

NOTES

- HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83 (COR56) 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 BBRK44) AS NORTHERN 1,388,617.55; EASTING 1,954,333.76; "SHH-3 2009" (PID BBRK45) AS NORTHERN 1,382,702.24; EASTING 1,950,183.98; "TDB 125" (PID BBRK43) AS NORTHERN 1,386,072.95; EASTING 1,950,690.54.
- 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/TIDE STATION 945 7292, KODIAK ISLAND, WOMAN'S BAY, ALASKA HOLDING USCGS 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.
- VERTICAL CONTROL WAS ALSO TIED INTO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) HOLDING THE OPUS DB PUBLISHED VALUES OF "NIC-2006" (PID BBRK44) AS 17.62 FEET; "SHH-3 2009" (PID BBRK45) AS 20.84 FEET; AND "TDB 125" (PID BBRK43) AS 20.88 FEET AND APPLYING THE AVERAGE DELTA TO THE REMAINING PRIMARY CONTROL.
- 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 GEDMATICS OFFICE V1.6. ALL PRIMARY CONTROL WAS DOUBLE-TIED USING REAL-TIME-KINEMATIC CONTROL METHODS AND INDEPENDENT BENCHMARK SOLUTIONS.
- 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.
- 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 ALTITUDE WERE MEASURED USING A COGN-ODOTRUS 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 GPS GINYE INTEGRATED SOFTWARE (GINYE 40). DATA PROCESSING AND FINAL DATA ANALYSIS WERE PERFORMED USING CARIS HIPS SOFTWARE (V6.1).
- SOUNDINGS ARE SHOWN IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
- THIS SURVEY IS INDICATIVE OF CONDITIONS ON THE DATES OF SURVEY.
- NINE MONUMENTS WERE SET THIS SURVEY, SEE CONTROL DATA TABLE.

USCG No.	DESCRIPTION	NORTHING	EASTING
26610	OVANE ROCK LIGHTED BELL BUOY 15	1,386,255	1,955,179
26615	KODIAK FERRY DOCK LIGHT (SOUTH)	1,385,772	1,950,082
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	1,386,048	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
---	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

STATION	CONTROL DATA		ELEV.		DESCRIPTION
	NORTHING	EASTING	(MLLW)	(NAVD88)	
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	1,951,025.54	28.11	29.47	3 1/4" DBC 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	1,381,835.87	1,949,180.93	23.94	25.50	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	1,950,683.43	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.

VOLUME COMPUTATIONS			
Project Depth -12' MLLW	CUBIC YARDS		
MINIMUM PAY LINE (-12' MLLW)*	2,284		
BETWEEN MINIMUM PAY LINE AND MAXIMUM PAY LINE (-13' MLLW)*	2,117		
VOLUME AVAILABLE ALONG SIDESLOPES (3:1, HV)	3,094		
TOTAL	7,495		

\* Volumes are within Project Limits and do not include SIDE SLOPES.

PROJECT LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,385,354.25	1,950,935.99	9	1,384,732.85	1,950,733.66
2	1,385,229.19	1,950,913.81	10	1,384,945.28	1,950,887.59
3	1,385,138.52	1,951,000.46	11	1,385,022.76	1,950,917.02
4	1,385,173.08	1,951,054.79	12	1,385,077.46	1,950,920.49
5	1,385,130.25	1,951,095.72	13	1,385,155.40	1,950,846.00
6	1,384,692.38	1,950,778.43	14	1,385,193.64	1,950,852.79
7	1,384,561.34	1,950,631.44	15	1,385,251.62	1,950,797.38
8	1,384,606.15	1,950,591.54			

**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.

*Michael R. Ewing* 11-11-2009  
 MICHAEL R. EWING, P.L.S. DATE  
 REGISTRATION NO. LS 11794



CONTRACT NO. W911KD-09-D-0002-0009  
 CONTRACTOR TERRASOOND LIMITED  
 CITY PALMER STATE ALASKA  
 Recommended: [Signature] RESIDENT ENGINEER  
 Approved: [Signature] RESIDENT ENGINEER  
 Date:

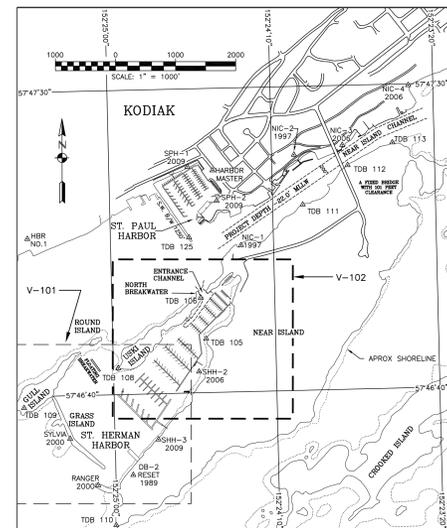
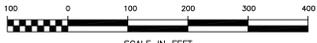
Item	Description	Unit	Amount

Date: 11/11/2009  
 Scale: 1" = 100'  
 Engineer: JEA  
 Designer: LEP/JGM/KFC/SAS  
 Checker: MRE  
 Reviewer: MRE  
 U.S. ARMY ENGINEER DISTRICT  
 CORPS OF ENGINEERS  
 ANCHORAGE, ALASKA  
 2687-09

KODIAK ALASKA  
 ST. HERMAN BOAT HARBOR  
 PROJECT CONDITION SURVEY  
 JUNE 20 - JULY 11, 2009

Reference number:  
**V-101**  
 Sheet 1 of 4





NOTES

- 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 OPERATIONAL DERIVED STATIONS: "NIC-4 2006" (PID BBRK45) AS NORTHING 1,386,617.55, EASTING 1,954,333.76; "SHI-3 2009" (PID BBRK45) AS NORTHING 1,382,702.24, EASTING 1,950,183.98; "TDB 125" (PID BBRK43) AS NORTHING 1,386,072.95, EASTING 1,950,690.54.
- 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 USCG&S BENCH MARK SRC NO 16 1884 AS 21.42 FEET. THIS VALUE IS FROM TIDAL EPOCH 1983-2001, PUBLISHED 8/12/2007 FOR THIS STATION.
- 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 BBRK44) AS 17.62 FEET; "SHI-3 2009" (PID BBRK43) AS 20.84 FEET; AND "TDB 125" (PID BBRK43) AS 20.88 FEET AND APPLYING THE AVERAGE DELTA TO THE REMAINING PRIMARY CONTROL.
- 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.
- 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 WERE DETERMINED BY AVERAGING THE FLOOD AND EBB SURVEYED LOCATIONS TO ESTABLISH AN APPROXIMATE BUOY ANCHOR POSITION.
- HYDROGRAPHIC DATA ACQUISITION WAS CONDUCTED JULY 7 THROUGH 11, 2009 USING A RESON SEABAT 7125 MULTIBeam ECHOSOUNDER (COOKKHZ WITH 511 BEAMS AT 128 DEGREES SWATH WIDTH), VESSEL POSITIONING, HEADING AND ALTITUDE WERE MEASURED USING A CODA-OCTOPUS F185 INERTIAL MOTION UNITS COOPERATING WITH RTK CORRECTORS FROM THE BASE STATION SET AT "TDB 125". SOUND VELOCITY CASTS WERE MEASURED USING AN ODOM DIGIBAR PRO SOUND VELOCITY PROFILER. SURFACE SOUND VELOCITY WAS MEASURED USING AN APPLIED MICRO-SYSTEMS SMART NAVIGATION AND DATA COLLECTION VESSEL TRACKING SYSTEM PERFORMED USING QPS QINSY INTEGRATED SOFTWARE (QINSY V8). DATA PROCESSING AND FINAL DATA ANALYSIS WERE PERFORMED USING CARIS HIPS SOFTWARE (V6.1).
- SOUNDINGS ARE SHOWN IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
- THIS SURVEY IS INDICATIVE OF CONDITIONS ON THE DATES OF SURVEY.
- THREE MONUMENTS WERE SET THIS SURVEY, SEE CONTROL DATA TABLE.

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)	1,386,843	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
---	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

STATION	NORTHING	EASTING	ELEV. (M.L.W.)	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
SHI-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	1,386,685.53	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	1,387,293.27	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.

PROJECT LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,385,354.25	1,950,935.99	9	1,384,732.85	1,950,733.66
2	1,385,229.19	1,950,913.81	10	1,384,945.28	1,950,687.59
3	1,385,138.52	1,951,000.46	11	1,385,022.76	1,950,917.02
4	1,385,173.08	1,951,054.79	12	1,385,077.46	1,950,920.49
5	1,385,130.25	1,951,095.72	13	1,385,155.40	1,950,848.00
6	1,384,892.38	1,950,778.43	14	1,385,193.84	1,950,852.79
7	1,384,561.34	1,950,631.44	15	1,385,251.62	1,950,797.38
8	1,384,606.15	1,950,591.54			

VOLUME COMPUTATIONS		
Project Depth -12' MLLW	CUBIC YARDS	
MINIMUM PAY LINE (-12' MLLW)*	2,284	
BETWEEN MINIMUM PAY LINE and MAXIMUM PAY LINE (-13' MLLW)*	2,117	
VOLUME AVAILABLE ALONG SIDESLOPES (3:1, HW)	3,094	
TOTAL	7,495	

\* Volumes are within Project Limits and do not include SIDE SLOPES.



CONTRACT NO. W911KB-09-D-0002-0009  
 CONTRACTOR TERRASOND LIMITED  
 CITY PALMER STATE ALASKA  
 Recommended: \_\_\_\_\_ Date: \_\_\_\_\_  
 Approved: \_\_\_\_\_  
 State Contract # \_\_\_\_\_

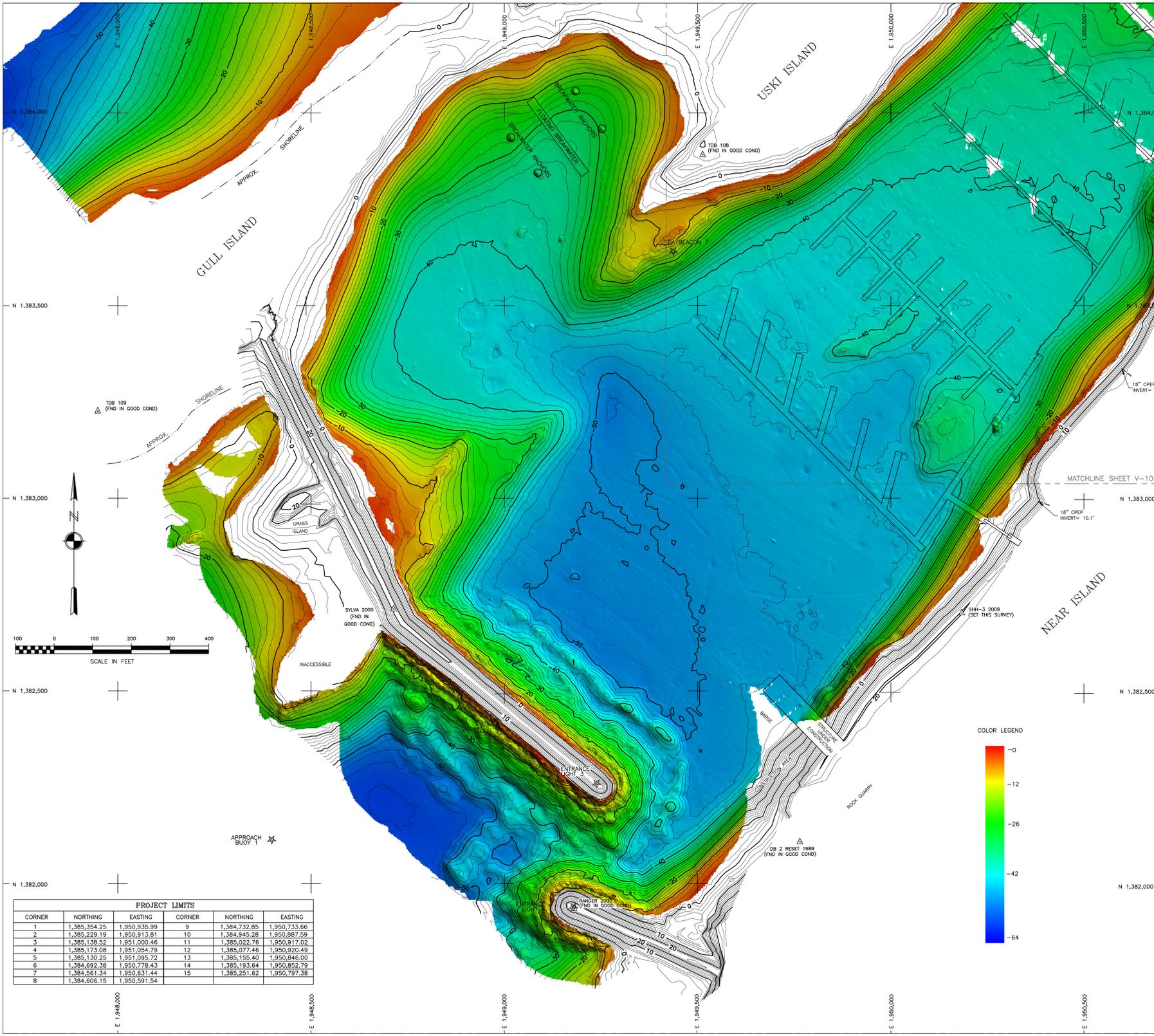
Rev.	Description	Date	Author

Date: 11/11/2009  
 Drawn: JEA  
 Checked: LEP/ACM/KFC/SAS  
 Reviewed: MRE  
 Scale: 1"=100'  
 U.S. ARMY ENGINEER DISTRICT  
 ALASKA DISTRICT  
 ANCHORAGE, ALASKA  
 2687-09

KODIAK, ALASKA  
 ST. HERMAN BOAT HARBOR  
 PROJECT CONDITION SURVEY  
 JUNE 20 - JULY 11, 2009

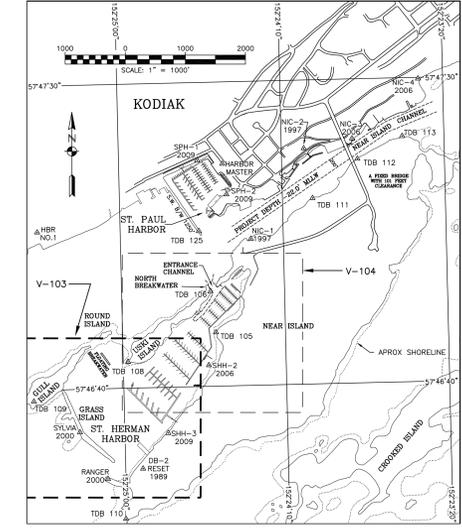
Reference number:  
**V-102**  
 Sheet 2 of 4

**SURVEY**



**PROJECT LIMITS**

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,385,354.25	1,950,935.99	9	1,384,732.85	1,950,733.66
2	1,385,229.19	1,950,913.81	10	1,384,945.28	1,950,887.59
3	1,385,136.52	1,951,000.46	11	1,385,022.76	1,950,917.02
4	1,385,173.08	1,951,054.79	12	1,385,077.46	1,950,920.49
5	1,385,130.25	1,951,095.72	13	1,385,155.40	1,950,846.00
6	1,384,692.38	1,950,778.43	14	1,385,193.64	1,950,852.79
7	1,384,561.34	1,950,631.44	15	1,385,251.62	1,950,797.38
8	1,384,606.15	1,950,591.54			



- NOTES**
- HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 5, NAD83 (CORSE) 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 BBK44) AS NORTHING 1,388,617.55; EASTING 1,954,333.76; "SHH-3 2009" (PID BBK45) AS NORTHING 1,382,702.24; EASTING 1,950,183.98; "TDB 125" (PID BBK43) AS NORTHING 1,386,072.95; EASTING 1,950,690.54.
  - 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 PLAN ARE BASED ON NOAA/NOS TIDAL STATION 945 7292, KODIAK ISLAND, WOMAN'S BAY, ALASKA HOLDING USCGC BENCH MARK NO. 16 1964 AS 21.42 FEET. THIS VALUE IS FROM TIDAL EPOCH 1983-2001, PUBLISHED 9/12/2007 FOR THIS STATION.
  - VERTICAL CONTROL WAS ALSO TIED INTO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD83) HOLDING THE OPUS DB PUBLISHED VALUES OF "NIC-4 2006" (PID BBK44) AS 17.62 FEET; "SHH-3 2009" (PID BBK45) AS 20.84 FEET; AND "TDB 125" (PID BBK43) AS 20.88 FEET AND APPLYING THE AVERAGE DELTA TO THE REMAINING PRIMARY CONTROL.
  - 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 BASELINE SOLUTIONS.
  - 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 AID-TO-NAVIGATION WERE SURVEYED AT THE LIGHT GLOBE. BUOY POSITIONS WERE DETERMINED BY AVERAGING THE FLOOD AND EBB SURVEYED LOCATIONS TO ESTABLISH AN APPROXIMATE BUOY ANCHOR POSITION.
  - 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 COGA-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 GPS ONST INTEGRATED SOFTWARE (ONST V6). DATA PROCESSING AND FINAL DATA ANALYSIS WERE PERFORMED USING CARIS HIPS SOFTWARE (V1.1).
  - SOUNDINGS ARE SHOWN IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
  - THIS SURVEY IS INDICATIVE OF CONDITIONS ON THE DATES OF SURVEY.
  - 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)	1,385,779	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	1,386,045	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	1,382,280	1,949,239
26733	ST. HERMAN HARBOR SOUTH ENTRANCE LIGHT 4	1,381,940	1,949,178
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 IS. BRIDGE NEAR IS. SIDE NORTH LIGHT	1,387,395	1,953,198
---	NEAR IS. BRIDGE KODIAK SIDE SOUTH LIGHT	1,387,302	1,953,239
---	NEAR IS. BRIDGE NEAR IS. SIDE SOUTH LIGHT	1,387,463	1,953,118
---	NEAR IS. BRIDGE SOUTH CENTER LIGHT	1,387,971	1,953,159
---	NEAR IS. BRIDGE NEAR IS. SIDE SOUTH LIGHT	1,387,278	1,953,200

**CONTROL DATA**

STATION	NORTHING	EASTING	ELEV. (MHW)	ELEV. (MLLW)	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
HBR No. 1997	1,385,942.73	1,951,555.54	28.12	29.47	3 1/4" DBC 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 2006	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	1,387,922.33	1,952,694.12	21.12	22.48	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	1,384,582.78	1,950,877.51	15.85	17.31	3 1/4" SBC IN GOOD CONDITION
TDB 106	1,385,084.06	1,950,883.53	16.89	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	1,386,622.12	1,952,694.12	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	1,385,072.95	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.



CONTRACT NO. W911KB-09-D-0002-0009  
 CONTRACTOR TERRASOUD LIMITED  
 CITY PALMER STATE ALASKA  
 Recommended: \_\_\_\_\_  
 Approved: \_\_\_\_\_  
 Date: \_\_\_\_\_

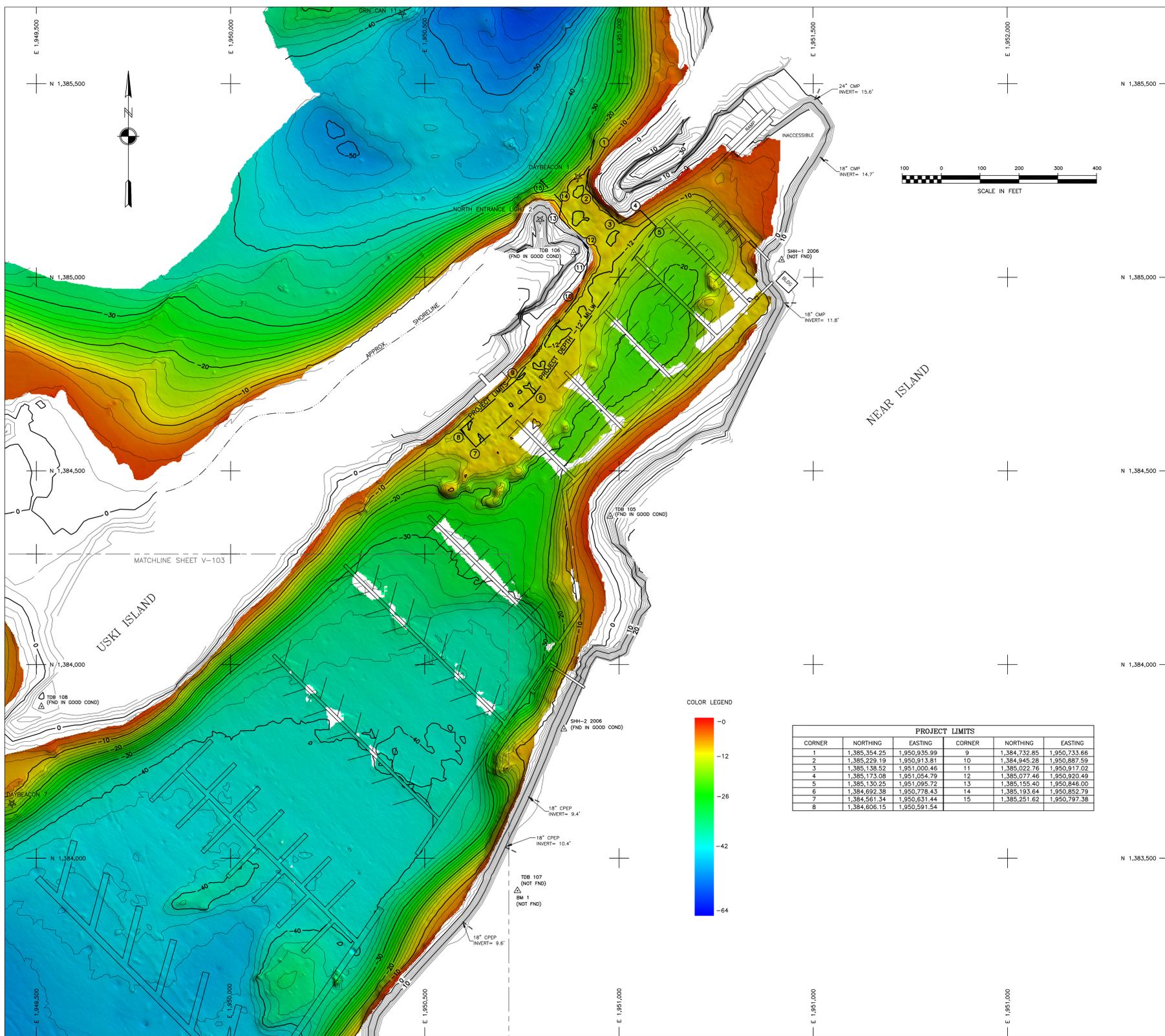
Date	Description

11/11/2009  
 Date: 11/11/2009  
 Scale: 1" = 100'  
 Design: JEA  
 Drawn: LEF/JGM/KCY/SAS  
 Reviewed: MRE  
 Submitted: \_\_\_\_\_  
 Checked: \_\_\_\_\_  
 U.S. ARMY ENGINEER DISTRICT  
 CORPS OF ENGINEERS  
 ANCHORAGE, ALASKA  
 2687-09

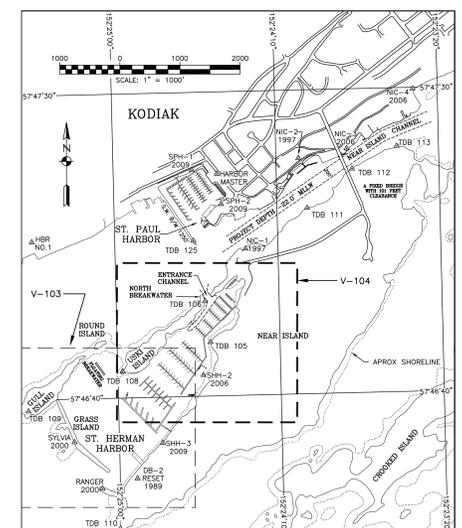
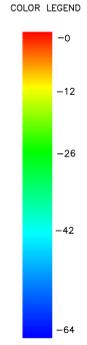
KODIAK, ALASKA  
 ST. HERMAN BOAT HARBOR  
 PROJECT CONDITION SURVEY  
 JUNE 20 - JULY 11, 2009

Reference number:  
**V-103**  
 Sheet 3 of 4

**SURVEY**



PROJECT LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,385,354.25	1,950,935.99	9	1,384,732.85	1,950,733.66
2	1,385,229.19	1,950,913.81	10	1,384,945.28	1,950,887.59
3	1,385,136.52	1,951,000.46	11	1,385,022.76	1,950,917.02
4	1,385,173.08	1,951,054.79	12	1,385,077.46	1,950,920.49
5	1,385,130.25	1,951,095.72	13	1,385,155.40	1,950,846.00
6	1,384,692.38	1,950,778.43	14	1,385,193.64	1,950,852.79
7	1,384,561.34	1,950,631.44	15	1,385,251.62	1,950,797.38
8	1,384,606.15	1,950,591.54			



NOTES

- 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 1,386,617.55, EASTING 1,954,333.76; "SHH-3 2009" (PID BBBK43) 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.
- VERTICAL CONTROL IS IN U.S. SURVEY FEET AND REFERS TO MEAN-LOWER-LOW-WATER DATUM (MLLW=0). THE MLLW VALUES SHOWN ON THIS PLAN ARE BASED ON NONA/NOS TIDAL STATION 945 7292, KODIAK ISLAND, WOMAN'S BAY, ALASKA HOLDING USCG'S 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.
- VERTICAL CONTROL WAS ALSO TIED INTO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAD83) HOLDING THE OPUS DB PUBLISHED VALUES OF "NIC-4 2006" (PID BBBK44) AS 17.62 FEET, "SHH-3 2009" (PID BBBK43) AS 20.84 FEET, AND "TDB 125" (PID BBBK43) AS 20.88 FEET AND APPLYING THE AVERAGE DELTA TO THE REMAINING PRIMARY CONTROL.
- 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.
- 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.
- HYDROGRAPHIC DATA ACQUISITION WAS CONDUCTED JULY 7 THROUGH JULY 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 PROBE. SURFACE SOUND VELOCITY WAS MEASURED USING AN APPLIED MICRO-SYSTEMS SMART PROBE. VESSEL NAVIGATION AND DATA COLLECTION WAS PERFORMED USING GPS CHIRP INTEGRATED SOFTWARE (CHIRP v8). DATA PROCESSING AND FINAL DATA ANALYSIS WERE PERFORMED USING CARIS HIPS SOFTWARE (V6.1).
- SOUNDINGS ARE SHOWN IN U.S. SURVEY FEET AND ARE MINUS UNLESS NOTED OTHERWISE.
- THIS SURVEY IS INDICATIVE OF CONDITIONS ON THE DATES OF SURVEY.
- 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	1,950,111
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	1,948,179
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	LEV. (M/L)	ELEV. (M/ENG)	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	1,951,955.54	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	1,386,617.55	1,954,333.77	10.30	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	1,950,898.42	21.17	22.53	3 1/4" DBC IN GOOD CONDITION
SHH-3 2009	1,382,702.24	1,950,183.98	19.45	20.81	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	1,384,362.78	1,950,973.11	15.95	17.31	3 1/4" SBC IN GOOD CONDITION
TDB 106	1,385,064.06	1,950,853.53	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.



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

Date	Drawn	Checked	Reviewed	Approved
11/11/2009	LEP/JGM/KFC/SAS	LEP/JGM/KFC/SAS	LEP/JGM/KFC/SAS	LEP/JGM/KFC/SAS

U.S. ARMY ENGINEER DISTRICT  
 CORPS OF ENGINEERS  
 ANCHORAGE, ALASKA  
 2687-09  
 DATE: 11/11/2009  
 DRAWN: LEP/JGM/KFC/SAS  
 CHECKED: LEP/JGM/KFC/SAS  
 REVIEWED: LEP/JGM/KFC/SAS  
 APPROVED: LEP/JGM/KFC/SAS

KODIAK, ALASKA  
 ST. HERMAN BOAT HARBOR  
 PROJECT CONDITION SURVEY  
 JUNE 20 - JULY 11, 2009

Reference number:  
**V-104**