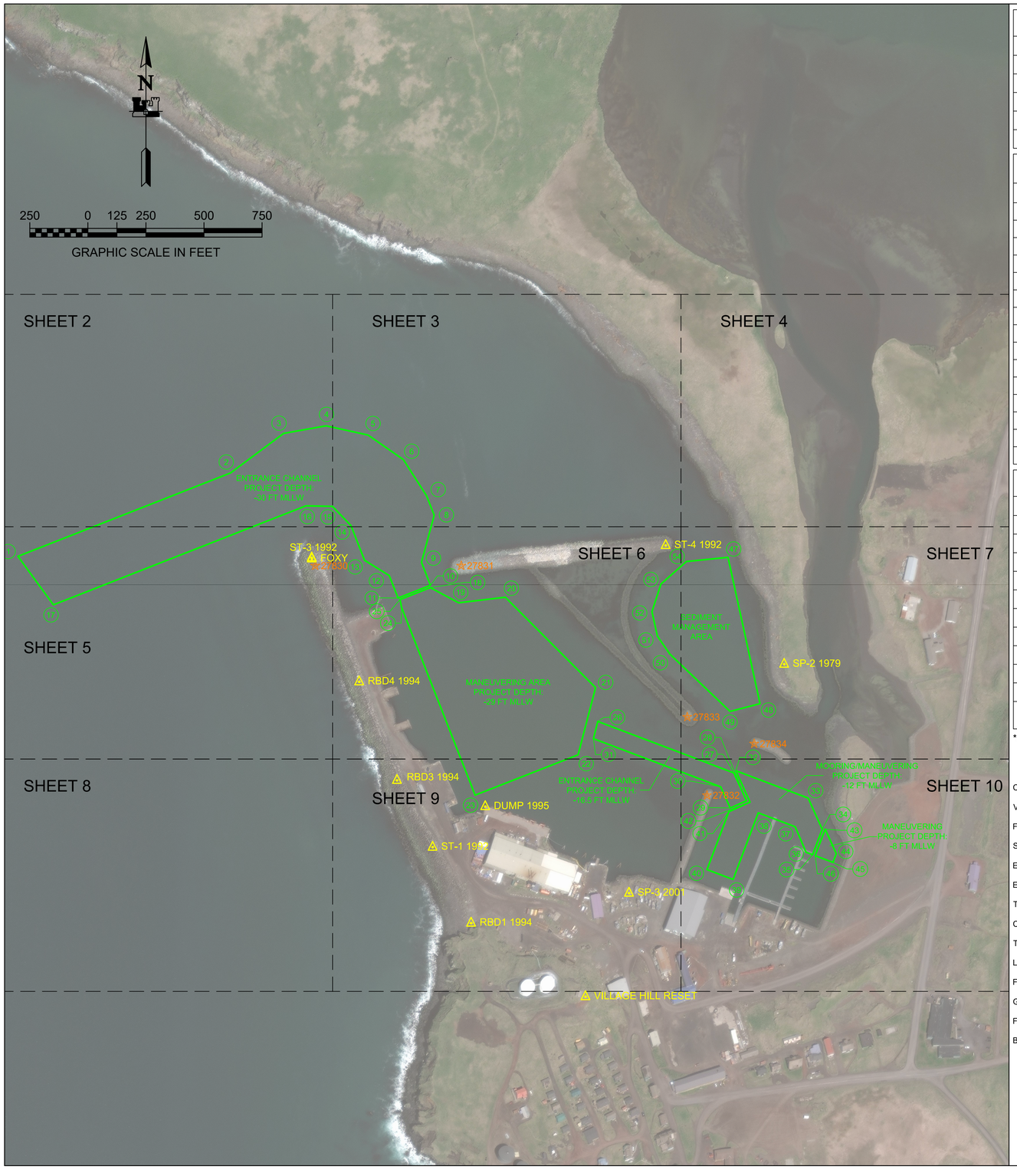


NAVIGATION AIDS

NO.	NORTHING	EASTING	DESCRIPTION
27830	1,142,582	1,583,175	ST. PAUL HARBOR JETTY LIGHT 4 FI R 4S
27831	1,142,582	1,583,804	ST. PAUL HARBOR JETTY LIGHT 3 FI G 4S
27832	1,141,594	1,584,862	ST. PAUL HARBOR LIGHT 6 FI R 2.5
27833	1,141,931	1,584,777	ST. PAUL HARBOR DAYBEACON A
27834	1,141,816	1,585,065	ST. PAUL HARBOR DAYBEACON B

VOLUME COMPUTATIONS

AREA A: ENTRANCE CHANNEL	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-30.0	29,627
AVAILABLE TO MAX PAY DEPTH (MP)	-31.0	39,951
AREA B: MANEUVERING AREA		
AVAILABLE TO PD	-29.0	5,282
AVAILABLE TO MP	-30.0	9,719
AREA C: ENTRANCE CHANNEL		
AVAILABLE TO PD	-16.5	4,425
AVAILABLE TO MP	-17.5	5,475
AREA D: MOORING/MANEUVERING		
AVAILABLE TO PD	-12.0	1,636
AVAILABLE TO MP	-13.0	3,380
AREA E: MANEUVERING		
AVAILABLE TO PD	-8.0	0
AVAILABLE TO MP	-9.0	30
TOTAL MAXIMUM VOLUME AVAILABLE (MP)		58,555

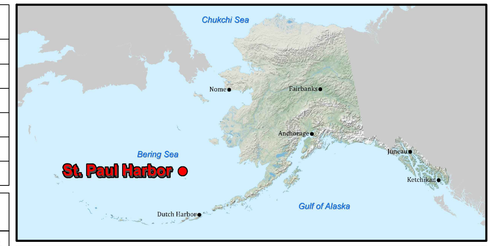
SURVEY CONTROL DATA

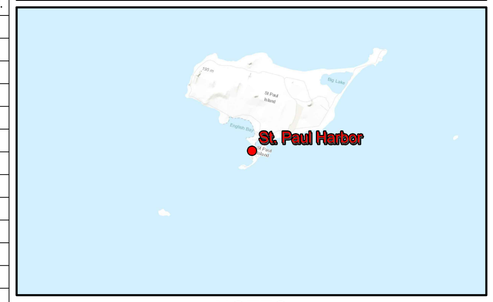
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
DUMP 1995	1,141,545.24	1,583,907.14	11.32	2 INCH DOMED AL CAP
FOXY	1,142,611.23	1,583,160.44	27.86	3.25 INCH USACE DOMED SBC
RBD1 1994	1,141,043.70	1,583,846.28	28.33	3.25 INCH USACE DOMED SBC
RBD3 1994	1,141,658.26	1,583,526.92	36.72	3.25 INCH USACE DOMED SBC
RBD4 1994	1,142,082.16	1,583,364.40	35.16	3.25 INCH USACE DOMED SBC
SP-2 1979	1,142,158.06	1,585,194.13	12.7	3.25 INCH USACE DOMED SBC
SP-3 2001	1,141,172.88	1,584,526.18	15.21	3.25 INCH DOMED SBC
ST-1 1992	1,141,370.57	1,583,680.59	33.16	3.25 INCH USACE DOMED SBC
ST-3 1992	1,142,616.08	1,583,159.92	27.97	3.25 INCH USACE DOMED SBC
ST-4 1992	1,142,668.99	1,584,684.10	16.7	3.25 INCH USACE DOMED SBC
VILLAGE HILL RESET	1,140,727.24	1,584,338.92	94.67	USCGS TRI-STA SBC

*Bench marks with coordinate precision of 0.1' were measured by RTK GNSS.

LEGEND

CULVERT
VALVE OR VALVE CONNECTION
FUEL VALVE
SIGN
ELECTRICAL JUNCTION BOX
ELECTRICAL SWITCH
TRANSFORMER
COMMUNICATION PEDESTAL
TV PEDESTAL
LIGHT POLE
FLOOD LIGHT
GUARD POST
FIRE HYDRANT
BUILDING





NOTES

1. HORIZONTAL CONTROL IS ALASKA STATE PLANE ZONE 9, NAD 83, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD 83 (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, "PLATINUM_AK2007 CORS ARP" (AB12 - PID DL6672) AS N 1,904,718.84, E 3,196,332.08, SANDPOINT_AK2004 CORS ARP" (AB07 - PID DL7635) AS N 628,509.99, E 3,619,003.59.

   LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 9, NAD83, IN US SURVEY FEET HOLDING USACE/NOS TIDAL BENCHMARK SBC "RBD1 1994" (PID:BBGM90/VM#16795) AS N 1,141,043.70', E 1,583,846.28'.

2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW = 0.0') BASED ON THE NOAA/NOS TIDAL BENCHMARK LIST: "9464212, VILLAGE COVE, ST. PAUL ISLAND, ALASKA", PUBLISHED 06/17/2019. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING USACE/NOS TIDAL BENCHMARK "RBD1 1994" (PID:BBGM90/VM#16795) AS 28.33'.

3. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 ELEVATIONS HOLDING USACE/NOS TIDAL BENCHMARK "RBD1 1994" (PID:BBGM90/VM#16795) AS 28.99'.

4. SOUNDINGS ARE IN U.S. SURVEY FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.

5. BATHYMETRY IN THE HARBOR WAS COLLECTED JULY 19 - 21, 2019. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2020 MULTIBEAM ECHOSOUNDER OPERATING AT 400 KHZ. SOUND VELOCITY THOUGH THE WATER COLUMN WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV WAVEMASTER V5 SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE R8 MODEL 3 GPS RECEIVER SET AT CONTROL STATION "RBD1 1994". DATA WAS COLLECTED AND PROCESSED USING QINSY 8.1 AND QIMERA 1.6 SOFTWARE. HORIZONTAL CONTROL WAS VERIFIED USING RTK GNSS EQUIPMENT AND TECHNIQUES. VERTICAL CONTROL WAS SURVEYED USING DIFFERENTIAL LEVELING TECHNIQUES.

6. BATHYMETRY IN THE CREEK AND LAGOON WAS COLLECTED JULY 19 - 21 2019. SOUNDINGS WERE COLLECTED USING AN ODOM CV-100 ECHO SOUNDER OPERATING AT 200KHZ. SOUND VELOCITY WAS DETERMINED WITH AN AML BASE X SOUND VELOCITY PROBE. POSITION AND RTK TIDE WERE MEASURED USING A TRIMBLE R8 MODEL 3 GPS RECIEVER RECIEVEING RTK CORRECTIONS FROM A TRIMBLE R8 MODEL 3 GPS RECEIVER SET AT CONTROL STATION "RBD1 1994". DATA WAS COLLECTED AND PROCESSED USING HYPACK 2017 SOFTWARE.

7. TERRESTIAL LASER SCANNING DATA WAS COLLECTED JULY 20, 2019. DATA WAS COLLECTED USING A RIEGL VZ400 LASER SCANNER AND PROCESSED USING QINSY 8.1 AND QIMERA 1.6 SOFTWARE. POSITION AND VESEL ORIENTATION WERE MEASURED USING AN APPLANIX POSMV WAVEMASTER V5 SYSTEM.

8. THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.

9. MULTIBEAM MAP SOUNDINGS ARE BINNED AT 24 FEET AND ARE SHOAL-BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS. SINGLEBEAM MAP SOUNDINGS ARE SORTED AT 24 FEET AND ARE SHOAL-BIASED, CONTOURS ARE BASED ON 3 FEET SORT SHOAL-BIASED IN THE HARBOR AND 12 FEET SORT SHOAL-BIASED IN THE LAGOON. VOLUME SOUNDINGS ARE BINNED AT 3 FEET AND ARE MEAN VALUE SOUNDINGS.

STATE OF ALASKA
49TH
GREGORY W. GIBSON
No. LS14824
REGISTERED PROFESSIONAL LAND SURVEYOR

THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN NSPS/THSOA CERTIFIED HYDROGRAPHER

Gregory W. Gibson (317)

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

REV.	DATE	BY	APPR.	DESCRIPTION

SURVEYED BY: GREGORY W. GIBSON
REVIEWED BY: ROBERT GOUGHNOUR
CHECKED BY: TAS/JBG/GWG
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE: 010169-VH01.DWG

U.S. ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
2204 3RD STREET
JBER, ALASKA 99506-0898

UPC: 010169
PROJECT DATE: 08 October 2019
SIZE: ANSI D
SCALE: 1" = 250'
CONTRACTOR: ETRAC INC.
CITY: WASILLA
STATE: ALASKA
CONTRACT NO.: W91KEB-14-D-0014
TASK ORDER NO.: 19F0055
JOB NO.: 0919

ST. PAUL ISLAND, ALASKA
010169 - ST. PAUL HARBOR
PROJECT CONDITION SURVEY
JULY 18 - JULY 26, 2019

REFERENCE NUMBER:
5-STP-92-07-01

E 1,582,000

E 1,582,250

E 1,582,500

E 1,582,750

E 1,583,000

N

50 0 25 50 100 150

GRAPHIC SCALE IN FEET

N 1,143,500

N 1,143,250

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

REV.	DATE	BY	APPR.	DESCRIPTION

U.S. ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
2204 3RD STREET
JBER, ALASKA 99506-0898

SURVEYED BY:
GREGORY W. GIBSON
DRAWN BY:
ROBERT GOUGHNOUR
CHECKED BY:
TAS/JBG/GWG
APPROVED BY:
THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE:
010169-VN01.DWG

UPC:
01016969
P.O. DATE:
08 October 2019
SIZE:
ANSI D
SCALE:
1" = 50'
JOB NO.:
0919
CONTRACTOR:
ETRAC INC.
CITY:
WASILLA
STATE:
ALASKA
CONTRACT NO.:
W91KEB-18-D-0014
TASK ORDER NO.:
19F0055

ST. PAUL ISLAND, ALASKA

010169 - ST. PAUL HARBOR

PROJECT CONDITION SURVEY

JULY 18 - JULY 26, 2019

REFERENCE NUMBER:

5-STP-92-07-01