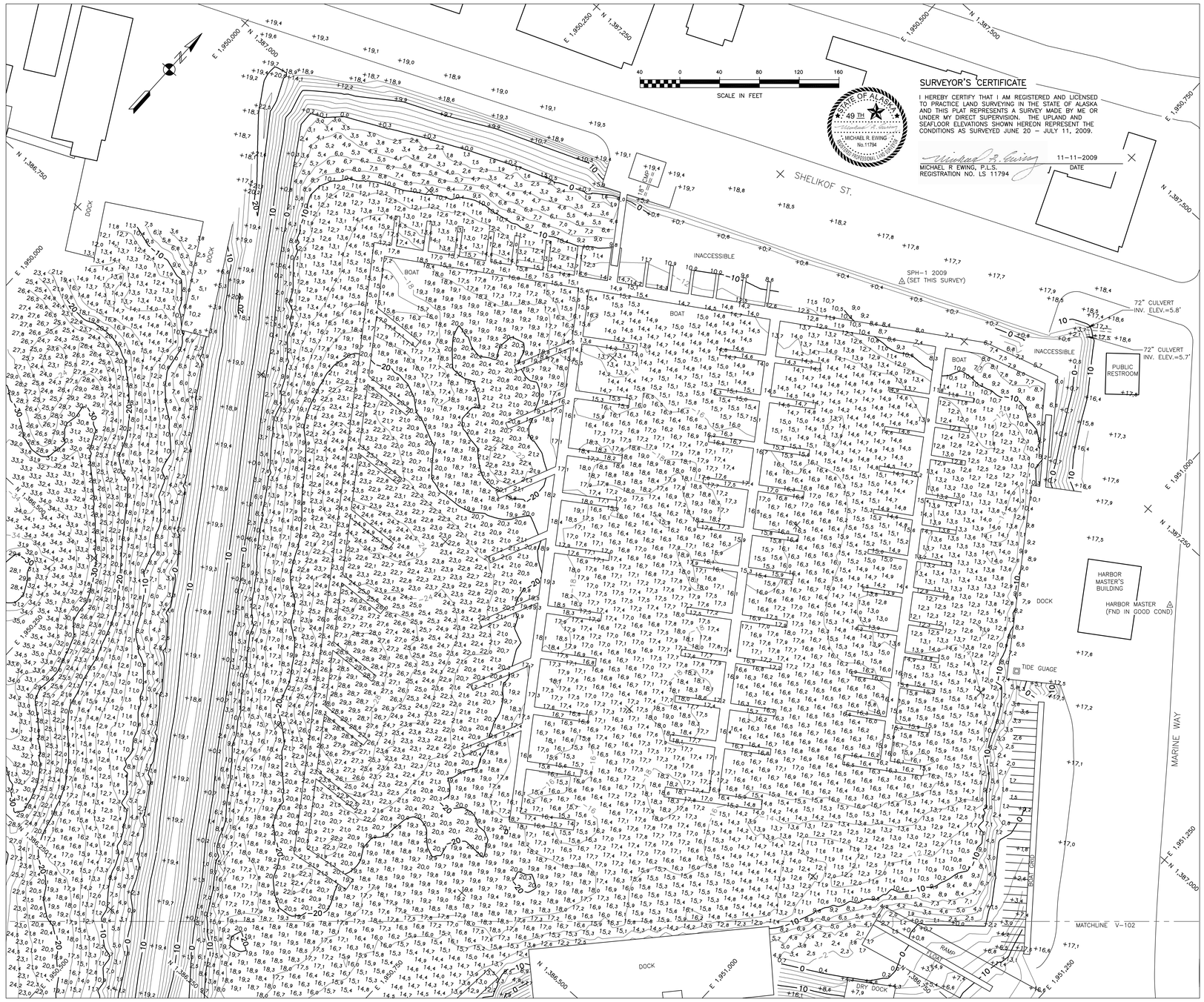
CORPS OF ENGINEERS



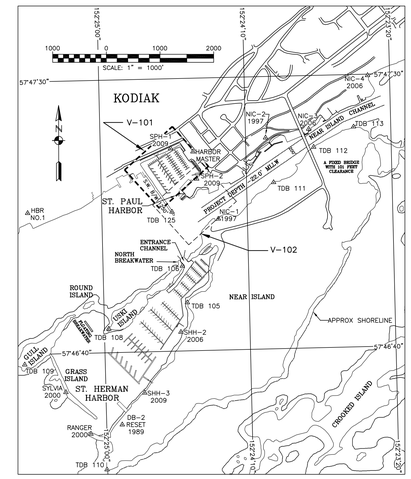
SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT I AM REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA AND THIS PLAT REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION. THE UPLAND AND SEAFLOOR ELEVATIONS SHOWN HEREON REPRESENT THE CONDITIONS AS SURVEYED JUNE 20 – JULY 11, 2009.

STATE OF ALASKA 49TH MICHAEL R. EWING No. 11794

MICHAEL R. EWING, P.L.S.
REGISTRATION NO. LS 11794

11-11-2009
DATE



NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83 (CORS96) IN U.S. SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE 2003 EPOCH VALUES OF OPUS DB DERIVED STATIONS: "NIC–4 2006" (PID BBBK44) AS NORTHING 1,388,617.55', EASTING 1,954,333.76'; "SHH–3 2009" (PID BBBK45) AS NORTHING 1,382,702.24', EASTING 1,950,183.98'; "TDB 125" (PID BBBK43) AS NORTHING 1,386,072.95', EASTING 1,950,690.54'.
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7. SOUNDINGS ARE SHOWN IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
8. THIS SURVEY IS INDICATIVE OF CONDITIONS ON THE DATES OF SURVEY.
9. THREE MONUMENTS WERE SET THIS SURVEY, SEE CONTROL DATA TABLE.

☆ NAVIGATION AIDS ☆

USCG No.	DESCRIPTION	NORTHING	EASTING
26610	CYANE ROCK LIGHTED BELL BUOY 15	1,388,255	1,955,179
26615	KODIAK FERRY DOCK LIGHT (SOUTH)	1,386,779	1,952,082
26615	KODIAK FERRY DOCK LIGHT (NORTH)	1,386,943	1,952,200
26620	KODIAK BOAT HARBOR DAYBEACON 2	1,386,160	1,950,981
26630	KODIAK BOAT HARBOR LIGHT 1	1,386,045	1,950,711
26635	ST. HERMAN BAY NORTH ENTRANCE DAYBEACON 1	1,385,259	1,950,894
26640	ST. HERMAN BAY NORTH ENTRANCE LIGHT 2	1,385,148	1,950,797
26730	ST. HERMAN HARBOR SOUTH APPROACH BUOY 1	1,382,114	1,948,398
26732	ST. HERMAN HARBOR SOUTH ENTRANCE LIGHT 3	1,382,260	1,949,239
26733	ST. HERMAN HARBOR SOUTH ENTRANCE LIGHT 4	1,381,940	1,949,179
26735	ST. HERMAN HARBOR SOUTH ENTRANCE DAYBEACON 7	1,383,641	1,949,437
26760	ST. PAUL HARBOR ENTRANCE CHANNEL BUOY 11	1,385,682	1,950,442
--	NEAR IS. BRIDGE KODIAK SIDE NORTH LIGHT	1,387,487	1,953,157
--	NEAR ISLAND BRIDGE NORTH CENTER LIGHT	1,387,395	1,953,198
--	NEAR IS. BRIDGE NEAR IS. SIDE NORTH LIGHT	1,387,302	1,953,239
--	NEAR IS. BRIDGE KODIAK SIDE SOUTH LIGHT	1,387,463	1,953,118
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△ CONTROL DATA △

STATION	NORTHING	EASTING	ELEV. (MLLW)	ELEV. (NAVD88)	DESCRIPTION
DB–2 RESET 1989	1,382,108.40	1,949,765.03	64.5	65.9	2" BC IN GOOD CONDITION
HARBOR MASTER	1,387,193.26	1,951,081.54	20.20	21.56	2" BC IN GOOD CONDITION
HBR No. 1	1,386,047.27	1,948,002.61	46.5	47.9	2 1/2" BC ON PIPE IN FAIR COND
NIC–1 1997	1,385,942.73	1,951,555.54	28.11	29.47	3 1/4" SBC IN GOOD CONDITION
NIC–2 1997	1,387,453.51	1,952,435.26	47.73	49.09	3 1/4" DBC IN GOOD CONDITION
NIC–3 2006	1,387,617.77	1,953,239.60	17.05	18.40	3 1/4" DBC IN GOOD CONDITION
NIC–4 2006	1,388,617.55	1,954,333.77	16.30	17.62	3 1/4" DBC IN GOOD CONDITION
RANGER 2000	1,381,935.87	1,949,180.93	23.84	25.20	3 1/4" SBC IN GOOD CONDITION
SHH–1 2006	---	---	--	--	NOT FOUND
SHH–2 2006	1,383,833.62	1,950,858.42	21.17	22.53	3 1/4" DBC IN GOOD CONDITION
SHH–3 2009	1,382,702.24	1,950,183.98	19.45	20.84	SET 3 1/4" DBC IN CONCRETE
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TDB 105	1,384,382.78	1,950,977.51	15.95	17.31	3 1/4" SBC IN GOOD CONDITION
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TDB 109	1,383,225.88	1,947,948.36	40.2	41.6	3 1/4" SBC IN GOOD CONDITION
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TDB 113	1,387,658.87	1,954,073.23	21.8	23.2	3 1/4" SBC IN GOOD CONDITION
TDB 125	1,386,072.95	1,950,690.54	19.51	20.88	3 1/4" SBC IN GOOD CONDITION

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SURVEY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–09–D–0002–0009
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
ARMY CONTRACTOR RESIDENT ENGINEER

Sym	Action	Description	Date	Approv
			11/11/2009	

Date: 11/11/2009
Dwg Scale: 1"=40'
Plot Scale:
Section
File:
Drawing #: 2675–09
Branch
Submitted
Chief

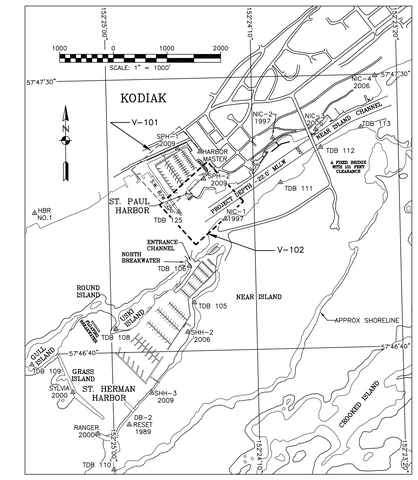
Designed: JEA
Drawn: CAE/SG/SAS
Reviewed: MRE
Checked:

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

KODIAK, ALASKA
ST. PAUL HARBOR
PROJECT CONDITION SURVEY
JUNE 20 – JULY 11, 2009

Reference number:
V–101
Sheet 1 of 4

CORPS OF ENGINEERS



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SURVEY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-09-D-0002-0009
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: Approved: Date:
FIRM: CONTRACTOR: RESIDENT ENGINEER

Sym	Action	Description	Date	Approv

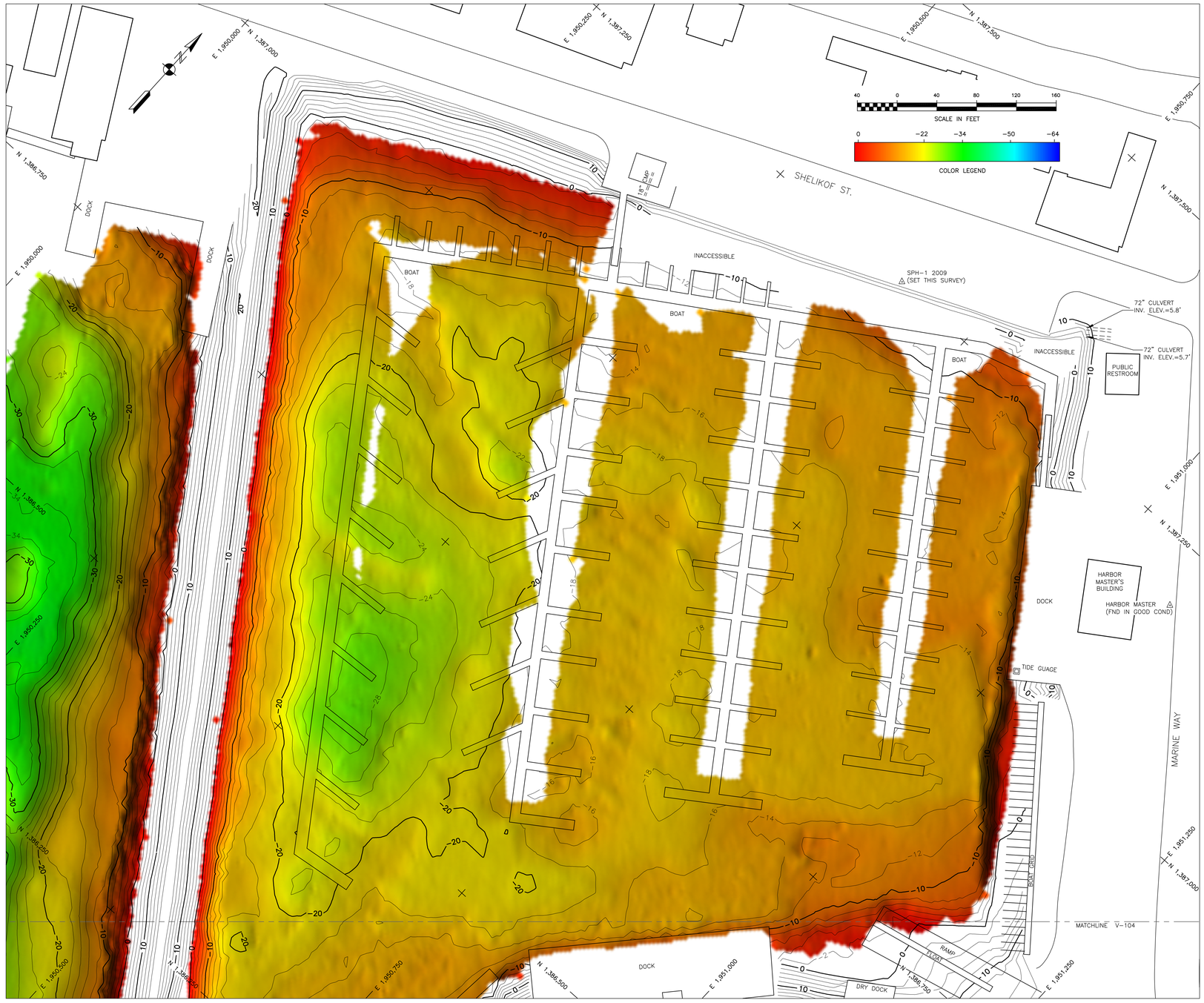
Date: 11/11/2009
Dwg Scale: 1"=40'
Plot Scale:
Drawn: JEA
Designed: JEA
Reviewed: CAE/SG/SAS
Reviewed: MRE
Submitted:
Chief:
Section
File:
Branch
Drawing #: 2675-09

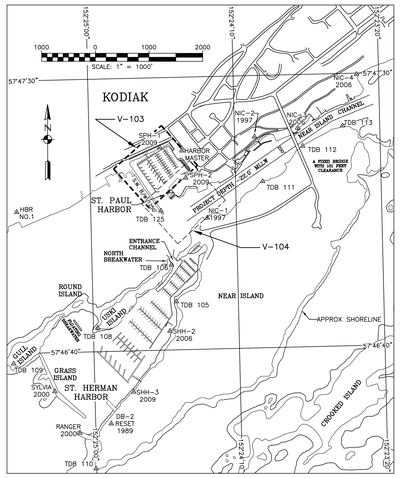
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

KODIAK, ALASKA
ST. PAUL HARBOR
PROJECT CONDITION SURVEY
JUNE 20 – JULY 11, 2009

Reference number:
V-102
Sheet 2 of 4

CORPS OF ENGINEERS





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26733	ST. HERMAN HARBOR SOUTH ENTRANCE LIGHT 4	1,381,940	1,949,179
26735	ST. HERMAN HARBOR SOUTH ENTRANCE DAYBEACON 7	1,383,641	1,949,437
26760	ST. PAUL HARBOR ENTRANCE CHANNEL BUOY 11	1,385,682	1,950,442
--	NEAR IS. BRIDGE KODIAK SIDE NORTH LIGHT	1,387,487	1,953,157
--	NEAR ISLAND BRIDGE NORTH CENTER LIGHT	1,387,395	1,953,198
--	NEAR IS. BRIDGE NEAR IS. SIDE NORTH LIGHT	1,387,302	1,953,239
--	NEAR IS. BRIDGE KODIAK SIDE SOUTH LIGHT	1,387,463	1,953,118
--	NEAR ISLAND BRIDGE SOUTH CENTER LIGHT	1,387,371	1,953,159
--	NEAR IS. BRIDGE NEAR IS. SIDE SOUTH LIGHT	1,387,278	1,953,200

△ CONTROL DATA △

STATION	NORTHING	EASTING	ELEV. (MLLW)	ELEV. (NAVD88)	DESCRIPTION
DB-2 RESET 1989	1,382,108.40	1,949,765.03	64.5	65.9	2" BC IN GOOD CONDITION
HARBOR MASTER	1,387,193.26	1,951,081.54	20.20	21.56	2" BC IN GOOD CONDITION
HBR No. 1	1,386,047.27	1,948,002.61	46.5	47.9	2 1/2" BC ON PIPE IN FAIR COND
NIC-1 1997	1,385,942.73	1,951,555.54	28.11	29.47	3 1/4" SBC IN GOOD CONDITION
NIC-2 1997	1,387,453.51	1,952,435.26	47.73	49.09	3 1/4" DBC IN GOOD CONDITION
NIC-3 2006	1,387,617.77	1,953,239.60	17.05	18.40	3 1/4" DBC IN GOOD CONDITION
NIC-4 2006	1,388,617.55	1,954,333.77	16.30	17.62	3 1/4" DBC IN GOOD CONDITION
RANGER 2000	1,381,935.87	1,949,180.93	23.84	25.20	3 1/4" SBC IN GOOD CONDITION
SHH-1 2006	---	---	--	--	NOT FOUND
SHH-2 2006	1,383,833.62	1,950,858.42	21.17	22.53	3 1/4" DBC IN GOOD CONDITION
SHH-3 2009	1,382,702.24	1,950,183.98	19.45	20.84	SET 3 1/4" DBC IN CONCRETE
SPH-1 2009	1,387,252.33	1,950,663.43	20.12	21.48	SET 3 1/4" DBC IN CONCRETE
SPH-2 2009	1,386,685.52	1,951,150.86	17.46	18.82	SET 3 1/4" DBC IN CONCRETE
SYLVA 2000	1,382,712.36	1,948,713.99	21.29	22.65	3 1/4" SBC IN GOOD CONDITION
TDB 105	1,384,382.78	1,950,977.51	15.95	17.31	3 1/4" SBC IN GOOD CONDITION
TDB 106	1,385,064.06	1,950,883.53	16.99	18.35	3 1/4" SBC IN GOOD CONDITION
TDB 108	1,383,891.39	1,949,513.26	19.48	20.84	3 1/4" SBC IN GOOD CONDITION
TDB 109	1,383,225.88	1,947,948.36	40.2	41.6	3 1/4" SBC IN GOOD CONDITION
TDB 110	1,381,270.47	1,949,482.08	35.4	36.8	3 1/4" SBC IN GOOD CONDITION
TDB 111	1,386,622.19	1,952,584.12	21.5	22.9	3 1/4" SBC IN GOOD CONDITION
TDB 112	1,387,280.27	1,953,330.09	55.2	56.6	3 1/4" DBC IN GOOD CONDITION
TDB 113	1,387,658.87	1,954,073.23	21.8	23.2	3 1/4" SBC IN GOOD CONDITION
TDB 125	1,386,072.95	1,950,690.54	19.51	20.88	3 1/4" SBC IN GOOD CONDITION

• ELEVATIONS SHOWN IN THIS TABLE TO THE NEAREST 0.1 FOOT WERE ACQUIRED USING RTK, THOSE SHOWN TO THE NEAREST 0.01 FOOT WERE ACQUIRED WITH A DIFFERENTIAL LEVEL.

SURVEY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-09-D-0002-0009
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: ARMY CONTRACTOR
Approved: RESIDENT ENGINEER
Date:

Sym	Action	Description	Date	Approv

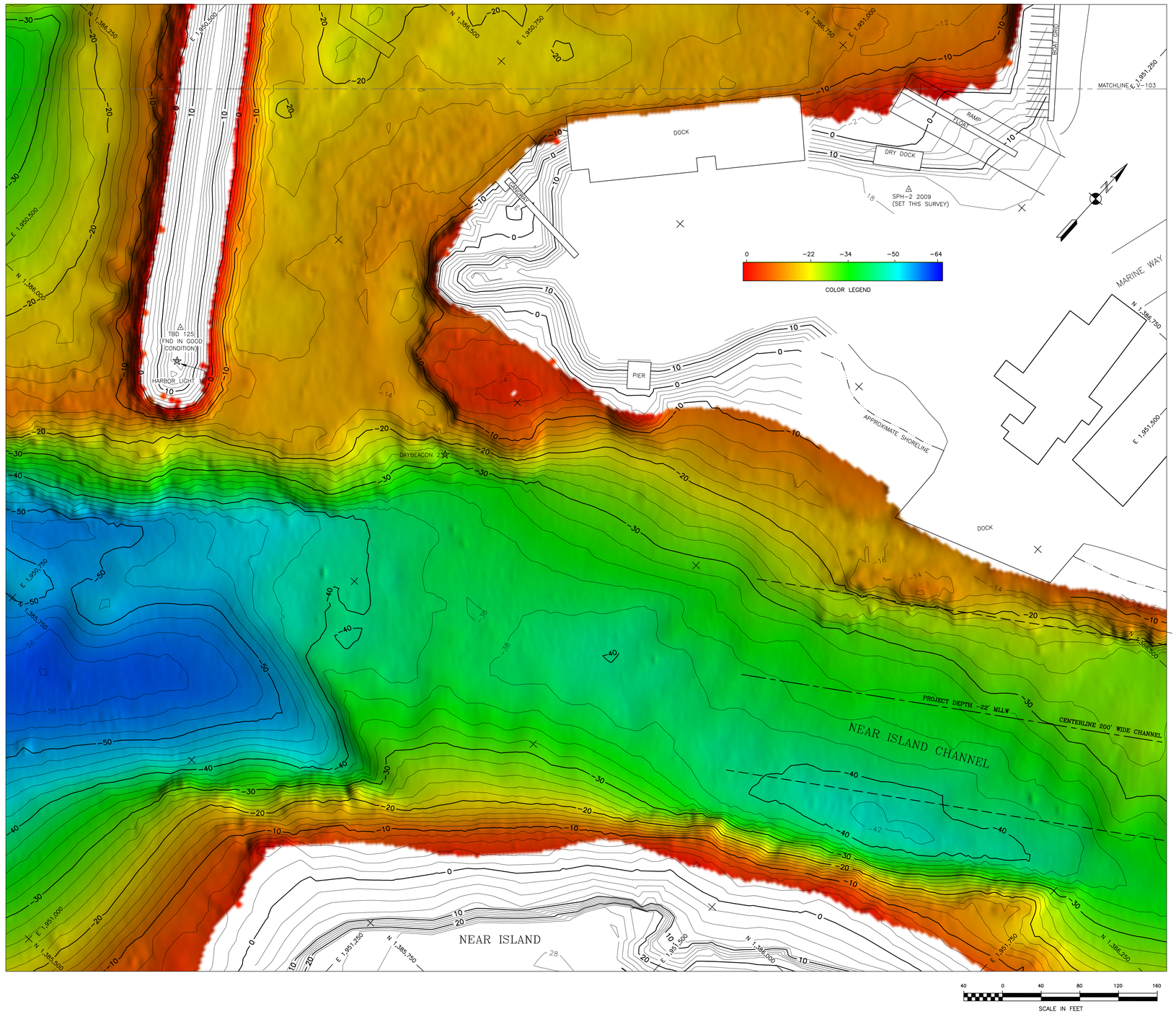
Designed: JEA
Drawn: SG/SAS
Reviewed: MRE
Submitted:
Chief:
Date: 11/11/2009
Dwg Scale:
Plot Scale: 1"=40'
Plot Date:
File:
Drawing #: 2675-09
Section:
Branch:

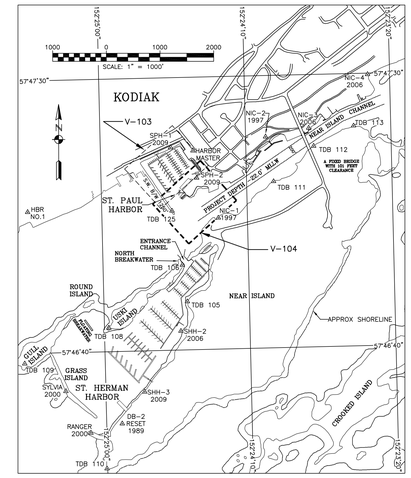
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

KODIAK, ALASKA
ST. PAUL HARBOR
PROJECT CONDITION SURVEY
JUNE 20 – JULY 11, 2009

Reference number:
V-103
Sheet 3 of 4

CORPS OF ENGINEERS





NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83 (CORS96) IN U.S. SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE 2003 EPOCH VALUES OF OPUS DB DERIVED STATIONS: "NIC-4 2006" (PID BBBK44) AS NORTHING 1,388,617.55', EASTING 1,954,333.76'; "SHH-3 2009" (PID BBBK45) AS NORTHING 1,382,702.24', EASTING 1,950,183.98'; "TDB 125" (PID BBBK43) AS NORTHING 1,386,072.95', EASTING 1,950,690.54'.

2. VERTICAL CONTROL IS IN U.S. SURVEY FEET AND REFERS TO MEAN-LOWER-LOW-WATER DATUM (MLLW=0.0'). THE MLLW VALUES SHOWN ON THIS PLAT ARE BASED ON NOAA/NOS TIDAL STATION 945 7292, KODIAK ISLAND, WOMAN'S BAY, ALASKA HOLDING USC&GS BENCH MARK SBC "NO 16 1964" AS 21.42 FEET. THIS VALUE IS FROM TIDAL EPOCH 1983-2001, PUBLISHED 9/12/2007 FOR THIS STATION.

3. VERTICAL CONTROL WAS ALSO TIED INTO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) HOLDING THE OPUS DB PUBLISHED VALUES OF "NIC-4 2006" (PID BBBK44) AS 17.62 FEET; "SHH-3 2009" (PID BBBK45) AS 20.84 FEET; AND "TDB 125" (PID BBBK43) AS 20.88 FEET AND APPLYING THE AVERAGE DELTA TO THE REMAINING PRIMARY CONTROL.

4. THE HORIZONTAL CONTROL SURVEY WAS CONDUCTED JUNE 20 THROUGH JULY 11, 2009 USING THREE (3) TRIMBLE R8 GPS RECEIVERS AND A COMBINATION OF STATIC GPS AND RTK SURVEY TECHNIQUES. GPS DATA POST-PROCESSING WAS ACCOMPLISHED USING TRIMBLE GEOMATICS OFFICE V1.6. ALL PRIMARY CONTROL WAS DOUBLE-TIED USING REAL-TIME-KINEMATIC CONTROL METHODS AND INDEPENDENT BASELINES SOLUTIONS.

5. THE TOPOGRAPHIC AND PLANIMETRIC SURVEYS WERE CONDUCTED JUNE 20 THROUGH JULY 11, 2009 USING TRIMBLE R8 GPS RECEIVERS, REAL-TIME-KINEMATIC PROCEDURES, AND CONVENTIONAL METHODS. FIXED AIDS-TO-NAVIGATION WERE SURVEYED AT THE LIGHT GLOBE. BUOY POSITIONS WHERE DETERMINED BY AVERAGING THE FLOOD AND EBB SURVEYED LOCATIONS TO ESTABLISH AN APPROXIMATE BUOY ANCHOR POSITION.

6. HYDROGRAPHIC DATA ACQUISITION WAS CONDUCTED JULY 7 THROUGH 11, 2009 USING A RESON SEABAT 7125 MULTIBEAM ECHOSOUNDER (200KHZ WITH 511 BEAMS AT 128 DEGREES SWATH WIDTH). VESSEL POSITIONING, HEADING AND ATTITUDE WERE MEASURED USING A CODA-OCTOPUS F185 INERTIAL MOTION UNIT OPERATING WITH RTK CORRECTORS FROM THE BASE STATION SET AT "TDB 125". SOUND VELOCITY CASTS WERE MEASURED AND COLLECTED USING AN ODOM DIGIBAR PRO SOUND VELOCITY PROFILER. SURFACE SOUND VELOCITY WAS MEASURED USING AN APPLIED MICRO-SYSTEMS SMART PROBE. VESSEL NAVIGATION AND DATA COLLECTION WAS PERFORMED USING QPS QINSY INTEGRATED SOFTWARE (QINSY v8). DATA PROCESSING AND FINAL DATA ANALYSIS WERE PERFORMED USING CARIS HIPS SOFTWARE (V6.1).

7. SOUNDINGS ARE SHOWN IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.

8. THIS SURVEY IS INDICATIVE OF CONDITIONS ON THE DATES OF SURVEY.

9. THREE MONUMENTS WERE SET THIS SURVEY, SEE CONTROL DATA TABLE.

☆ NAVIGATION AIDS ☆

USCG No.	DESCRIPTION	NORTHING	EASTING
26610	CYANE ROCK LIGHTED BELL BUOY 15	1,388,255	1,955,179
26615	KODIAK FERRY DOCK LIGHT (SOUTH)	1,386,779	1,952,082
26615	KODIAK FERRY DOCK LIGHT (NORTH)	1,386,943	1,952,200
26620	KODIAK BOAT HARBOR DAYBEACON 2	1,386,160	1,950,981
26630	KODIAK BOAT HARBOR LIGHT 1	1,386,045	1,950,711
26635	ST. HERMAN BAY NORTH ENTRANCE DAYBEACON 1	1,385,259	1,950,894
26640	ST. HERMAN BAY NORTH ENTRANCE LIGHT 2	1,385,148	1,950,797
26730	ST. HERMAN HARBOR SOUTH APPROACH BUOY 1	1,382,114	1,948,398
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SURVEY

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-09-D-0002-0009
CONTRACTOR TERRASOND LIMITED
CITY PALMER STATE ALASKA
Recommended: ARMY CONTRACTOR
Approved: RESIDENT ENGINEER
Date:

Sym	Action	Description	Date	Approv

Date: 11/11/2009
Dwg Scale: 1"=40'
Plot Scale:
File:
Drawing #: 2675-09

Designed: JEA
Drawn: CAE/SH/SAS
Reviewed: MRE
Submitted:
Chief:

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

KODIAK, ALASKA
ST. PAUL HARBOR
PROJECT CONDITION SURVEY
JUNE 20 – JULY 11, 2009

Reference number:
V-104
Sheet 4 of 4