDROGRAPHIC SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION. THE ELEVATIONS SHOWN HEREON ACCURATELY DEPICT THE DEPTHS AS SURVEYED JULY 8–22, 2010.

STATE OF ALASKA — 49th — Thomas S. Newman — LS 8034 — REGISTERED PROFESSIONAL LAND SURVEYOR

AUGUST 27, 2010
DATE

THOMAS S. NEWMAN, P.L.S.
REGISTRATION NO. LS 8034
ACSM CERTIFICATION NO. 173



☆ NAVIGATION AIDS ☆

USCG No.	DESCRIPTION	NORTHING	EASTING
26420	KNIK ARM SHOAL LIGHTED BUOY 7	2,631,863.2	1,624,689.7

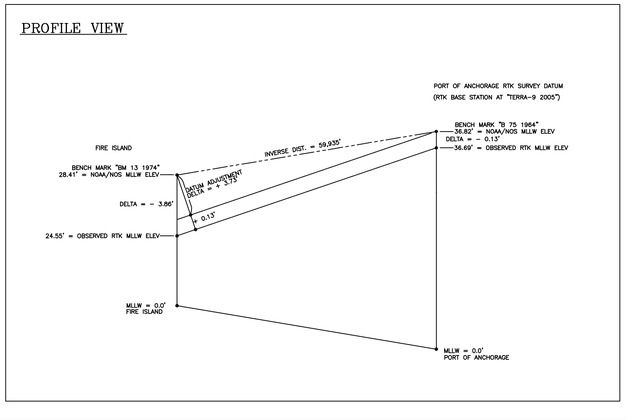
POA – DISPOSAL SITE LIMITS

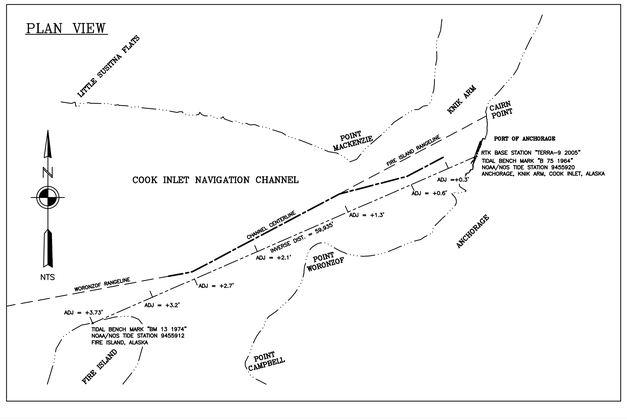
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
DS1	2,642,356.04	1,653,697.24	DS3	2,650,128.76	1,658,655.55
DS2	2,650,812.98	1,656,776.26	DS4	2,641,671.82	1,655,576.56

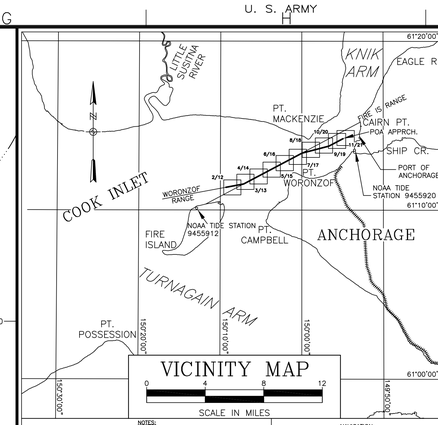
C.I.N.C. – DISPOSAL SITE LIMITS

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
D1	2,626,323.49	1,614,048.61	D3	2,624,354.99	1,614,048.61
D2	2,626,323.49	1,616,673.28	D4	2,624,354.99	1,616,673.28

REAL–TIME–KINEMATIC GPS TIDES DATUM ADJUSTMENT BASIS







NOTES:
1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN–LOWER–LOW–WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150–DEGREE SWATH–WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART–PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI–BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL–TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET–RS GPS RECEIVER SET AT CONTROL STATION, "TERRA–10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL–TIME–KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
4. THE SURVEY AND THE PRELIMINARY PROCESSED DATASET WAS BASED ON RTK MLLW TIDE DATUM AT THE PORT OF ANCHORAGE AS NOTED ABOVE. THE FINAL DATASET WAS ADJUSTED TO REFLECT THE DIFFERENCE IN TIDE DATUM VALUES AT THE PORT OF ANCHORAGE (NOAA/NOS 9455920) AND THE TIDE DATUM VALUES AT FIRE ISLAND (NOAA/NOS 9455912). THIS "TILTED PLANE" ADJUSTMENT WAS PERFORMED TO PROVIDE A UNIFORM MLLW BASED APPROACH FROM THE WEST END OF THE COOK INLET NAVIGATION CHANNEL INTO THE PORT OF ANCHORAGE. THE ADJUSTMENT IS BASED ON OBSERVED RTK HEIGHT VALUES MEASURED AT BOTH NOAA/NOS TIDE STATIONS LISTED ABOVE. THE OBSERVED RTK DIFFERENCE HOLDS THE PORT OF ANCHORAGE AT 0.0' AND FIRE ISLAND AT –3.73'. THE ADJUSTMENT WAS PERFORMED USING CARIS BASE EDITOR V2.1 RAISING ALL SOUNDINGS PROPORTIONATELY ALONG THE DISTANCE BETWEEN THE TIDAL BENCH MARKS UTILIZED TO DEFINE THE VERTICAL DATUM. THE ADJUSTMENT AT THE PORT OF ANCHORAGE IS 0.0' EXTENDING TO AN ADJUSTMENT OF +3.73' AT FIRE ISLAND (SEE DIAGRAM ON SHEET 1).
5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
6. THIS SURVEY IS INDICATIVE OF GENERAL CONDITIONS ON THE DATES OF SURVEY.
7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW	CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH (–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE (–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES 3:1 (H:V)	112,106
TOTAL	4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
SL5	2,627,490.72	1,619,603.68
SL6	2,638,640.64	1,640,654.15
SL7	2,640,288.38	1,642,358.15
SL8	2,647,179.66	1,655,368.53
SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
NC4	2,626,365.49	1,613,110.61	0+00
NC5	2,627,562.38	1,619,578.73	65+00
NC6	2,638,711.03	1,640,626.81	303+00
NC7	2,642,189.38	1,649,983.88	403+50
NC8	2,644,878.56	1,655,055.31	459+50
NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

⚠ CONTROL COORDINATES ⚠

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

2500 0 2500 5000 7500
SCALE IN FEET
HORIZONTAL SCALE: 1"=2500'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

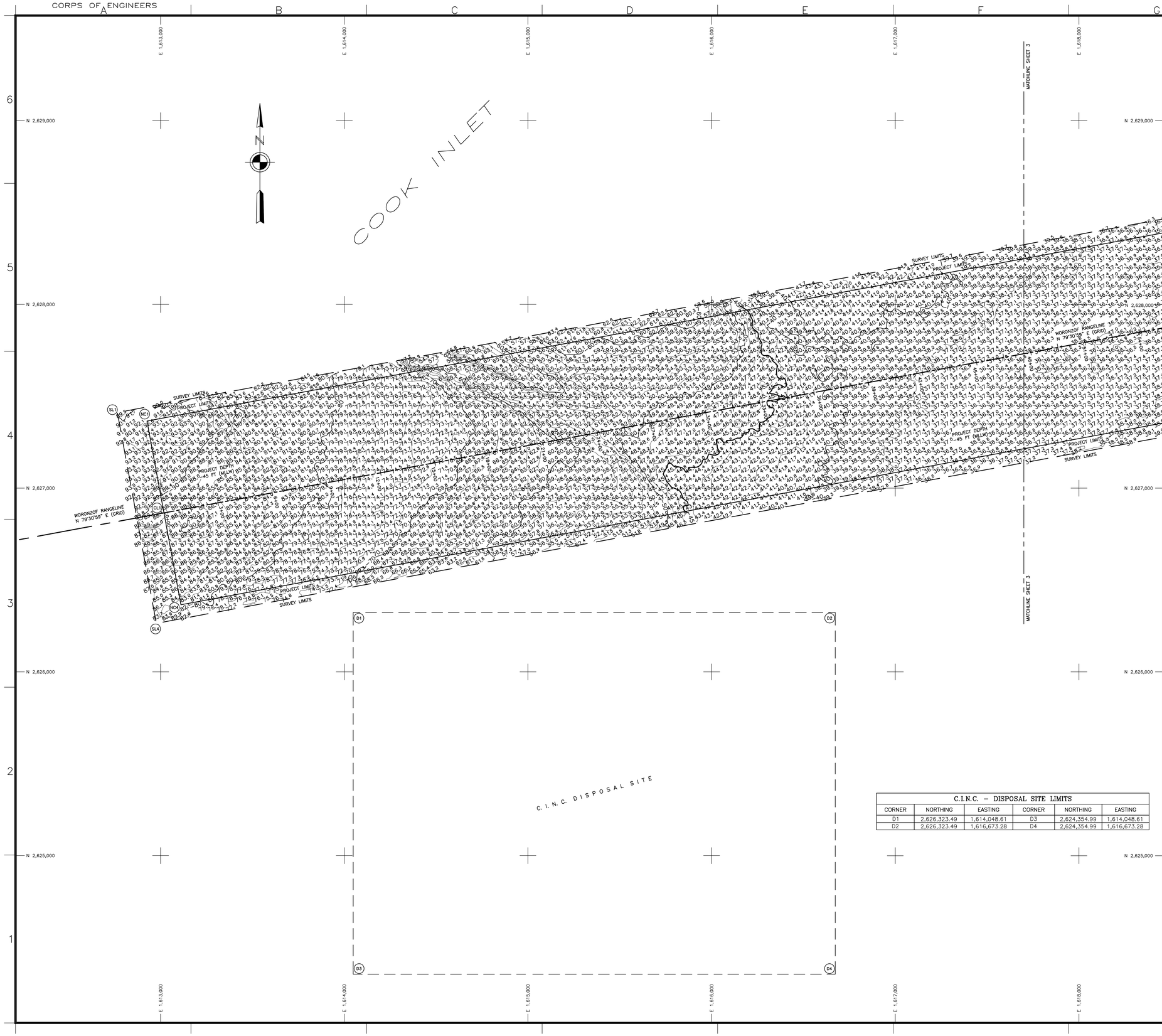
Date: 08/06/10
Dwg. Scale: AS NOTED
Plot. Scale:
File:
Drawing #: 2770-10
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL Section
Submitted: Branch
Chief, USACE Survey No.:

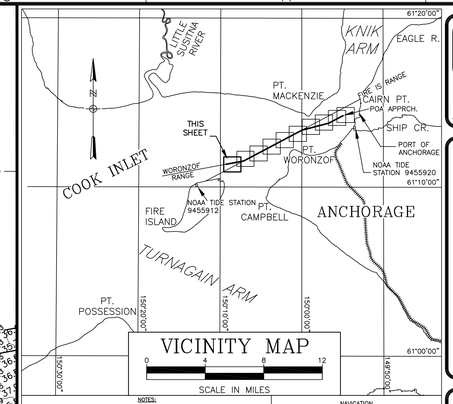
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-101
Sheet 1 of 21

CORPS OF ENGINEERS — U. S. ARMY





NOTES:
1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
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NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

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COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

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200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

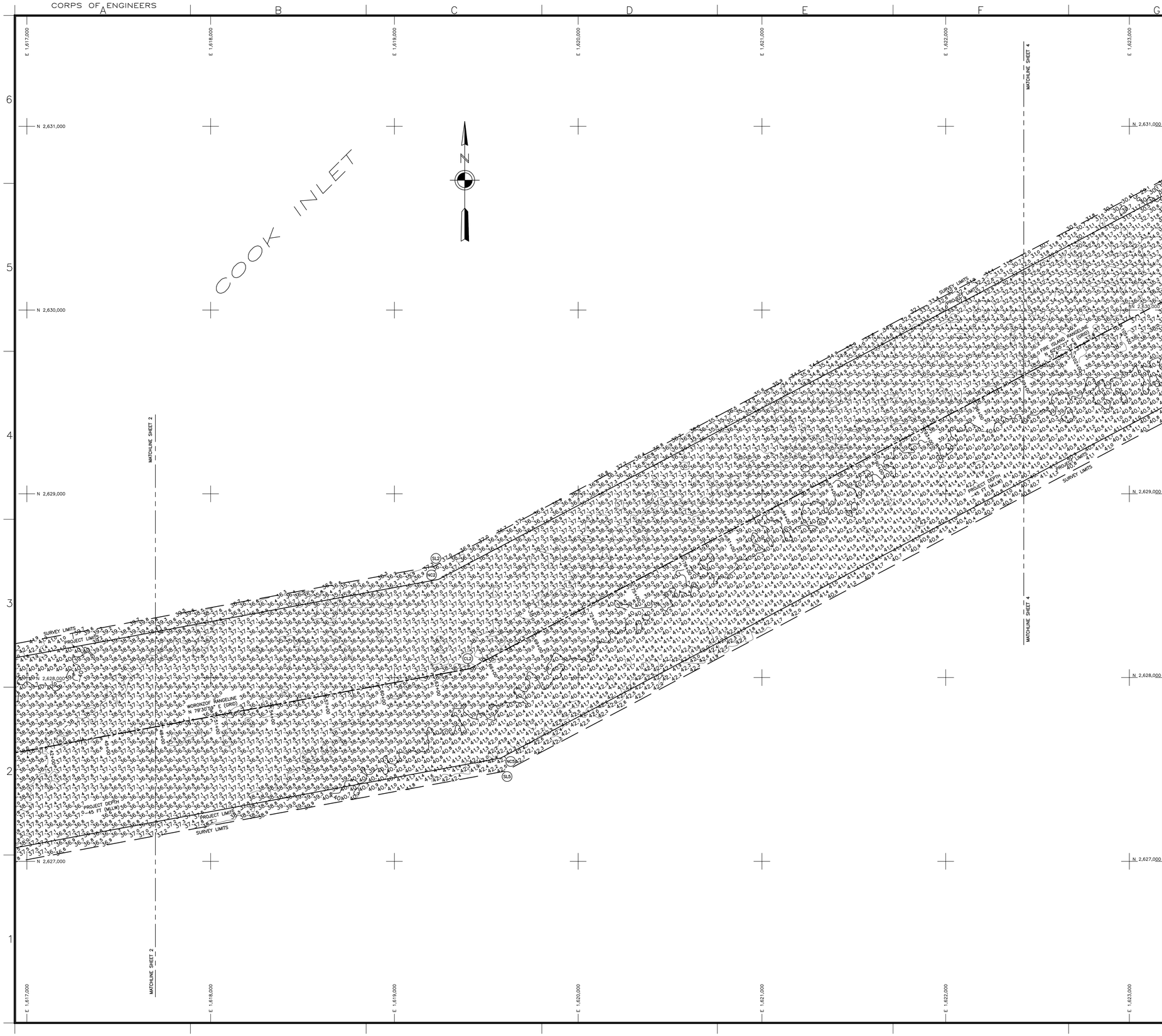
Sym.	Action	Description	Date	Approval

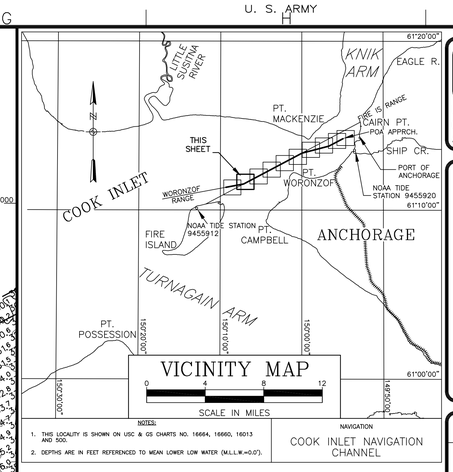
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted: Branch
Chief, Section
USACE Survey No.: Drawing #
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
2770-10

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-102
Sheet 2 of 21





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NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

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7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW		CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH	(–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE	(–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
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SL10	2,643,984.07	1,655,699.41
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PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
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BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

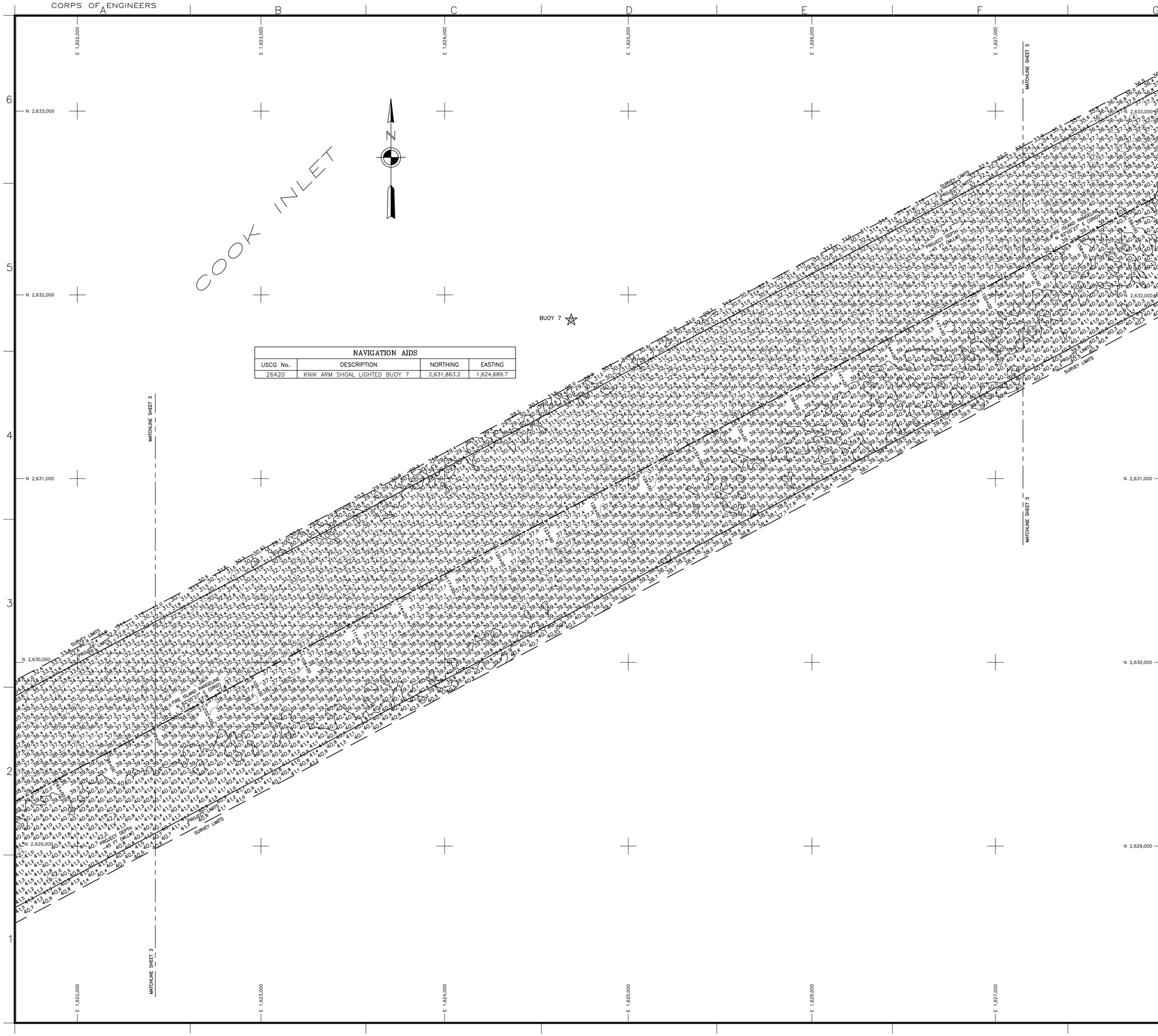
Date: 08/06/10
Dwg. Scale: AS NOTED
Plot. Scale:
File: Section
Drawing #: Branch
2770-10

Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief:
USACE, Survey No:

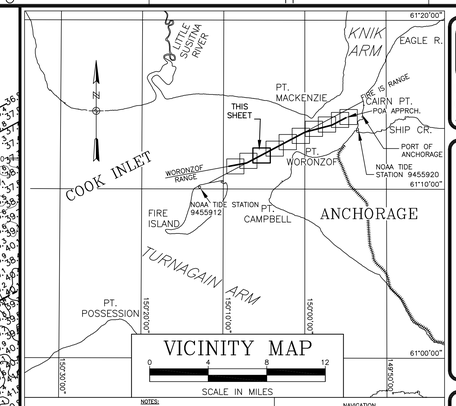
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-103
Sheet 3 of 21



NAVIGATION AIDS			
USCG No.	DESCRIPTION	NORTHING	EASTING
26420	KNIK ARM SHOAL LIGHTED BUOY 7	2,631,863.2	1,624,689.7



NOTES:
1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0').

NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

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200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PROJ. CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approd.

Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL Section
Submitted: Branch
Chief, Drawing #
USACE Survey No.: 2770-10

Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:

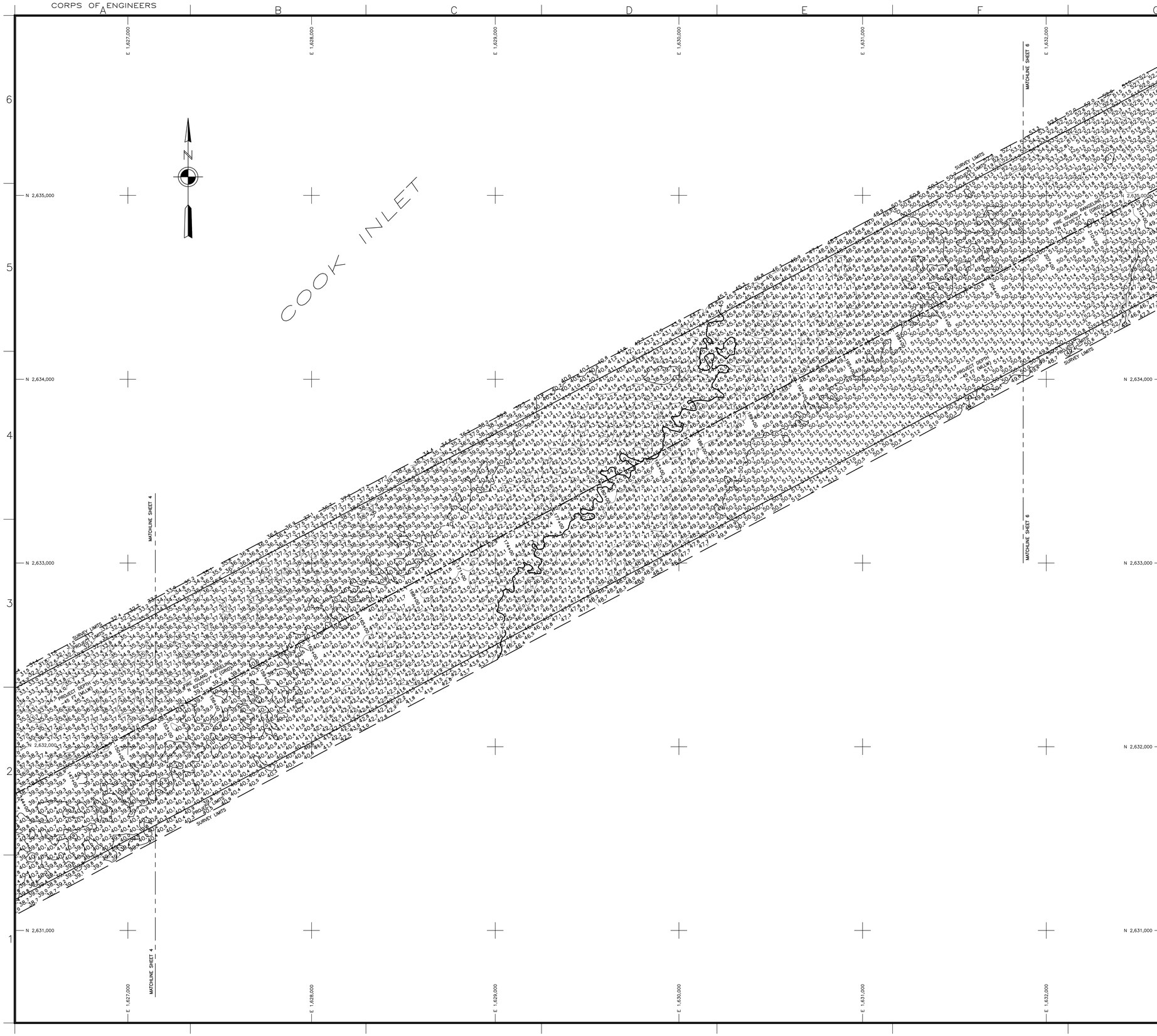
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

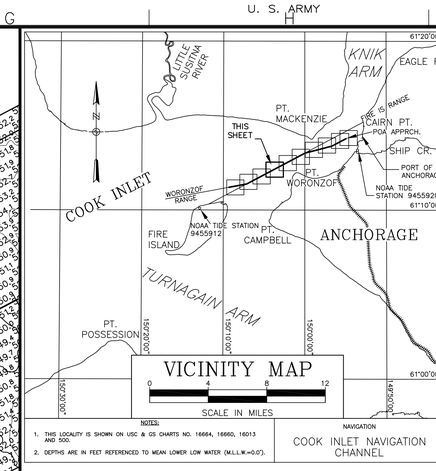
ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-104
Sheet 4 of 21

CORPS OF ENGINEERS

U. S. ARMY





NOTES:

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NAVIGATION

COOK INLET NAVIGATION CHANNEL

NOTES

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EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600

SCALE IN FEET

HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FRAME CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approval

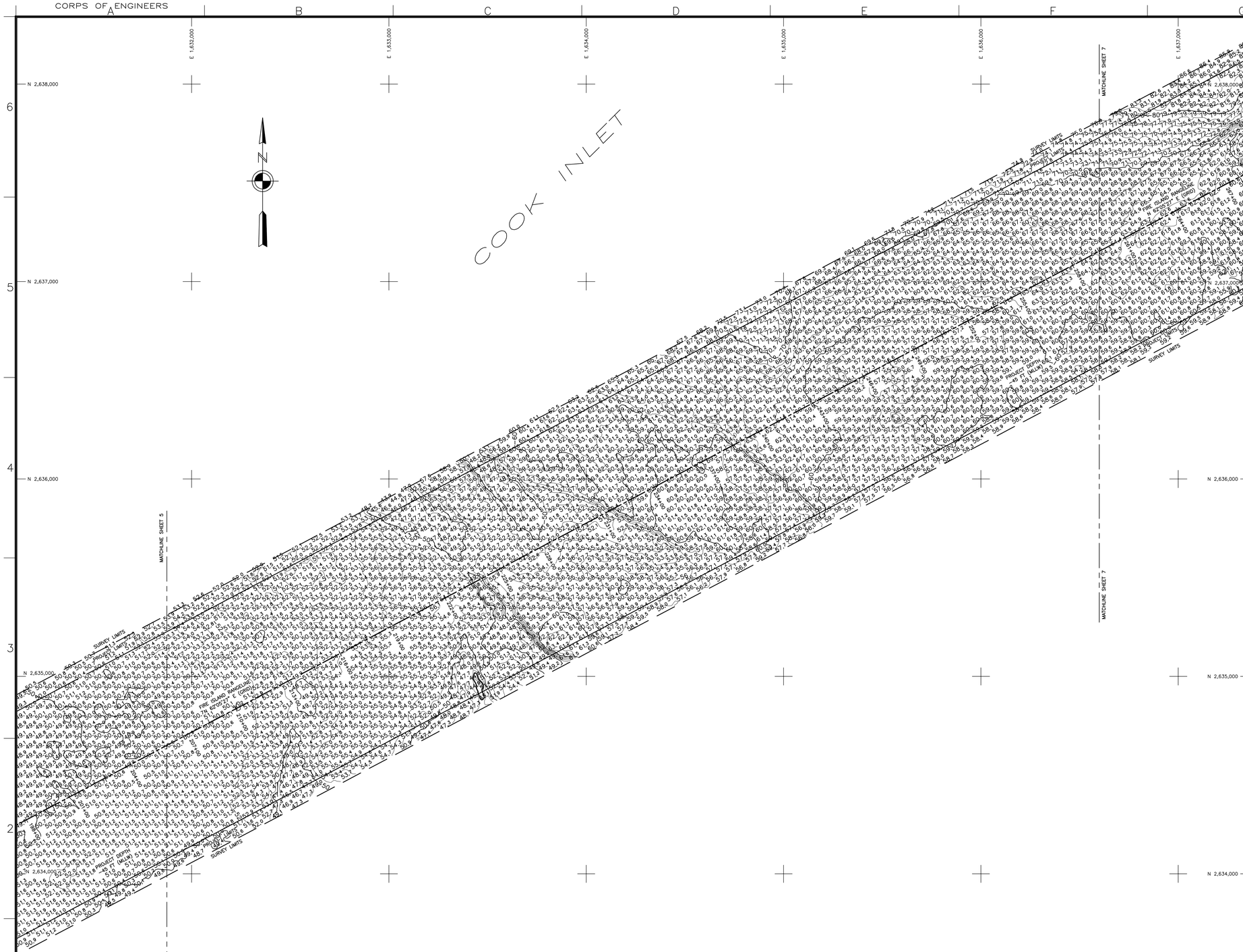
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Drawing #: 2770-10
Section
Branch
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief:
USACE Survey No.:

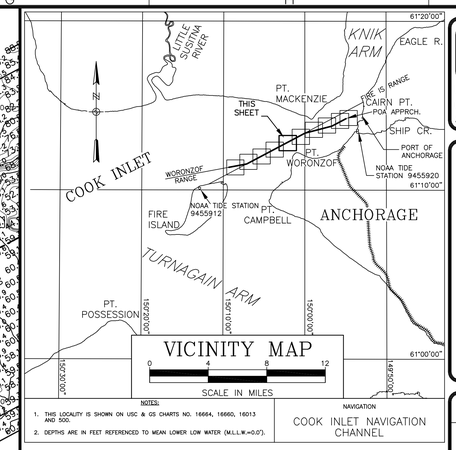
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-105
Sheet 5 of 21

CORPS OF ENGINEERS — U. S. ARMY





NOTES:
1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0').

NAVIGATION
COOK INLET NAVIGATION CHANNEL

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-08-D-0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN–LOWER–LOW–WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150–DEGREE SWATH–WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART–PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI–BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL–TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET–RS GPS RECEIVER SET AT CONTROL STATION, "TERRA–10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL–TIME–KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
4. THE SURVEY AND THE PRELIMINARY PROCESSED DATASET WAS BASED ON RTK MLLW TIDE DATUM AT THE PORT OF ANCHORAGE AS NOTED ABOVE. THE FINAL DATASET WAS ADJUSTED TO REFLECT THE DIFFERENCE IN TIDE DATUM VALUES AT THE PORT OF ANCHORAGE (NOAA/NOS 9455920) AND THE TIDE DATUM VALUES AT FIRE ISLAND (NOAA/NOS 9455912). THIS "TILTED PLANE" ADJUSTMENT WAS PERFORMED TO PROVIDE A UNIFORM MLLW BASED APPROACH FROM THE WEST END OF THE COOK INLET NAVIGATION CHANNEL INTO THE PORT OF ANCHORAGE. THE ADJUSTMENT IS BASED ON OBSERVED RTK HEIGHT VALUES MEASURED AT BOTH NOAA/NOS TIDE STATIONS LISTED ABOVE. THE OBSERVED RTK DIFFERENCE HOLDS THE PORT OF ANCHORAGE AT 0.0' AND FIRE ISLAND AT –3.73'. THE ADJUSTMENT WAS PERFORMED USING CARIS BASE EDITOR V2.1 RAISING ALL SOUNDINGS PROPORTIONATELY ALONG THE DISTANCE BETWEEN THE TIDAL BENCH MARKS UTILIZED TO DEFINE THE VERTICAL DATUM. THE ADJUSTMENT AT THE PORT OF ANCHORAGE IS 0.0' EXTENDING TO AN ADJUSTMENT OF +3.73' AT FIRE ISLAND (SEE DIAGRAM ON SHEET 1).
5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
6. THIS SURVEY IS INDICATIVE OF GENERAL CONDITIONS ON THE DATES OF SURVEY.
7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW		CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH	(–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE	(–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
SL5	2,627,490.72	1,619,603.68
SL6	2,638,640.64	1,640,654.15
SL7	2,640,288.38	1,642,358.15
SL8	2,647,179.66	1,655,368.53
SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
NC4	2,626,365.49	1,613,110.61	0+00
NC5	2,627,562.38	1,619,578.73	65+00
NC6	2,638,711.03	1,640,626.81	303+00
NC7	2,642,189.38	1,649,983.88	403+50
NC8	2,644,878.56	1,655,055.31	459+50
NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

⚠ CONTROL COORDINATES ⚠

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

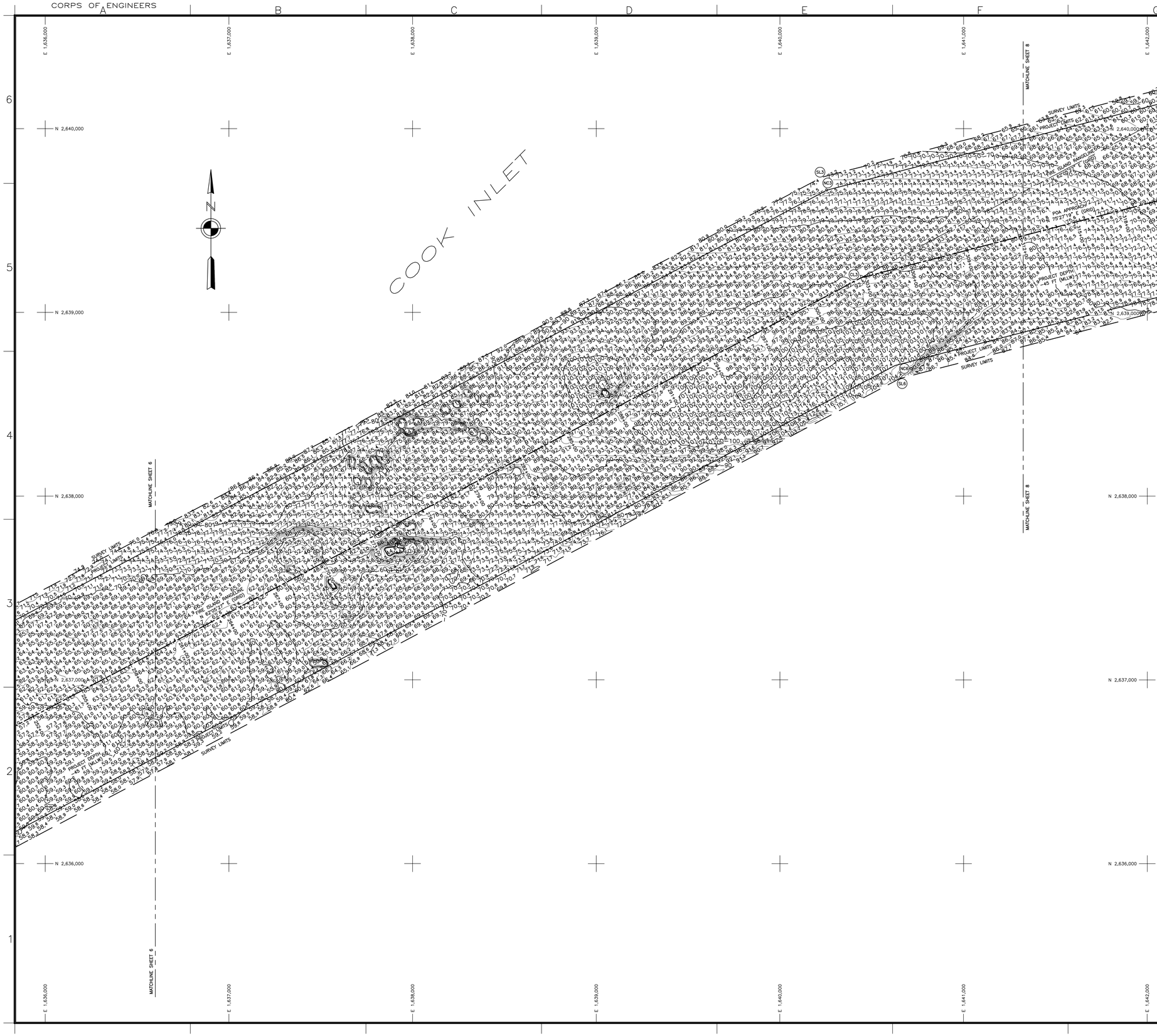
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL Section
Submitted: Branch
Chief, Drawing #
USACE Survey No.: 2770-10
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:

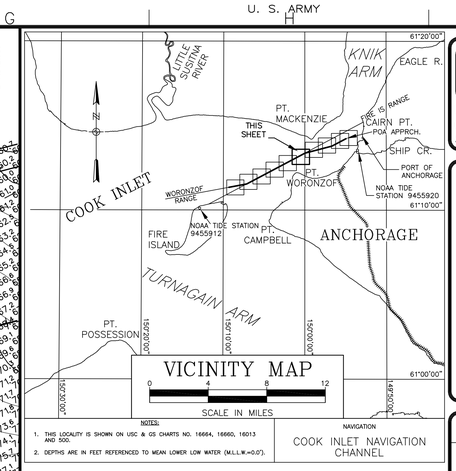
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-106
Sheet 6 of 21

CORPS OF ENGINEERS — U. S. ARMY





NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0').

NAVIGATION: COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
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7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW		CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH	(–45' MLLW)	3,691,263
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VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
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200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PROJ. CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

Date: 08/06/10
Dwg. Scale: AS NOTED
Plot. Scale:
File: Section
Drawing #: Branch
2770-10

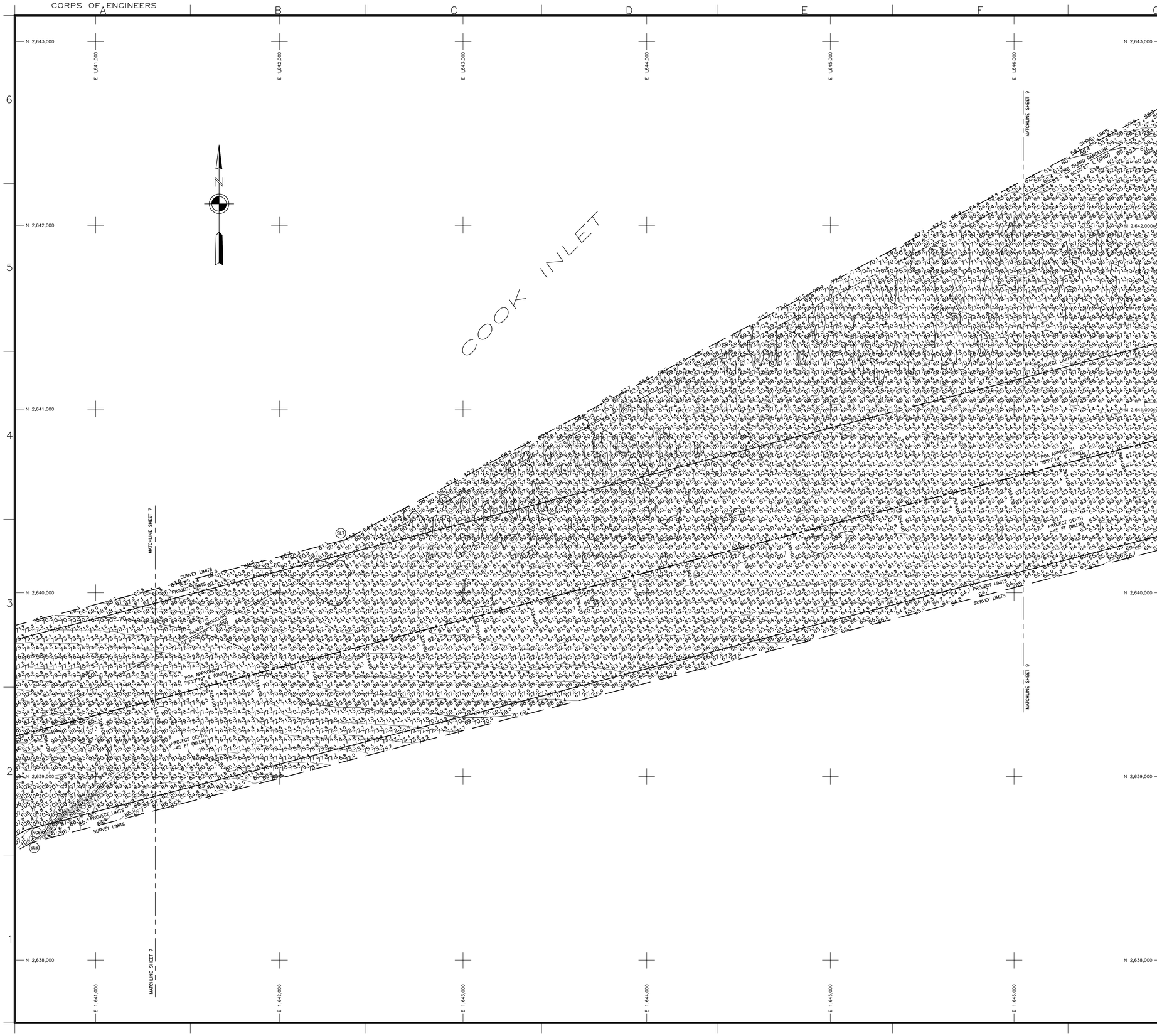
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief:
USACE Survey No.:

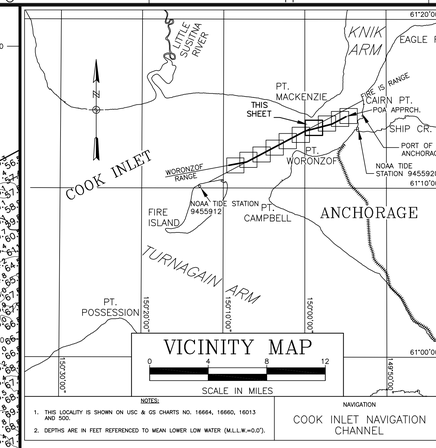
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-107
Sheet 7 of 21

CORPS OF ENGINEERS — U. S. ARMY





NOTES:
1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
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7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW	CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH (–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE (–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES 3:1 (H:V)	112,106
TOTAL	4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
SL5	2,627,490.72	1,619,603.68
SL6	2,638,640.64	1,640,654.15
SL7	2,640,288.38	1,642,358.15
SL8	2,647,179.66	1,655,368.53
SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
NC4	2,626,365.49	1,613,110.61	0+00
NC5	2,627,562.38	1,619,578.73	65+00
NC6	2,638,711.03	1,640,626.81	303+00
NC7	2,642,189.38	1,649,983.88	403+50
NC8	2,644,878.56	1,655,055.31	459+50
NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

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STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
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PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

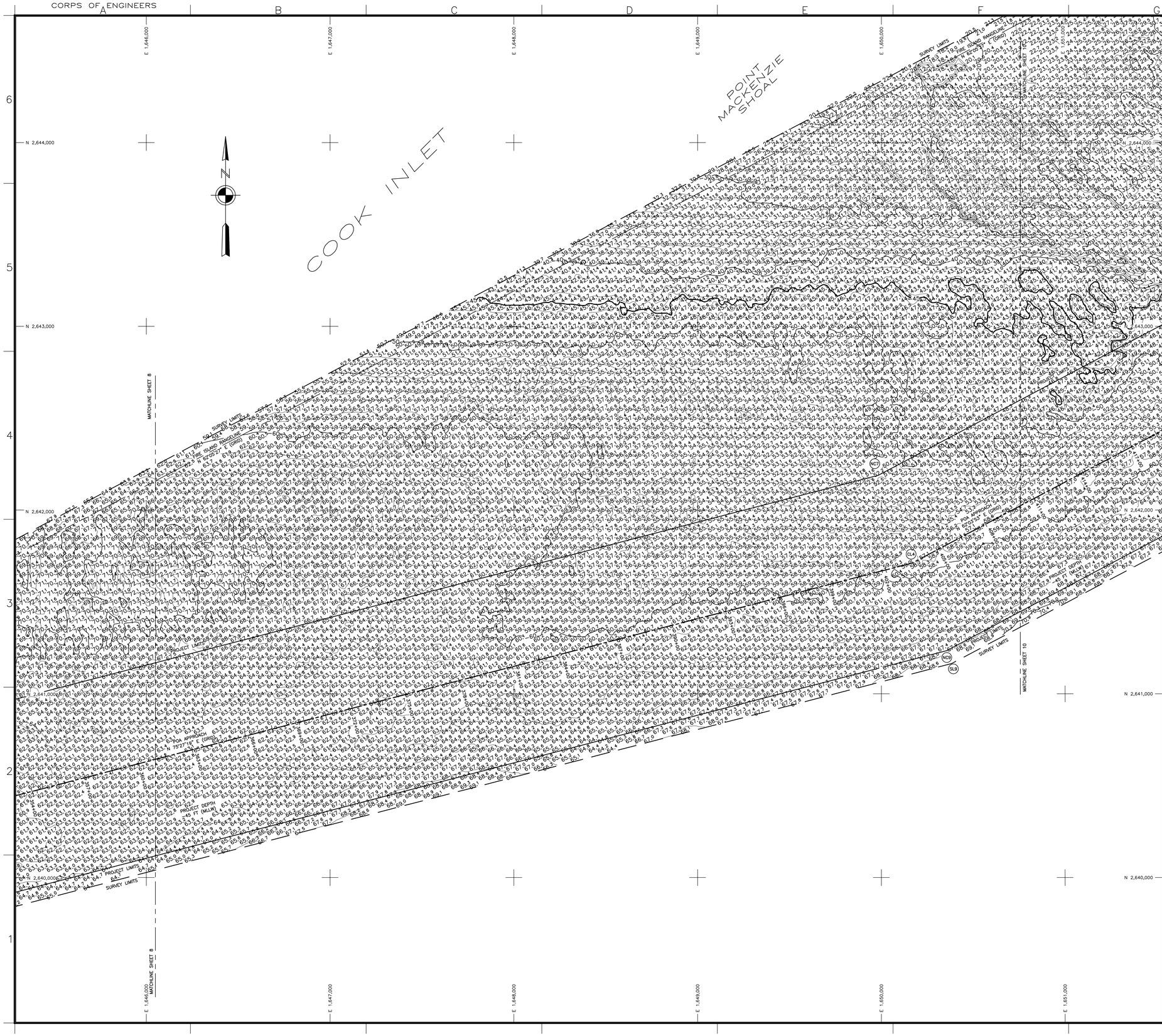
Sym.	Action	Description	Date	Approv.

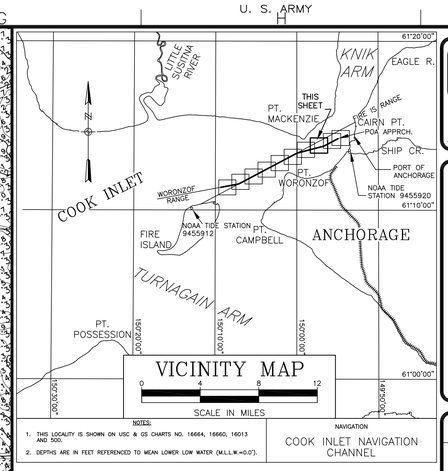
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL Section
Submitted: Branch
Chief, USACE Survey No: Drawing #: 2770-10
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-108
Sheet 8 of 21





NOTES:
1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0').

NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN–LOWER–LOW–WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150–DEGREE SWATH–WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART–PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI–BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL–TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET–RS GPS RECEIVER SET AT CONTROL STATION, "TERRA–10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL–TIME–KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
4. THE SURVEY AND THE PRELIMINARY PROCESSED DATASET WAS BASED ON RTK MLLW TIDE DATUM AT THE PORT OF ANCHORAGE AS NOTED ABOVE. THE FINAL DATASET WAS ADJUSTED TO REFLECT THE DIFFERENCE IN TIDE DATUM VALUES AT THE PORT OF ANCHORAGE (NOAA/NOS 9455920) AND THE TIDE DATUM VALUES AT FIRE ISLAND (NOAA/NOS 9455912). THIS "TILTED PLANE" ADJUSTMENT WAS PERFORMED TO PROVIDE A UNIFORM MLLW BASED APPROACH FROM THE WEST END OF THE COOK INLET NAVIGATION CHANNEL INTO THE PORT OF ANCHORAGE. THE ADJUSTMENT IS BASED ON OBSERVED RTK HEIGHT VALUES MEASURED AT BOTH NOAA/NOS TIDE STATIONS LISTED ABOVE. THE OBSERVED RTK DIFFERENCE HOLDS THE PORT OF ANCHORAGE AT 0.0' AND FIRE ISLAND AT –3.73'. THE ADJUSTMENT WAS PERFORMED USING CARIS BASE EDITOR V2.1 RAISING ALL SOUNDINGS PROPORTIONATELY ALONG THE DISTANCE BETWEEN THE TIDAL BENCH MARKS UTILIZED TO DEFINE THE VERTICAL DATUM. THE ADJUSTMENT AT THE PORT OF ANCHORAGE IS 0.0' EXTENDING TO AN ADJUSTMENT OF +3.73' AT FIRE ISLAND (SEE DIAGRAM ON SHEET 1).
5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
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7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

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VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

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200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PROJ. CONTRACTOR RESIDENT ENGINEER

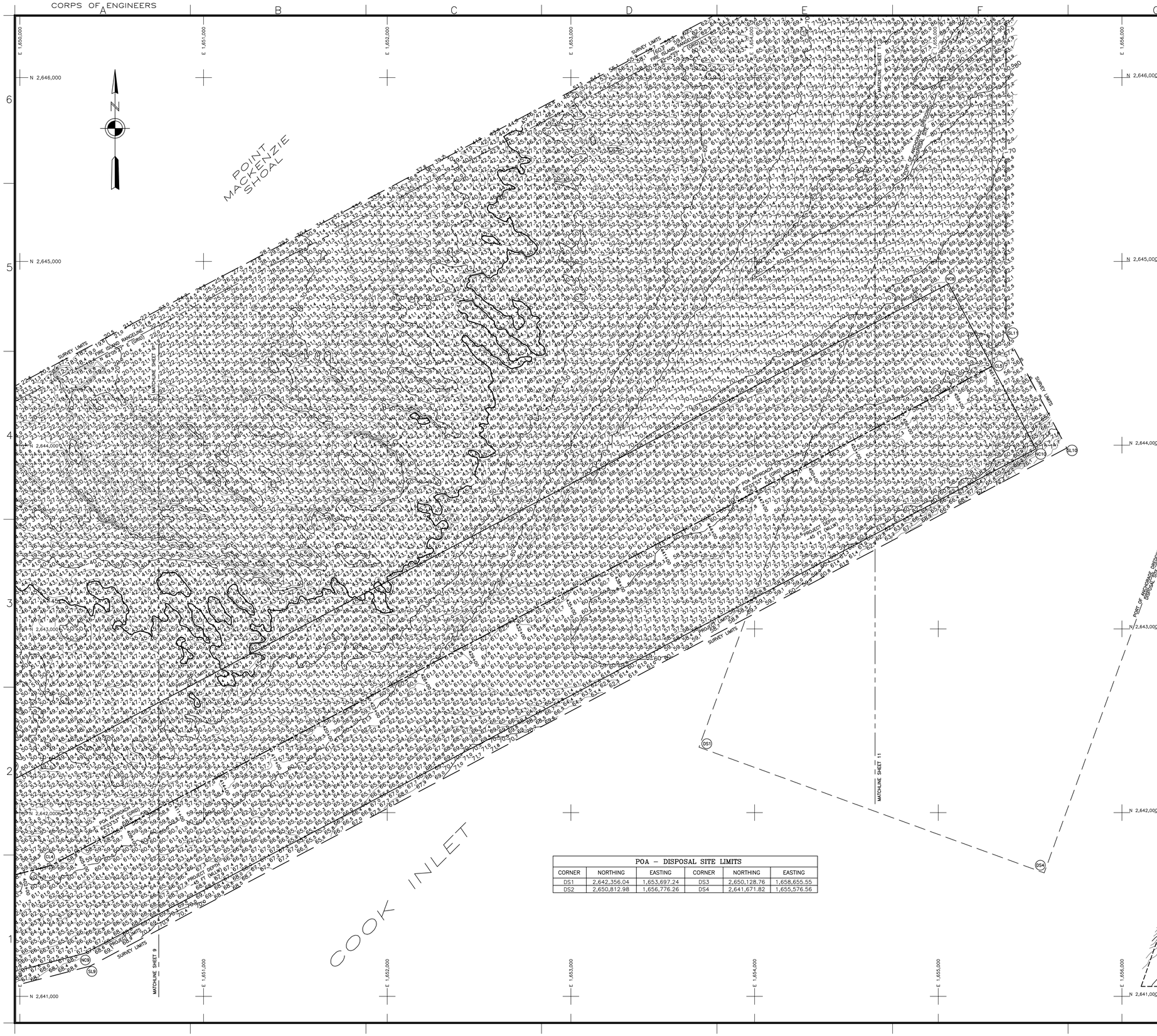
Sym.	Action	Description	Date	Approval

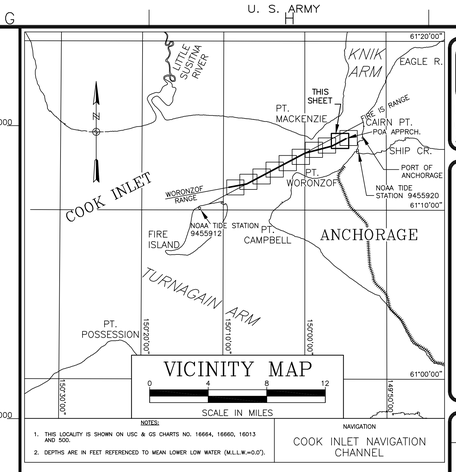
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Section
Branch
Drawing #: 2770-10
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief
USACE Survey No.:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-109
Sheet 9 of 21





NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NAVIGATION

COOK INLET NAVIGATION CHANNEL

NOTES

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NC10	2,643,980.06	1,655,531.75	459+50

POA – DISPOSAL SITE LIMITS

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
DS1	2,642,356.04	1,653,697.24	DS3	2,650,128.76	1,658,655.55
DS2	2,650,812.98	1,656,776.26	DS4	2,641,671.82	1,655,576.56

⚠ CONTROL COORDINATES ⚠

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
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200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approval

Date: 08/06/10
Dwg Scale: AS NOTED
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Drawing #: 2770-10
Section
Branch
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief
USACE Survey No.:

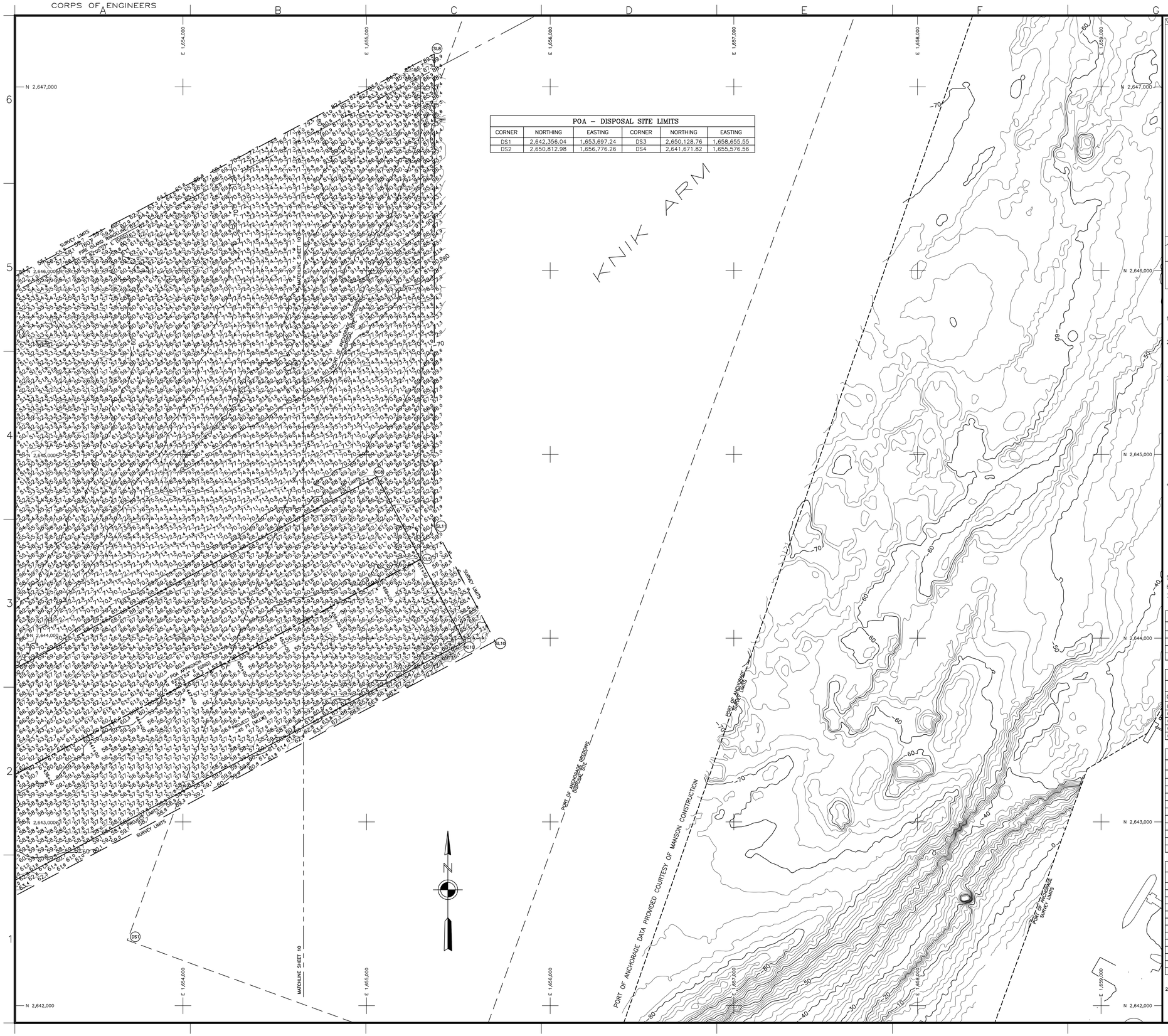
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-110
Sheet 10 of 21

CORPS OF ENGINEERS

U. S. ARMY



POA – DISPOSAL SITE LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
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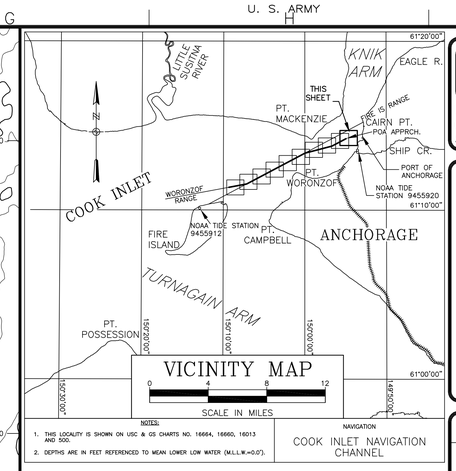


NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN–LOWER–LOW–WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150–DEGREE SWATH–WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART–PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI–BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL–TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET–RS GPS RECEIVER SET AT CONTROL STATION, "TERRA–10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL–TIME–KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
4. THE SURVEY AND THE PRELIMINARY PROCESSED DATASET WAS BASED ON RTK MLLW TIDE DATUM AT THE PORT OF ANCHORAGE AS NOTED ABOVE. THE FINAL DATASET WAS ADJUSTED TO REFLECT THE DIFFERENCE IN TIDE DATUM VALUES AT THE PORT OF ANCHORAGE (NOAA/NOS 9455920) AND THE TIDE DATUM VALUES AT FIRE ISLAND (NOAA/NOS 9455912). THIS "TILTED PLANE" ADJUSTMENT WAS PERFORMED TO PROVIDE A UNIFORM MLLW BASED APPROACH FROM THE WEST END OF THE COOK INLET NAVIGATION CHANNEL INTO THE PORT OF ANCHORAGE. THE ADJUSTMENT IS BASED ON OBSERVED RTK HEIGHT VALUES MEASURED AT BOTH NOAA/NOS TIDE STATIONS LISTED ABOVE. THE OBSERVED RTK DIFFERENCE HOLDS THE PORT OF ANCHORAGE AT 0.0' AND FIRE ISLAND AT –3.73'. THE ADJUSTMENT WAS PERFORMED USING CARIS BASE EDITOR V2.1 RAISING ALL SOUNDINGS PROPORTIONATELY ALONG THE DISTANCE BETWEEN THE TIDAL BENCH MARKS UTILIZED TO DEFINE THE VERTICAL DATUM. THE ADJUSTMENT AT THE PORT OF ANCHORAGE IS 0.0' EXTENDING TO AN ADJUSTMENT OF +3.73' AT FIRE ISLAND (SEE DIAGRAM ON SHEET 1).
5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
6. THIS SURVEY IS INDICATIVE OF GENERAL CONDITIONS ON THE DATES OF SURVEY.
7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS	
PROJECT DEPTH –45' MLLW	CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH (–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE (–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES 3:1 (H:V)	112,106
TOTAL	4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
SL5	2,627,490.72	1,619,603.68
SL6	2,638,640.64	1,640,654.15
SL7	2,640,288.38	1,642,358.15
SL8	2,647,179.66	1,655,368.53
SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
NC4	2,626,365.49	1,613,110.61	0+00
NC5	2,627,562.38	1,619,578.73	65+00
NC6	2,638,711.03	1,640,626.81	303+00
NC7	2,642,189.38	1,649,983.88	403+50
NC8	2,644,878.56	1,655,055.31	459+50
NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

⚠ CONTROL COORDINATES ⚠

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600

SCALE IN FEET

HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PROJ. CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approd

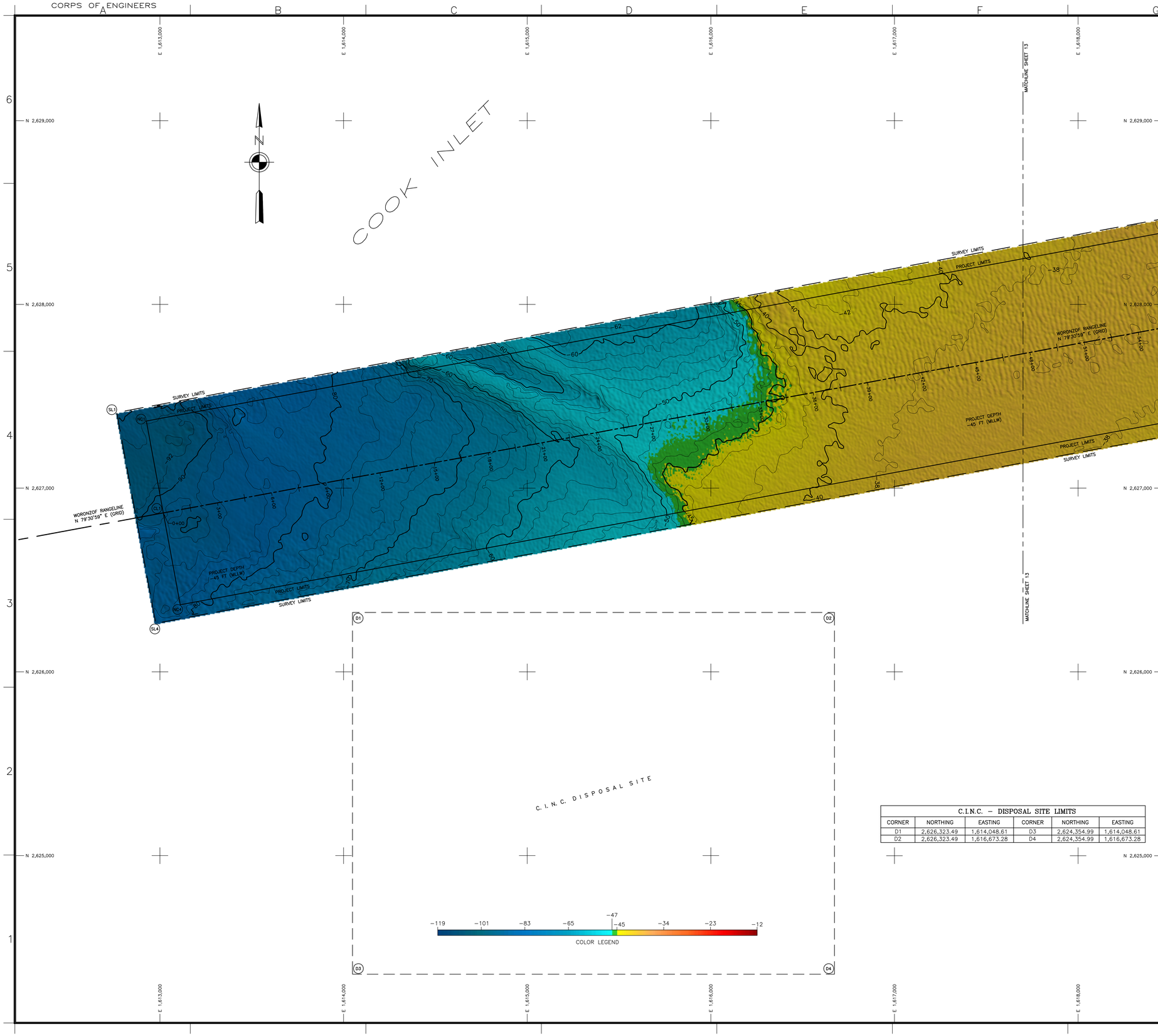
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief: A. CHURCHILL
Submitted:
Chief:
USACE Survey No.:
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Section
Drawing #:
Branch:
2770-10

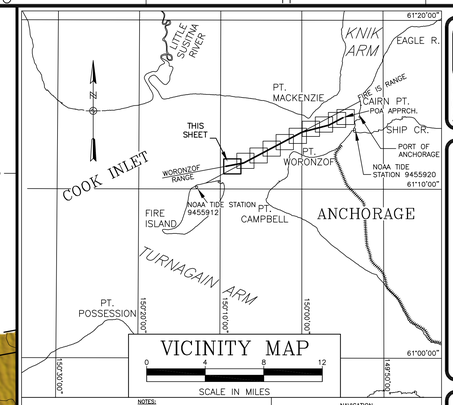
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-111
Sheet 11 of 21

CORPS OF ENGINEERS — U. S. ARMY





NOTES:
1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

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NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

C.I.N.C. – DISPOSAL SITE LIMITS

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
D1	2,626,323.49	1,614,048.61	D3	2,624,354.99	1,614,048.61
D2	2,626,323.49	1,616,673.28	D4	2,624,354.99	1,616,673.28

CONTROL COORDINATES

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
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RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

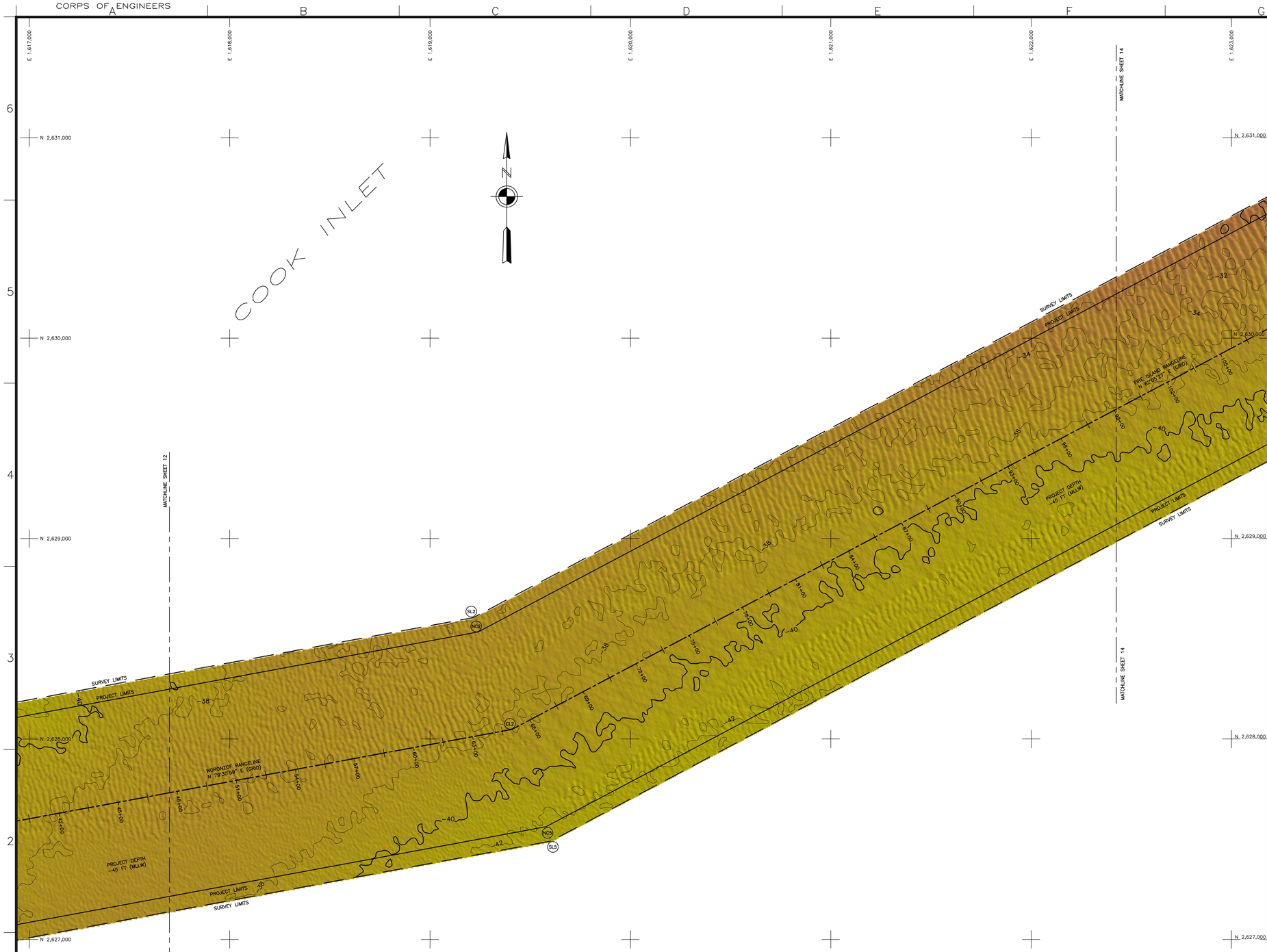
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief, ——
USACE Survey No: ——
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Drawing #: 2770-10

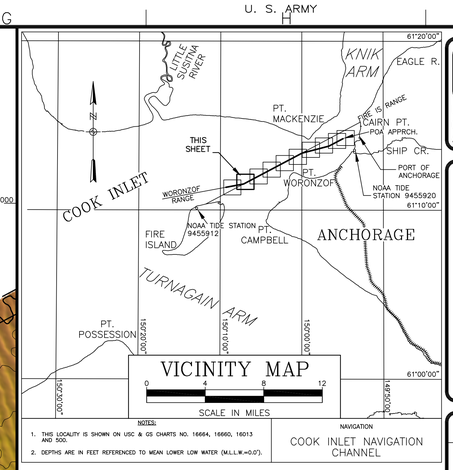
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-112
Sheet 12 of 21

CORPS OF ENGINEERS — U. S. ARMY





US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-08-D-0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

Sym	Action	Description	Date	Approv

Date: 08/06/10
Dwg Scale: AS NOTED
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Drawing #: 2770-10
Designed: JEA
Drawn: KNB
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Chief: A. CHURCHILL
Section
Branch
Submitted:
Chief
USACE Survey No.:
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-113
Sheet 13 of 21

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
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7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW		CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH	(–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE	(–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

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SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
NC4	2,626,365.49	1,613,110.61	0+00
NC5	2,627,562.38	1,619,578.73	65+00
NC6	2,638,711.03	1,640,626.81	303+00
NC7	2,642,189.38	1,649,983.88	403+50
NC8	2,644,878.56	1,655,055.31	459+50
NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

⚠ CONTROL COORDINATES ⚠

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NOS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

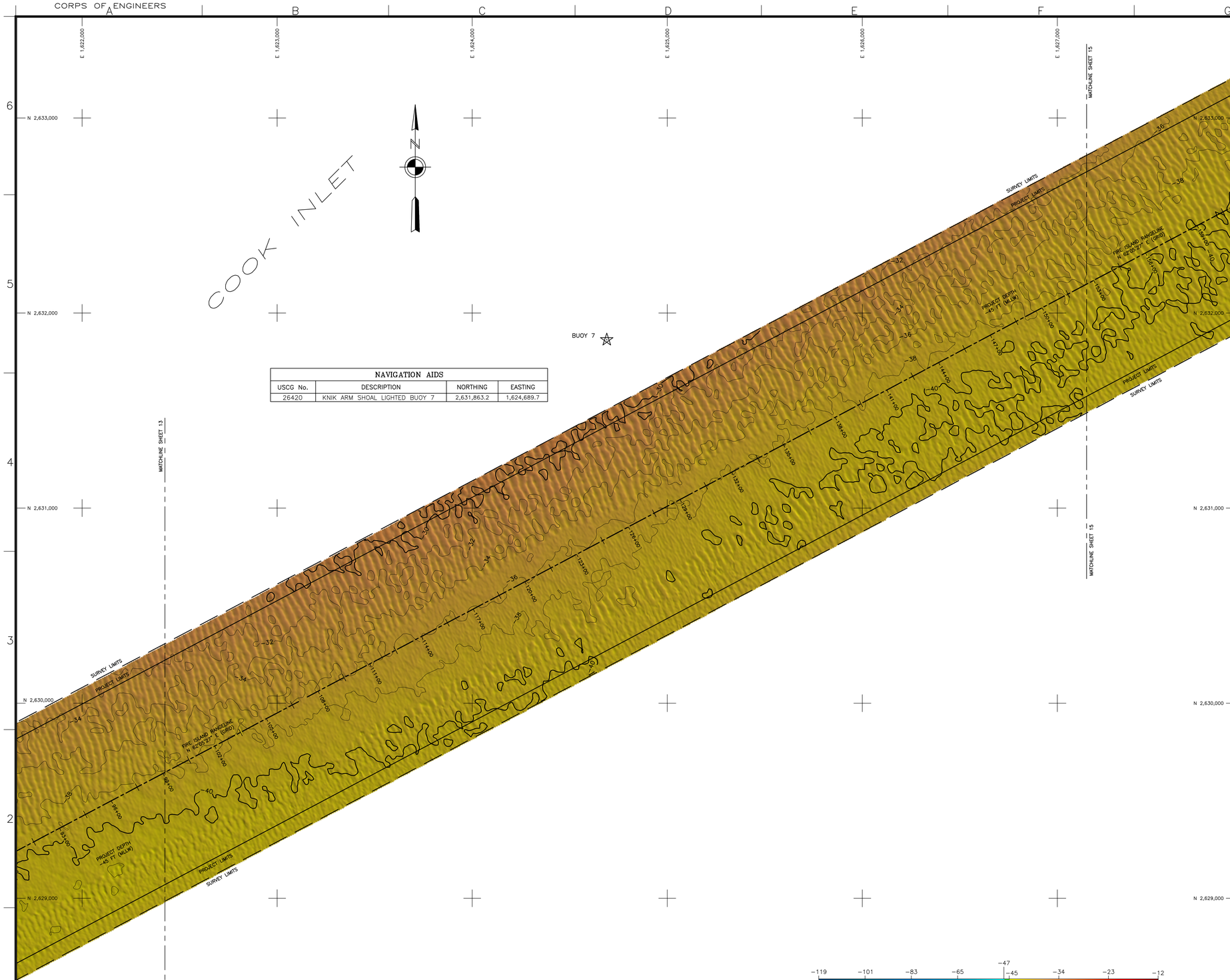
COLOR LEGEND: –119 –101 –83 –65 –47 –45 –34 –23 –12

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

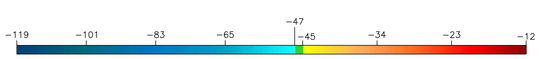
BATHYMETRY

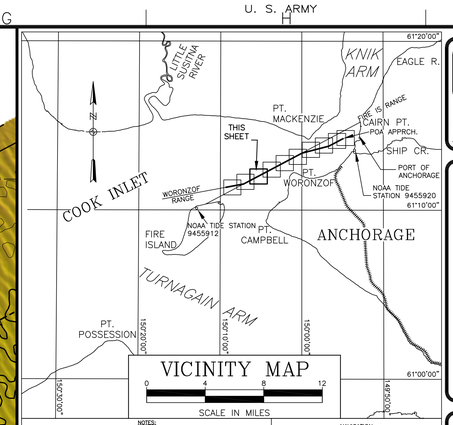
CORPS OF ENGINEERS

U. S. ARMY



NAVIGATION AIDS			
USCG No.	DESCRIPTION	NORTHING	EASTING
26420	KNIK ARM SHOAL LIGHTED BUOY 7	2,631,863.2	1,624,689.7





NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NAVIGATION

COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN-LOWER-LOW-WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150-DEGREE SWATH-WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART-PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI-BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL-TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET-RS GPS RECEIVER SET AT CONTROL STATION, "TERRA-10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL-TIME-KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
4. THE SURVEY AND THE PRELIMINARY PROCESSED DATASET WAS BASED ON RTK MLLW TIDE DATUM AT THE PORT OF ANCHORAGE AS NOTED ABOVE. THE FINAL DATASET WAS ADJUSTED TO REFLECT THE DIFFERENCE IN TIDE DATUM VALUES AT THE PORT OF ANCHORAGE (NOAA/NOS 9455920) AND THE TIDE DATUM VALUES AT FIRE ISLAND (NOAA/NOS 9455912). THIS "TILTED PLANE" ADJUSTMENT WAS PERFORMED TO PROVIDE A UNIFORM MLLW BASED APPROACH FROM THE WEST END OF THE COOK INLET NAVIGATION CHANNEL INTO THE PORT OF ANCHORAGE. THE ADJUSTMENT IS BASED ON OBSERVED RTK HEIGHT VALUES MEASURED AT BOTH NOAA/NOS TIDE STATIONS LISTED ABOVE. THE OBSERVED RTK DIFFERENCE HOLDS THE PORT OF ANCHORAGE AT 0.0' AND FIRE ISLAND AT -3.73'. THE ADJUSTMENT WAS PERFORMED USING CARIS BASE EDITOR V2.1 RAISING ALL SOUNDINGS PROPORTIONATELY ALONG THE DISTANCE BETWEEN THE TIDAL BENCH MARKS UTILIZED TO DEFINE THE VERTICAL DATUM. THE ADJUSTMENT AT THE PORT OF ANCHORAGE IS 0.0' EXTENDING TO AN ADJUSTMENT OF +3.73' AT FIRE ISLAND (SEE DIAGRAM ON SHEET 1).
5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
6. THIS SURVEY IS INDICATIVE OF GENERAL CONDITIONS ON THE DATES OF SURVEY.
7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS	
PROJECT DEPTH -45' MLLW	CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH (-45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE (-47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES 3:1 (H:V)	112,106
TOTAL	4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
SL5	2,627,490.72	1,619,603.68
SL6	2,638,640.64	1,640,654.15
SL7	2,640,288.38	1,642,358.15
SL8	2,647,179.66	1,655,368.53
SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
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CONTROL COORDINATES

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
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PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ-1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
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NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
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NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI-STA SBC

200 0 200 400 600

SCALE IN FEET

HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-08-D-0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PROJ. CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Section
Branch
Drawing #:
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief
USACE Survey No.: 2770-10

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

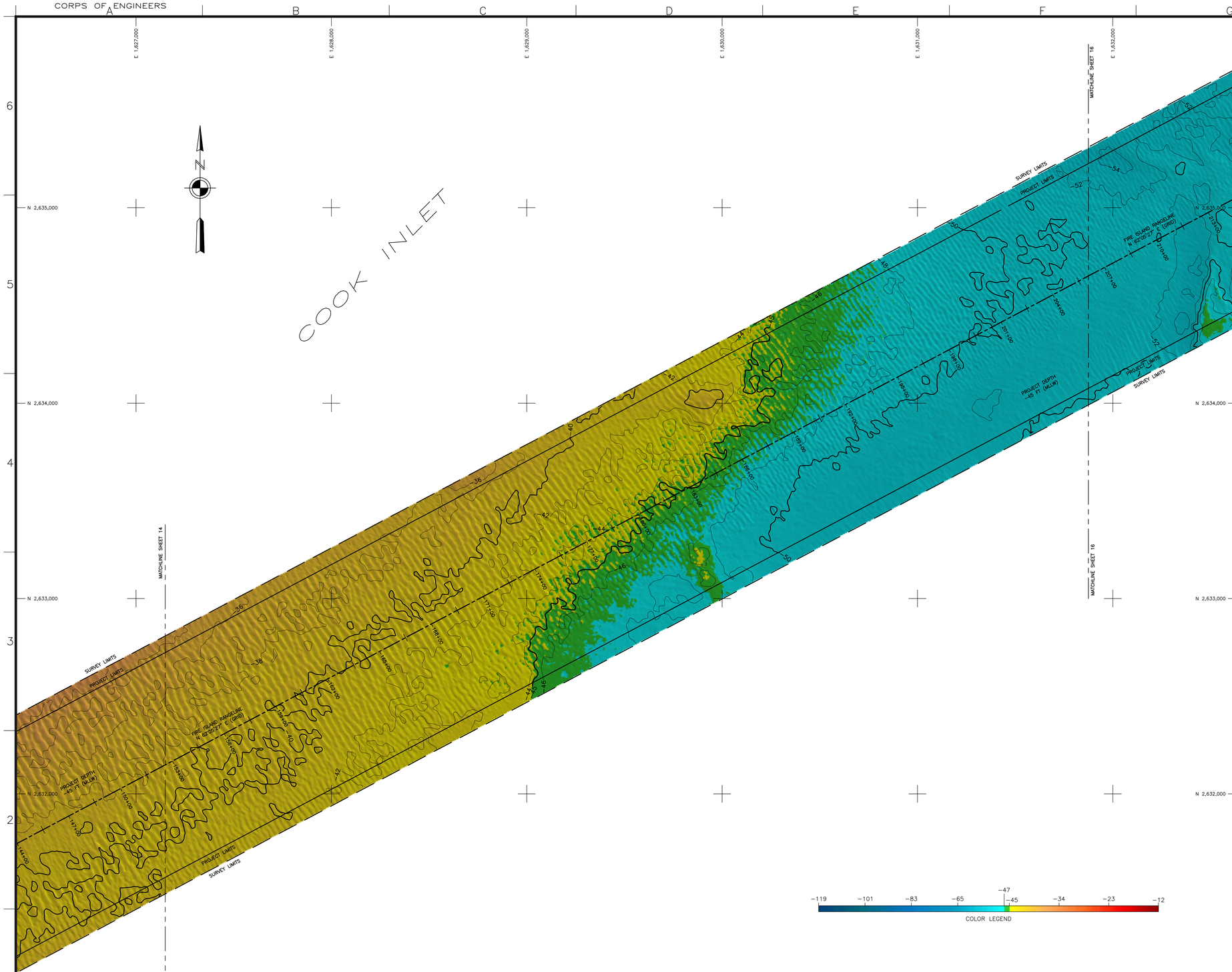
ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8-22, 2010

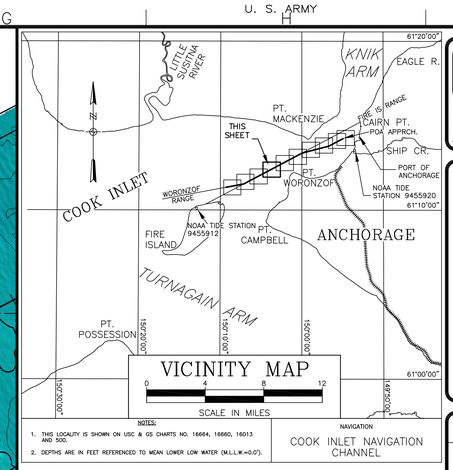
Reference number:
V-114

Sheet 14 of 21

CORPS OF ENGINEERS

U. S. ARMY





NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (MLLW=0.0').

NAVIGATION

COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
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VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW	CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH (–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE (–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES 3:1 (H:V)	112,106
TOTAL	4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
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RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Section:
Branch:
Drawing #:
2770-10

Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief:
USACE Survey No:

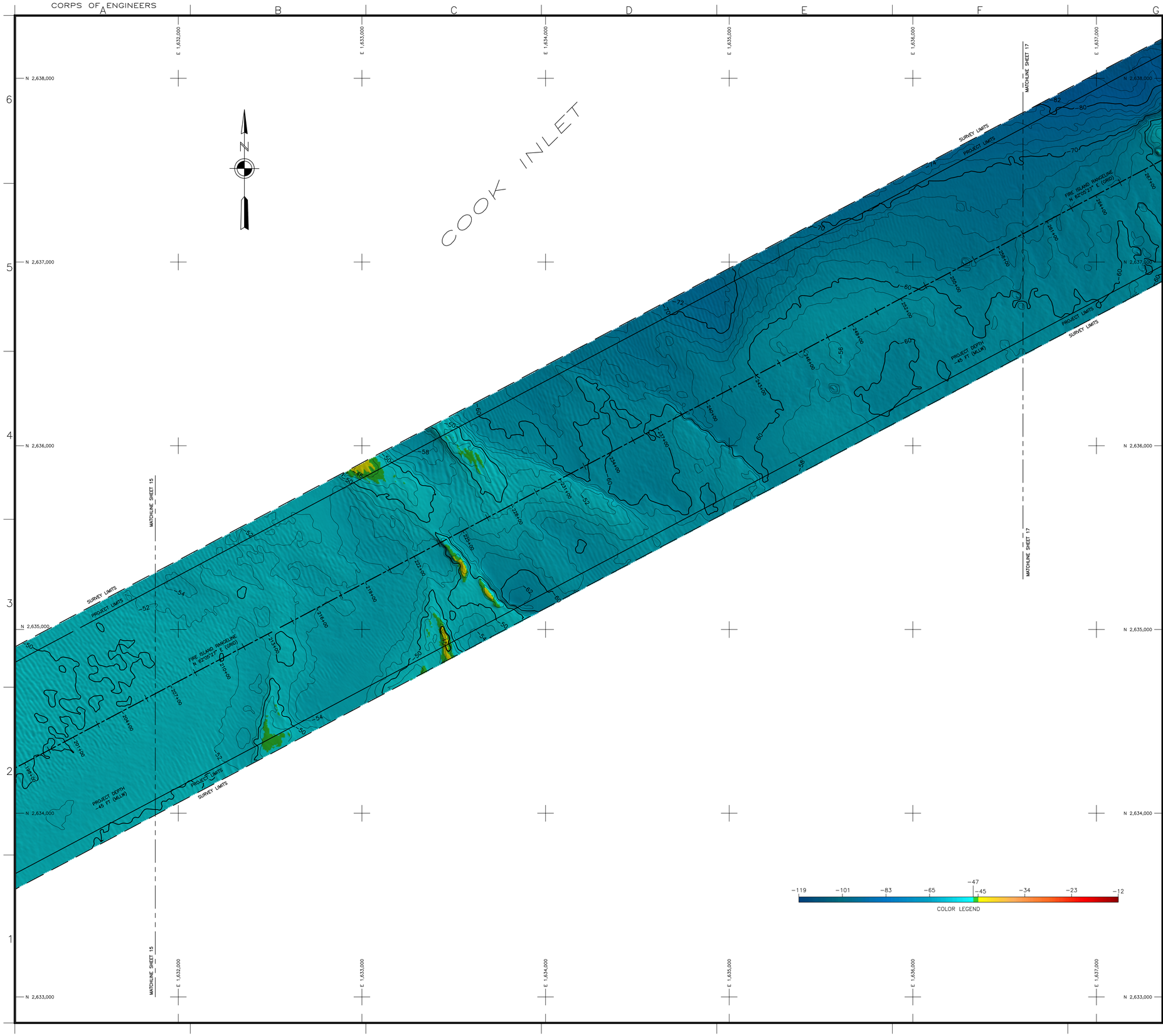
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

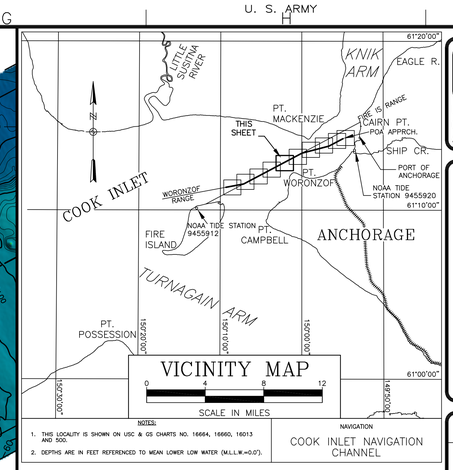
ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-115
Sheet 15 of 21

CORPS OF ENGINEERS

U. S. ARMY





NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
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NAVIGATION

COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
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VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW		CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH	(–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE	(–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
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RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600

SCALE IN FEET

HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

Date: 08/06/10
Dwg. Scale: AS NOTED
Plot. Scale:
File:
Drawing #: 2770-10
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL Section
Submitted: Branch
Chief, USACE Survey No.:

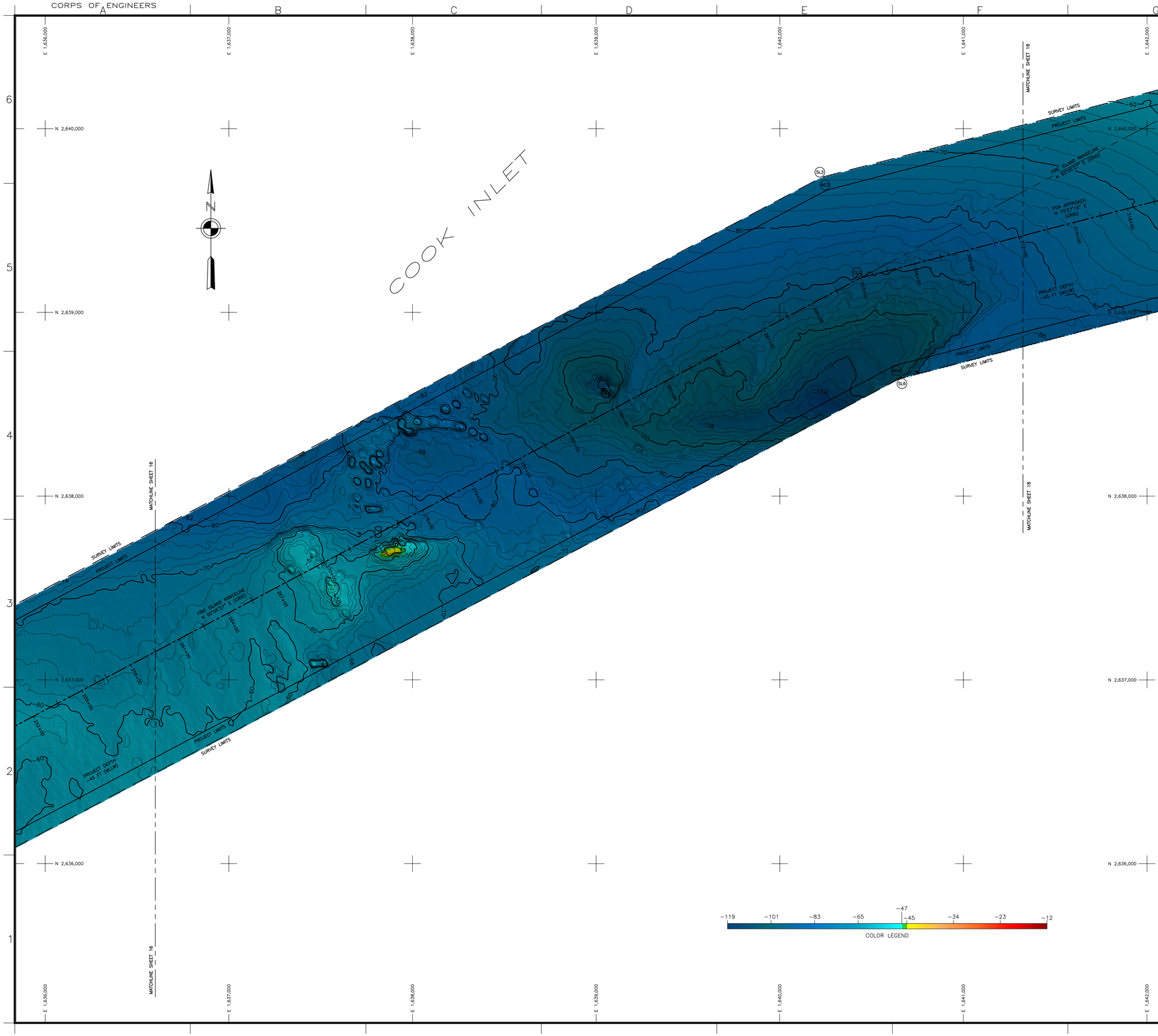
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

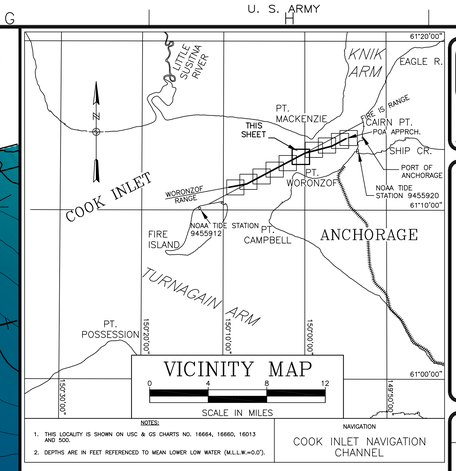
ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-116
Sheet 16 of 21

CORPS OF ENGINEERS

U. S. ARMY





NOTES:

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NAVIGATION

COOK INLET NAVIGATION CHANNEL

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COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
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200 0 200 400 600

SCALE IN FEET

HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym	Action	Description	Date	Approv

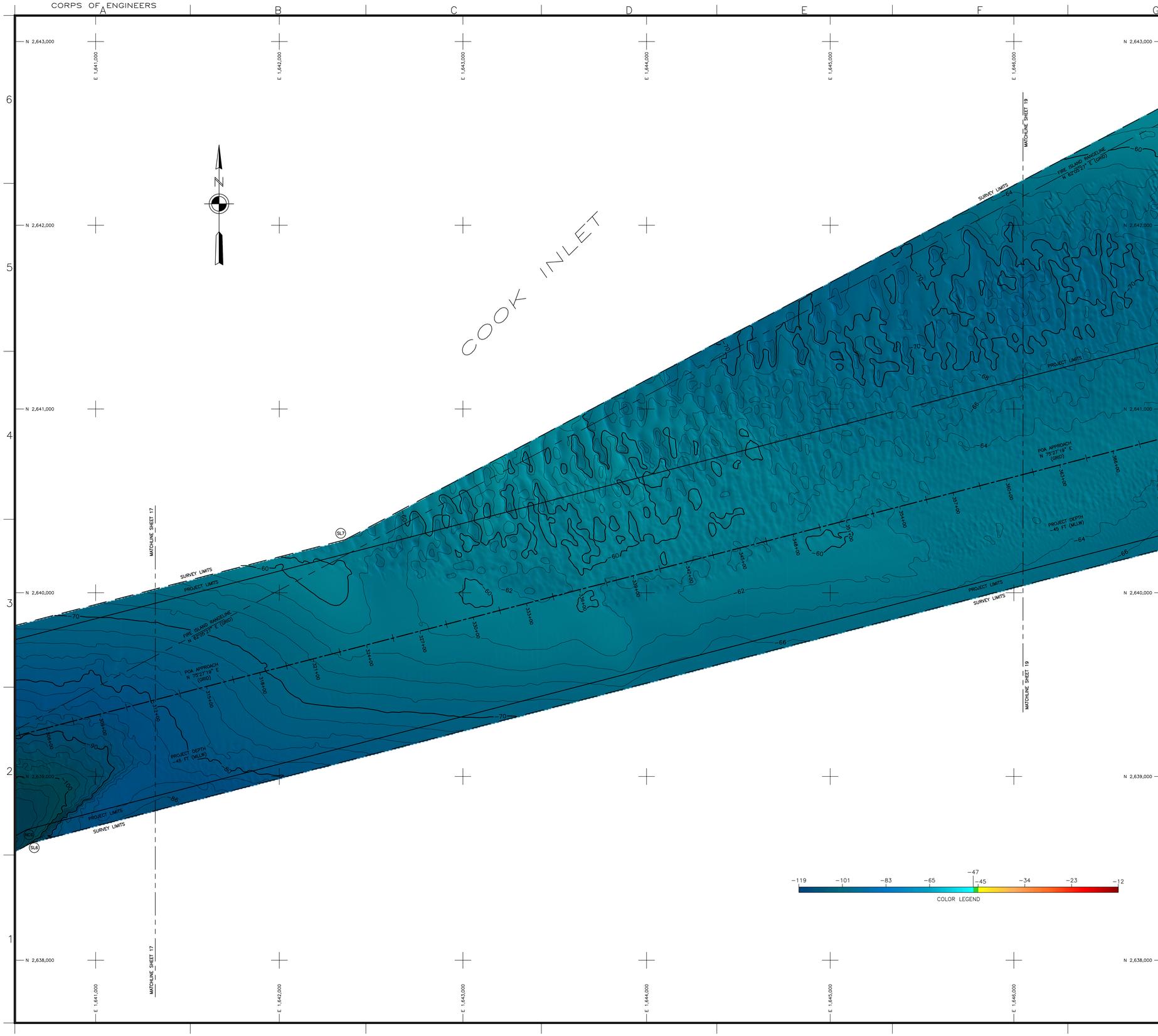
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Drawing #: 2770-10
Section
Branch
Chief: A. CHURCHILL
Submitted:
Chief:
USACE Survey No.:
Designed: JEA
Drawn: KNB
Reviewed: KDW

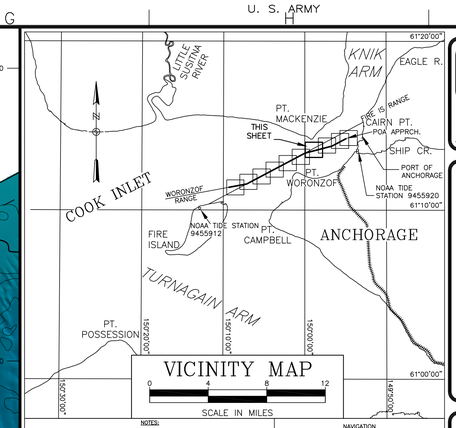
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-117
Sheet 17 of 21

CORPS OF ENGINEERS — U. S. ARMY





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COOK INLET NAVIGATION CHANNEL

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AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

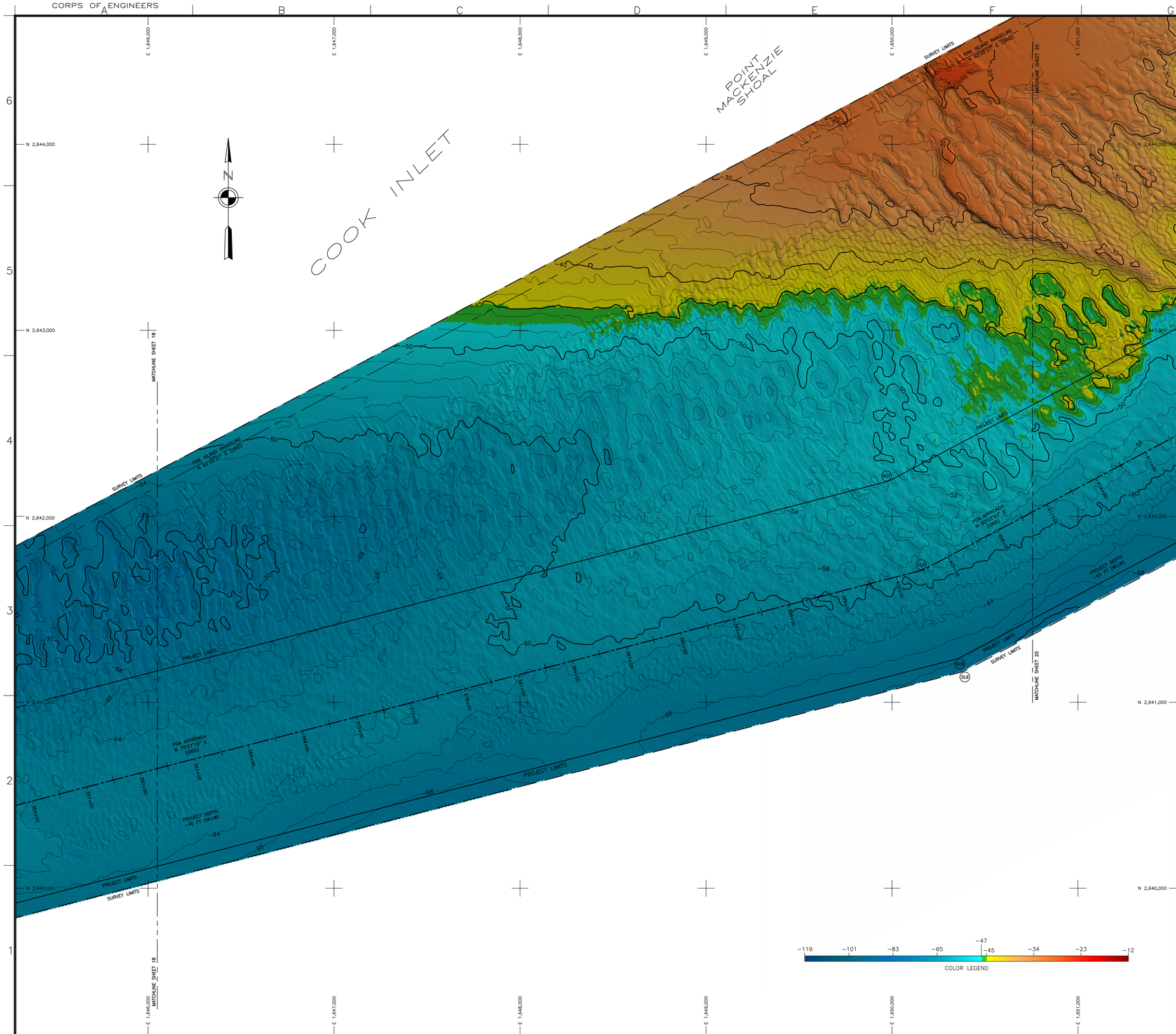
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL Section
Submitted: Branch
Chief, Drawing #
USACE Survey No.: 2770-10
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:

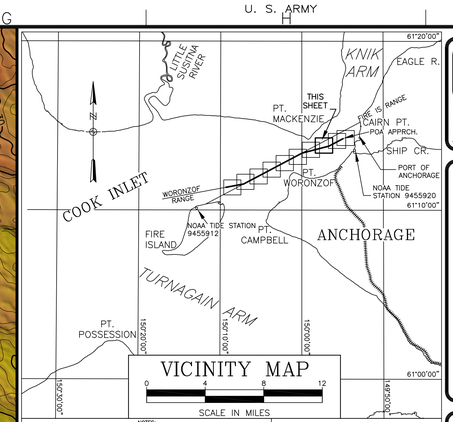
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-118
Sheet 18 of 21

CORPS OF ENGINEERS — U. S. ARMY





NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NAVIGATION
COOK INLET NAVIGATION CHANNEL

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN–LOWER–LOW–WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150–DEGREE SWATH–WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART–PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI–BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL–TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET–RS GPS RECEIVER SET AT CONTROL STATION, "TERRA–10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL–TIME–KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
4. THE SURVEY AND THE PRELIMINARY PROCESSED DATASET WAS BASED ON RTK MLLW TIDE DATUM AT THE PORT OF ANCHORAGE AS NOTED ABOVE. THE FINAL DATASET WAS ADJUSTED TO REFLECT THE DIFFERENCE IN TIDE DATUM VALUES AT THE PORT OF ANCHORAGE (NOAA/NOS 9455920) AND THE TIDE DATUM VALUES AT FIRE ISLAND (NOAA/NOS 9455912). THIS "TILTED PLANE" ADJUSTMENT WAS PERFORMED TO PROVIDE A UNIFORM MLLW BASED APPROACH FROM THE WEST END OF THE COOK INLET NAVIGATION CHANNEL INTO THE PORT OF ANCHORAGE. THE ADJUSTMENT IS BASED ON OBSERVED RTK HEIGHT VALUES MEASURED AT BOTH NOAA/NOS TIDE STATIONS LISTED ABOVE. THE OBSERVED RTK DIFFERENCE HOLDS THE PORT OF ANCHORAGE AT 0.0' AND FIRE ISLAND AT –3.73'. THE ADJUSTMENT WAS PERFORMED USING CARIS BASE EDITOR V2.1 RAISING ALL SOUNDINGS PROPORTIONATELY ALONG THE DISTANCE BETWEEN THE TIDAL BENCH MARKS UTILIZED TO DEFINE THE VERTICAL DATUM. THE ADJUSTMENT AT THE PORT OF ANCHORAGE IS 0.0' EXTENDING TO AN ADJUSTMENT OF +3.73' AT FIRE ISLAND (SEE DIAGRAM ON SHEET 1).
5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
6. THIS SURVEY IS INDICATIVE OF GENERAL CONDITIONS ON THE DATES OF SURVEY.
7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW		CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH	(–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE	(–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
SL5	2,627,490.72	1,619,603.68
SL6	2,638,640.64	1,640,654.15
SL7	2,640,288.38	1,642,358.15
SL8	2,647,179.66	1,655,368.53
SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
NC4	2,626,365.49	1,613,110.61	0+00
NC5	2,627,562.38	1,619,578.73	65+00
NC6	2,638,711.03	1,640,626.81	303+00
NC7	2,642,189.38	1,649,983.88	403+50
NC8	2,644,878.56	1,655,055.31	459+50
NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

⚠ CONTROL COORDINATES ⚠

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NOS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approval

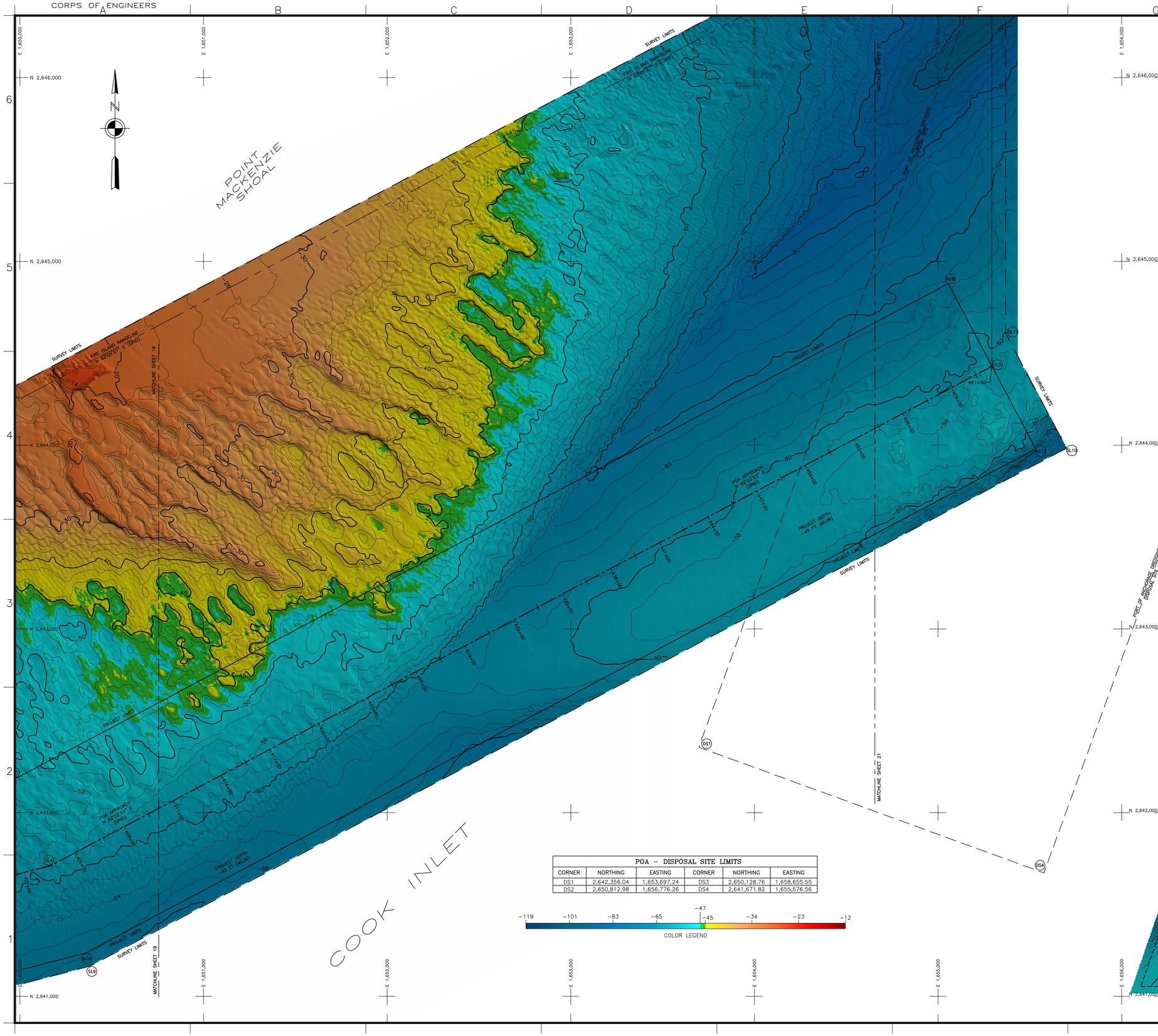
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief: A. CHURCHILL
Submitted:
Chief:
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Section
Branch
Drawing #:
USACE Survey No.: 2770-10

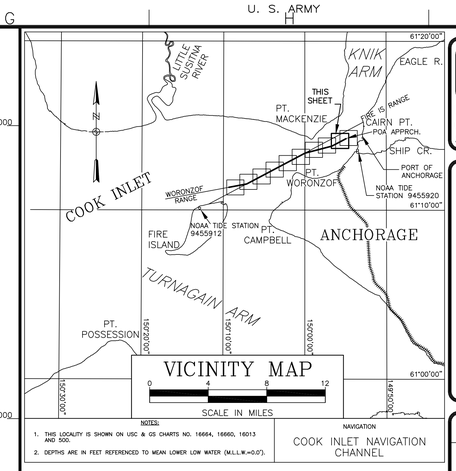
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-119

CORPS OF ENGINEERS — U. S. ARMY





NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN–LOWER–LOW–WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150–DEGREE SWATH–WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART–PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI–BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL–TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET–RS GPS RECEIVER SET AT CONTROL STATION, "TERRA–10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL–TIME–KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
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5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
6. THIS SURVEY IS INDICATIVE OF GENERAL CONDITIONS ON THE DATES OF SURVEY.
7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS

PROJECT DEPTH –45' MLLW		CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH	(–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE	(–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES	3:1 (H:V)	112,106
TOTAL		4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

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CHANNEL LIMITS

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NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

POA – DISPOSAL SITE LIMITS

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
DS1	2,642,356.04	1,653,697.24	DS3	2,650,128.76	1,658,655.55
DS2	2,650,812.98	1,656,776.26	DS4	2,641,671.82	1,655,576.56

CONTROL COORDINATES

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
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NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600
SCALE IN FEET
HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

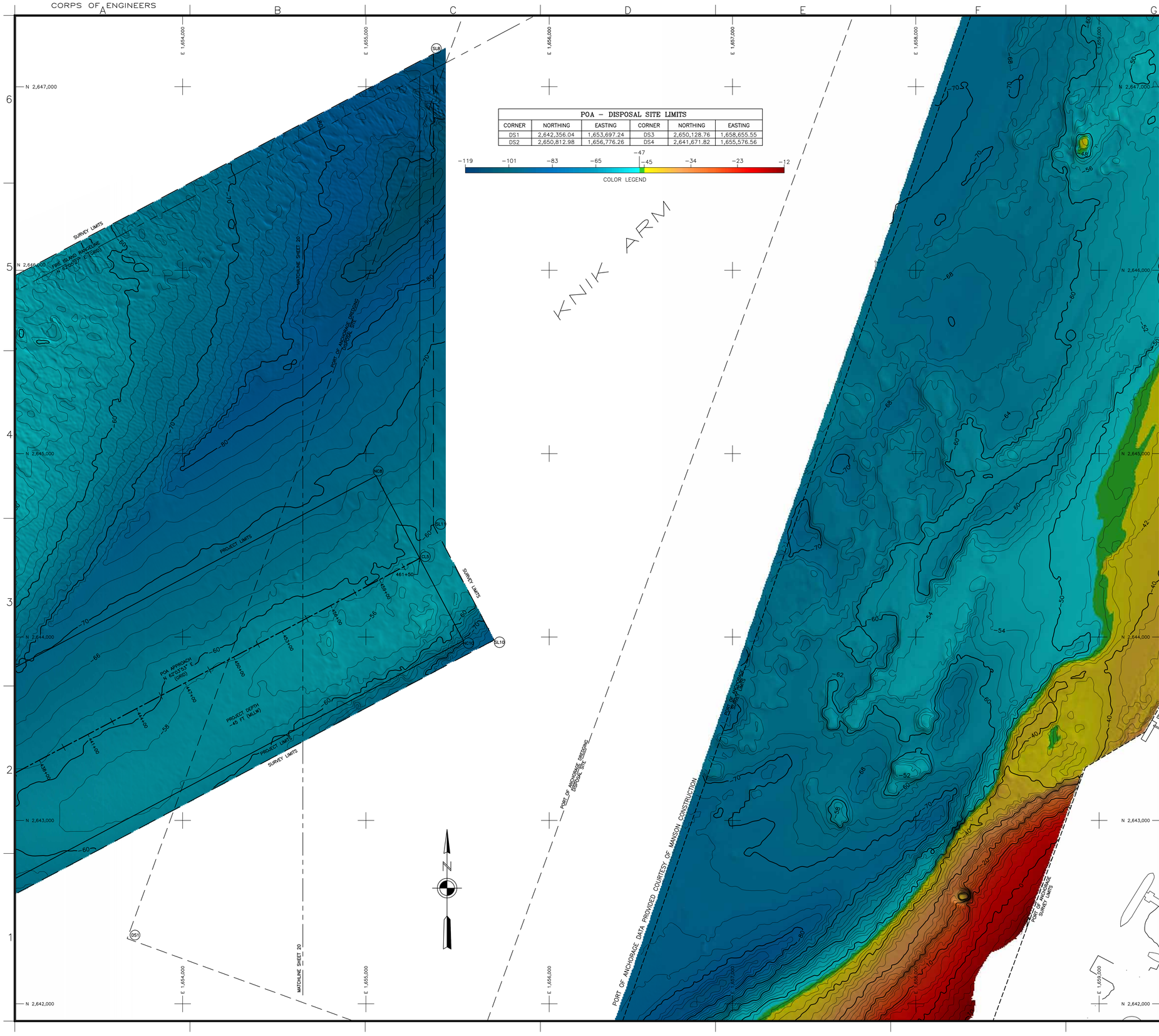
Date: 08/06/10
Dwg. Scale: AS NOTED
Plot. Scale:
File:
Section
Branch
Drawing #: 2770-10
Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief: A. CHURCHILL
Submitted:
Chief:
USACE Survey No.:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-120
Sheet 20 of 21

CORPS OF ENGINEERS — U. S. ARMY



POA – DISPOSAL SITE LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
DS1	2,642,356.04	1,653,697.24	DS3	2,650,128.76	1,658,655.55
DS2	2,650,812.98	1,656,776.26	DS4	2,641,671.82	1,655,576.56

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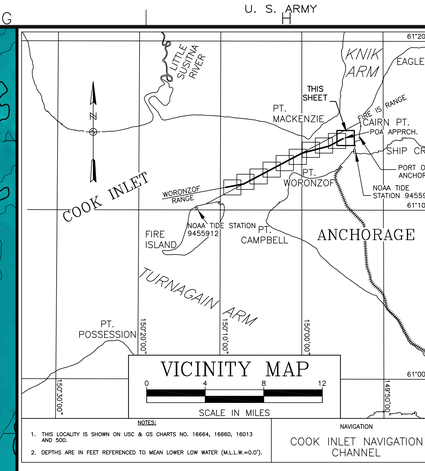
COLOR LEGEND



NOTES:

1. THIS LOCALITY IS SHOWN ON USC & GS CHARTS NO. 16664, 16660, 16013 AND 500.
2. DEPTHS ARE IN FEET REFERENCED TO MEAN LOWER LOW WATER (M.L.L.W.=0.0').

NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 4, NAD83 IN U.S. SURVEY FEET HOLDING USACE SBC "N END 1978" AS N 2,646,652.19, E 1,660,582.43 AND USACE SBC "S END 1978" AS N 2,644,298.25, E 1,659,725.47.
2. VERTICAL CONTROL IS MEAN–LOWER–LOW–WATER (MLLW = 0.0') IN U.S. SURVEY FEET BASED ON NOAA/NOS TIDAL DATUM "9455920 ANCHORAGE, KNIK ARM, COOK INLET, ALASKA", PUBLISHED 04/21/2003, HOLDING USCGS SBC "B 75 1964" AS 36.82' AND NOAA/NOS TIDAL DATUM "9455912 FIRE ISLAND, ALASKA", PUBLISHED 05/21/2004, HOLDING NOS SBC "BM 13 1974" AS 28.41'. (SEE NOTE 4)
3. THIS SURVEY WAS PERFORMED BY TERRASOND, LTD. BETWEEN JULY 8, 2010 AND JULY 22, 2010. SOUNDINGS WERE COLLECTED USING A RESON SEABAT 7101 MULTIBEAM ECHOSOUNDER WITH A 240kHz, 150–DEGREE SWATH–WIDTH TRANSDUCER (511 BEAMS). BEAM STEERING WAS ACCOMPLISHED USING AN APPLIED MICROSYSTEMS LABORATORIES (AML) SMART–PROBE, SOUND VELOCITY PROFILER LOCATED AT THE SONAR HEAD. SOUND VELOCITY THROUGH THE WATER COLUMN WAS MEASURED AND APPLIED USING AN ODOM DIGI–BAR PRO SOUND VELOCITY PROFILER DEPLOYED DURING THE SURVEY. VESSEL ATTITUDE, HEADING, POSITIONING AND REAL–TIME TIDES WERE PROVIDED USING A CODA OCTOPUS F185 INERTIAL MOTION UNIT OPERATING ON KINEMATIC GPS CORRECTIONS BROADCAST FROM A TRIMBLE NET–RS GPS RECEIVER SET AT CONTROL STATION, "TERRA–10 2008", LOCATED ATOP THE PORT OFFICE BUILDING. REAL–TIME–KINEMATIC HEIGHT VALUES WERE CALIBRATED TO DIRECT MANUAL TIDE OBSERVATIONS HOLDING USCGS SBC "TIDAL 16 1966", LOCATED AT NOAA/NOS TIDE STATION "9455920" AT THE PORT OF ANCHORAGE. SURVEY NAVIGATION AND DATA COLLECTION WERE PERFORMED USING HYPACK "HYSWEEP 2010" INTEGRATED SOFTWARE (V2010). DATA PROCESSING WAS PERFORMED USING CARIS HIPS SOFTWARE (V7.0).
4. THE SURVEY AND THE PRELIMINARY PROCESSED DATASET WAS BASED ON RTK MLLW TIDE DATUM AT THE PORT OF ANCHORAGE AS NOTED ABOVE. THE FINAL DATASET WAS ADJUSTED TO REFLECT THE DIFFERENCE IN TIDE DATUM VALUES AT THE PORT OF ANCHORAGE (NOAA/NOS 9455920) AND THE TIDE DATUM VALUES AT FIRE ISLAND (NOAA/NOS 9455912). THIS "TILTED PLANE" ADJUSTMENT WAS PERFORMED TO PROVIDE A UNIFORM MLLW BASED APPROACH FROM THE WEST END OF THE COOK INLET NAVIGATION CHANNEL INTO THE PORT OF ANCHORAGE. THE ADJUSTMENT IS BASED ON OBSERVED RTK HEIGHT VALUES MEASURED AT BOTH NOAA/NOS TIDE STATIONS LISTED ABOVE. THE OBSERVED RTK DIFFERENCE HOLDS THE PORT OF ANCHORAGE AT 0.0' AND FIRE ISLAND AT –3.73'. THE ADJUSTMENT WAS PERFORMED USING CARIS BASE EDITOR V2.1 RAISING ALL SOUNDINGS PROPORTIONATELY ALONG THE DISTANCE BETWEEN THE TIDAL BENCH MARKS UTILIZED TO DEFINE THE VERTICAL DATUM. THE ADJUSTMENT AT THE PORT OF ANCHORAGE IS 0.0' EXTENDING TO AN ADJUSTMENT OF +3.73' AT FIRE ISLAND (SEE DIAGRAM ON SHEET 1).
5. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
6. THIS SURVEY IS INDICATIVE OF GENERAL CONDITIONS ON THE DATES OF SURVEY.
7. THERE WERE NO NEW MONUMENTS ESTABLISHED DURING THIS SURVEY.

VOLUME COMPUTATIONS	
PROJECT DEPTH –45' MLLW	CUBIC YARDS
VOLUME AVAILABLE ABOVE PROJECT DEPTH (–45' MLLW)	3,691,263
VOLUME AVAILABLE BETWEEN PD AND MAXIMUM PAYLINE (–47' MLLW)	1,158,497
VOLUME AVAILABLE ALONG SIDESLOPES 3:1 (H:V)	112,106
TOTAL	4,961,866

COOK INLET NAVIGATION CHANNEL COORDINATES

CHANNEL CENTERLINE

COR.	NORTHING	EASTING	STATION	DESCRIPTION
CL1	2,626,865.50	1,613,018.09	0+00	CENTERLINE WORONZOF RANGELINE
CL2	2,628,048.21	1,619,409.58	65+00	WORONZOF/FIRE ISLAND RANGELINE INT.
CL3	2,639,188.27	1,640,441.44	303+00	FIRE ISLAND/TRANSITION TO POA APPROACH
CL4	2,641,712.17	1,650,169.36	403+50	POA APPROACH
CL5	2,644,429.31	1,655,293.53	459+50	CENTERLINE POA APPROACH

SURVEY LIMITS

CORNER	NORTHING	EASTING
SL1	2,627,411.97	1,612,764.42
SL2	2,628,605.70	1,619,215.48
SL3	2,639,735.90	1,640,228.73
SL4	2,626,264.45	1,612,976.77
SL5	2,627,490.72	1,619,603.68
SL6	2,638,640.64	1,640,654.15
SL7	2,640,288.38	1,642,358.15
SL8	2,647,179.66	1,655,368.53
SL9	2,641,164.57	1,650,382.20
SL10	2,643,984.07	1,655,699.41
SL11	2,644,608.06	1,655,368.53

CHANNEL LIMITS

COR.	NORTHING	EASTING	STATION
NC1	2,627,365.51	1,612,925.56	0+00
NC2	2,628,534.04	1,619,240.43	65+00
NC3	2,639,665.52	1,640,256.07	303+00
NC4	2,626,365.49	1,613,110.61	0+00
NC5	2,627,562.38	1,619,578.73	65+00
NC6	2,638,711.03	1,640,626.81	303+00
NC7	2,642,189.38	1,649,983.88	403+50
NC8	2,644,878.56	1,655,055.31	459+50
NC9	2,641,234.96	1,650,354.84	403+50
NC10	2,643,980.06	1,655,531.75	459+50

⚠ CONTROL COORDINATES ⚠

STATION	NORTHING	EASTING	ELEV.	DESCRIPTION
N END 1978	2,646,652.19	1,660,582.43	41.39	USACE SBC
S END 1978	2,644,295.69	1,659,728.19	40.37	USACE SBC
TERRA–10 2008	2,644,971.59	1,660,156.45	80.40	PORT OFFICE ANT. MOUNT
PORT 1989	2,639,936.64	1,656,922.51	39.93	USACE SAC
EQ–1	2,629,995.41	1,643,787.75	–	–
VAN DUSEN GPS 1986	2,621,198.82	1,648,753.69	–	NGS SBC
AWWU 1994	2,629,310.76	1,635,837.68	–	3" ALCAP
NOAA/NOS TIDAL BENCH MARKS AT THE PORT OF ANCHORAGE 9455920				
TIDAL 16 1966	2,644,293	1,659,727	40.53	USCGS BENCH MARK SBC
B 75 1964	2,644,598	1,660,095	36.82	USCGS BENCH MARK SBC
NOAA/NOS TIDAL BENCH MARKS AT FIRE ISLAND 9455912				
BM 13 1974	2,620,685	1,605,138	28.41	NOS TIDAL BENCH MARK SBC
RIFE 1960	2,620,520	1,604,180	29.99	USCGS TRI–STA SBC

200 0 200 400 600

SCALE IN FEET

HORIZONTAL SCALE: 1"=200'

BATHYMETRY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–08–D–0002
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM CONTRACTOR RESIDENT ENGINEER

Sym.	Action	Description	Date	Approv.

Designed: JEA
Drawn: KNB
Reviewed: KDW
Chief, A. CHURCHILL
Submitted:
Chief, Branch
USACE Survey No:
Date: 08/06/10
Dwg Scale: AS NOTED
Plot Scale:
File:
Drawing #: 2770-10

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ANCHORAGE, ALASKA
COOK INLET NAVIGATION CHANNEL
PROJECT CONDITION SURVEY
JULY 8–22, 2010

Reference number:
V-121
Sheet 21 of 21