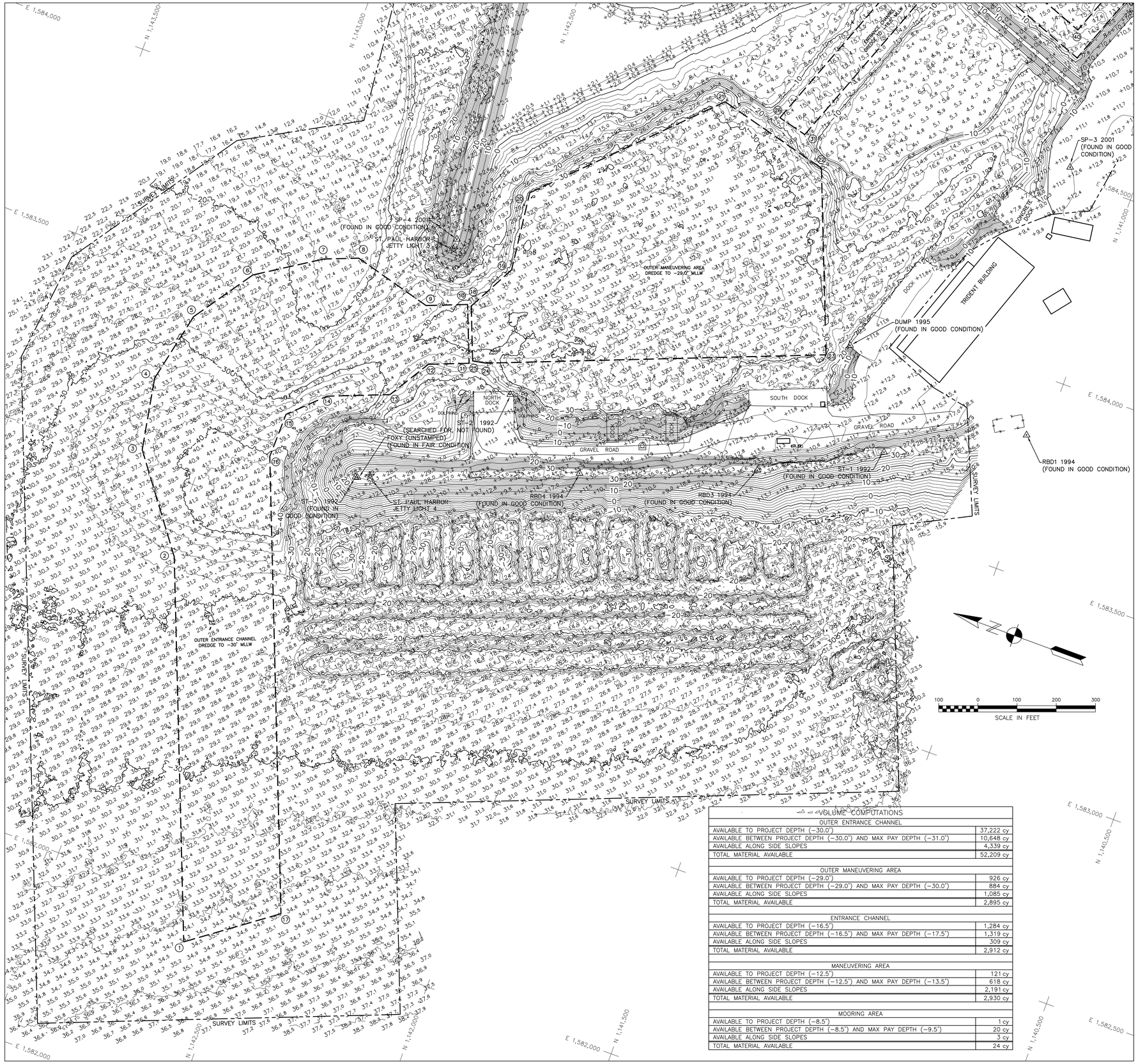
CORPS OF ENGINEERS



SCALE IN FEET
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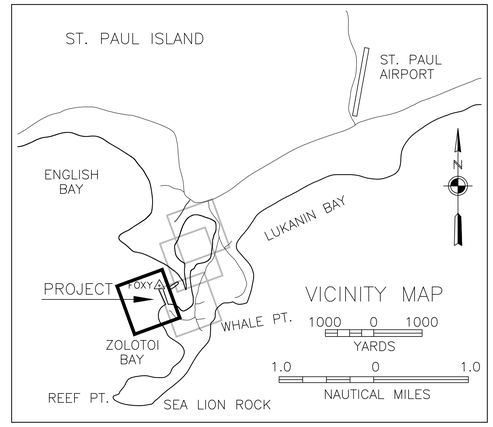

NOTES

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2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST: "9464212, VILLAGE COVE, ST. PAUL ISLAND, ALASKA", PUBLISHED 05/04/2010. THIS TIDAL DATUM IS BASED ON A SPECIAL 2 YEAR OBSERVATION PERIOD FROM OCTOBER 2006 TO SEPTEMBER 2008. THE TIDAL DATUM IS REFERENCED BY HOLDING USC&GS TIDAL BENCHMARK "NO 3 1946" AS 15.479' AND NOS TIDAL BENCHMARK "4212 N 2002" AS 10.817'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, BASED ON HOLDING PUBLISHED VERTICAL VALUES FOR USC&GS BENCHMARK "NO 3 1946", AS 15.48', AND NOS BENCHMARK "4212 N 2002" AS 10.82'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, HOLDING USACE "SP–3 2001" AS 16.27', BASED ON GPS OBSERVATIONS FROM AUGUST 29 & 30, 2011.
3. THE SURVEY WAS CONDUCTED AUGUST 23 – SEPTEMBER 1, 2011. HYDROGRAPHIC SOUNDING DATA WAS COLLECTED USING AN ODOM ES3 MULTI–BEAM ECHOSOUNDER (200KHZ, 120–DEGREE SWATH–WIDTH WITH 120, 0.75 DEGREE BEAMS). POSITIONING AND VESSEL ATTITUDE WERE PROVIDED IN REAL TIME USING A TRIMBLE 461 RTK GPS RECEIVER OPERATING ON KINEMATIC CORRECTORS BROADCAST FROM A TRIMBLE 5700 RTK BASE RECEIVER SET AT CONTROL STATION, "1475–1 1986". SOUND VELOCITY PROFILE WAS PROVIDED USING AN ODOM DIGI–BAR PRO, AND WAS PROVIDED IN REAL TIME AT THE SOUNDER HEAD USING AN ODOM DIGI–BAR V. DATA COLLECTION AND NAVIGATION WERE PERFORMED USING HYPACK HYSWEEP (2010) SOFTWARE. MULTI–BEAM SURVEY DATA WAS POST–PROCESSED USING HYPACK HYSWEEP (2010) SOFTWARE.
4. MEAN LOWER LOW WATER ELEVATIONS FOR MONUMENTS SP–2 1979, SP–4 2001, ST–1 1992, ST–4 1992 AND RBD 1 1994 WERE NOT UPDATED THIS SURVEY.
5. DREDGE LIMITS FOR THE OUTER ENTRANCE CHANNEL (–30 PROJECT DEPTH AREA) AND OUTER MANEUVERING AREA (–29 PROJECT DEPTH AREA) WERE OBTAINED FROM A CONSTRUCTION DOCUMENT DRAWING PROVIDED BY THE USACE. COORDINATE VALUES WERE TRANSLATED FROM THE PROVIDED NAD 27 VALUES TO NAD 83 HOLDING USACE SBC "ST–3 1992", AND USACE SBC "RBD1 1994".
6. SOUNDING VALUES SHOWN ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.
8. THIS SURVEY WAS CONDUCTED BY HUGHES AND ASSOCIATES, WASILLA, AK.

CONTROL COORDINATES

STATION	NORTHING	EASTING	ELEV. (MLLW)	ELEV. (NAVD88)	DESCRIPTION
VILLAGE HILL	1,140,727.24	1,584,338.92	94.88	95.73	USCGS TRI–STA SBC
DUMP 1995	1,141,545.24	1,583,907.14	11.52	12.37	2" AL–CAP (DAMAGED)
SP–2 1979	1,142,158.06	1,585,194.13	12.74	13.59	USACE SBC
SP–3 2001	1,141,172.88	1,584,526.18	15.42	16.27	3–1/4" DOMED BC
SP–4 2001	1,142,580.64	1,583,818.62	21.00	21.85	3–1/4" DOMED BC
ST–1 1992	1,141,370.57	1,583,680.59	33.25	34.10	USACE SBC
ST–2 1992	1,142,317.19	1,583,492.87	---	---	DESTROYED
ST–3 1992	1,142,616.08	1,583,159.92	28.23	29.08	USACE SBC
ST–4 1992	1,142,668.99	1,584,684.10	16.85	17.70	USACE SBC
RBD1 1994	1,141,043.70	1,583,846.28	28.41	29.26	USACE SBC
RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)

SEE NOTES 2 AND 4 FOR CONTROL DATA DETAILS

PROJECT LIMITS

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,142,622.52	1,581,895.40	24	1,142,403.08	1,583,546.68
2	1,142,981.30	1,582,810.55	25	1,142,436.72	1,583,540.43
3	1,143,151.52	1,583,039.22	26	1,141,912.08	1,584,391.78
4	1,143,184.20	1,583,221.67	27	1,141,690.43	1,584,977.33
5	1,143,144.58	1,583,402.73	28	1,141,570.67	1,585,031.47
6	1,143,038.69	1,583,554.85	29	1,141,539.36	1,584,962.22
7	1,142,882.64	1,583,654.87	30	1,141,630.48	1,584,921.02
8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
10	1,142,498.09	1,583,671.36	33	1,141,582.02	1,585,297.63
11	1,142,443.01	1,583,531.83	34	1,141,447.98	1,585,358.05
12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
14	1,142,754.87	1,583,329.05	37	1,141,458.60	1,585,241.83
15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
16	1,142,839.79	1,583,134.65	39	1,141,231.80	1,584,974.31
17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
18	1,142,487.90	1,583,670.98	41	1,141,523.48	1,584,956.23
19	1,142,422.69	1,583,792.65	42	1,141,564.68	1,585,047.35
20	1,142,446.47	1,583,993.42	43	1,141,448.38	1,585,371.03
21	1,142,057.34	1,584,382.13	44	1,141,342.63	1,585,418.71
22	1,141,768.53	1,584,306.91	45	1,141,305.25	1,585,404.55
23	1,141,594.69	1,583,863.58	46	1,141,334.25	1,585,327.84

VOLUME COMPUTATIONS

OUTER ENTRANCE CHANNEL	
AVAILABLE TO PROJECT DEPTH (–30.0')	37,222 cy
AVAILABLE BETWEEN PROJECT DEPTH (–30.0') AND MAX PAY DEPTH (–31.0')	10,648 cy
AVAILABLE ALONG SIDE SLOPES	4,339 cy
TOTAL MATERIAL AVAILABLE	52,209 cy
OUTER MANEUVERING AREA	
AVAILABLE TO PROJECT DEPTH (–29.0')	926 cy
AVAILABLE BETWEEN PROJECT DEPTH (–29.0') AND MAX PAY DEPTH (–30.0')	884 cy
AVAILABLE ALONG SIDE SLOPES	1,085 cy
TOTAL MATERIAL AVAILABLE	2,895 cy
ENTRANCE CHANNEL	
AVAILABLE TO PROJECT DEPTH (–16.5')	1,284 cy
AVAILABLE BETWEEN PROJECT DEPTH (–16.5') AND MAX PAY DEPTH (–17.5')	1,319 cy
AVAILABLE ALONG SIDE SLOPES	309 cy
TOTAL MATERIAL AVAILABLE	2,912 cy
MANEUVERING AREA	
AVAILABLE TO PROJECT DEPTH (–12.5')	121 cy
AVAILABLE BETWEEN PROJECT DEPTH (–12.5') AND MAX PAY DEPTH (–13.5')	618 cy
AVAILABLE ALONG SIDE SLOPES	2,191 cy
TOTAL MATERIAL AVAILABLE	2,930 cy
MOORING AREA	
AVAILABLE TO PROJECT DEPTH (–8.5')	1 cy
AVAILABLE BETWEEN PROJECT DEPTH (–8.5') AND MAX PAY DEPTH (–9.5')	20 cy
AVAILABLE ALONG SIDE SLOPES	3 cy
TOTAL MATERIAL AVAILABLE	24 cy

NAVIGATION AIDS

DESCRIPTION	USCG NO.	NORTHING	EASTING
ST. PAUL HARBOR JETTY LIGHT 3	27831	1,142,579.40	1,583,791.10
ST. PAUL HARBOR JETTY LIGHT 4	27830	1,142,582.30	1,583,175.00
ST. PAUL HARBOR LIGHT 6		1,141,594.64	1,584,861.68

STATE OF ALASKA
49TH
JACK S. HUGHES
LS–4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–10–D–0005–0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA Recommended: Approved: Date:
– PRIME CONTRACTOR – RESIDENT ENGINEER

Sym	Action	Description	Date	Appvd

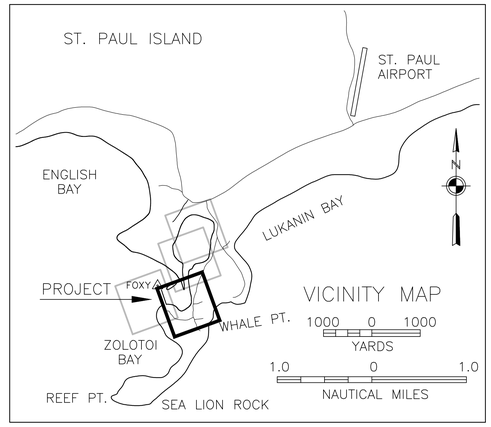
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

Designed: REH
Drawn: REH
Reviewed: CSH
Chief:
Submitted:
Chief:
Date: 11/17/11
Dwg Scale: 1" = 100'
Plot Scale:
Section
File:
Branch
Drawing #:
2976–11

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V–101
Sheet 1 of 10

CORPS OF ENGINEERS



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JACK S. HUGHES
LS–4915
STATE OF ALASKA
49TH
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–10–D–0005–0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
– PRIME CONTRACTOR – RESIDENT ENGINEER –

Sym	Action	Description	Date	Appvd

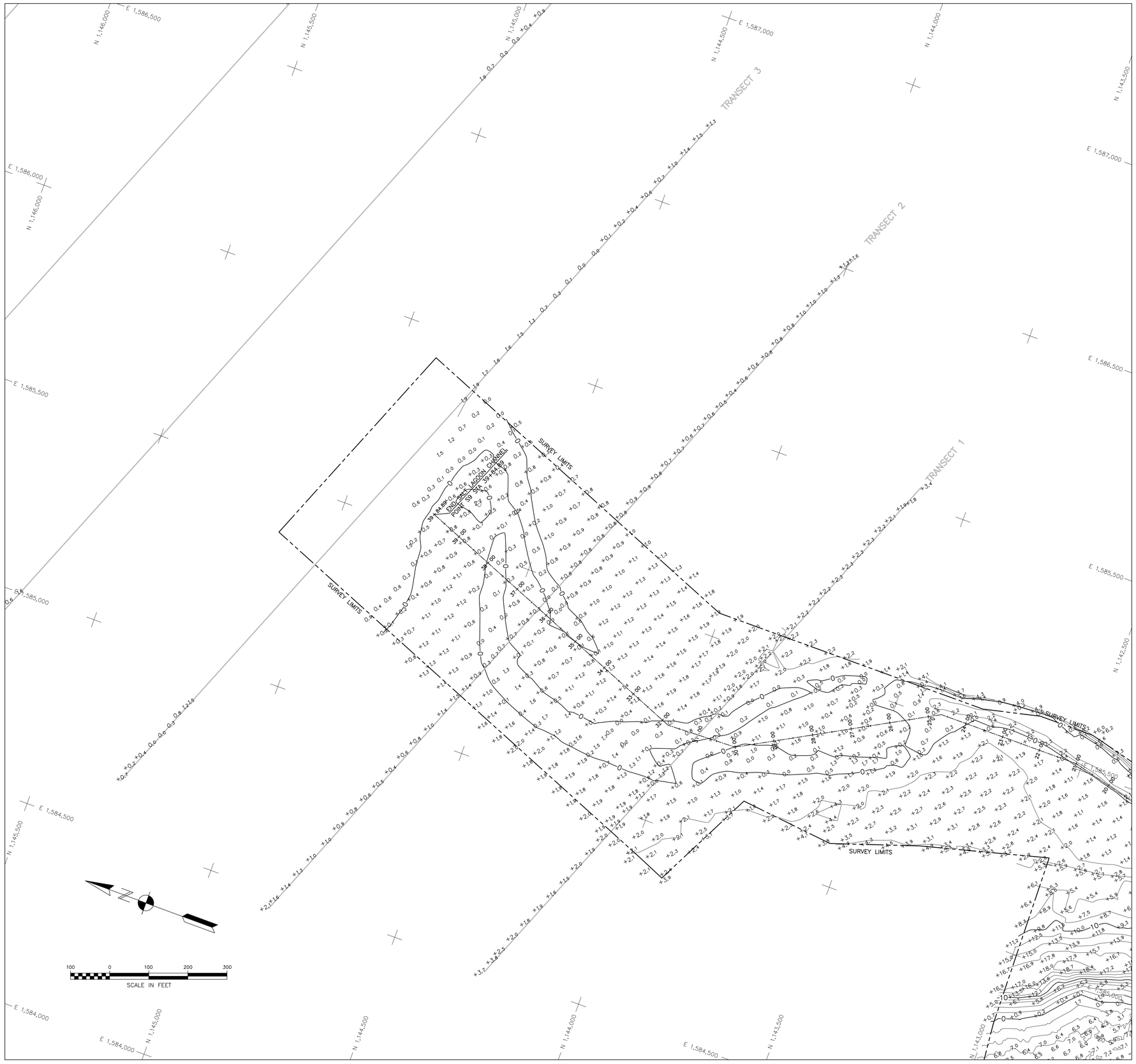
Designed: HUGHES AND ASSOCIATES
Drawn: REH
Reviewed: CSH
Chief, ——— Section
Submitted:
Chief, ——— Branch
Date: 11/17/11
Dwg Scale: 1" = 100'
Plot Scale:
File:
Drawing #: 2976–11

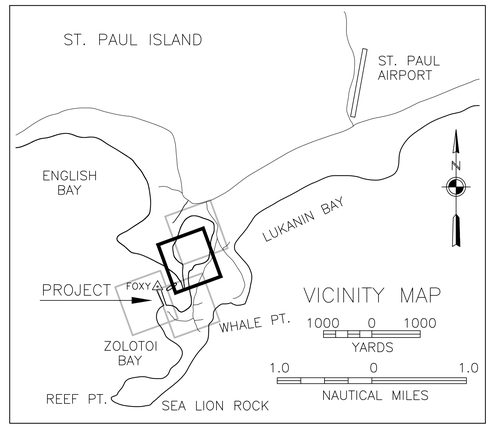
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V–102
Sheet 2 of 10

CORPS OF ENGINEERS





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6. SOUNDING VALUES SHOWN ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.
8. THIS SURVEY WAS CONDUCTED BY HUGHES AND ASSOCIATES, WASILLA, AK.

CONTROL COORDINATES

STATION	NORTHING	EASTING	ELEV. (MLLW)	ELEV. (NAVD88)	DESCRIPTION
VILLAGE HILL	1,140,727.24	1,584,338.92	94.88	95.73	USCGS TRI–STA SBC
DUMP 1995	1,141,545.24	1,583,907.14	11.52	12.37	2" AL–CAP (DAMAGED)
SP–2 1979	1,142,158.06	1,585,194.13	12.74	13.59	USACE SBC
SP–3 2001	1,141,172.88	1,584,526.18	15.42	16.27	3–1/4" DOMED BC
SP–4 2001	1,142,580.64	1,583,818.62	21.00	21.85	3–1/4" DOMED BC
ST–1 1992	1,141,370.57	1,583,680.59	33.25	34.10	USACE SBC
ST–2 1992	1,142,317.19	1,583,492.87	---	---	DESTROYED
ST–3 1992	1,142,616.08	1,583,159.92	28.23	29.08	USACE SBC
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RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)

SEE NOTES 2 AND 4 FOR CONTROL DATA DETAILS

PROJECT LIMITS

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,142,622.52	1,581,895.40	24	1,142,403.08	1,583,546.68
2	1,142,981.30	1,582,810.55	25	1,142,436.72	1,583,540.43
3	1,143,151.52	1,583,039.22	26	1,141,912.08	1,584,391.78
4	1,143,184.20	1,583,221.67	27	1,141,690.43	1,584,977.33
5	1,143,144.58	1,583,402.73	28	1,141,570.67	1,585,031.47
6	1,143,038.69	1,583,554.85	29	1,141,539.36	1,584,962.22
7	1,142,882.64	1,583,654.87	30	1,141,630.48	1,584,921.02
8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
10	1,142,498.09	1,583,671.36	33	1,141,582.02	1,585,297.63
11	1,142,443.01	1,583,531.83	34	1,141,447.98	1,585,358.05
12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
14	1,142,754.87	1,583,329.05	37	1,141,458.60	1,585,241.83
15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
16	1,142,839.79	1,583,134.65	39	1,141,231.80	1,584,974.31
17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
18	1,142,487.90	1,583,670.98	41	1,141,523.48	1,584,956.23
19	1,142,422.69	1,583,792.65	42	1,141,564.68	1,585,047.35
20	1,142,446.47	1,583,993.42	43	1,141,448.38	1,585,371.03
21	1,142,057.34	1,584,382.13	44	1,141,342.63	1,585,418.71
22	1,141,768.53	1,584,306.91	45	1,141,305.25	1,585,404.55
23	1,141,594.69	1,583,863.58	46	1,141,334.25	1,585,327.84

NAVIGATION AIDS

DESCRIPTION	USCG NO.	NORTHING	EASTING
ST. PAUL HARBOR JETTY LIGHT 3	27831	1,142,579.40	1,583,791.10
ST. PAUL HARBOR JETTY LIGHT 4	27830	1,142,582.30	1,583,175.00
ST. PAUL HARBOR LIGHT 6		1,141,594.64	1,584,861.68

STATE OF ALASKA 49TH
JACK S. HUGHES
LS–4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–10–D–0005–0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym	Action	Description	Date	Appvd

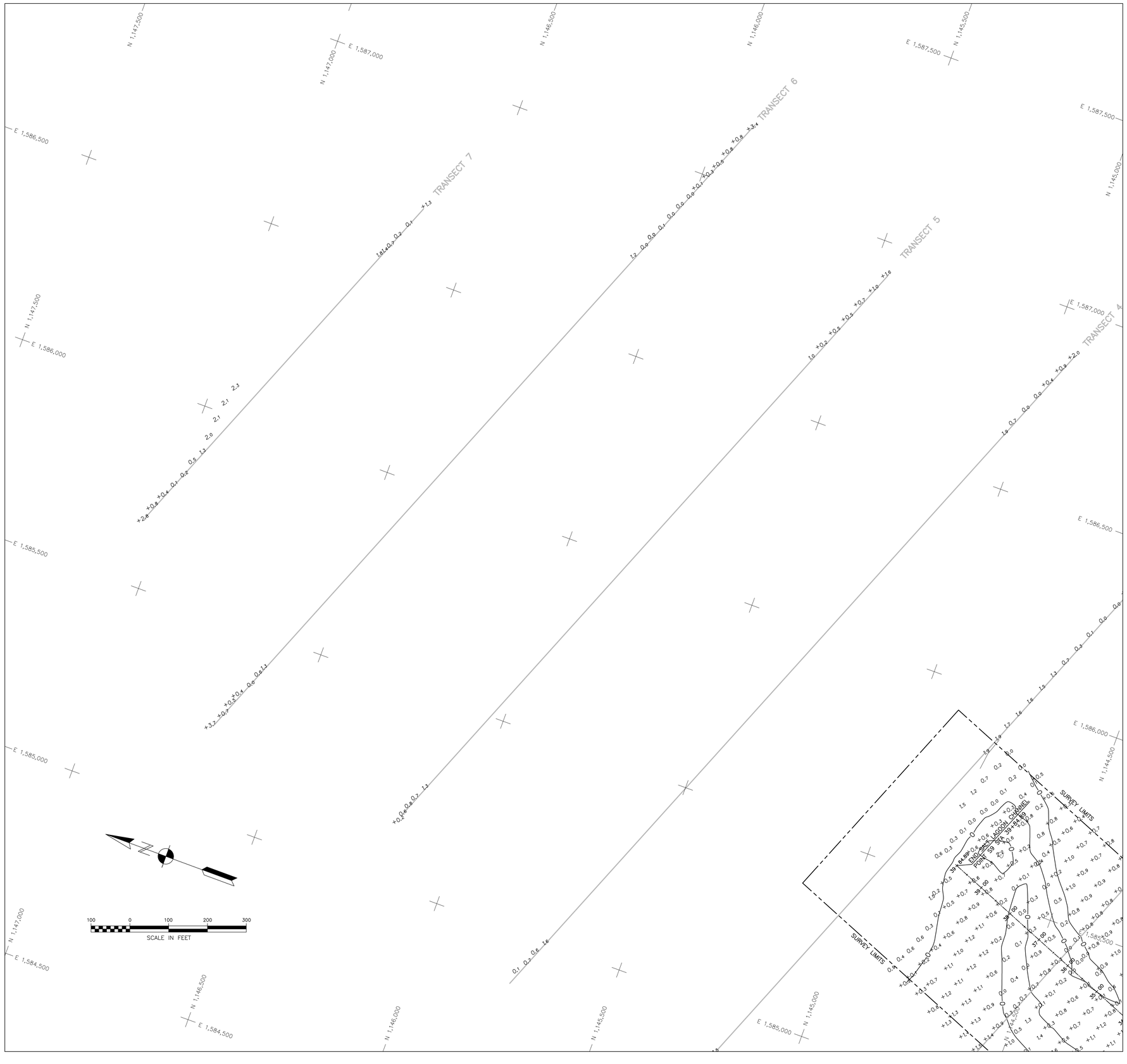
Designed: HUGHES AND ASSOCIATES Date: 11/17/11
Drawn: REH Dwg Scale: 1" = 100'
Reviewed: CSH Plot Scale:
Chief Section File:
Submitted: Branch Drawing #: 2976–11
Chief

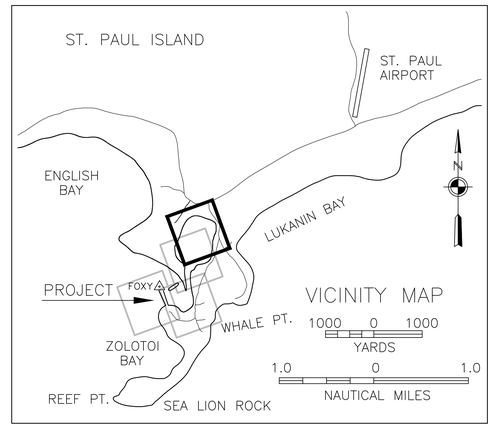
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V–103
Sheet 3 of 10

CORPS OF ENGINEERS





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STATE OF ALASKA
49TH
JACK S. HUGHES
LS–4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–10–D–0005–0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym	Action	Description	Date	Appvd

Designed: HUGHES AND ASSOCIATES Date: 11/17/11
Drawn: REH Dwg Scale: 1" = 100'
Reviewed: CSH Plot Scale:
Chief: Section File:
Submitted: Branch Drawing #:
Chief:

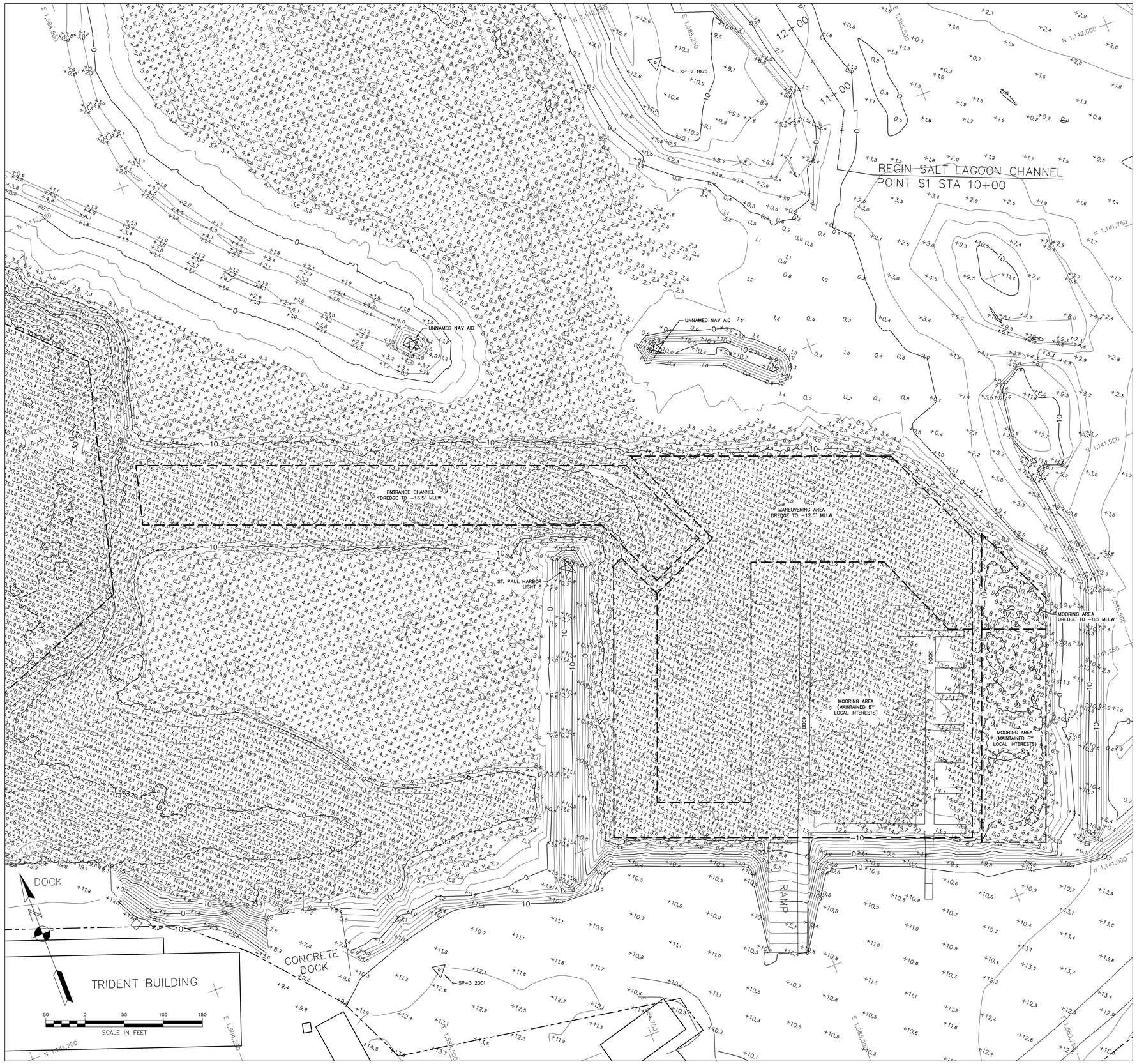
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

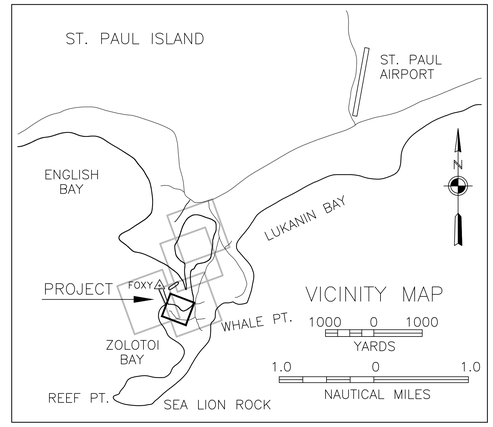
2976–11

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V–104
Sheet 4 of 10

CORPS OF ENGINEERS





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ST–3 1992	1,142,616.08	1,583,159.92	28.23	29.08	USACE SBC
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RBD1 1994	1,141,043.70	1,583,846.28	28.41	29.26	USACE SBC
RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)

SEE NOTES 2 AND 4 FOR CONTROL DATA DETAILS

PROJECT LIMITS

CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,142,622.52	1,581,895.40	24	1,142,403.08	1,583,546.68
2	1,142,981.30	1,582,810.55	25	1,142,436.72	1,583,540.43
3	1,143,151.52	1,583,039.22	26	1,141,912.08	1,584,391.78
4	1,143,184.20	1,583,221.67	27	1,141,690.43	1,584,977.33
5	1,143,144.58	1,583,402.73	28	1,141,570.67	1,585,031.47
6	1,143,038.69	1,583,554.85	29	1,141,539.36	1,584,962.22
7	1,142,882.64	1,583,654.87	30	1,141,630.48	1,584,921.02
8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
10	1,142,498.09	1,583,671.36	33	1,141,582.02	1,585,297.63
11	1,142,443.01	1,583,531.83	34	1,141,447.98	1,585,358.05
12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
14	1,142,754.87	1,583,329.05	37	1,141,458.60	1,585,241.83
15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
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17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
18	1,142,487.90	1,583,670.98	41	1,141,523.48	1,584,956.23
19	1,142,422.69	1,583,792.65	42	1,141,564.68	1,585,047.35
20	1,142,446.47	1,583,993.42	43	1,141,448.38	1,585,371.03
21	1,142,057.34	1,584,382.13	44	1,141,342.63	1,585,418.71
22	1,141,768.53	1,584,306.91	45	1,141,305.25	1,585,404.55
23	1,141,594.69	1,583,863.58	46	1,141,334.25	1,585,327.84

NAVIGATION AIDS

DESCRIPTION	USCG NO.	NORTHING	EASTING
ST. PAUL HARBOR JETTY LIGHT 3	27831	1,142,579.40	1,583,791.10
ST. PAUL HARBOR JETTY LIGHT 4	27830	1,142,582.30	1,583,175.00
ST. PAUL HARBOR LIGHT 6		1,141,594.64	1,584,861.68

STATE OF ALASKA 49TH
JACK S. HUGHES
LS–4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–10–D–0005–0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
– PRIME CONTRACTOR – RESIDENT ENGINEER

Sym	Action	Description	Date	Appvd

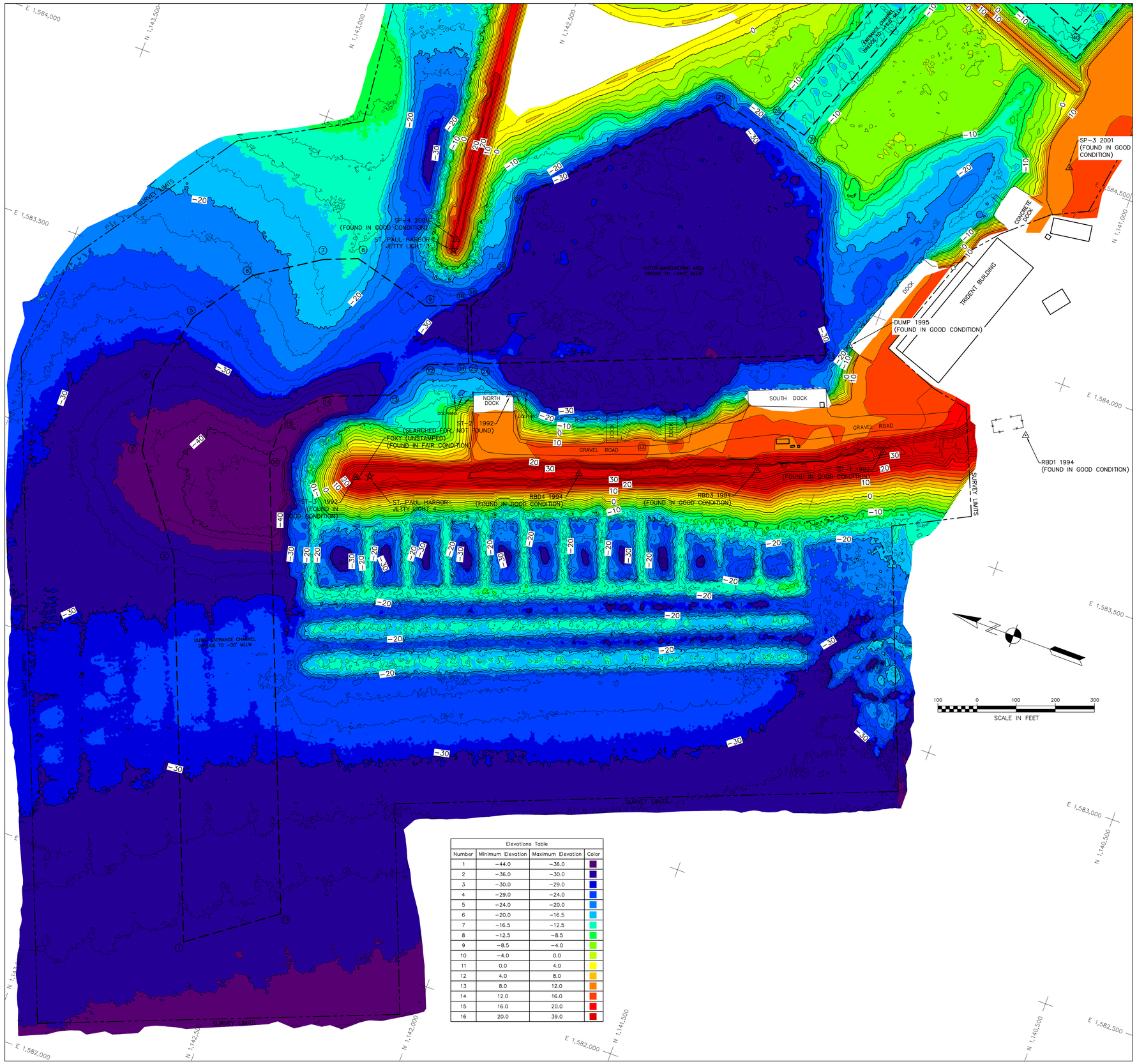
Designed: HUGHES AND ASSOCIATES
Drawn: REH
Reviewed: CSH
Chief
Submitted
Chief
Date: 11/17/11
Dwg Scale: 1" = 50'
Plot Scale:
Section
File:
Branch
Drawing #:
2976–11

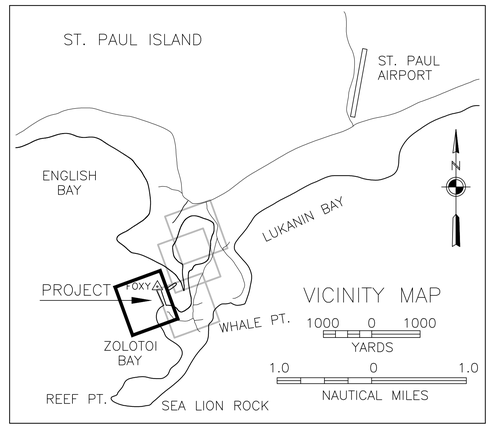
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V–105
Sheet 5 of 10

CORPS OF ENGINEERS





NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 9, NAD83, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 (CORS) 2003.00 EPOCH VALUES OF NGS CORS STATIONS: "BETHEL WAAS CORS ARP" (BET1 – PID DK4091) AS N 2,570,534.05, E 3,095,568.82 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "PLATINUM_AK2007 CORS ARP" (AB12 – PID DL6672) AS N 1,904,718.84, E 3,196,332.08 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "SANDPOINT_AK2004 CORS ARP" (AB07 – PID DL7635) N 628,509.99, E 3,619,003.59 (ALASKA STATE PLANE, ZONE 9, NAD 83). CORS STATIONS STATE PLANE COORDINATES ARE CONVERTED FROM LAT/LONG USING NGS PROGRAM SPCS83(V2.1). RESULTANT COORDINATES AT PRIMARY HARBOR CONTROL HOLD USACE SBC "SP–3 2001" AS N 1,141,172.90, E 1,584,526.11 AND USACE SBC "ST–3 1992" AS N 1142616.10, E 1,583,159.85.
2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST: "9464212, VILLAGE COVE, ST. PAUL ISLAND, ALASKA", PUBLISHED 05/04/2010. THIS TIDAL DATUM IS BASED ON A SPECIAL 2 YEAR OBSERVATION PERIOD FROM OCTOBER 2006 TO SEPTEMBER 2008. THE TIDAL DATUM IS REFERENCED BY HOLDING USC&GS TIDAL BENCHMARK "NO 3 1946" AS 15.479' AND NOS TIDAL BENCHMARK "4212 N 2002" AS 10.817'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, BASED ON HOLDING PUBLISHED VERTICAL VALUES FOR USC&GS BENCHMARK "NO 3 1946", AS 15.48', AND NOS BENCHMARK "4212 N 2002" AS 10.82'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, HOLDING USACE "SP–3 2001" AS 16.27', BASED ON GPS OBSERVATIONS FROM AUGUST 29 & 30, 2011.
3. THE SURVEY WAS CONDUCTED AUGUST 23 – SEPTEMBER 1, 2011. HYDROGRAPHIC SOUNDING DATA WAS COLLECTED USING AN ODOM ES3 MULTI–BEAM ECHOSOUNDER (200KHZ, 120–DEGREE SWATH–WIDTH WITH 120, 0.75 DEGREE BEAMS). POSITIONING AND VESSEL ATTITUDE WERE PROVIDED IN REAL TIME USING A TRIMBLE 461 RTK GPS RECEIVER OPERATING ON KINEMATIC CORRECTORS BROADCAST FROM A TRIMBLE 5700 RTK BASE RECEIVER SET AT CONTROL STATION, "1475–1 1986". SOUND VELOCITY PROFILE WAS PROVIDED USING AN ODOM DIGI–BAR PRO, AND WAS PROVIDED IN REAL TIME AT THE SOUNDER HEAD USING AN ODOM DIGI–BAR V. DATA COLLECTION AND NAVIGATION WERE PERFORMED USING HYPACK HYSWEEP (2010) SOFTWARE. MULTI–BEAM SURVEY DATA WAS POST–PROCESSED USING HYPACK HYSWEEP (2010) SOFTWARE.
4. MEAN LOWER LOW WATER ELEVATIONS FOR MONUMENTS SP–2 1979, SP–4 2001, ST–1 1992, ST–4 1992 AND RBD 1 1994 WERE NOT UPDATED THIS SURVEY.
5. DREDGE LIMITS FOR THE OUTER ENTRANCE CHANNEL (–30 PROJECT DEPTH AREA) AND OUTER MANEUVERING AREA (–29 PROJECT DEPTH AREA) WERE OBTAINED FROM A CONSTRUCTION DOCUMENT DRAWING PROVIDED BY THE USACE. COORDINATE VALUES WERE TRANSLATED FROM THE PROVIDED NAD 27 VALUES TO NAD 83 HOLDING USACE SBC "ST–3 1992", AND USACE SBC "RBD1 1994".
6. SOUNDING VALUES SHOWN ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.
8. THIS SURVEY WAS CONDUCTED BY HUGHES AND ASSOCIATES, WASILLA, AK.

CONTROL COORDINATES					
STATION	NORTHING	EASTING	ELEV. (MLLW)	ELEV. (NAVD88)	DESCRIPTION
VILLAGE_HILL	1,140,727.24	1,584,338.92	94.88	95.73	USCGS TRI–STA SBC
DUMP 1995	1,141,545.24	1,583,907.14	11.52	12.37	2" AL–CAP (DAMAGED)
SP–2 1979	1,142,158.06	1,585,194.13	12.74	13.59	USACE SBC
SP–3 2001	1,141,172.88	1,584,526.18	15.42	16.27	3–1/4" DOMED BC
SP–4 2001	1,142,580.64	1,583,818.62	21.00	21.85	3–1/4" DOMED BC
ST–1 1992	1,141,370.57	1,583,680.59	33.25	34.10	USACE SBC
ST–2 1992	1,142,317.19	1,583,492.87	---	---	DESTROYED
ST–3 1992	1,142,616.08	1,583,159.92	28.23	29.08	USACE SBC
ST–4 1992	1,142,668.99	1,584,684.10	16.85	17.70	USACE SBC
RBD1 1994	1,141,043.70	1,583,846.28	28.41	29.26	USACE SBC
RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)
SEE NOTES 2 AND 4 FOR CONTROL DATA DETAILS					

PROJECT LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,142,622.52	1,581,895.40	24	1,142,403.08	1,583,546.68
2	1,142,981.30	1,582,810.55	25	1,142,436.72	1,583,540.43
3	1,143,151.52	1,583,039.22	26	1,141,912.08	1,584,391.78
4	1,143,184.20	1,583,221.67	27	1,141,690.43	1,584,977.33
5	1,143,144.58	1,583,402.73	28	1,141,570.67	1,585,031.47
6	1,143,038.69	1,583,554.85	29	1,141,539.36	1,584,962.22
7	1,142,882.64	1,583,654.87	30	1,141,630.48	1,584,921.02
8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
10	1,142,498.09	1,583,671.36	33	1,141,582.02	1,585,297.63
11	1,142,443.01	1,583,531.83	34	1,141,447.98	1,585,358.05
12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
14	1,142,754.87	1,583,329.05	37	1,141,458.60	1,585,241.83
15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
16	1,142,839.79	1,583,134.65	39	1,141,231.80	1,584,974.31
17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
18	1,142,487.90	1,583,670.98	41	1,141,523.48	1,584,956.23
19	1,142,422.69	1,583,792.65	42	1,141,564.68	1,585,047.35
20	1,142,446.47	1,583,993.42	43	1,141,448.38	1,585,371.03
21	1,142,057.34	1,584,382.13	44	1,141,342.63	1,585,418.71
22	1,141,768.53	1,584,306.91	45	1,141,305.25	1,585,404.55
23	1,141,594.69	1,583,863.58	46	1,141,334.25	1,585,327.84

NAVIGATION AIDS			
DESCRIPTION	USCG NO.	NORTHING	EASTING
ST. PAUL HARBOR JETTY LIGHT 3	27831	1,142,579.40	1,583,791.10
ST. PAUL HARBOR JETTY LIGHT 4	27830	1,142,582.30	1,583,175.00
ST. PAUL HARBOR LIGHT 6		1,141,594.64	1,584,861.68

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	–44.0	–36.0	
2	–36.0	–30.0	
3	–30.0	–29.0	
4	–29.0	–24.0	
5	–24.0	–20.0	
6	–20.0	–16.5	
7	–16.5	–12.5	
8	–12.5	–8.5	
9	–8.5	–4.0	
10	–4.0	0.0	
11	0.0	4.0	
12	4.0	8.0	
13	8.0	12.0	
14	12.0	16.0	
15	16.0	20.0	
16	20.0	39.0	

100 0 100 200 300
SCALE IN FEET

STATE OF ALASKA 49TH
JACK S. HUGHES
LS–4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB–10–D–0005–0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
– RESIDENT ENGINEER – – PRIME CONTRACTOR –

Sym	Action	Description	Date	Appvd

Date: 11/17/11
Dwg Scale: 1" = 100'
Plot Scale:
File:
Drawing #: 2976–11
Designed: REH
Drawn: REH
Reviewed: CSH
Chief: Section
Submitted:
Chief: Branch
HUGHES AND ASSOCIATES

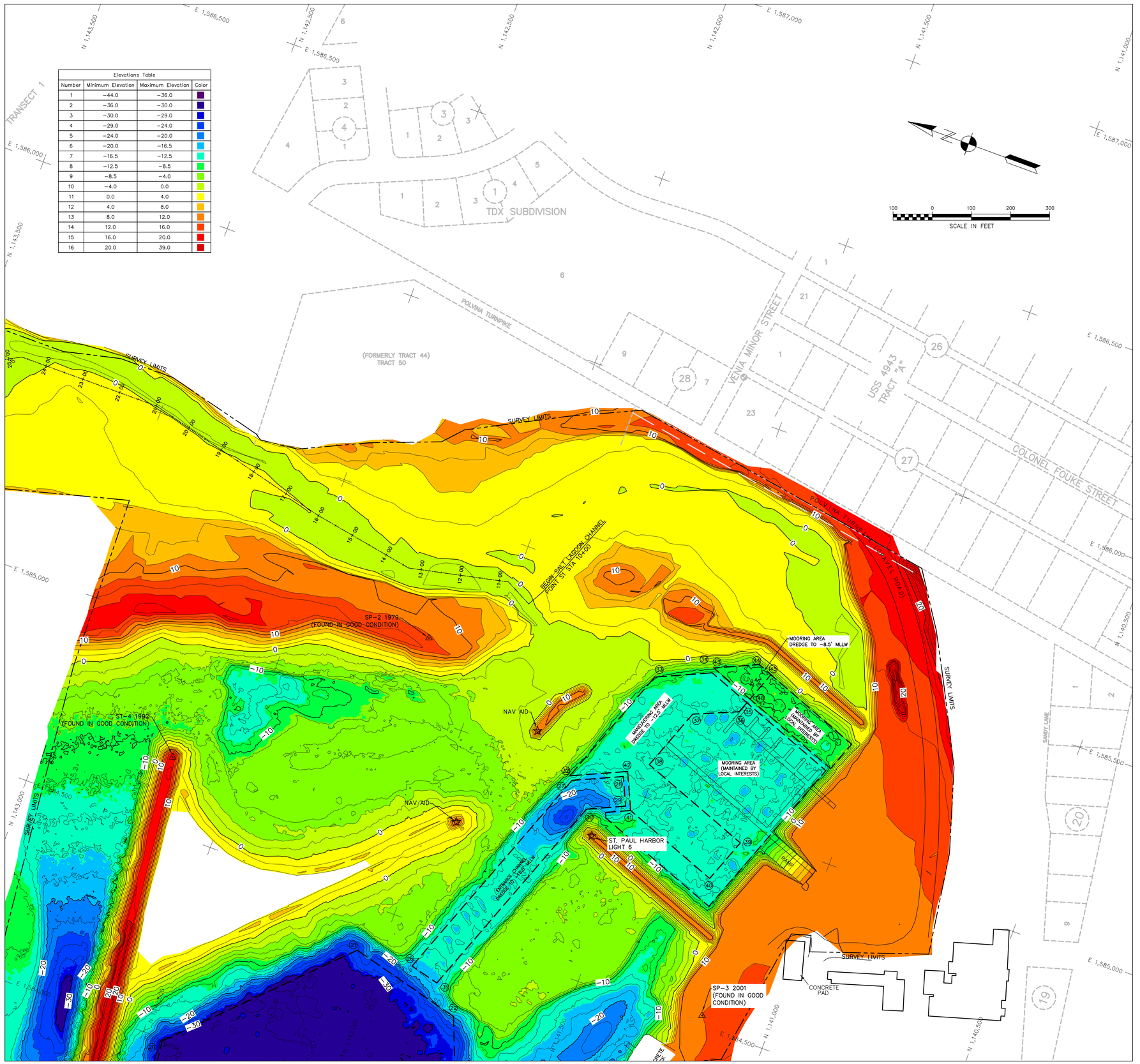
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

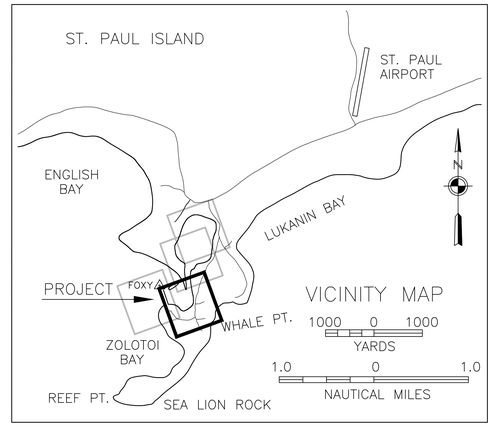
ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V–106
Sheet 6 of 10

CORPS OF ENGINEERS

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	−44.0	−36.0	
2	−36.0	−30.0	
3	−30.0	−29.0	
4	−29.0	−24.0	
5	−24.0	−20.0	
6	−20.0	−16.5	
7	−16.5	−12.5	
8	−12.5	−8.5	
9	−8.5	−4.0	
10	−4.0	0.0	
11	0.0	4.0	
12	4.0	8.0	
13	8.0	12.0	
14	12.0	16.0	
15	16.0	20.0	
16	20.0	39.0	





NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 9, NAD83, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 (CORS) 2003.00 EPOCH VALUES OF NGS CORS STATIONS: "BETHEL WAAS CORS ARP" (BET1 – PID DK4091) AS N 2,570,534.05, E 3,095,568.82 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "PLATINUM_AK2007 CORS ARP" (AB12 – PID DL6672) AS N 1,904,718.84, E 3,196,332.08 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "SANDPOINT_AK2004 CORS ARP" (AB07 – PID DL7635) N 628,509.99, E 3,619,003.59 (ALASKA STATE PLANE, ZONE 9, NAD 83). CORS STATIONS STATE PLANE COORDINATES ARE CONVERTED FROM LAT/LONG USING NGS PROGRAM SPCS83(V2.1). RESULTANT COORDINATES AT PRIMARY HARBOR CONTROL HOLD USACE SBC "SP-3 2001" AS N 1,141,172.90, E 1,584,526.11 AND USACE SBC "ST-3 1992" AS N 1142616.10, E 1,583,159.85.
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ST-2 1992	1,142,317.19	1,583,492.87	---	---	DESTROYED
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RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)
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PROJECT LIMITS					
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8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
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12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
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15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
16	1,142,839.79	1,583,134.65	39	1,141,231.80	1,584,974.31
17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
18	1,142,487.90	1,583,670.98	41	1,141,523.48	1,584,956.23
19	1,142,422.69	1,583,792.65	42	1,141,564.68	1,585,047.35
20	1,142,446.47	1,583,993.42	43	1,141,448.38	1,585,371.03
21	1,142,057.34	1,584,382.13	44	1,141,342.63	1,585,418.71
22	1,141,768.53	1,584,306.91	45	1,141,305.25	1,585,404.55
23	1,141,594.69	1,583,863.58	46	1,141,334.25	1,585,327.84

☆ NAVIGATION AIDS ☆			
DESCRIPTION	USCG NO.	NORTHING	EASTING
ST. PAUL HARBOR JETTY LIGHT 3	27831	1,142,579.40	1,583,791.10
ST. PAUL HARBOR JETTY LIGHT 4	27830	1,142,582.30	1,583,175.00
ST. PAUL HARBOR LIGHT 6		1,141,594.64	1,584,861.68

STATE OF ALASKA 49TH
JACK S. HUGHES
LS-4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-10-D-0005-0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

No.	Action	Description	Date	Appvd

Date: 11/17/11
Dwg Scale: 1" = 100'
Plot Scale:
File:
Drawing #:

Designed: HUGHES AND ASSOCIATES
Drawn: REH
Reviewed: CSH
Chkd: Section
Submitted: Branch
Chkd:

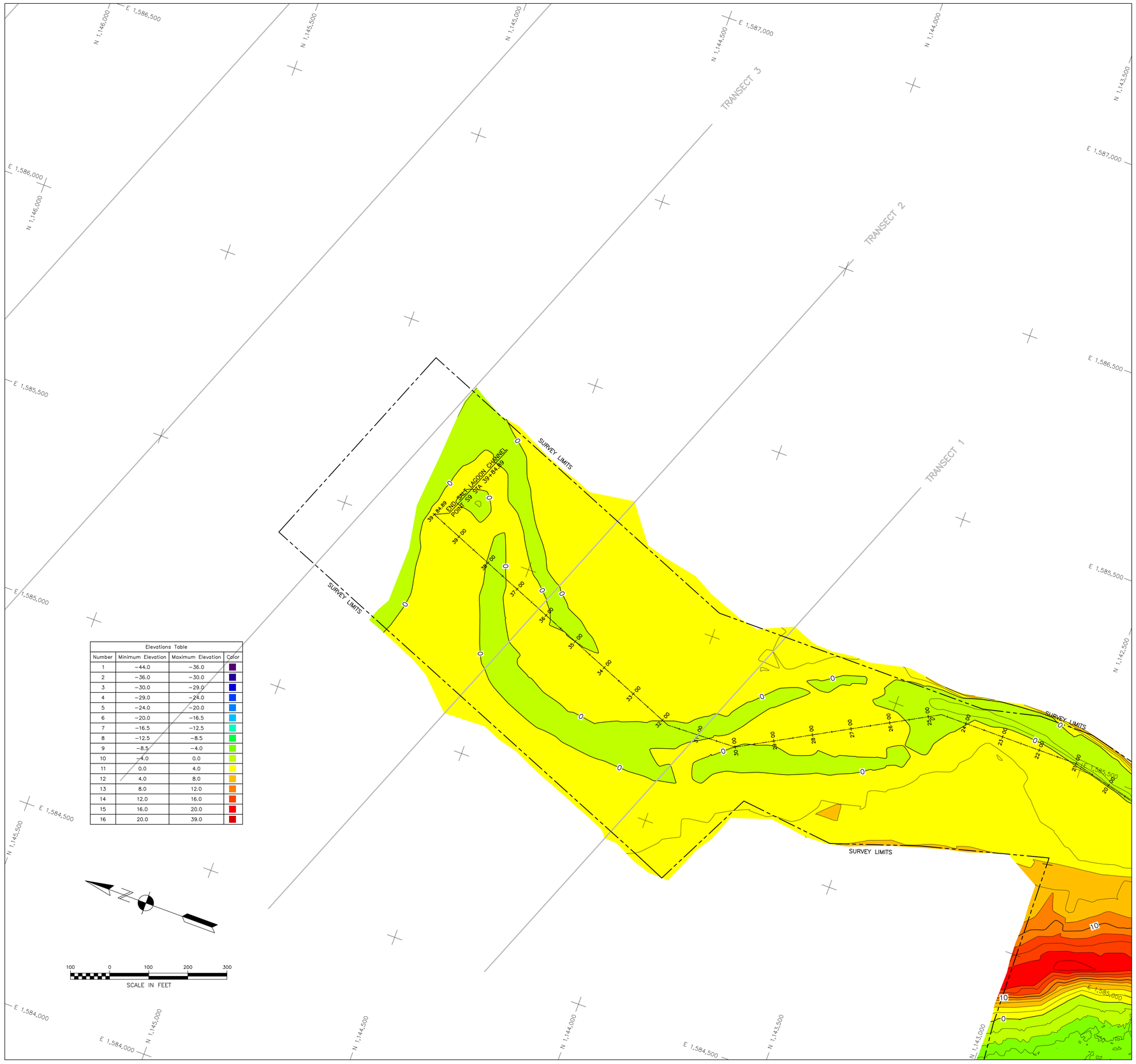
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

2976-11

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V-107
Sheet 7 of 10

CORPS OF ENGINEERS



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
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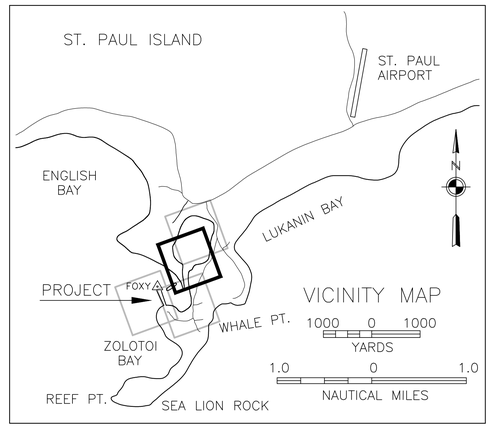
2	−36.0	−30.0	
3	−30.0	−29.0	
4	−29.0	−24.0	
5	−24.0	−20.0	
6	−20.0	−16.5	
7	−16.5	−12.5	
8	−12.5	−8.5	
9	−8.5	−4.0	
10	−4.0	0.0	
11	0.0	4.0	
12	4.0	8.0	
13	8.0	12.0	
14	12.0	16.0	
15	16.0	20.0	
16	20.0	39.0	



NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 9, NAD83, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 (CORS) 2003.00 EPOCH VALUES OF NGS CORS STATIONS: "BETHEL WAAS CORS ARP" (BET1 – PID DK4091) AS N 2,570,534.05, E 3,095,568.82 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "PLATINUM_AK2007 CORS ARP" (AB12 – PID DL6672) AS N 1,904,718.84, E 3,196,332.08 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "SANDPOINT_AK2004 CORS ARP" (AB07 – PID DL7635) N 628,509.99, E 3,619,003.59 (ALASKA STATE PLANE, ZONE 9, NAD 83). CORS STATIONS STATE PLANE COORDINATES ARE CONVERTED FROM LAT/LONG USING NGS PROGRAM SPCS83(V2.1). RESULTANT COORDINATES AT PRIMARY HARBOR CONTROL HOLD USACE SBC "SP−3 2001" AS N 1,141,172.90, E 1,584,526.11 AND USACE SBC "ST−3 1992" AS N 1142616.10, E 1,583,159.85.
2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST: "9464212, VILLAGE COVE, ST. PAUL ISLAND, ALASKA", PUBLISHED 05/04/2010. THIS TIDAL DATUM IS BASED ON A SPECIAL 2 YEAR OBSERVATION PERIOD FROM OCTOBER 2006 TO SEPTEMBER 2008. THE TIDAL DATUM IS REFERENCED BY HOLDING USC&GS TIDAL BENCHMARK "NO 3 1946" AS 15.479' AND NOS TIDAL BENCHMARK "4212 N 2002" AS 10.817'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, BASED ON HOLDING PUBLISHED VERTICAL VALUES FOR USC&GS BENCHMARK "NO 3 1946", AS 15.48', AND NOS BENCHMARK "4212 N 2002" AS 10.82'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, HOLDING USACE "SP−3 2001" AS 16.27', BASED ON GPS OBSERVATIONS FROM AUGUST 29 & 30, 2011.
3. THE SURVEY WAS CONDUCTED AUGUST 23 – SEPTEMBER 1, 2011. HYDROGRAPHIC SOUNDING DATA WAS COLLECTED USING AN ODOM ES3 MULTI−BEAM ECHOSOUNDER (200KHZ, 120−DEGREE SWATH−WIDTH WITH 120, 0.75 DEGREE BEAMS). POSITIONING AND VESSEL ATTITUDE WERE PROVIDED IN REAL TIME USING A TRIMBLE 461 RTK GPS RECEIVER OPERATING ON KINEMATIC CORRECTORS BROADCAST FROM A TRIMBLE 5700 RTK BASE RECEIVER SET AT CONTROL STATION, "1475−1 1986". SOUND VELOCITY PROFILE WAS PROVIDED USING AN ODOM DIGI−BAR PRO, AND WAS PROVIDED IN REAL TIME AT THE SOUNDER HEAD USING AN ODOM DIGI−BAR V. DATA COLLECTION AND NAVIGATION WERE PERFORMED USING HYPACK HYSWEEP (2010) SOFTWARE. MULTI−BEAM SURVEY DATA WAS POST−PROCESSED USING HYPACK HYSWEEP (2010) SOFTWARE.
4. MEAN LOWER LOW WATER ELEVATIONS FOR MONUMENTS SP−2 1979, SP−4 2001, ST−1 1992, ST−4 1992 AND RBD 1 1994 WERE NOT UPDATED THIS SURVEY.
5. DREDGE LIMITS FOR THE OUTER ENTRANCE CHANNEL (−30 PROJECT DEPTH AREA) AND OUTER MANEUVERING AREA (−29 PROJECT DEPTH AREA) WERE OBTAINED FROM A CONSTRUCTION DOCUMENT DRAWING PROVIDED BY THE USACE. COORDINATE VALUES WERE TRANSLATED FROM THE PROVIDED NAD 27 VALUES TO NAD 83 HOLDING USACE SBC "ST−3 1992", AND USACE SBC "RBD1 1994".
6. SOUNDING VALUES SHOWN ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.
8. THIS SURVEY WAS CONDUCTED BY HUGHES AND ASSOCIATES, WASILLA, AK.

CONTROL COORDINATES				
STATION	NORTHING	EASTING	ELEV. (MLLW)	ELEV. (NAVD88)	DESCRIPTION
VILLAGE HILL	1,140,727.24	1,584,338.92	94.88	95.73	USCGS TRI−STA SBC
DUMP 1995	1,141,545.24	1,583,907.14	11.52	12.37	2" AL−CAP (DAMAGED)
SP−2 1979	1,142,158.06	1,585,194.13	12.74	13.59	USACE SBC
SP−3 2001	1,141,172.88	1,584,526.18	15.42	16.27	3−1/4" DOMED BC
SP−4 2001	1,142,580.64	1,583,818.62	21.00	21.85	3−1/4" DOMED BC
ST−1 1992	1,141,370.57	1,583,680.59	33.25	34.10	USACE SBC
ST−2 1992	1,142,317.19	1,583,492.87	---	---	DESTROYED
ST−3 1992	1,142,616.08	1,583,159.92	28.23	29.08	USACE SBC
ST−4 1992	1,142,668.99	1,584,684.10	16.85	17.70	USACE SBC
RBD1 1994	1,141,043.70	1,583,846.28	28.41	29.26	USACE SBC
RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)

SEE NOTES 2 AND 4 FOR CONTROL DATA DETAILS

PROJECT LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,142,622.52	1,581,895.40	24	1,142,403.08	1,583,546.68
2	1,142,981.30	1,582,810.55	25	1,142,436.72	1,583,540.43
3	1,143,151.52	1,583,039.22	26	1,141,912.08	1,584,391.78
4	1,143,184.20	1,583,221.67	27	1,141,690.43	1,584,977.33
5	1,143,144.58	1,583,402.73	28	1,141,570.67	1,585,031.47
6	1,143,038.69	1,583,554.85	29	1,141,539.36	1,584,962.22
7	1,142,882.64	1,583,654.87	30	1,141,630.48	1,584,921.02
8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
10	1,142,498.09	1,583,671.36	33	1,141,582.02	1,585,297.63
11	1,142,443.01	1,583,531.83	34	1,141,447.98	1,585,358.05
12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
14	1,142,754.87	1,583,329.05	37	1,141,458.60	1,585,241.83
15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
16	1,142,839.79	1,583,134.65	39	1,141,231.80	1,584,974.31
17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
18	1,142,487.90	1,583,670.98	41	1,141,523.48	1,584,956.23
19	1,142,422.69	1,583,792.65	42	1,141,564.68	1,585,047.35
20	1,142,446.47	1,583,993.42	43	1,141,448.38	1,585,371.03
21	1,142,057.34	1,584,382.13	44	1,141,342.63	1,585,418.71
22	1,141,768.53	1,584,306.91	45	1,141,305.25	1,585,404.55
23	1,141,594.69	1,583,863.58	46	1,141,334.25	1,585,327.84

NAVIGATION AIDS			
DESCRIPTION	USCG NO.	NORTHING	EASTING
ST. PAUL HARBOR JETTY LIGHT 3	27831	1,142,579.40	1,583,791.10
ST. PAUL HARBOR JETTY LIGHT 4	27830	1,142,582.30	1,583,175.00
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STATE OF ALASKA 49TH
JACK S. HUGHES LS−4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB−10−D−0005−0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Sym	Action	Description	Date	Appvd

Designed: HUGHES AND ASSOCIATES Date: 11/17/11
Drawn: REH Dwg Scale: 1" = 100'
Reviewed: CSH Plot Scale:
Chief Section File:
Submitted: Branch Drawing #:
Chief

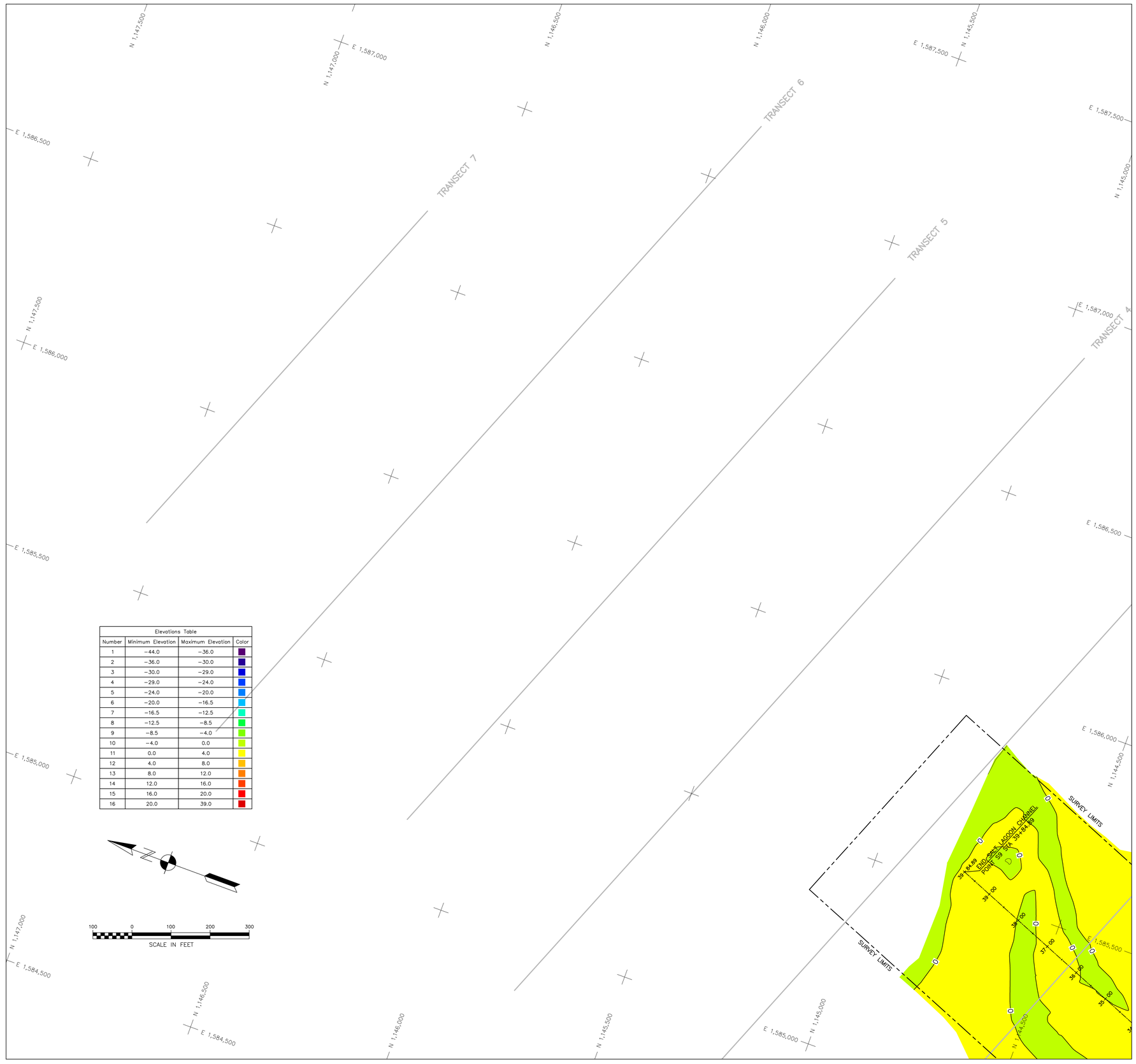
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

2976−11

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V−108
Sheet 8 of 10

CORPS OF ENGINEERS



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
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10	−4.0	0.0	
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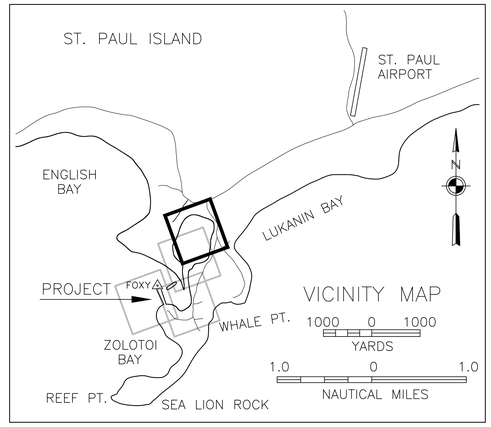
13	8.0	12.0	
14	12.0	16.0	
15	16.0	20.0	
16	20.0	39.0	



NOTES

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SP−3 2001	1,141,172.88	1,584,526.18	15.42	16.27	3−1/4" DOMED BC
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ST−1 1992	1,141,370.57	1,583,680.59	33.25	34.10	USACE SBC
ST−2 1992	1,142,317.19	1,583,492.87	---	---	DESTROYED
ST−3 1992	1,142,616.08	1,583,159.92	28.23	29.08	USACE SBC
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RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)
SEE NOTES 2 AND 4 FOR CONTROL DATA DETAILS					

PROJECT LIMITS					
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4	1,143,184.20	1,583,221.67	27	1,141,690.43	1,584,977.33
5	1,143,144.58	1,583,402.73	28	1,141,570.67	1,585,031.47
6	1,143,038.69	1,583,554.85	29	1,141,539.36	1,584,962.22
7	1,142,882.64	1,583,654.87	30	1,141,630.48	1,584,921.02
8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
10	1,142,498.09	1,583,671.36	33	1,141,582.02	1,585,297.63
11	1,142,443.01	1,583,531.83	34	1,141,447.98	1,585,358.05
12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
14	1,142,754.87	1,583,329.05	37	1,141,458.60	1,585,241.83
15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
16	1,142,839.79	1,583,134.65	39	1,141,231.80	1,584,974.31
17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
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☆ NAVIGATION AIDS ☆			
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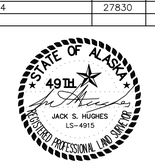


US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB−10−D−0005−0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
PRIME CONTRACTOR RESIDENT ENGINEER

Seq#	Action	Description	Date	Appvd

Date: 11/17/11
Dwg Scale: 1" = 100'
Plot Scale:
File:
Drawing #: 2976−11

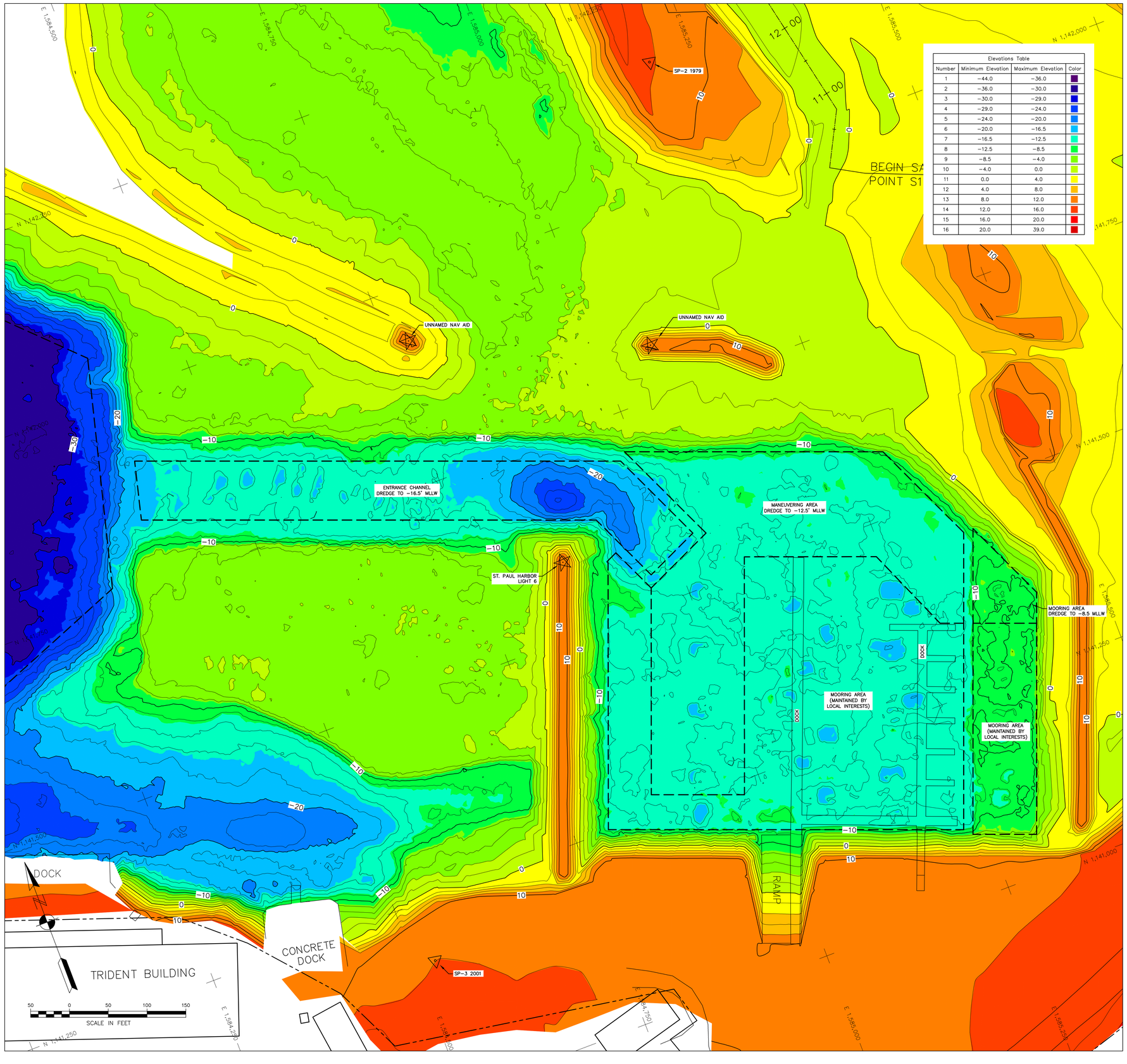
Designed: HUGHES AND ASSOCIATES
Drawn: REH
Reviewed: CSH
Chief, — Section
Submitted:
Chief, — Branch

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

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V−109
Sheet 9 of 10

CORPS OF ENGINEERS



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
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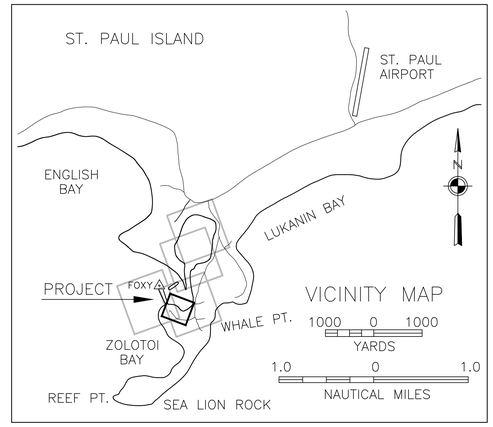
5	-24.0	-20.0	
6	-20.0	-16.5	
7	-16.5	-12.5	
8	-12.5	-8.5	
9	-8.5	-4.0	
10	-4.0	0.0	
11	0.0	4.0	
12	4.0	8.0	
13	8.0	12.0	
14	12.0	16.0	
15	16.0	20.0	
16	20.0	39.0	



NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 9, NAD83, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 (CORS) 2003.00 EPOCH VALUES OF NGS CORS STATIONS: "BETHEL WAAS CORS ARP" (BET1 – PID DK4091) AS N 2,570,534.05, E 3,095,568.82 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "PLATINUM_AK2007 CORS ARP" (AB12 – PID DL6672) AS N 1,904,718.84, E 3,196,332.08 (ALASKA STATE PLANE, ZONE 9, NAD 83) AND "SANDPOINT_AK2004 CORS ARP" (AB07 – PID DL7635) N 628,509.99, E 3,619,003.59 (ALASKA STATE PLANE, ZONE 9, NAD 83). CORS STATIONS STATE PLANE COORDINATES ARE CONVERTED FROM LAT/LONG USING NGS PROGRAM SPCS83(V2.1). RESULTANT COORDINATES AT PRIMARY HARBOR CONTROL HOLD USACE SBC "SP-3 2001" AS N 1,141,172.90, E 1,584,526.11 AND USACE SBC "ST-3 1992" AS N 1142616.10, E 1,583,159.85.
2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST: "9464212, VILLAGE COVE, ST. PAUL ISLAND, ALASKA", PUBLISHED 05/04/2010. THIS TIDAL DATUM IS BASED ON A SPECIAL 2 YEAR OBSERVATION PERIOD FROM OCTOBER 2006 TO SEPTEMBER 2008. THE TIDAL DATUM IS REFERENCED BY HOLDING USC&GS TIDAL BENCHMARK "NO 3 1946" AS 15.479' AND NOS TIDAL BENCHMARK "4212 N 2002" AS 10.817'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, BASED ON HOLDING PUBLISHED VERTICAL VALUES FOR USC&GS BENCHMARK "NO 3 1946", AS 15.48', AND NOS BENCHMARK "4212 N 2002" AS 10.82'. ALSO PROVIDED ARE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) EQUIVALENTS, HOLDING USACE "SP-3 2001" AS 16.27', BASED ON GPS OBSERVATIONS FROM AUGUST 29 & 30, 2011.
3. THE SURVEY WAS CONDUCTED AUGUST 23 – SEPTEMBER 1, 2011. HYDROGRAPHIC SOUNDING DATA WAS COLLECTED USING AN ODOM ES3 MULTI-BEAM ECHOSOUNDER (200KHZ, 120-DEGREE SWATH-WIDTH WITH 120, 0.75 DEGREE BEAMS). POSITIONING AND VESSEL ATTITUDE WERE PROVIDED IN REAL TIME USING A TRIMBLE 461 RTK GPS RECEIVER OPERATING ON KINEMATIC CORRECTORS BROADCAST FROM A TRIMBLE 5700 RTK BASE RECEIVER SET AT CONTROL STATION, "1475-1 1985". SOUND VELOCITY PROFILE WAS PROVIDED USING AN ODOM DIGI-BAR PRO, AND WAS PROVIDED IN REAL TIME AT THE SOUNDER HEAD USING AN ODOM DIGI-BAR V. DATA COLLECTION AND NAVIGATION WERE PERFORMED USING HYPACK HYSWEEP (2010) SOFTWARE. MULTI-BEAM SURVEY DATA WAS POST-PROCESSED USING HYPACK HYSWEEP (2010) SOFTWARE.
4. MEAN LOWER LOW WATER ELEVATIONS FOR MONUMENTS SP-2 1979, SP-4 2001, ST-1 1992, ST-4 1992 AND RBD 1 1994 WERE NOT UPDATED THIS SURVEY.
5. DREDGE LIMITS FOR THE OUTER ENTRANCE CHANNEL (-30 PROJECT DEPTH AREA) AND OUTER MANEUVERING AREA (-29 PROJECT DEPTH AREA) WERE OBTAINED FROM A CONSTRUCTION DOCUMENT DRAWING PROVIDED BY THE USACE. COORDINATE VALUES WERE TRANSLATED FROM THE PROVIDED NAD 27 VALUES TO NAD 83 HOLDING USACE SBC "ST-3 1992", AND USACE SBC "RBD1 1994".
6. SOUNDING VALUES SHOWN ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
7. THIS DRAWING IS INDICATIVE OF GENERAL SEAFLOOR CONDITIONS ON THE DATES OF SURVEY.
8. THIS SURVEY WAS CONDUCTED BY HUGHES AND ASSOCIATES, WASILLA, AK.

CONTROL COORDINATES					
STATION	NORTHING	EASTING	ELEV. (MLLW)	ELEV. (NAVD88)	DESCRIPTION
VILLAGE HILL	1,140,727.24	1,584,338.92	94.88	95.73	USCGS TRI-STA SBC
DUMP 1995	1,141,545.24	1,583,907.14	11.52	12.37	2" AL-CAP (DAMAGED)
SP-2 1979	1,142,158.06	1,585,194.13	12.74	13.59	USACE SBC
SP-3 2001	1,141,172.88	1,584,526.18	15.42	16.27	3-1/4" DOMED BC
SP-4 2001	1,142,580.64	1,583,818.62	21.00	21.85	3-1/4" DOMED BC
ST-1 1992	1,141,370.57	1,583,680.59	33.25	34.10	USACE SBC
ST-2 1992	1,142,317.19	1,583,492.87	---	---	DESTROYED
ST-3 1992	1,142,616.08	1,583,159.92	28.23	29.08	USACE SBC
ST-4 1992	1,142,668.99	1,584,684.10	16.85	17.70	USACE SBC
RBD1 1994	1,141,043.70	1,583,846.28	28.41	29.26	USACE SBC
RBD3 1994	1,141,658.26	1,583,526.92	---	---	USACE SBC
RBD4 1994	1,142,082.16	1,583,364.40	---	---	USACE SBC
FOXY	1,142,611.23	1,583,160.44	28.12	28.97	USACE SBC (UNSTAMPED)
SEE NOTES 2 AND 4 FOR CONTROL DATA DETAILS					

PROJECT LIMITS					
CORNER	NORTHING	EASTING	CORNER	NORTHING	EASTING
1	1,142,622.52	1,581,895.40	24	1,142,403.08	1,583,546.68
2	1,142,981.30	1,582,810.55	25	1,142,436.72	1,583,540.43
3	1,143,151.52	1,583,039.22	26	1,141,912.08	1,584,391.78
4	1,143,184.20	1,583,221.67	27	1,141,690.43	1,584,977.33
5	1,143,144.58	1,583,402.73	28	1,141,570.67	1,585,031.47
6	1,143,038.69	1,583,554.85	29	1,141,539.36	1,584,962.22
7	1,142,882.64	1,583,654.87	30	1,141,630.48	1,584,921.02
8	1,142,799.55	1,583,687.45	31	1,141,837.91	1,584,373.06
9	1,142,596.81	1,583,632.66	32	1,141,699.90	1,584,986.22
10	1,142,498.09	1,583,671.36	33	1,141,582.02	1,585,297.63
11	1,142,443.01	1,583,531.83	34	1,141,447.98	1,585,358.05
12	1,142,539.77	1,583,493.89	35	1,141,338.50	1,585,316.62
13	1,142,605.59	1,583,387.57	36	1,141,349.24	1,585,288.21
14	1,142,754.87	1,583,329.05	37	1,141,458.60	1,585,241.83
15	1,142,837.58	1,583,249.44	38	1,141,518.60	1,585,082.67
16	1,142,839.79	1,583,134.65	39	1,141,231.80	1,584,974.31
17	1,142,413.84	1,582,047.81	40	1,141,274.28	1,584,862.08
18	1,142,487.90	1,583,670.98	41	1,141,523.48	1,584,956.23
19	1,142,422.69	1,583,792.65	42	1,141,564.68	1,585,047.35
20	1,142,446.47	1,583,993.42	43	1,141,448.38	1,585,371.03
21	1,142,057.34	1,584,382.13	44	1,141,342.63	1,585,418.71
22	1,141,768.53	1,584,306.91	45	1,141,305.25	1,585,404.55
23	1,141,594.69	1,583,863.58	46	1,141,334.25	1,585,327.84

NAVIGATION AIDS			
DESCRIPTION	USCG NO.	NORTHING	EASTING
ST. PAUL HARBOR JETTY LIGHT 3	27831	1,142,579.40	1,583,791.10
ST. PAUL HARBOR JETTY LIGHT 4	27830	1,142,582.30	1,583,175.00
ST. PAUL HARBOR LIGHT 6		1,141,594.64	1,584,861.68

STATE OF ALASKA 49TH
JACK S. HUGHES
LS-4915
REGISTERED PROFESSIONAL LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
ALASKA DISTRICT

CONTRACT NO. W911KB-10-D-0005-0005
CONTRACTOR HUGHES & ASSOCIATES STATE AK
CITY WASILLA
Recommended: Approved: Date:
– PRIME CONTRACTOR – RESIDENT ENGINEER

Serial Action	Description	Date Approved

Date: 11/17/11
Dwg Scale: 1" = 50'
Plot Scale:
File:
Drawing #: 2976-11
Designed: HUGHES AND ASSOCIATES
Drawn: REH
Reviewed: CSH
Chief – Section
Submitted
Chief – Branch

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

ST. PAUL ISLAND, ALASKA
ST. PAUL HARBOR
CONDITION SURVEY
AUGUST 23 – SEPTEMBER 1, 2011

Reference number:
V-110
Sheet 10 of 10