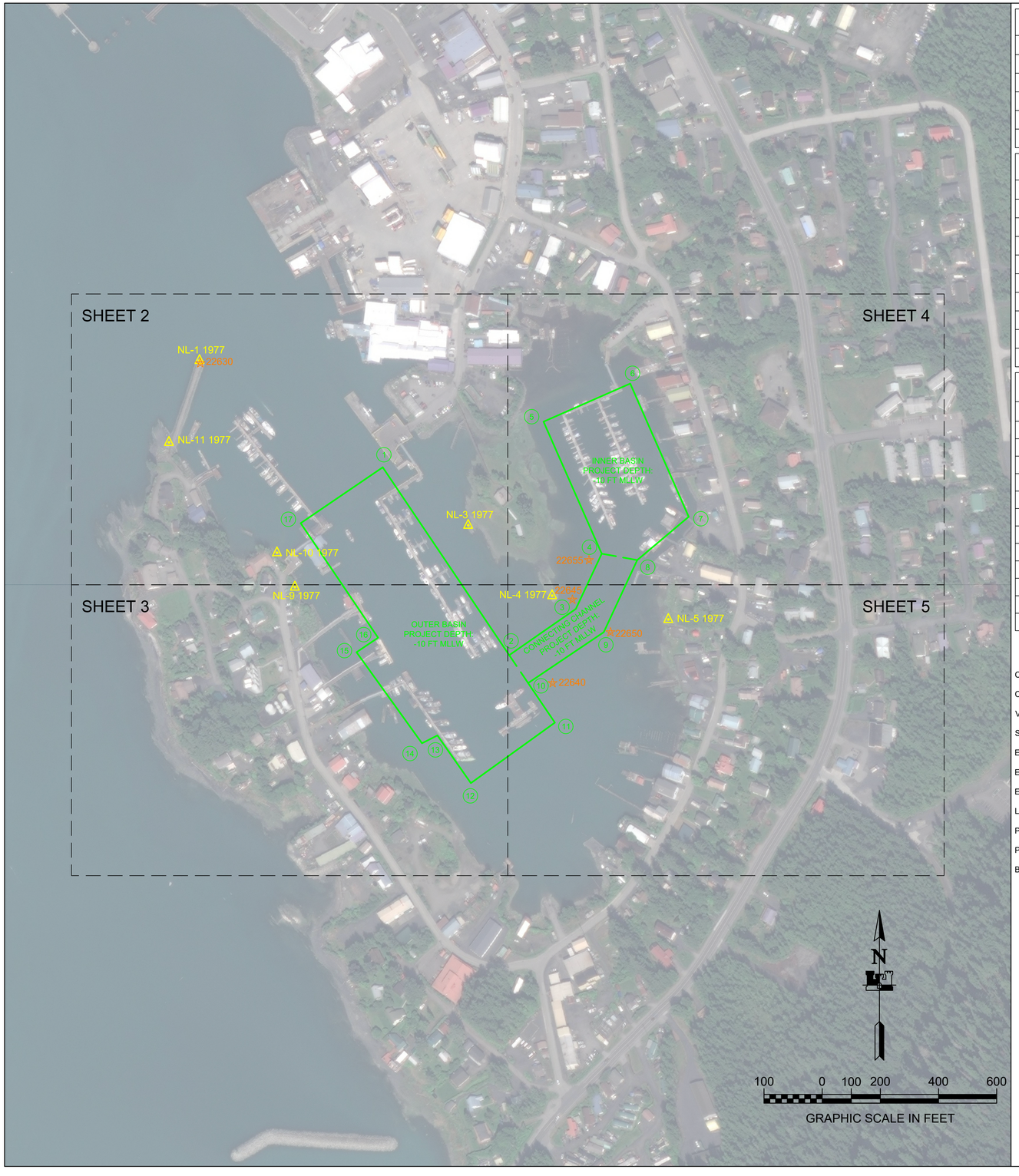


NAVIGATION AIDS			
NO.	NORTHING	EASTING	DESCRIPTION
22630	1,694,512	2,944,943	BREAKWATER LIGHT 2 FI R 4S
22640	1,693,412	2,946,154	DAYBEACON 4
22645	1,693,699	2,946,222	DAYBEACON 5
22650	1,693,587	2,946,353	DAYBEACON 6
22655	1,693,835	2,946,279	DAYBEACON 7

PROJECT LIMITS		
CORNER#	NORTHING	EASTING
1	1,694,154.00	2,945,570.00
2	1,693,508.00	2,946,005.00
3	1,693,667.00	2,946,234.00
4	1,693,857.00	2,946,323.00
5	1,694,311.00	2,946,123.00
6	1,694,442.00	2,946,421.00
7	1,693,984.00	2,946,622.00
8	1,693,835.00	2,946,445.00
9	1,693,587.00	2,946,330.00

PROJECT LIMITS		
CORNER#	NORTHING	EASTING
10	1,693,412.00	2,946,070.00
11	1,693,276.00	2,946,162.00
12	1,693,068.00	2,945,873.00
13	1,693,232.00	2,945,758.00
14	1,693,205.00	2,945,705.00
15	1,693,518.00	2,945,480.00
16	1,693,568.00	2,945,554.00
17	1,693,962.00	2,945,288.00

VOLUME COMPUTATIONS		
AREA A: OUTER BASIN	MLLW=0	CU. YD.
AVAILABLE TO PROJECT DEPTH (PD)	-10.0	2,226
AVAILABLE TO MAX PAY DEPTH (MP)	-11.0	5,880
AVAILABLE SIDE SLOPES (SS) AT 3:1 (H:V) & 25' WIDE	VARIES	1,140
AREA B: CONNECTING CHANNEL		
AVAILABLE TO PD	-10.0	116
AVAILABLE TO MP	-11.0	284
AVAILABLE SS AT 3:1 (H:V) & 25' WIDE	VARIES	709
AREA C: INNER BASIN		
AVAILABLE TO PD	-10.0	1,519
AVAILABLE TO MP	-11.0	4,147
AVAILABLE SS AT 3:1 (H:V) & 25' WIDE	VARIES	1,938
TOTAL MAXIMUM VOLUME AVAILABLE (MP + SS)		14,098

LEGEND

- CULVERT
- CATCH BASIN
- VALVE OR VALVE CONNECTION
- SIGN
- ELECTRICAL PEDESTAL
- ELECTRICAL PEDESTAL WITH LIGHT
- ELECTRICAL SWITCH
- LIGHT POLE
- POWER POLE WITH LIGHT
- POWER POLE
- BUILDING

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)

NOTES

1. PRIMARY PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83 (2011) 2010.00, IN US SURVEY FEET BASED ON A FULLY CONSTRAINED STATIC GPS NETWORK HOLDING THE PUBLISHED NAD83 2003.00 EPOCH VALUES OF NGS CORS STATIONS:"KLAWOCKAIRAK2006 CORS ARP" (PID DM7451); "LEV6 LEVEL ISLAND 6 CORS ARP" (PID DJ3035); "A1S5 ANNETTE ISLAND 5 CORS ARP" (PID DK6482.

   LOCAL PROJECT HORIZONTAL CONTROL IS ALASKA STATE PLANE, ZONE 1, NAD83, IN U.S. SURVEY FEET HOLDING USACE DOMED SBC "HH-5 2015" AS N 1,690,528.07', E 2,945,715.80'.

2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0'), BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST "9451204 WRANGELL, WRANGELL ISLAND, ALASKA", PUBLISHED 7/15/2004. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA/NOS TIDAL BENCH MARK "945 1204 BM 5" (PID BBDG97 / VM#16496) AS 57.71'.

3. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12B) ELEVATIONS HOLDING NOAA/NOS TIDAL BENCH MARK "945 1204 BM 5" (PID BBDG97 / VM#16496) AS 54.46'.

4. SOUNDINGS ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICTATED.

5. BATHYMETRY WAS COLLECTED AUGUST 10-13, 2019. SOUNDINGS WERE COLLECTED USING AN R2SONIC 2020 MULTIBEAM ECHOSOUNDER OPERATING AT 400 KHZ. SOUND VELOCITY THOUGH THE WATER COLUMN WAS DETERMINED WITH A 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 "HH-5 2015". 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. TERRESTIAL LASER SCANNING DATA WAS COLLECTED AUGUST 10-13, 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.

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

8. MAP SOUNDINGS ARE BINNED AT 24 FEET AND ARE SHOAL-BIASED. CONTOURS ARE BASED ON 12 FEET BINNED SHOAL-BIASED SOUNDINGS. VOLUME SOUNDINGS ARE BINNED AT 3 FEET AND ARE MEAN VALUE SOUNDINGS.

SURVEY CONTROL DATA				
STATION	NORTHING	EASTING	MLLW	DESCRIPTION
1204 BM 5	1,696,448.86	2,945,337.04	57.71	3.75 INCH SBC
HH-5 2015	1,690,528.07	2,945,715.80	24.98	3.5 INCH USACE DOMED SBC
LARGE-2 1922	1,683,964.45	2,925,896.83	21.2	3.5 INCH USCGS DOMED SBC
NL-1 1977	1,694,521.22	2,944,940.27	14.66	3.5 INCH USACE DOMED SBC
NL-3 1977	1,693,954.53	2,945,863.80	13.46	3.5 INCH USACE DOMED SBC
NL-4 1977	1,693,712.40	2,946,152.17	14.29	3.5 INCH USACE DOMED SBC
NL-5 1977	1,693,630.72	2,946,551.87	14.46	3.5 INCH USACE DOMED SBC
NL-9 1977	1,693,741.95	2,945,267.89	15.83	3.5 INCH USACE DOMED SBC
NL-10 1977	1,693,860.13	2,945,206.54	14.10	3.5 INCH USACE DOMED SBC
NL-11 1977	1,694,239.54	2,944,835.11	20.15	3.5 INCH USACE DOMED SBC
NO 6 1954	1,696,366.66	2,944,512.60	40.27	3.5 INCH USCGS DOMED SBC

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

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

REV.	DATE	BY	APPR.	DESCRIPTION

CONTRACT NO.:
W912RB-18-D-2014
TASK ORDER NO.:
19F0064
JOB NO.:
1119
CONTRACTOR:
ETRAC INC.
CITY:
WASILLA
STATE:
ALASKA
UPC:
021500
PROJECT NO.:
07 October 2019
SCALE:
1" = 200'
SURVEYED BY:
GREGORY W. GIBSON
DRAWN BY:
ROBERT GOUGHNOUR
CHECKED BY:
TAS/JBG/GWG
APPROVED BY:
THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE:
021500_VH02.DWG

U.S. ARMY CORPS OF ENGINEERS
ALASKA DISTRICT
2204 3RD STREET
JBER, ALASKA 99506-2898

WRANGELL, ALASKA
021500 - WRANGELL HARBOR
PROJECT CONDITION SURVEY
AUGUST 8 - AUGUST 14, 2019

REFERENCE NUMBER:
1-WRA-92-07-56

SHEET 1 OF 6

E 2,945,000
E 2,945,250
E 2,945,500
E 2,945,750
E 2,944,750
E 2,945,000
N 1,694,500
N 1,694,250
N 1,694,000

*OBJ-024 (START OF OUTFALL PIPE)
*OBJ-004
*OBST-005
*OBJ-008
*OBJ-023
*OBJ-009
*OBJ-019
*OBST-002
*OBST-006
*OBST-011
NL-11 1977
NL-10 1977
NL-1 1977
PHONE BOOTH
CRANE
CRANE
PUMP STATION X2
INACCESSIBLE
CRANE
OHE

N

50 0 25 50 100 150
GRAPHIC SCALE IN FEET

OBJECTS AND OBSTRUCTION DATA

ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBJ-003	1,694,018.1	2,945,100.8	-2.0	40X1X1
OBJ-004	1,694,388.2	2,944,766.4	-8.2	4X4X4
OBJ-008	1,694,223.9	2,944,922.6	-0.3	8X2X1
OBJ-019	1,694,287.5	2,945,369.6	-24.4	24X1X2
OBJ-023	1,694,096.0	2,945,297.0	-20.6	21X1X1
OBJ-024 (START OF OUTFALL PIPE)	1,694,606.6	2,945,402.8	-19.6	108X2X1
OBST-002	1,693,833.5	2,945,674.2	-8.0	3X2X3
OBST-005	1,693,960.4	2,945,246.7	-6.0	5X2X1
OBST-006	1,693,829.1	2,945,750.4	-7.4	4X3X3
OBST-008	1,694,363.5	2,944,795.1	-2.9	8X4X3
OBST-011	1,694,089.0	2,945,535.1	10.8	22X1X6

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

REV.	DATE	BY	APPR.	DESCRIPTION

CONTRACT NO.: W91KGB-15-D-0014
TASK ORDER NO.: 19F0064
JOB NO.: 1119
CONTRACTOR: ETRAC INC.
STATE: ALASKA
CITY: WASILLA
UPC: 021500
PROJECT DATE: 07 October 2019
SCALE: 1" = 50'
SIZE: ANSI D
SURVEYED BY: GREGORY W. GIBSON, RAMON TAS, ROBERT GOUGHNOUR
CHECKED BY: TAS/JBG/GWG
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE: 021500_VH02.DWG

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

WRANGELL, ALASKA
021500 - WRANGELL HARBOR
PROJECT CONDITION SURVEY
AUGUST 8 - AUGUST 14, 2019

REFERENCE NUMBER:
1-WRA-92-07-56

OBJECTS AND OBSTRUCTION DATA

ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBJ-001	1,693,235.4	2,945,839.1	-10.3	3X2X1
OBJ-009	1,693,299.8	2,945,628.5	-9.0	5X3X2
OBJ-010	1,693,702.8	2,945,865.4	-7.1	2X2X1
OBJ-011	1,693,696.7	2,945,870.6	-7.8	2X2X1
OBJ-014	1,693,735.0	2,945,360.4	-0.6	47X1X1
OBJ-016	1,693,209.2	2,945,676.8	-7.9	19X1X1
OBJ-017	1,693,174.3	2,945,683.9	-0.2	6X3X2
OBST-001	1,693,350.7	2,945,924.3	-9.6	3X3X1
OBST-007	1,693,553.8	2,945,545.2	-5.8	9X1X3
OBST-009	1,693,326.9	2,945,632.0	-9.4	47X2X2
OBST-010	1,693,304.9	2,945,606.9	-5.6	25X1X4

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

REV.	DATE	BY	APPR.	DESCRIPTION

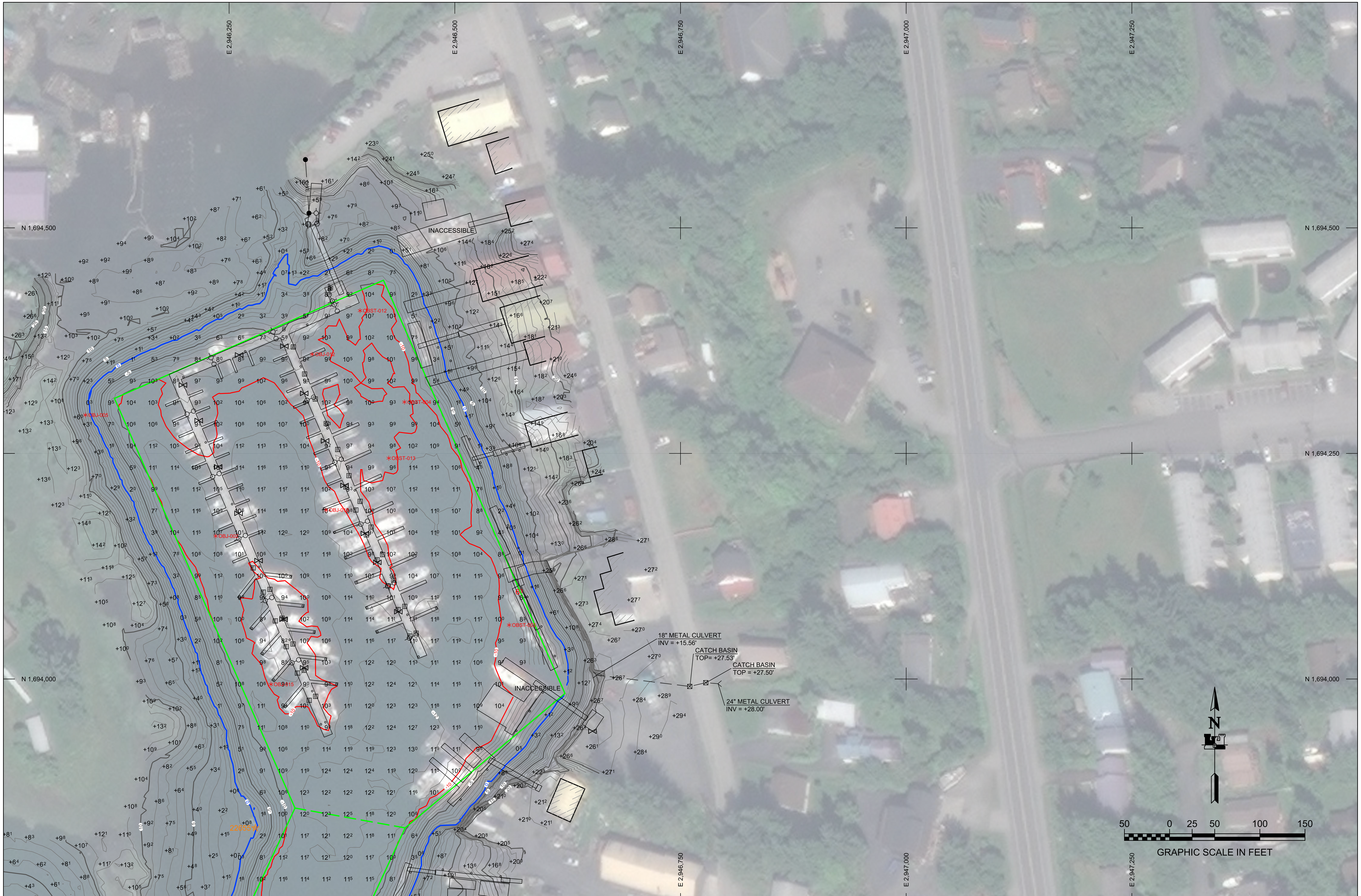
SURVEYED BY: GREGORY W. GIBSON
RECORDED BY: ROBERT GOUGHNOUR
CHECKED BY: AS/JBG/GWG
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE: 021500_VH02.DWG

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

UPC: 021500
PROJECT DATE: 07 October 2019
SCALE: 1" = 50'
JOB NO.: 1119
CONTRACTOR: ETRAC INC.
CITY: WASILLA
STATE: ALASKA
CONTRACT NO.: W91KEB-18-D-0014
TASK ORDER NO.: 19F0064

WRANGELL, ALASKA
021500 - WRANGELL HARBOR
PROJECT CONDITION SURVEY
AUGUST 8 - AUGUST 14, 2019

REFERENCE NUMBER:
1-WRA-92-07-56



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	UPC: 021500	CONTRACT NO.: W911KB-18-D-0014
DRAWN BY: ROBERT GOUGHNOUR	PLOT DATE: 07 October 2019	TASK ORDER NO.: 19F0064
CHECKED BY: TAS/JBG/GWG	SIZE: ANSI D / SCALE: 1" = 50'	JOB NO.: 1119
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION		CONTRACTOR: ETRAC INC.
FILE: 021500_VH02.DWG		CITY: WASILLA / STATE: ALASKA

WRANGELL, ALASKA

021500 - WRANGELL HARBOR

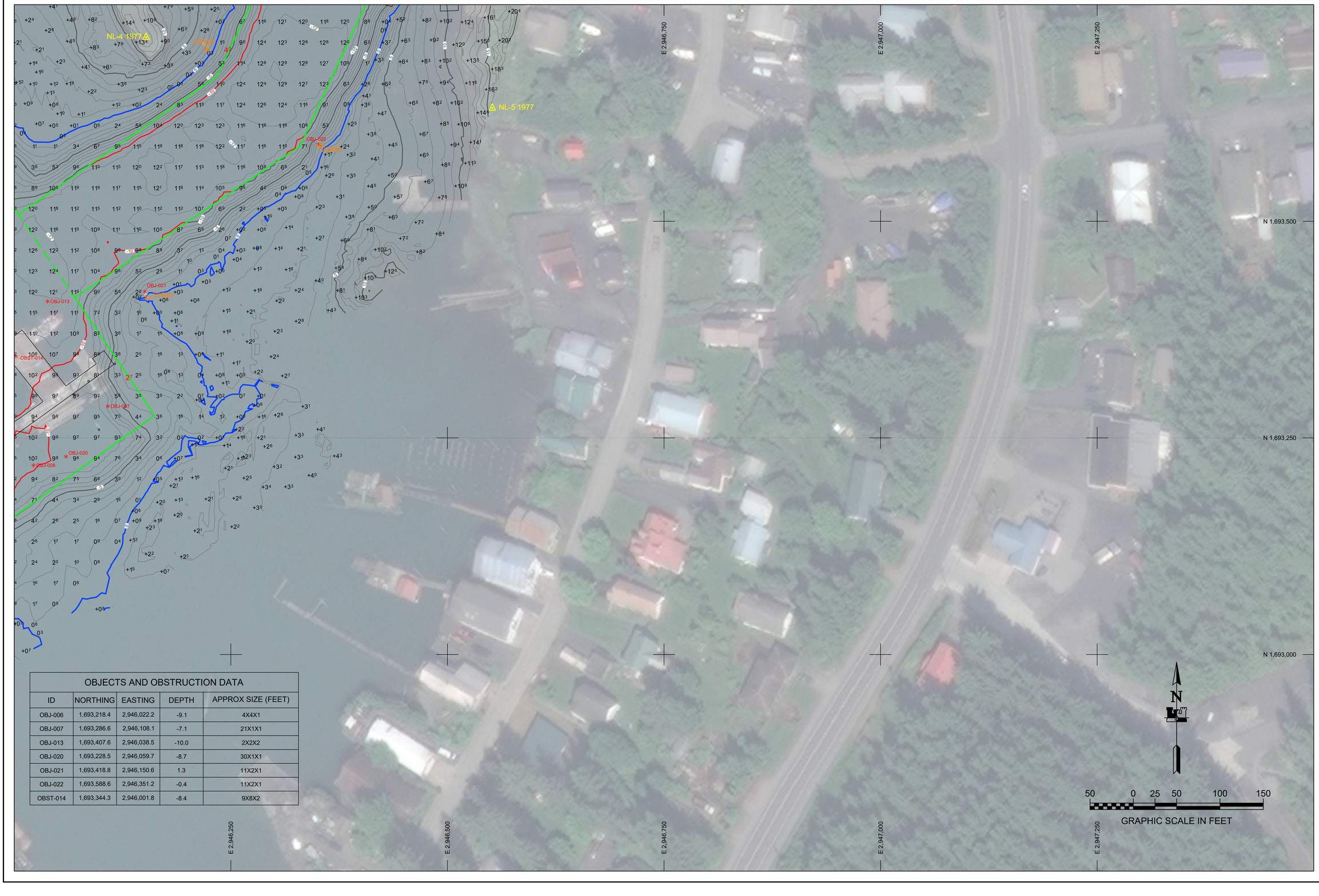
PROJECT CONDITION SURVEY

AUGUST 8 - AUGUST 14, 2019

REFERENCE NUMBER:

1-WRA-92-07-56

SHEET 4 OF 6



OBJECTS AND OBSTRUCTION DATA				
ID	NORTHING	EASTING	DEPTH	APPROX SIZE (FEET)
OBJ-006	1,693,218.4	2,946,022.2	-9.1	4X4X1
OBJ-007	1,693,286.6	2,946,108.1	-7.1	21X1X1
OBJ-013	1,693,407.6	2,946,038.5	-10.0	2X2X2
OBJ-020	1,693,228.5	2,946,059.7	-8.7	30X1X1
OBJ-021	1,693,418.8	2,946,150.6	1.3	11X2X1
OBJ-022	1,693,588.6	2,946,351.2	-0.4	11X2X1
OBST-014	1,693,344.3	2,946,001.8	-8.4	9X8X2

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

REV.	DATE	BY	APPR.	DESCRIPTION

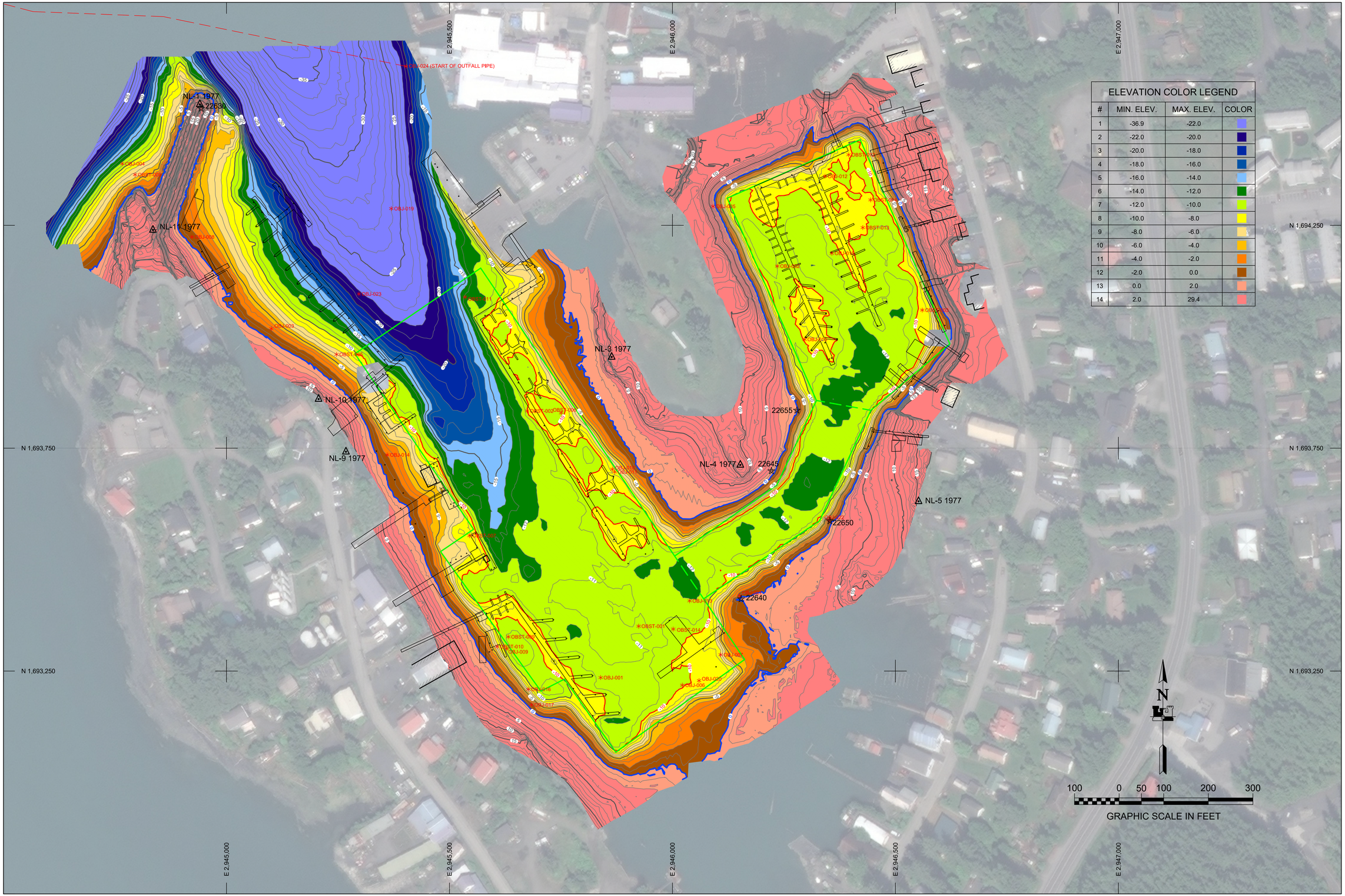
SURVEYED BY: GREGORY W. GIBSON
REVIEWED BY: ROBERT GOUGHNOUR
CHECKED BY: TAS/JBG/GWG
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE: 021500_VH02.DWG

UPC: 021500
PROJECT DATE: 07 October 2019
SIZE: ANSI D
SCALE: 1" = 50'
JOB NO.: 1119
CONTRACTOR: ETRAC INC.
CONTRACT NO.: W91KB-18-D-0014
TASK ORDER NO.: 19F0064
CITY: WASILLA
STATE: ALASKA

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

WRANGELL, ALASKA
021500 - WRANGELL HARBOR
PROJECT CONDITION SURVEY
AUGUST 8 - AUGUST 14, 2019

REFERENCE NUMBER:
1-WRA-92-07-56



ELEVATION COLOR LEGEND

#	MIN. ELEV.	MAX. ELEV.	COLOR
1	-36.9	-22.0	
2	-22.0	-20.0	
3	-20.0	-18.0	
4	-18.0	-16.0	
5	-16.0	-14.0	
6	-14.0	-12.0	
7	-12.0	-10.0	
8	-10.0	-8.0	
9	-8.0	-6.0	
10	-6.0	-4.0	
11	-4.0	-2.0	
12	-2.0	0.0	
13	0.0	2.0	
14	2.0	29.4	

US ARMY CORPS OF ENGINEERS®
ALASKA DISTRICT

REV.	DATE	BY	APPR.	DESCRIPTION

CONTRACT NO.: W91KKB-18-D-0014
TASK ORDER NO.: 19F0064
JOB NO.: 1119
CONTRACTOR: ETRAC INC.
CITY: WASILLA
STATE: ALASKA

UPC: 021500
DATE: 07 October 2019
SCALE: 1" = 100'
SIZE: ANSI D

SURVEYED BY: GREGORY W. GIBSON
ROBERT GOUGHNOUR
CHECKED BY: TAS/JBG/GWG
APPROVED BY: THOMAS SLOAN, CHIEF GEOMATICS SECTION
FILE: 021500_VH02.DWG

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ALASKA DISTRICT
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JBER, ALASKA 99506-0898

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