

F00477

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey Field Examination

Field No. NRT3-10-01-01

Registry No. F00477

LOCALITY

State California

General Locality San Francisco Bay

Sublocality Port of San Francisco and Vicinity

2001

CHIEF OF PARTY
Kathryn Simmons

LIBRARY & ARCHIVES

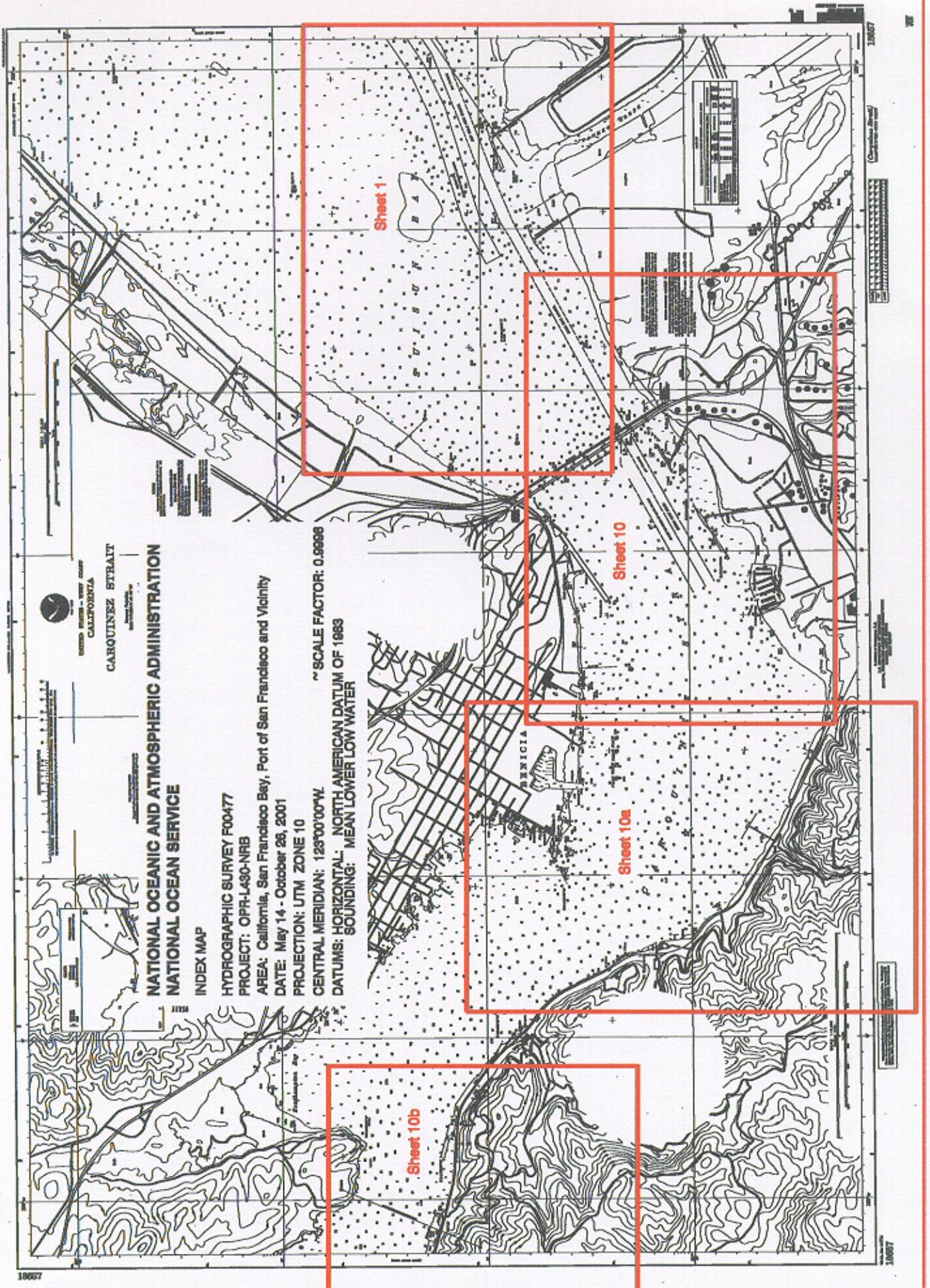
DATE _____

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTER NO. F00477
HYDROGRAPHIC TITLE SHEET		
INSTRUCTIONS The hydrographic sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office.		FIELD NO. NRT3-10-01-01
State California		
General Locali San Francisco Bay		
Sublocality Port of San Francisco and Vicinity		
Scale 1:10,000 Date of Survey May 14 - Oct 26, 2001		
Instructions D 4/6/01 Project No. OPR-L430-NRB		
Vessel Launch 1212		
Chief of Party Kathryn Simmons		
Surveyed by K. Simmons, K. Brown, E. Wernicke		
Soundings taken by echo sounder, hand lead, pole Innerspace 448, EG&G 272-T SSS		
Graphic record scaled by NRT3 personnel		
Graphic record checked by NRT3 personnel		
Evaluation by R. Davies Automated pl HP Designjet1050c		
Verification by R. Davies		
Soundings in Feet at MLLW		
REMARKS: Time in UTC.		
Revisions and annotations appearing as endnotes were generated during office processing.		
All depths listed in this report are referenced to mean lower low water unless otherwise noted.		



CARQUINEZ STRAIT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

INDEX MAP
 HYDROGRAPHIC SURVEY F00477
 PROJECT: OPR-L490-NRB
 AREA: California, San Francisco Bay, Port of San Francisco and Vicinity
 DATE: May 14 - October 28, 2001
 PROJECTION: UTM ZONE 10
 CENTRAL MERIDIAN: 123°00'00"W
 SCALE FACTOR: 0.9998
 DATUMS: HORIZONTAL: NORTH AMERICAN DATUM OF 1983
 SOUNDING: MEAN LOWER LOW WATER



Sheet 3

Sheet 12

Sheet 13

Sheet 14

Sheet 4

Sheet 5

Sheet 6

Sheet 7a

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

INDEX MAP

HYDROGRAPHIC SURVEY F00477

PROJECT: OPR-L430-NRB

AREA: California, San Francisco Bay, Port of San Francisco and Vicinity

DATE: May 14 - October 26, 2001

PROJECTION: UTM ZONE 10

CENTRAL MERIDIAN: 123°00'00"W

~ SCALE FACTOR: 0.99996

DATUMS: HORIZONTAL: NORTH AMERICAN DATUM OF 1983

SOUNDING: MEAN LOWER LOW WATER

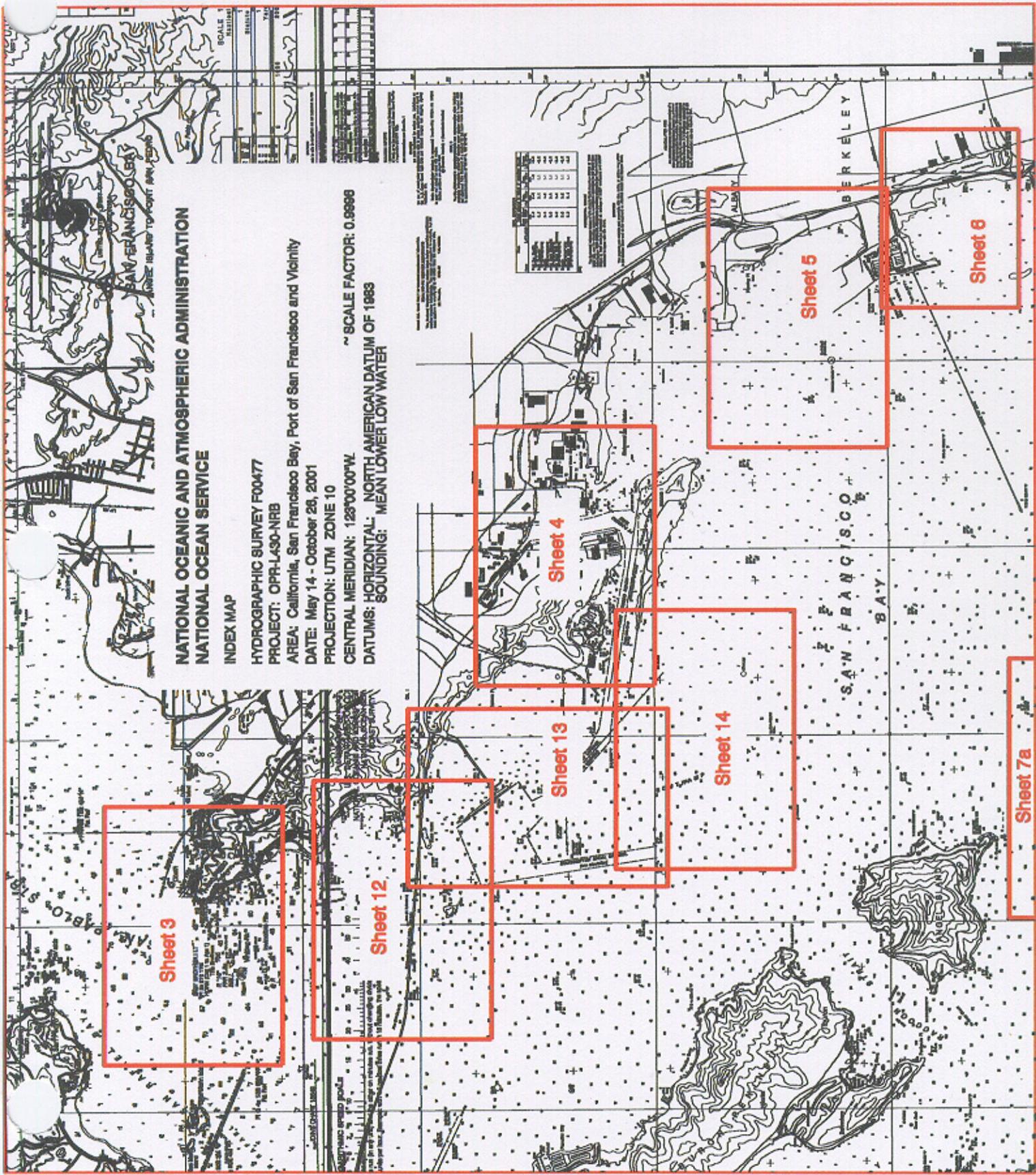
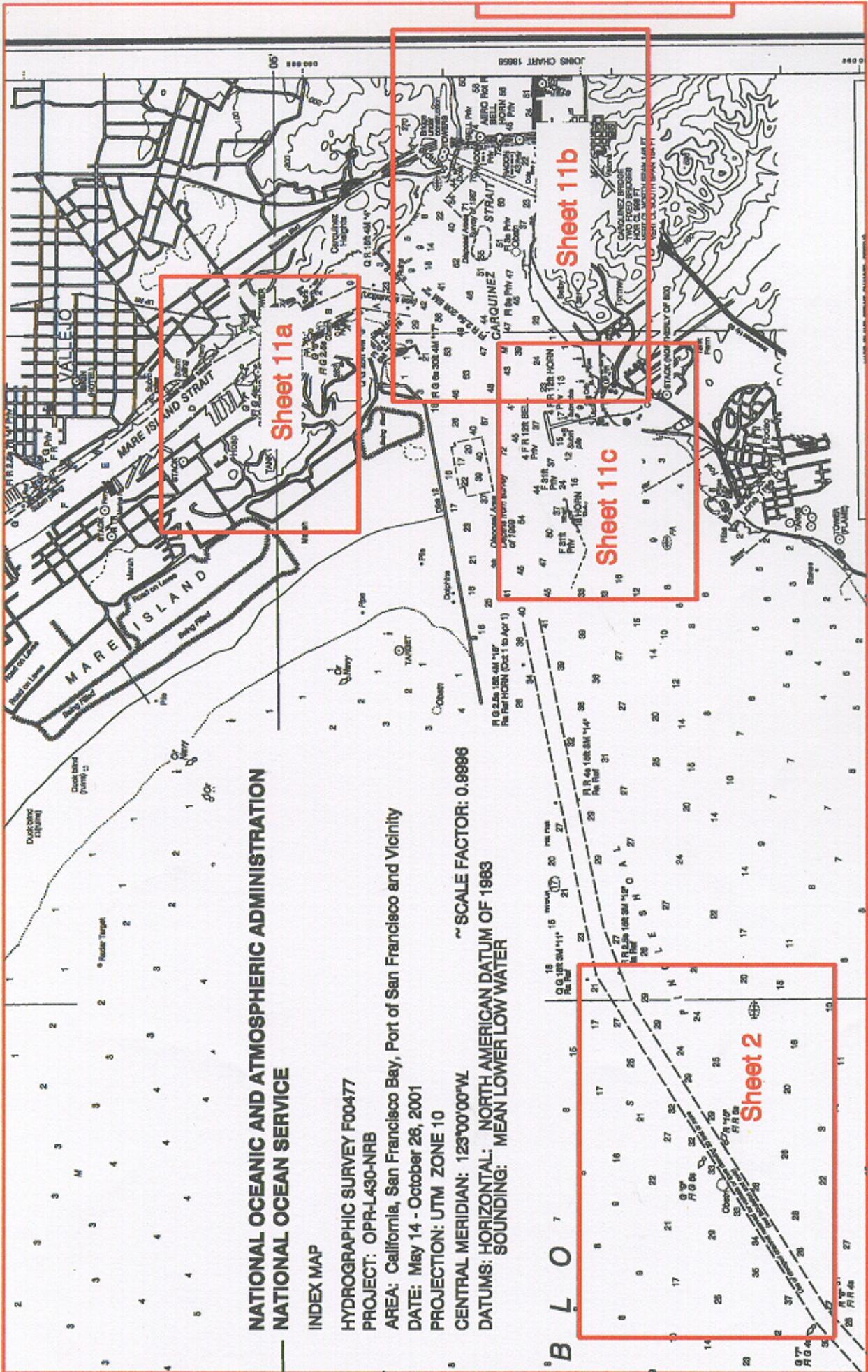


Table with 2 columns: Symbol, Description. Includes symbols for buoys, lights, and other navigational markers.

Vertical text on the right side of the chart, possibly a title or reference text.

Vertical text on the left side of the chart, possibly a title or reference text.



**NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE**

INDEX MAP

HYDROGRAPHIC SURVEY F00477

PROJECT: OPR-L430-NRB

AREA: California, San Francisco Bay, Port of San Francisco and Vicinity

DATE: May 14 - October 26, 2001

PROJECTION: UTM ZONE 10

CENTRAL MERIDIAN: 123°00'00"W

DATUMS: HORIZONTAL: NORTH AMERICAN DATUM OF 1983

SOUNDING: MEAN LOWER LOW WATER

~ SCALE FACTOR: 0.9986

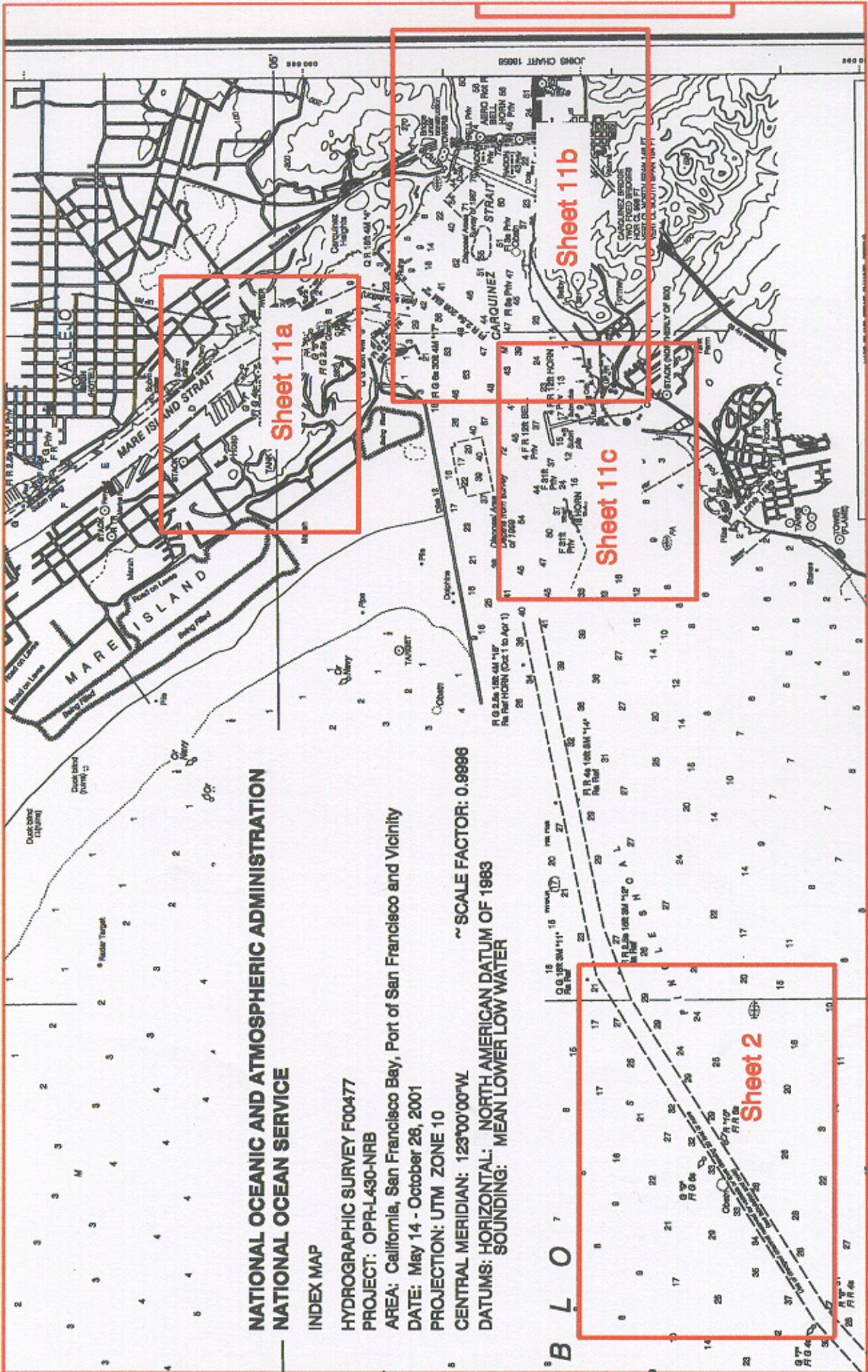
B L O

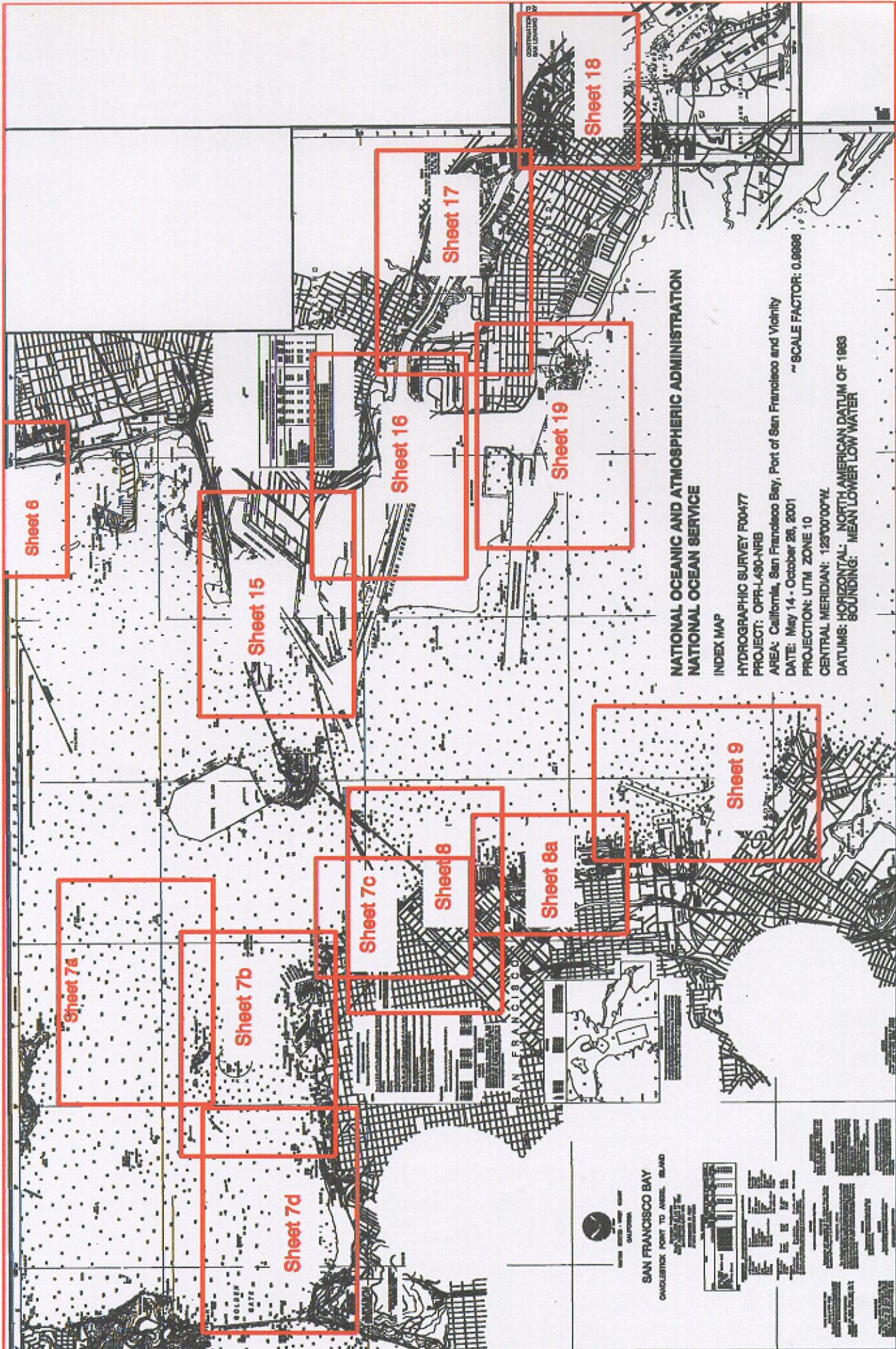
Sheet 11a

Sheet 11b

Sheet 11c

Sheet 2





Descriptive Report to Accompany F00477

OPR-L430-NRB

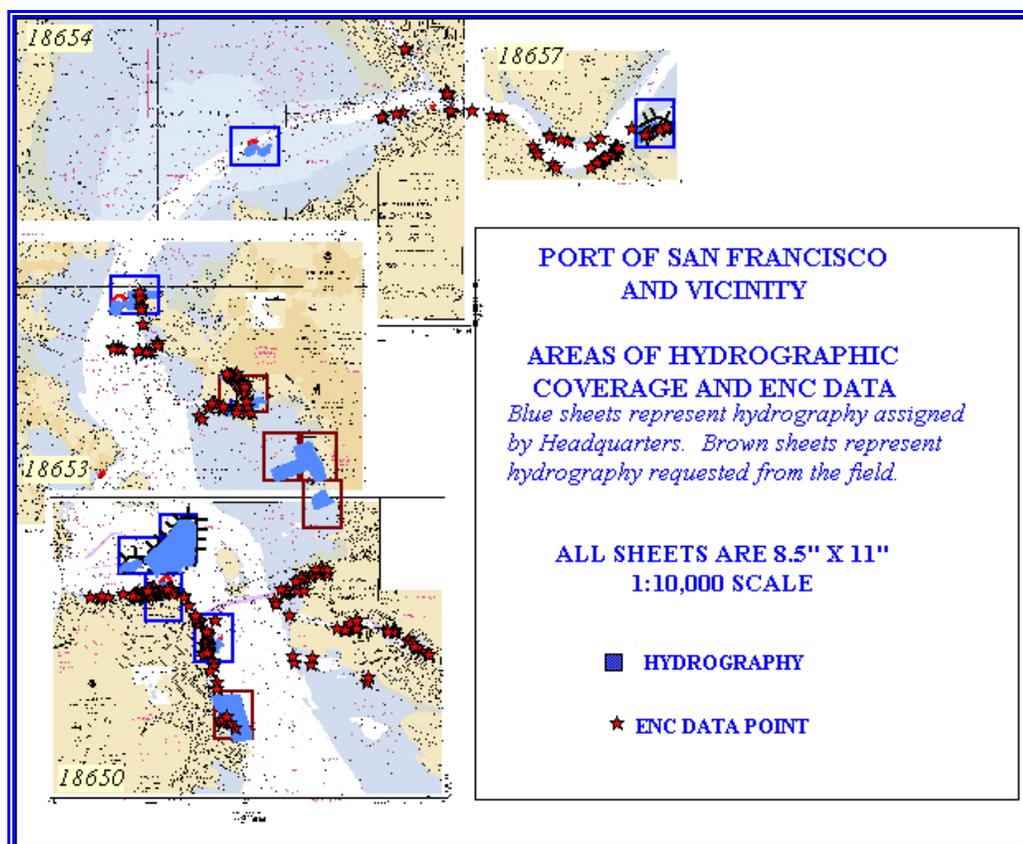
2000¹

Navigation Response Team 3

A. AREA SURVEYED

This field examination was conducted in accordance with Port Instructions OPR-L430-NRB, Port of San Francisco and Vicinity, California. F00477 includes hydrographic data, vector data for S57 products; i.e., electronic navigation charts (ENC), and detached positions. (*NOTE: Project Instructions refer to F00476; the error was not picked up until the end of the survey. Every effort was made to correct the designation where it appears in the data; however, it is possible that some instances were missed.*)

Survey areas are shown in the following graphic.²



Data acquisition was conducted from May 14 (DN 134) through October 26, 2001 (DN 299).

B. DATA ACQUISITION AND PROCESSING

B1. Equipment and Vessels

NOAA Launch 1212, a 27-foot SeaArk, was used for the majority of point data collection, and collection of all detached positions. The 4.5-ton launch is eight feet wide, has a static draft of 0.4 meters and is powered by two 150-hp outboards. No changes to the standard vessel sounding configuration were necessary. The launch is equipped with a Dell Pentium II PC. Sounding data were collected using an Innerspace 448 echosounder, SN 263.

Side scan sonar (SSS) data were collected using the following equipment:

Type	Serial Number
EG&G 272-T Towfish	015598
EG&G 260 Recorder	015602

Differential GPS data were collected using the following equipment:

Equipment Location	Type Receiver/Antenna	Receiver Serial No.	Antenna Serial No.
VN 1212	Trimble DSM212L 27207	0220164491	0220166460
Backpack	Trimble TSC1	224011684	220187539

Corrections for speed of sound through the water column were computed with data obtained from Seacat conductivity, temperature and depth recorder, SN 1892. NOAA's VELOCWIN software was used to download and process the sound velocity data.

Coastal Oceanographic's Hypack software, version 5.0, was used for hydrographic data collection. NOAA's HPTools and Hps were used for hydrographic data processing.

NOAA's HPTools (version 10.9.1) and HPS were used for detached position data processing.

Trimble TSC1 data logger and Asset Surveyor software version 5.00 were used for ENC vector data collection. Pathfinder Office 2.51 and Mapinfo (version 6.0) were used for processing.³

B2. Quality Control

Because all hydrographic areas were small, no crosslines were run; however, side scan lines were oriented orthogonally whenever possible as well as at angles to the mainscheme. In addition, splits were usually run on different days than mainscheme. Agreement is good and no systematic error is apparent.⁴ Point data and line data were evaluated by comparison to the chart, to SPIN and IKONOS satellite imagery, and to feature drawings prepared in the field. Where multipathing is known to occur; i.e., under bridges or other obstruction, points were examined with more rigorous

attention. Positions significantly inconsistent with the above sources were deleted.⁵

B3. Corrections to Echo Soundings

Occasional problems with misdigitization or bottom tracking were encountered during this survey. Where the echogram was unambiguous, the digital record was corrected to reflect the paper trace. Where the echogram trace was discontinuous, the selected soundings were deselected or rejected. Gaps in the sounding interval greater than 6mm at the scale of the survey were resurveyed.

Leadline Comparisons

Periodic leadline comparisons, annotated on the echogram, confirm proper digitization of the echosounder depths. Leadline comparison forms are located in Appendix V.⁶

Static Draft

Static draft for VN 1212 was determined on January 29, 2001 (*DN 029*). First, the depth of the transducer face from a reference mark on the hull was measured. Next, with the launch in the water, fuel tanks half full and two persons aboard, the depth from this reference mark to the waterline was measured. Combining the two measurements, a static draft of 0.4 meters was calculated.

Dynamic Draft

Settlement and squat measurements were conducted for VN 1212 on January 30, 2001 (*DN 030*). All measurements were performed in San Diego Bay. Field records are included in Appendix V.⁷

Transducer and antenna offsets, static draft, and settlement and squat correctors were entered into Offset Table 1.⁸ Correctors were applied during processing in HPS using the Reapply Vertical Correctors Utility.

C. VERTICAL AND HORIZONTAL CONTROL

Tides and Water Levels

Port Instructions define twenty tide zones within the project area. The tide corrector values referenced to primary tide stations at San Francisco, CA (*941-4290*), Richmond, CA (*941-4863*), Alameda, CA (*941-4750*), and Port Chicago, CA (*941-5144*) are provided in the zoning file "L430NRT32001CORP" which is included on the project CD.

Preliminary, six-minute real tides recorded at this station were downloaded from the NOAA,

NOS, CO_OPS web site (<http://www.opsd.nos.noaa.gov/cgi-bin/prelimqry.pl>). Using the HPTools utility, the tides were imported into HPS Tide Tables 1- 4. Zone Utilities computed the appropriate zone for each sounding; time and height adjustments were computed; and corrected tides were applied to sounding data. ⁹

Horizontal Datum

The horizontal control datum for this project is North American Datum of 1983 (NAD83).¹⁰

Position Control

For ENC data collection, differential correctors were provided by Racal Landstar via the Trimble receiver. For detached positions, differential GPS (DGPS) provided control. The U.S. Coast Guard beacons at Point Blunt, CA (302 kHz) and Vandenburg Air Force Base, CA (321 kHz) were used.

Velocity of Sound

Five velocity casts were conducted for the project as shown in the table below:

Cast No/Day	Latitude/Longitude	Depth(m)	Location
1 /143	37°50'35"N / 122°24'35"W	33.9	San Francisco Bay
2 /156	37°50'51"N / 122°24'42"W	53.7	San Francisco Bay
3 /170	37°50'42"N / 122°28'02"W	58.3	San Francisco Bay
4/198	38°02'58"N / 122°05'50"W	22.1	Suisun Bay
5/213	37°50'33"N / 122°24'51"W	51.0	San Francisco Bay

Corrections for speed of sound through the water column were computed from data obtained with a Seacat conductivity, temperature and depth recorder. Sea-Bird Electronics Model SBE-19, S/N 1892, was used for all casts. NOAA VELOCWIN software was used to initialize the recorder as well as to process all casts.

Appendix E contains the calibration report for Seacat instrument S/N 1892. ¹¹

D. RESULTS AND RECOMMENDATIONS

D1. Chart Comparison

Comparison will be limited to the largest scale charts covering the survey area; however, the area is represented on the following charts: ¹²

Chart No.	Date	Edition	Scale
18649	January 22, 2000	61 st	1:40,000
18650	January 01, 2001	50 th	1:20,000
18651	July 29, 1995	40 th	1:40,000
18653	September 30, 2000	9 th	1:20,000
18654	October 30, 1999	41 st	1:40,000
18655	March 13, 1999	57 th	1:10,000
18656	March 31, 2001	52 nd	1:40,000
18657	July 3, 1999	17 th	1:10,000
18658	March 13, 1999	29 th	1:10,000

ENC DATA and Detached Positions

ENC data were collected on items throughout San Francisco Bay. Some items were new features; others were inaccurately depicted on the chart. Three categories were defined for ENC items: Of these, two were established for Point data: 1) Fixed Aids, and 2) Structures. The third category, Line Features, was used for all line data. Line data were collected on curved features and on complex structures where multiple points would have been confusing. It was also used to define shoreline changes. All items were assigned Position numbers in order of collection. When multiple points were acquired on a single feature, the number was incremented by decimals; e.g., 301.1, 301.2, etc.

Detached positions were used primarily to position buoys, private aids and features not deemed critical to zero-visibility navigation,¹³ and for disapproval of various shoreline features. These are plotted on Mapinfo layer Featr01; see remarks label for purpose of the detached position.

All ENC data were plotted in Mapinfo: the data were imported into tables created for each day and category; e.g., structures03jul.tab, fixedaids04feb.tab, etc. A single table for each category was created and the daily data were accumulated into its respective table; e.g., Structures.tab includes all point data collected in that category. The hydrographer's final representation of each feature as it should be charted was drawn onto a separate layer; the drawing is based on the data points and line data, supplemented by field drawings, SPIN or IKONOS imagery and digital photos.¹⁴ This layer was saved as FieldSheet.tab. A Notes layer was created to clarify the FieldSheet layer where necessary. Field notes were recorded in HYPACK during data collection and serve as additional clarification; these notes are included in FieldNotes.tab. Photographs were embedded into a separate Mapinfo Table: Photos.tab

Chart 18650 - San Francisco Bay

In accordance with project instructions, 200% side scan coverage and hydrography at 20-meter line spacing were acquired in areas east and west of Alcatraz Island. The area east of Alcatraz is characterized by large sand waves which commonly reach heights of three and four meters; these are clearly visible on the sonargram. Strong tidal currents around Alcatraz Island are the probable cause of the sand waves, and it is reasonable to assume that they shift and change with conditions. The 39-foot shoal centered at latitude 37°49'42.546"N, longitude 122°24'46.318"W, (*Position No. 11032, DN 173*) is the peak of a large sand wave.¹⁵

Hydrography and side scan sonar data were collected at the request of San Francisco pilots in and around the approaches to Pier 96 at latitude 37°44'34.2"N, longitude 122°22'15.5"W. Their concern was reports of shoaling. Vessels moored along the southern portion of the pier blocked hydrographic data acquisition and interfered with DGPS reception, resulting in a gap in data in this area. Depths available along the pier ranged from 38 to 40 feet.¹⁶ A 40-foot shoal at latitude 37°44'20.5"N, longitude 122°21'47.5"W, is located in the southern approach to the pier. Charted depths in the area are 42 feet. Surveyed depths in the north approach were also found to be one-to-two feet shoaler than charted in several places. A 44-foot sounding¹⁷ at latitude 37°45'16.0"N, longitude 122°21'48.9"W, was located 55 meters¹⁸ northwest of a charted depth of 47 feet. Elsewhere surveyed soundings are in general agreement with the chart.¹⁹

The Parks Department requested data defining the extent of accretion along the south shoreline immediately east of the Golden Gate Bridge. At a zero tide on August 21, 2001, (*DN 233*) the hydrographer collected line data with the Trimble backpack while walking along the shore at the water line. The data were collected over a 32-minute period beginning at 7:58 a.m. Maximum accretion of 64 meters was observed in the vicinity of the pier occupied by NOAA's San Francisco tide station 941-4290.²⁰

The Port of San Francisco requested side scan and current sounding data in the area between Piers 40 and 45. A submarine moored alongside Pier 45 defined the west limits of the hydrography. Pier 41 has been removed and no ruins were observed on the sonargram. Surveyed depths between the piers are generally shallower than charted, another indication of sediment deposition along the south shore. Delete the charted pier and other submerged obstructions. Chart the soundings from this survey.²¹

Chart 18653 - Angel Island to San Pedro

Sounding data around Point San Pablo (*Fixes 13977 - 14665, DN 214*) were collected at the request of the Port of Richmond out of concern for reports of shoaling around the south end of the wharf at Point San Pablo, and in the channel leading to the Point San Pablo yacht harbor. Indeed, soundings along the south approach do indicate some minor shoaling. Along the wharf face depths range from 20 feet at the south end, which is in ruins, to 43 feet at the north end. Hydrography in the channel leading to Point San Pablo yacht harbor located a least depth of eight feet located at latitude 37°58'0.224"N, longitude 122°25'38.669"W.²² Delete the "8 ft reported 1984" notation at latitude 37°57'57"N, longitude 122°25'31.5"W, and chart the soundings from this survey.²³ Elsewhere, hydrography showed general agreement with the charted soundings. The 60-foot contour has been extended north as well as westward around the 75-foot sounding at latitude 37°57'36"N, longitude 122°25'59"W. Depths on the east side of the Brothers Rocks indicate a steeper sloping bottom than charted..²⁴

The Port of Richmond also requested side scan sonar investigation of charted submerged piles in the Richmond marina as well as hydrographic investigation of possible shoaling in the marina and at the entrance near the breakwater. No piles were observed during 200% side scan sonar operations (*Fixes 14499 - 14556*)²⁵; however the obstruction charted at latitude 37°54'36.670"N, longitude 122°20'49.398 W, was confirmed (*Contacts 14656.3p and 14546.5p*).²⁶ Hydrography confirmed shoaling inside the marina and around the breakwater at the entrance. The channel leading into the marina shows no significant changes.²⁷

Hydrography around the Point Potrero turn and the charted drydock located at approximate latitude 37°54'16"N, longitude 122°22'00"W, was requested because current soundings were not available for the inside of the turn. ²⁸

Several piles and piers along the west side of the harbor centered at latitude 37°55'05"N, longitude 122°21'58.6"W, were disproved with 200% SSS coverage (*Fixes 14479 - 14498, DN 227*), and should be deleted. ²⁹ See Notes layer in Mapinfo.

The Port of Richmond requested investigation of a wreck sunk years ago. (See Danger to Navigation Report.) The wreck, reported to be a tugboat, was confirmed with side scan sonar at latitude 37°55'24"N, longitude 122°22'25"W. ³⁰ Development hydrography located a least depth of 22 feet (*Fix 17838, DN 298*). A dive investigation (*DN 299*) confirmed the sunken vessel and the least depth measurement of 22 feet (see dive investigation report) was the same as the least depth obtained by echosounder. Chart echosounder depth. ³¹

Hydrography on the north and south sides of the Berkeley Yacht harbor (*Fixes 14784 - 15853, DN 240, and 15541 - 16547, DN 254*) was done at the request of Mr. Don Neuwirth, Planning Manager, East Bay Regional Park District, California State Parks. The hydrography was requested to supplement a comprehensive general plan for the new "Eastshore State Park." The hydrography is in general agreement with the chart. Some shoaling is indicated at the north side of the area south of the yacht harbor. Chart current hydrography. ³²

The south end of the pier at Point San Pablo located at latitude 37°57'43"N, longitude 122°25'44"W, is in ruins. Chart per Mapinfo Field Sheet layer. ³³

A new breakwater has been constructed at latitude 37°56'17"N, longitude 122°25'04"W, and was positioned with Trimble DGPS (*ENC data points 161.1 - 161.2*) and is shown on the Mapinfo Field Sheet layer. ³⁴

A new wharf and piers constructed at latitude 37°55'17"N, longitude 122°22'18.3"W, were positioned with Trimble DGPS (*ENC data points 202.1 - 202.9, and 221*). ³⁵

A new breakwater has been constructed at latitude 37°54'25.8"N, longitude 122°22'52.5"W, and was positioned with Trimble DGPS (*ENC data points 180.1 and 180.2*), and is depicted on the Mapinfo FieldSheet layer. ³⁶

The north end of the charted wharf at Richmond's Inner Harbor Terminal No. 3 (latitude 37°54'54"N, longitude 122°21'41"W) is a pier in ruins. Chart per Mapinfo Field Sheet layer. ³⁷

A new ferry pier has been constructed at latitude 37°54'33"N, longitude 122°21'35.5"W. Chart per Mapinfo Field Sheet layer. ³⁸

The above changes and all other changes to the Richmond Harbor area are depicted in Mapinfo on the Field Sheet layer with details provided on the Notes table. ³⁹

Chart 18657 - Carquinez Strait

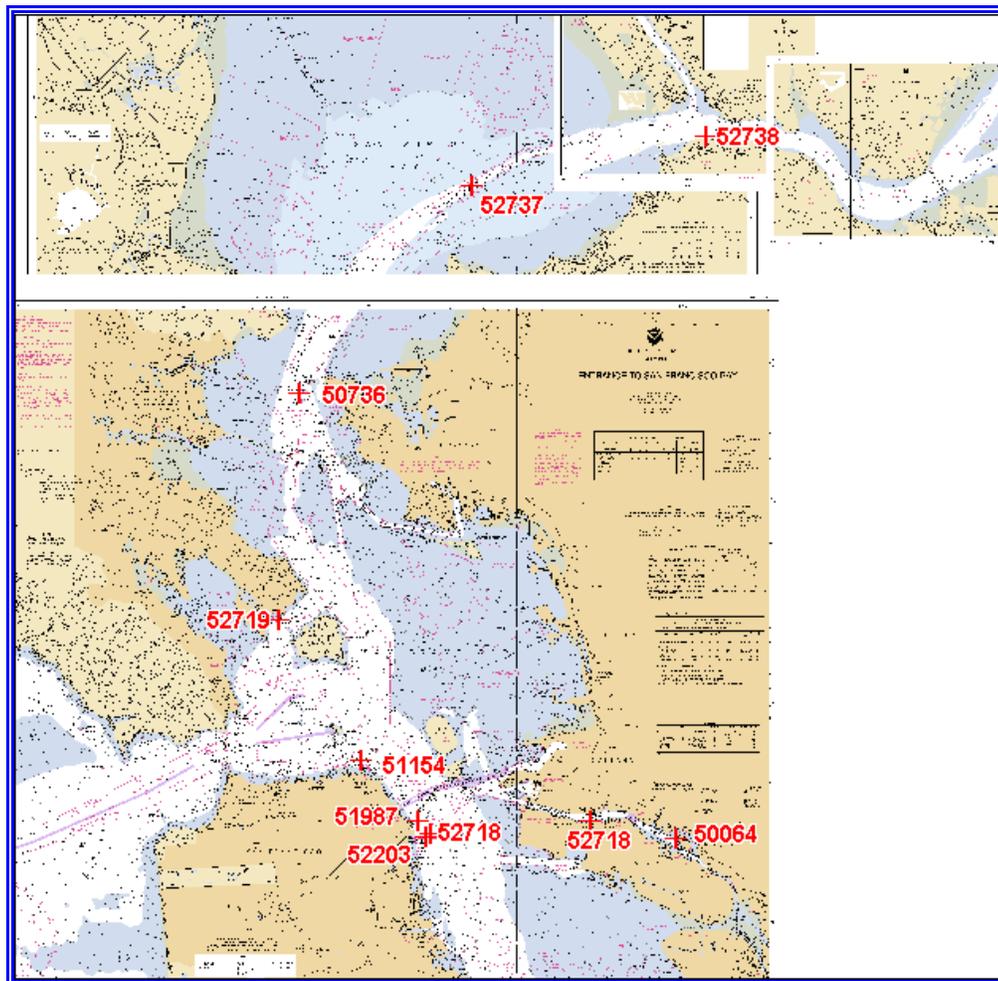
In accordance with project instructions, 100% side scan coverage and hydrography at 20-meter line spacing were acquired around the oil piers on the south side of Suisun Bay at approximate position 38°03'00"N, longitude 122°06'00"W (*Fixes 12290 - 13344, DN's 198 - 199*). No contacts were observed and soundings are generally consistent with charted depths. One exception is a 39-foot sounding located at 38:02'56.771"N, longitude 122:05'53.869"W, (*Pos. No. 12912, DN 198*) which is 125 meters SW of a charted 39-foot depth. ⁴⁰

Dangers to Navigation

⁴¹ One danger to navigation was located. See Danger to Navigation Report included in Appendix I.

AWOIS Items

Ten assigned AWOIS items located in the San Francisco Bay area are shown in the graphic below. Investigation results were recorded in the database L430awois.mdb. Copies of the reports and supporting data are included with this report. ⁴²



D2. Additional Results

The following fixed aids to navigation were positioned with the Trimble DGPS receiver to one-meter accuracy: ⁴³

Navigational Aid	LLN	Latitude	Longitude
SF Bay Presidio Shoal Light 2 (<i>charted as buoy</i>)	4285	37°48'26.7358"N	122°27'38.7995"W
SF Bay Anita Rock Light	4290	37°48'29.9971"N	122°27'12.8298"W
San Francisco W. Yacht Harbor Light 2	4300	37°48'31.4709"N	122°26'24.2856"W
San Francisco East Yacht Harbor Light 2	4305	37°48'28.5443"N	122°25'58.5665"W
Aquatic Park Entrance Light 1	4306	37°48'38.1174"N	122°25'25.0811"W
Fishermans Wharf Breakwater Light A	4307	37°48'40.3389"N	122°25'21.5724"W
Fishermans Wharf Breakwater Light B	4308	37°48'42.1598"N	122°25'16.6008"W
Fishermans Wharf Entrance Light 2	4309	37°48'43.2306"N	122°25'11.371"W
Pier 39 Breakwater Light 4	4500	37°48'40.4567"N	122°24'41.453"W
Pier 39 Breakwater Light A	4515	37°48'41.4255"N	122°24'36.5788"W
Pier 39 Breakwater Light B	4520	37°48'41.0549"N	122°24'33.6384"W
Pier 39 Breakwater Center Light C	4525	37°48'40.6522"N	122°24'30.6966"W
Pier 39 Breakwater Light D	4530	37°48'38.4366"N	122°24'29.857"W
Pier 39 Breakwater Light E	4535	37°48'36.2228"N	122°24'29.0252"W
Pier 39 Breakwater Light F	4540	37°48'33.9898"N	122°24'28.1782"W
Pier 39 Marina Light 1	4544	37°48'30.5807"N	122°24'27.5388"W
Pier 39 Marina Light 2	4545	37°48'31.7303"N	122°24'27.3235"W
Pier 27-29 W Light	4550	37°48'27.3354"N	122°24'03.31305"W
Pier 27-29 E Light	4555	37°48'26.2668"N	122°24'01.68098"W
Pier 1 North Light	4565	37°47'53.4027"N	122°23'35.4203"W
Pier 1 South Light	4570	37°47'52.6738"N	122°23'34.7542"W
South Beach Harbor North Entrance Light 2	4576	37°46'54.5316"N	122°23'05.55724"W
South Beach Harbor North Entrance Light 1	4577	37°46'55.3508"N	122°23'04.26314"W
South Beach Harbor Breakwater Light A	4577.1	37°46'50.0946"N	122°23'03.77892"W
South Beach Harbor Breakwater Light B	4577.2	37°46'45.0603"N	122°23'03.272"W
South Beach Harbor South Entrance Light 1	4578	37°46'42.3528"N	122°23'07.29668"W
South Beach Harbor South Entrance Light 2	4579	37°46'41.5153"N	122°23'06.66807"W
Oakland Outer Harbor Range B Front Light	4610	37°48'57.4601"N	122°19'29.1497"W
Oakland Outer Harbor Range B Rear Light	4615	37°49'02.9268"N	122°19'19.0083"W
Oakland Outer Harbor Centerline Range Front Light	4617	37°48'57.8099"N	122°19'33.9516"W
Oakland Outer Harbor Centerline Range Rear Light	4618	37°49'02.0945"N	122°19'25.6861"W
Oakland Outer Harbor Range A Front Light	4620	37°48'56.3333"N	122°19'42.0118"W
Oakland Outer Harbor Range A Rear Light	4625	37°49'01.9309"N	122°19'31.0298"W
Oakland Seventh Street Terminal Light 2	4635	37°48'20.7876"N	122°20'33.5097"W
Bart Obstruction Light	4640	37°48'40.7534"N	122°20'18.1334"W

Navigational Aid	LLN	Latitude	Longitude
Bart Obstruction Light	4640	37°48'41.2161"N	122°20'18.0958"W
Oakland Seventh Street Terminal Light 1	4660	37°48'13.1799"N	122°20'28.7002"W
Oakland Inner Harbor Light 8	4675	37°47'51.6939"N	122°19'57.3956"W
Oakland Inner Harbor Light 10	4680	37°47'27.4575"N	122°18'09.35695"W
Coast Guard Island Pier South Light	4681	37°46'44.5922"N	122°14'52.012"W
Coast Guard Island Pier North Light	4682	37°46'52.2857"N	122°15'05.419"W
Oakland Inner Harbor Turning Basin Light A	4683	37°47' 42.4007"N	122°17'21.8525"W
Oakland Inner Harbor Turning Basin Light B	4684	37°47'27.7459"N	122°17'20.3825"W
Ballena Bay Light 3 (no light at the time of the survey)	4785	37°45'56.985"N	122°16'56.435"W
Brooklyn Basin 9th Ave Turning Basin Range Rear Lt	4686	37°47'01.9238"N	122°15'11.9987"W
Brooklyn Basin North Channel Light 2	4690	37°47'7.4545"N	122°15'21.1398"W
Alameda Naval Air Station Channel Light 3	4755	37°46'36.5272"N	122°19'51.8927"W
Alameda Naval Air Station Channel Light 4	4760	37°46'24.1569"N	122°19'48.5567"W
Alameda Naval Air Station Channel Light 5	4765	37°46'34.07"N	122°19'05.96566"W
Alameda Naval Air Station Channel Light 6	4770	37°46'21.4311"N	122°19'07.23876"W
Ballena Bay Light 1	4780	37°45'48.8549"N	122°16'57.6465"W
Brooklyn Basin South Channel Light 1	4685	37°47'2.71719"N	122°15'21.839"W
Pier 94 North End Light	4915	37°44'43.7813"N	122°22'22.0302"W
Pier 94/96 North Channel Range Front Light	4917	37°44'38.0139"N	122°22'29.6187"W
Pier 94/96 North Channel Range Rear Light	4918	37°44'31.3657"N	122°22'33.2141"W
Pier 94/96 South Channel Range Front Light	4926	37°44'32.0128"N	122°22'14.784"W
Pier 94/96 South Channel Range Rear Light	4927	37°44'39.3815"N	122°22'36.6185"W
Pier 96 Lighter Basin Entrance Light 2	4930	37°44'24.4735"N	122°22'03.70309"W
Richmond Harbor Approach Range Front Light	5670	37°54'02.7375"N	122°23'29.5027"W
Richmond Harbor Approach Range Rear Light	5675	37°53'55.6055"N	122°23'19.6124"W
Richmond Harbor Channel Light 8	5710	37°54'16.0096"N	122°23'05.89531"W
Brickyard Cove Harbor Light 1	5715	37°54'25.5782"N	122°22'58.4131"W
Brickyard Cove Harbor Light 2	5720	37°54'24.8214"N	122°22'57.6004"W
Richmond Harbor Channel Light 9	5725	37°54'19.0349"N	122°22'31.5506"W
Richmond Harbor Channel Light 10	5730	37°54'12.2033"N	122°22'33.5454"W
Richmond Harbor Channel Light 12	5735	37°54'06.1072"N	122°22'00.98459"W
Point Potrero Reach Range Front Passing Light 14	5740	37°54'08.8015"N	122°21'36.7662"W
Point Potrero Reach Range Rear Light	5741	37°54'07.4364"N	122°21'25.2875"W
Richmond Harbor Channel Light 16 (<i>buoy on chart</i>)	5745	37°54'21.0196"N	122°21'34.4459"W
Richmond Harbor Channel Light 18 (<i>buoy on chart</i>)	5750	37°54'27.7671"N	122°21'36.943"W
Point San Pablo Terminal Light 4	5870	37°57'52.7733"N	122°25'46.0778"W
Carquinez Strait Light 20	6230	38°03'14.2956"N	122°11'44.2593"W
Benicia Marina Light 1	6247	38°02'31.6843"N	122°09'27.7114"W
Benicia Marina Light 2	6248	38°02'31.357"N	122°09'26.6125"W

Navigational Aid	LLN	Latitude	Longitude
Benicia Wharf Light	6250	38°02'24.08"N	122°08'18.5192"W
Martinez Marina Light 1	6255	38°01'40.8451"N	122°08'17.6257"W
Martinez Marina Light 2	6260	38°01'40.0275"N	122°08'18.3176"W
Shell Oil Wharf W. End Light <i>(on mooring platform)</i>	6265	38°01'48.8803"N	122°08'01.79195"W
Shell Oil Wharf East End Light <i>(on mooring platform)</i>	6275	38°01'58.3661"N	122°07'43.3509"W
Amorco Wharf Light <i>(on mooring platform)</i>	6280	38°02'4.62269"N	122°07'30.4993"W
Amorco Wharf Light <i>(on mooring platform)</i>	6280	38°02'09.5034"N	122°07'20.0369"W
Suisun Bay North Channel Light 2	6325	38°02'52.7564"N	122°06'42.8615"W
Point Edith Crossing South Range Front Light	6375	38°02'56.1616"N	122°05'23.3051"W
Point Edith Crossing South Range Rear Light	6380	38°02'48.9629"N	122°05'36.8953"W

Selected buoys and private aids were positioned with hydrographic DGPS and are plotted on Featr01.tab. ⁴⁴

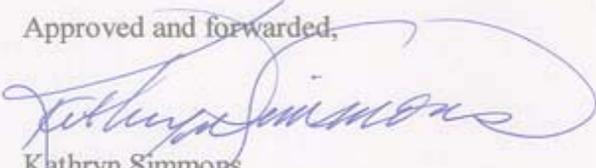
E. APPROVAL SHEET

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Navigation Response Branch Operations Manual, the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and NOS Hydrographic Surveys Specifications and Deliverables. ⁴⁵

The data were reviewed daily during acquisition and processing.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and forwarded,



Kathryn Simmons
Team Leader
Navigation Response Team 3

1. PHB Revision - 2001
2. PHB Revision - Twenty-seven page size plots (11"x16" and 8.5"x11") have been generated during office processing. Together they comprise the smooth sheet. See index sheets attached to the descriptive report behind the Title Sheet.
3. PHB Revision - Survey data was processed in the office with HPS, HPTools, Mapinfo and Microstation 95.
4. PHB Revision - Do not concur. Crosslines were not run according to hydrographic specifications. Adjacent lines of hydrography were compared throughout the survey area and reflect good agreement. Development lines, splits, are not a replacement for crosslines, they are used for the development of critical areas. The evaluator feels that the data is consistent for the depth and positional accuracy and adequate to supersede prior information in the common area.
5. PHB Revision - Concur
6. PHB Revision - Filed with the hydrographic data
7. PHB Revision - Filed with the hydrographic data.
8. PHB Revision - Filed with the hydrographic data
9. PHB Revision - Soundings and elevations have been reduced to Mean Lower Low Water (MLLW) or Mean High Water (MHW) as appropriate with verified tide correctors obtained from NOAA/NOS CO-OPS website. The correctors are zoned direct from San Francisco, CA, Alameda, CA, Richmond, CA and Port Chicago, CA., gage numbers 941-4290, 941-4750, 941-4863 and 941-5144.
10. PHB Revision - The data is plotted using a Universal Transverse Mercator (UTM) Zone 10 projection and are depicted on twenty-seven plotter sheets.
11. PHB Revision - Filed with the hydrographic data.
12. PHB Revision - The following charts were the only charts which were compared to:

Chart	Edition /Date	Scale
18650	51 st , 4/20/02	1:20000
18653	9 th , 9/30/00	1:20000
18654	42 nd , 4/06/02	1:40000
18655	58 th , 12/22/01	1:10000
18657	18 th , 3/17/01	1:10000

13. PHB Revision - When features were deemed critical to zero-visibility navigation a detached position was taken with the Trimble GPS backpacks.
14. PHB Revision - The dates for the San Francisco area imagery are: Richmond IKONOS, dated 3/18/00, San Francisco SPIN2, dated 8/1/98, Carquinez Strait SPIN2, dated 8/1/98, Alameda/Berkeley SPIN2, dated 1/1/98.

There are no contemporary photogrammetric source data available for this survey. The shoreline in brown on the smooth sheets is for orientation only, and originates with chart 18650 50th Edition, dated 1/13/01, 18653 9th Edition, dated 9/30/00, 18654 41st Edition, dated 10/30/99 18655 58th Edition, dated 12/22/01 and 18657 18th Edition, dated 3/17/01. The shoreline was digitized in MicroStation during the compilation of the smooth sheet.

There are numerous revisions to the MHW. These changes are depicted with a solid red line on the smooth sheet and are adequate to supersede prior photogrammetric shoreline maps. Other changes, depicted with a dashed red line, originate with SPIN-2 and IKONOS satellite imagery. The dashed red line denotes an approximate location of the MHW. The quality of the hydrographic positioning was frequently inadequate to depict the shoreline changes with a

solid red line. In many instances, the positioning failed to provide sufficient information to tie the newly located shoreline to existing charted shoreline. The cartographer utilized the SPIN-2 and IKONOS imagery as a guide to fill in these voids. The result of combining the hydrography and photogrammetric information is a usable cartographic depiction of conditions at the time of the survey.

The quality of the MHW depicted with a dashed line is unknown. While it is contemporary with the date of the SPIN-2 and IKONOS photography and is believed to be reasonably complete it is a simple digitization of raster imagery without proper photogrammetric controls. Use of this information to update nautical charts should only be considered if no other later or better quality source exists.

15. PHB Revision - Concur, the area has strong currents and sand waves. Notes to the effect, strong currents and sand waves have been added to the smooth sheet. With approved tides applied, the sounding is 38 feet located at latitude 37/49/43.113N, longitude 122/24/45.599. This sounding was reported as a danger to navigation on June 21, 2002. See attached Report of Dangers to Navigation letter..

16. PHB Revision - Concur

17. PHB Revision - 45-foot sounding

18. PHB Revision - 70 meters

19. PHB Revision - Concur, chart area according to the smooth sheet.

20. PHB Revision - Concur, Chart approximate low water line between latitude 37/48/33.52N, longitude 122/28/30.335W and latitude 37/48/25.923N, longitude 122/26/51.9W.

21. PHB Revision - Concur, Chart soundings and features as shown on the survey.

22. PHB Revision - 10 feet located at latitude 38/58/0.21N, longitude 122/25/38.757W.

23. PHB Revision - Concur, chart 10 ft Oct 2001

24. PHB Revision - Concur, chart area according to smooth sheet

25. PHB Revision - Concur, remove all charted submerged piles from the chart.

26. PHB Revision - Concur, retain charted 12 foot obstruction at latitude 37/54/36.670W, longitude 122/20/49.398W.

27. PHB Revision - Chart sounding according to this survey.

28. PHB Revision - Chart this area according to this survey.

29. PHB Revision - Concur, chart area according to this survey.

30. PHB Revision - Correction, latitude 37/55/24.192N, longitude 122/22/25.242W

31. PHB Revision - Concur, with smooth tides applied, the least depth on the wreck is 23 feet at MLLW

32. PHB Revision - Concur, chart according to the smooth sheet, these sounding differences are in the range of 1 to 2 feet at MLLW.

33. PHB Revision -Concur

34. PHB Revision - Concur, chart according to the smooth sheet.

35. PHB Revision - Concur, chart wharf and piers as shown on the smooth sheet.
36. PHB Revision - Concur, chart breakwater at the above position and as shown on the smooth sheet.
37. PHB Revision - Concur, chart pier ruins at the above position and as shown on the smooth sheet.
38. PHB Revision - Concur, chart new pier at the above position and add a ferry note in the vicinity of the new pier. See smooth sheet for depiction.
39. PHB Revision - Concur with clarification, chart all field changes based on the present survey information. In addition the following charted items should be changed from visible to submerged. The hydrographer did not complete a thorough investigation to completely disprove these charted items.

Feature	Latitude	Longitude
Pile	37/49/3.424N	122/19/13.094W
Pile	37/49/5.404N	122/19/11.323W

The following charted item should be retained as charted. The hydrographer did not complete a thorough investigation to completely disprove this charted item.

Feature	Latitude	Longitude
submerged rock	37/49/02.79N	122/19/13.84W

Survey F00477 is adequate to supersede and supplement charted shoreline within the charted area.

40. PHB Revision - Concur, chart soundings from this survey.
41. PHB Revision - Two additional dangers were discovered during office processing. Both letters are attached to this report.
42. PHB Revision - Concur
43. PHB Revision - Concur. In addition the following aids were not listed in the descriptive report and are not within the survey sheet limits but were located and described by the hydrographer.

LL Name	LL#	Latitude	Longitude
Southampton Shoal Channel Buoy 1	5640	37/53/25.10N	122/25/13.07W
Southampton Shoal Channel Buoy 2	5645	37/53/26.06N	122/25/04.02W
Berkley Marine Channel Light 2	5630	37/50/51.90N	122/21/38.08W
Berkley Marine Channel Light 3	5635	37/51/27.74N	122/20/57.77W
Treasure Island East Channel Lighted Buoy 3	4602	37/49/26.55N	122/21/10.73W
Oakland Inner Harbor Lighted Buoy 6	4672	37/47/55.36N	122/20/13.02W
Richmond Harbor Channel Light Buoy 6	5700	37/54/20.89N	122/23/37.54W

It is recommended that the PA note on the charted fixed aid Ballena Bay Esturary Light , LL# 4785, be removed. A static GPS position was taken to locate this aid at latitude 37/46/05.858N, longitude 122/17/18.078W.

The following aids to navigation positions and/or descriptions differ from the Light List Volume VI publication. These aids need to be further investigated.

Light List Name	Survey Position#	Latitude	Longitude
Ballena Bay Esturary Light	17399	37/46/06.69N	122/17/17.671W
Ballena Bay Esturary Light	17398	37/46/05.858N	122/17/18.078W

Richmond Harbor Channel lighted Buoy 18 was not found at its charted location. A fixed aid was found at latitude 37/54/27.76N, longitude 122/21/36.943.

Richmond Harbor Channel Lighted Buoy 16 was not found at its charted location. A fixed aid was found at latitude 37/54/21.02N, longitude 122/21/34.445W.

Presidio Shoal Buoy 2 (LL# 4285) has been replaced by a fixed aid at latitude 27/48/26.73N, longitude 122/27/38.8W.

Pier 96 Lighter Basin Entrance Light 1 was destroyed at the time of the survey, latitude 37/44/21.065N, longitude 122/22/04.436W.

44. PHB Revision - Concur with clarification, selected buoys and private aids have shown on the smooth sheet..

45. PHB Revision - Concur

RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

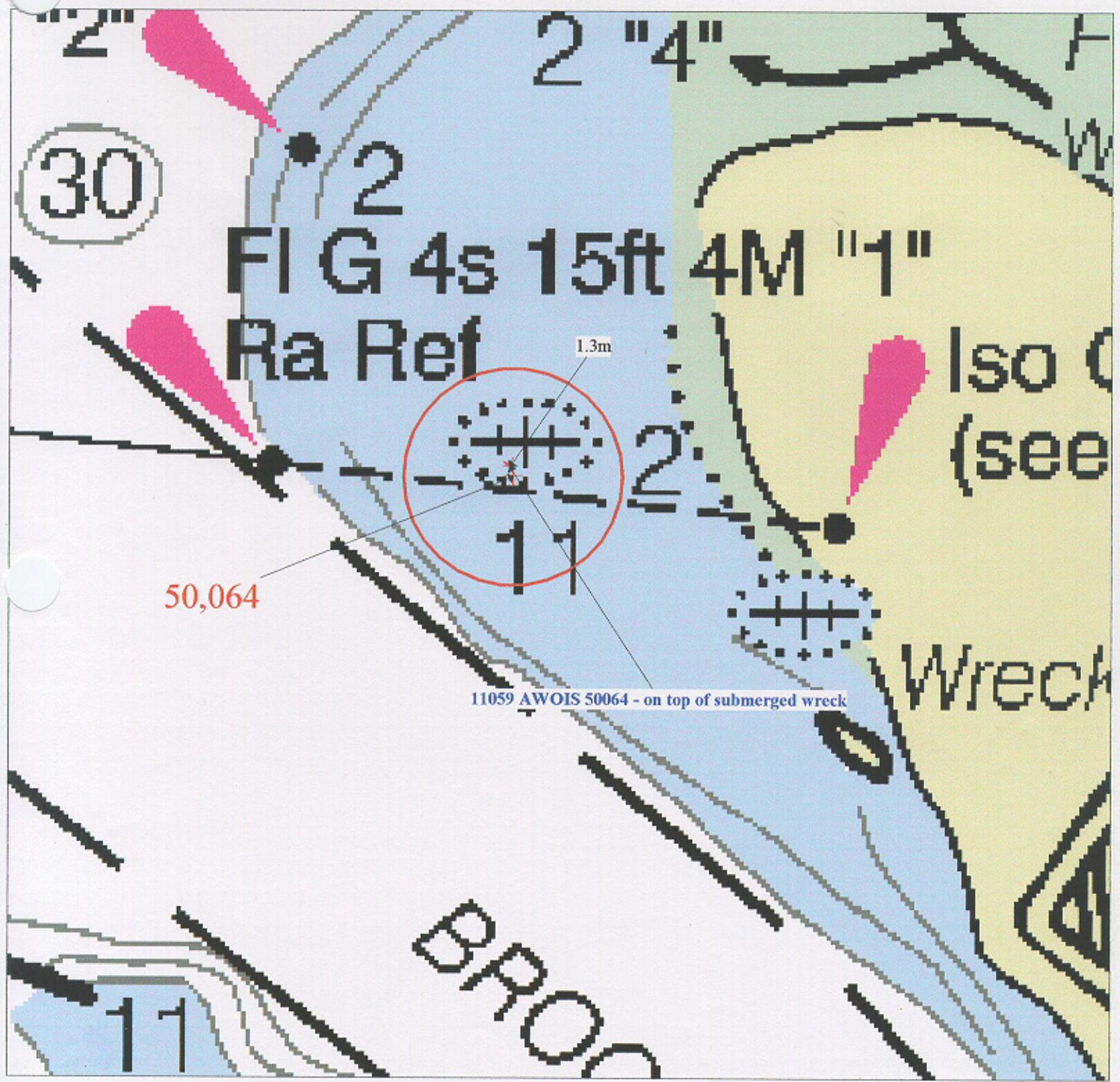
Techniqnote

History HISTORY
UNKNOWN SOURCE--DANGEROUS SUNKEN WK, APPROX. DATE OF SOURCE 1959-61. POSITION
SCALED AT 1:20,000 IN LAT.37-47-02N, LONG.122-15-15W.
H9873/80-81--OPR-L123-PHP; ITEM 19; VISIBLE WRECK UNCOVERS 1FT AT MLLW IN
LAT.37-47-02.89N, LONG.122-15-13.30W. (ENTERED, 1/84, RWD)
NANCI AIR PHOTOT REVISION, 1997; WRECK NOT SEEN, REVISED TO SUBMERGED.

Fieldnote INVESTIGATION
DATE(S): 06/25/01 (DN: 176)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: 1212 TIME: 16:25:28.000
INVESTIGATION METHODS USED: ECHO SOUNDER
SURVEYED POSITION: LAT. 37:47:02.725 LON. 122:15:17.263
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: The wreck was located with echosounder at a depth of 1.6 feet (.5 meters), Fix Number 11059
CHARTING RECOMMENDATION (HYDROGRAPHER): Retain the wreck as charted
EVALUATOR COMMENTS: Do not concur. Remove charted wreck, chart wreck cov 1 foot at latitude 37/47/02.725N, longitude 122/15/17.263W

Proprietary

YEARSUNK NIMANUM



50,064

11059 AWOIS 50064 - on top of submerged wreck

RECRD 50736 VESSLTERMS UNKNOWN CHART 18653 AREA L
CARTOCODE 0370 SNDINGCODE 127 DEPTH 50

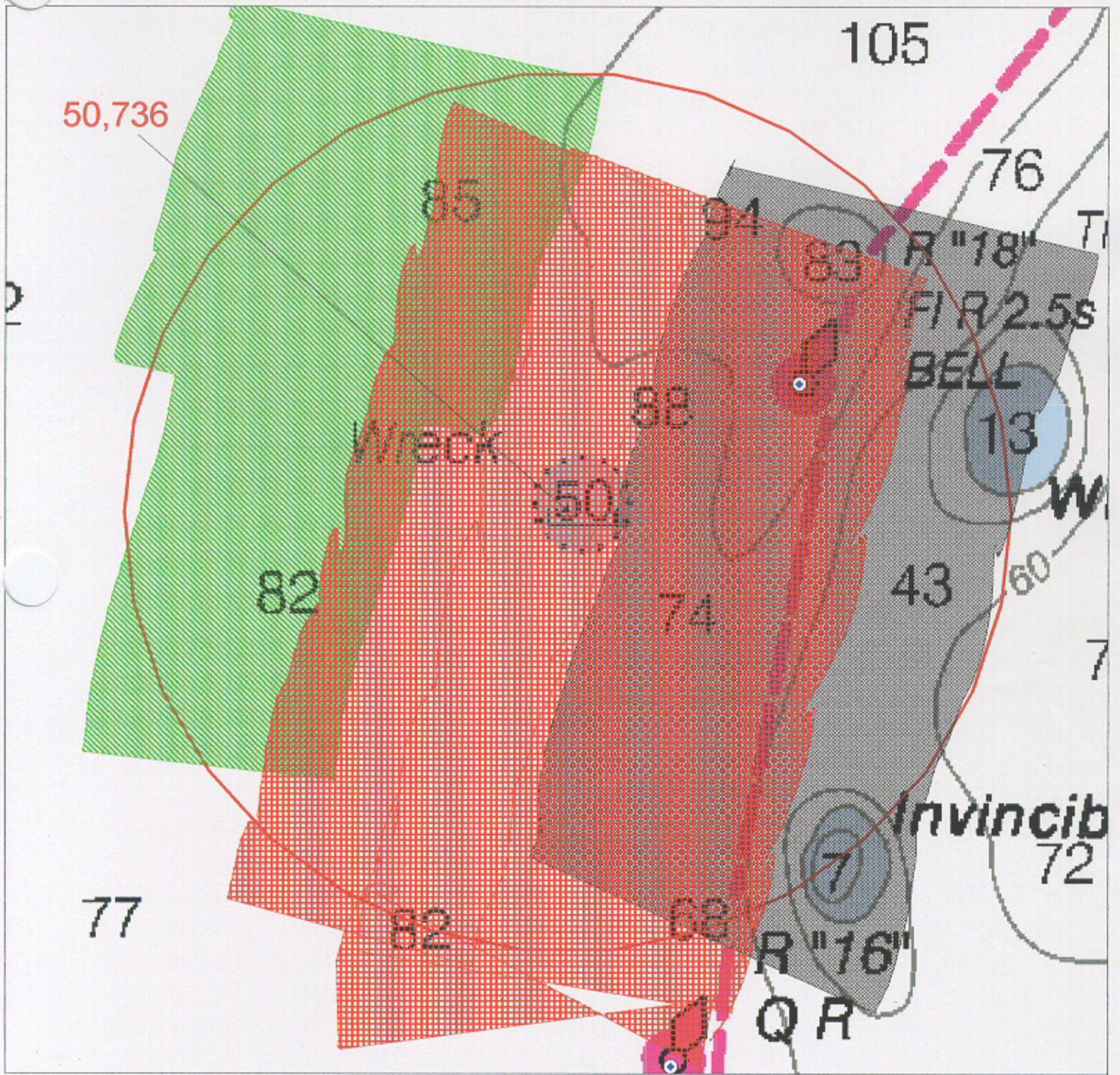
LAT83 37/57/31.72 LONG83 122/26/31.90 NATVDATUM 6
LATDEC: 37.9588111111111 LONDEC: 122.442194444444 GPQUALITY Low
GPSOURCE Scaled

PROJECT OPR-L430 ITEMSTATUS Assigned SEARCHTYPE Full
RADIUS 350 INIT MCR ASSIGNED 3/6/01
TECNIQ S2,ES,BD,DI,SD
Techniqnote SEARCH NOT REQUIRED INSHORE OF THE 60 FT DEPTH CONTOUR

History HISTORY
NM4/52--OIL BARGE SUNK IN LAT.37-57-32N, LONG.122-26-28W IN 85FT OF WATER.
NM15/53--COE; 50FT SWEEP AREA (MLLW) IN LAT 37-57-32N, LONG.122-26-28W (PA).
NOTHING FOUND.
CL346/53--SAME AS NM15/53.
H9811/79--OPR-L123-DA-79; WK NOT INVESTIGATED, NOT COVERED BY MAINSCHEME
HYDROGRAPHY. (UPDATED 2/87 RWD).
FE302/87--OPR-L123-PHP-87; WK NOT INVESTIGATED, PHP INDICATES DIVING TO DANGEROUS, RECOMMENDS SSS.
(UPDATED 8/88 RWD).
H10480/93--SUBM WRECK NOT LOCATED WITH ECHOSOUNDER INVESTIGATION AT 10M NS AND 12M EW
LINESPACING. SSS WAS NOT USED. RECOMMEND RETAIN CHARTED 50FT CLEARANCE DEPTH. (UPDATED 3/95 RWD)

Fieldnote INVESTIGATION
DATE(S): 10/23/01 (DN: 296)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: 1212 TIME: 18:62:45
INVESTIGATION METHODS USED: 200% SIDE SCAN SONAR, ECHO SOUNDER
SURVEYED POSITION: LAT. 37:57:28.92N LON. 122:26:28.59W
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: The wrecked barge was clearly visible on the sonagram (contacts 17612.7s, 17570.3s). The contacts were fully developed; the barge limits were defined and the least depth of 74 feet (22.5 meters) was found at the above location (Pos. No. 17659)
CHARTING RECOMMENDATION (HYDROGRAPHER): Delete the 50-foot submerged wreck charted at latitude 37:57:31.96 N, longitude 122:26:31.52 W. Chart the soundings from this survey.
EVALUATOR COMMENTS: Concur with clarification, delete 50 foot submerged wreck, chart submerged wreck with a least depth of 74 feet at latitude 37:57:28.915N, longitude 122:26:28.500W.

Proprietary YEARSUNK NIMANUM



50,736

105

76

85

94

R "18"

FIR 2.5s

BELL

13

Wreck

88

50

82

74

43

60

Invincib

72

77

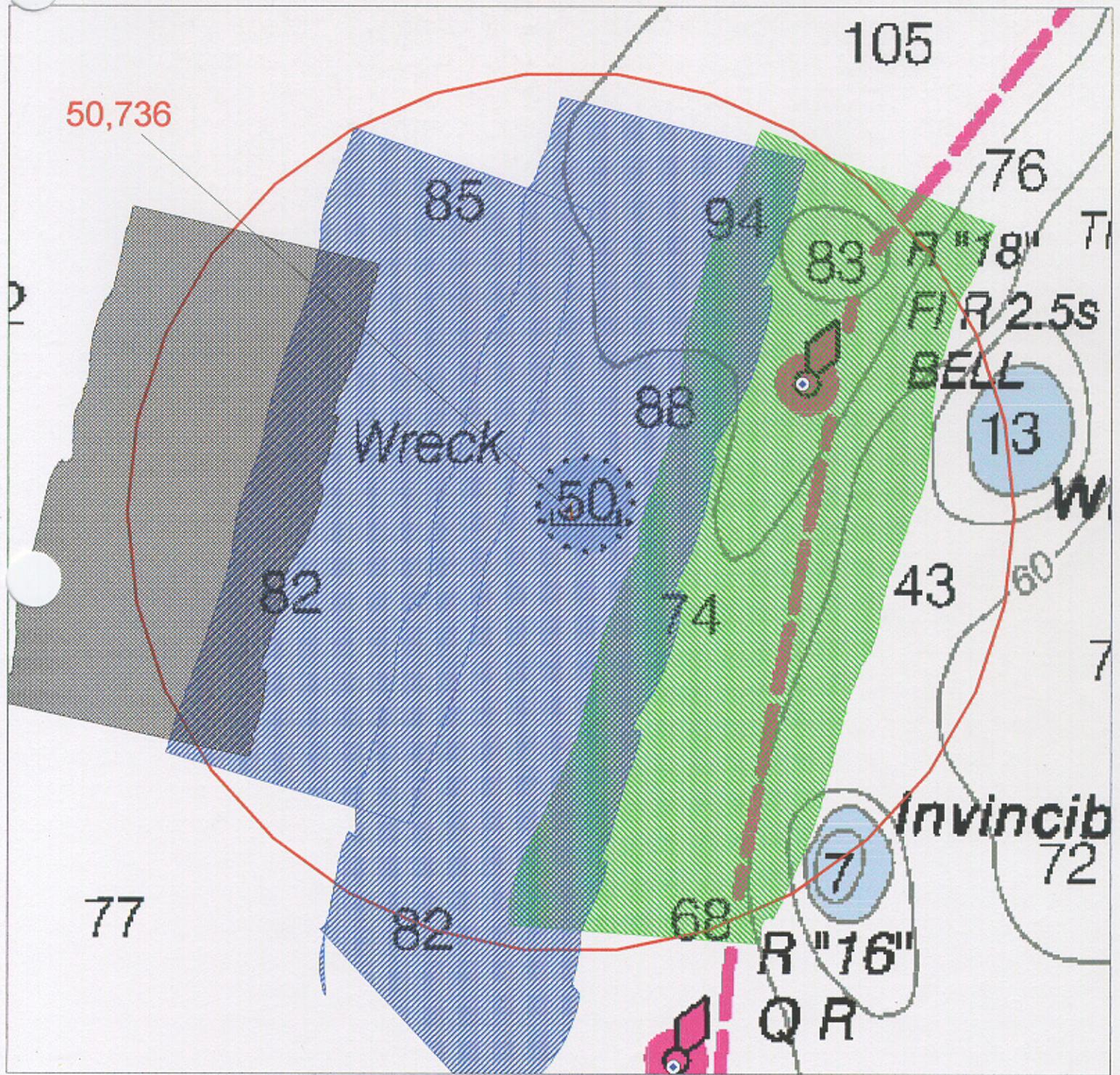
82

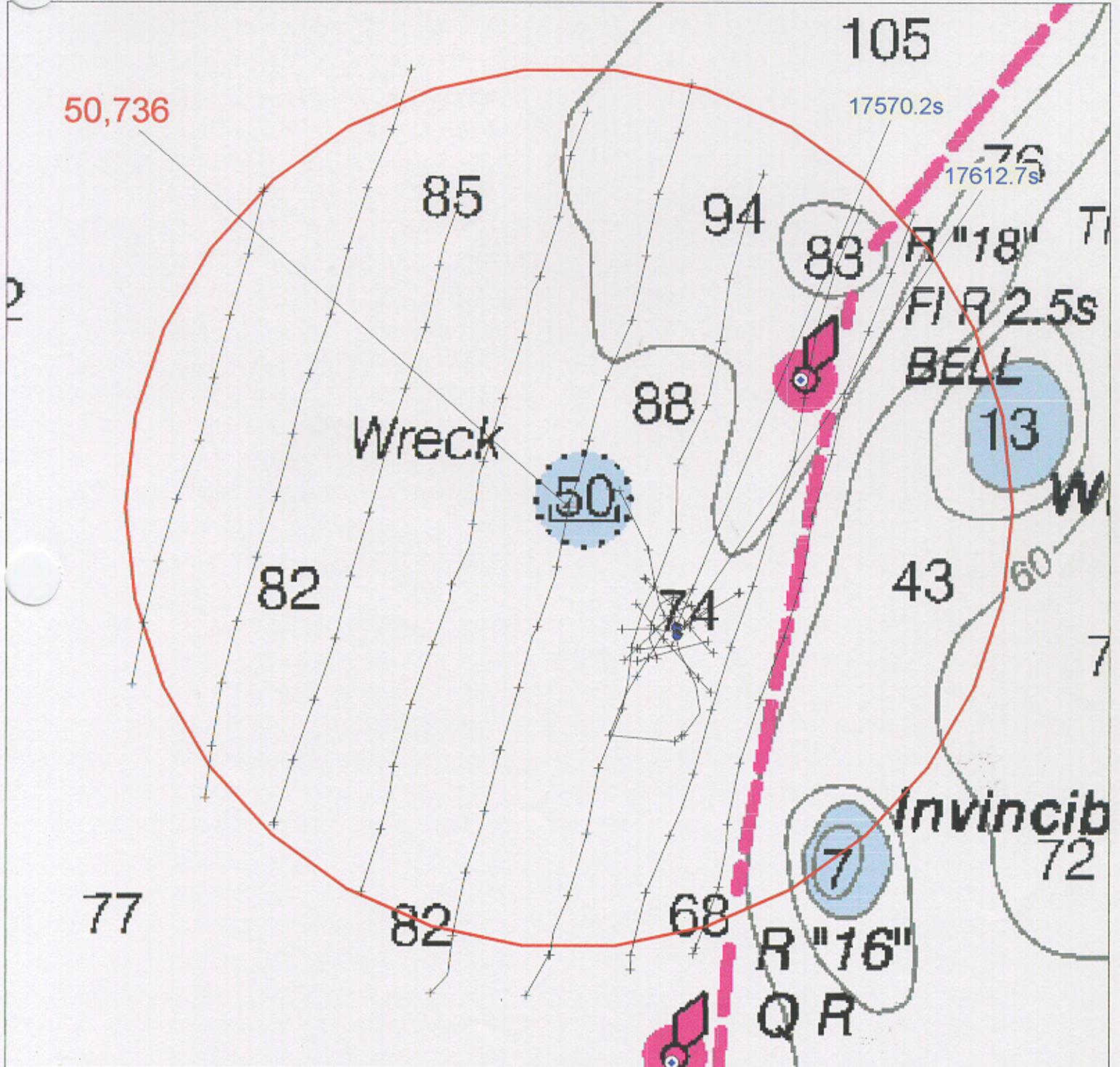
88

R "16"

Q R

7





RECRD VESSLTERMS CHART AREA
CARTOCODE SENDINGCODE DEPTH

LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History

HISTORY
H9794/78--57-61FT DEPTHS EXIST IN VICINITY.
LNM42/85(10/17/85)--12TH CGD; DANG SUBM WK, PA, 26FT SAIL BOAT REPORTED SUNK APPROX 350YDS NORTH OF PIER 39, IN LAT 37-48.5N, LONG 122-24.4W IN 40 FT OF WATER.
LNM50/85(12/12/85)--12TH CGD; GP REVISED TO LAT 37-48-53N, LONG 122-24-39W, NOTICE STATED THAT VESSEL COULD NOT BE LOCATED.
NM2/86--DANG WK PA, IN LAT 37-48-53N, LONG 122-24-39W. (ENTERED 12/86 RWD)
H10456/93--WRECK NOT CONSIDERED DISPROVED WITH 150M RADIUS, 12M ES INVESTIGATION. REVISE PA TO ED. (UPDATED 1/95 RWD).

Fieldnote

INVESTIGATION
DATE(S): 06/26/01, 07/31/01, 08/01/01 (DN: 177, 212, 213)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: 1212 TIME:
INVESTIGATION METHODS USED: 200% SIDE SCAN SONAR, ECHO SOUNDER
SURVEYED POSITION: LAT. 37:48:54.48 N LON. 122:24:40.7 W
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: The only contact observed on the sonargram was an indistinct feature which suggested debris (Contact 11658.0P) This contact, even though insignificant, was fully developed with 5-to-10-meter line spacing; no obstruction was found.
CHARTING RECOMMENDATION (HYDROGRAPHER): Delete the charted wreck; chart the soundings from this survey.
EVALUATOR COMMENTS: Concur

Proprietary

YEARSUNK

NIMANUM

76

51,154

11658.0P

74

61

46

ED

55

2"

Priv Bkw Lts

38

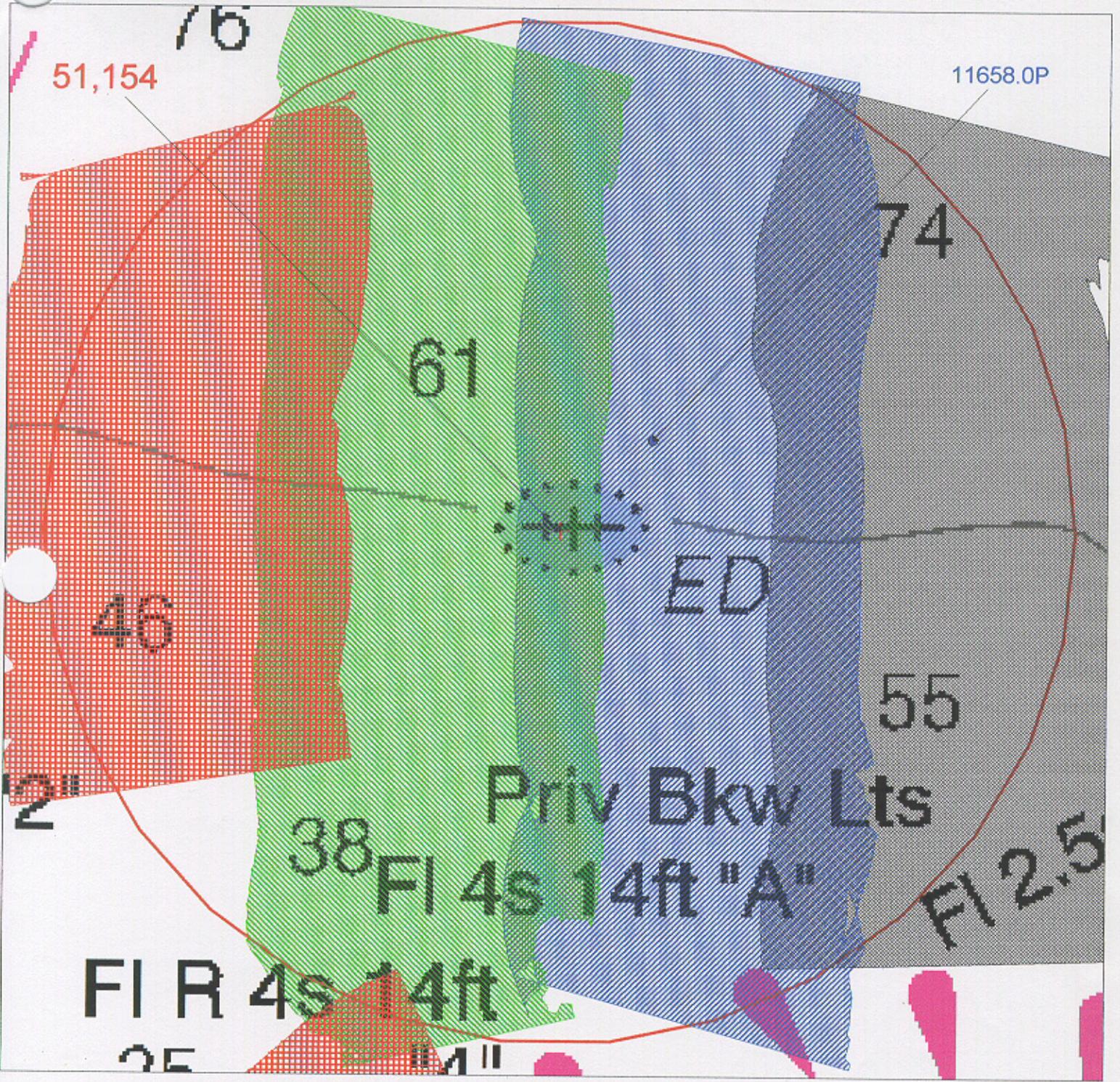
FI 4s 14ft "A"

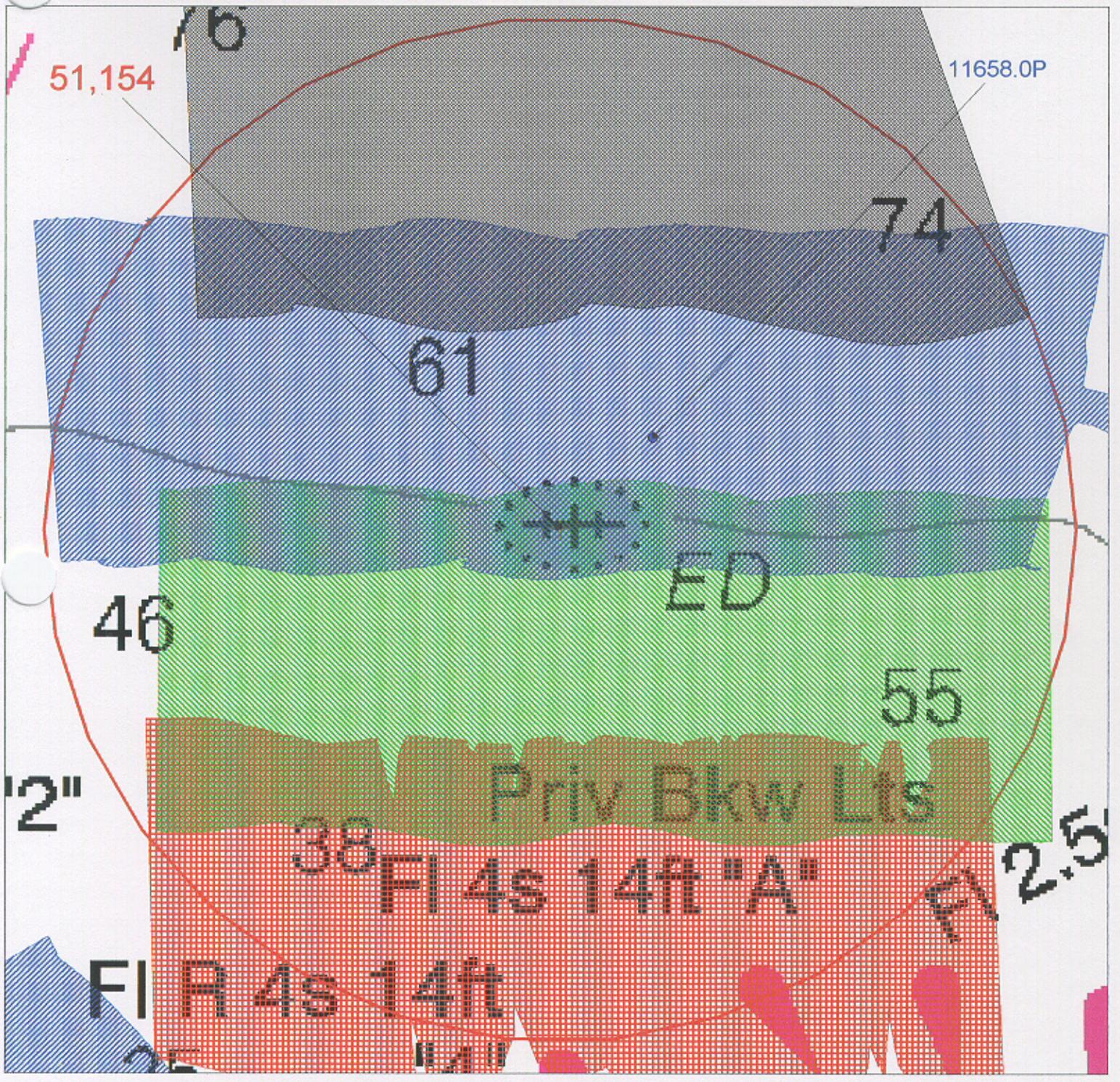
FI 2.5

FI R 4s 14ft

25

14"





51,154

11658.0P

76

74

61

ED

46

55

Priv Bkw Lts

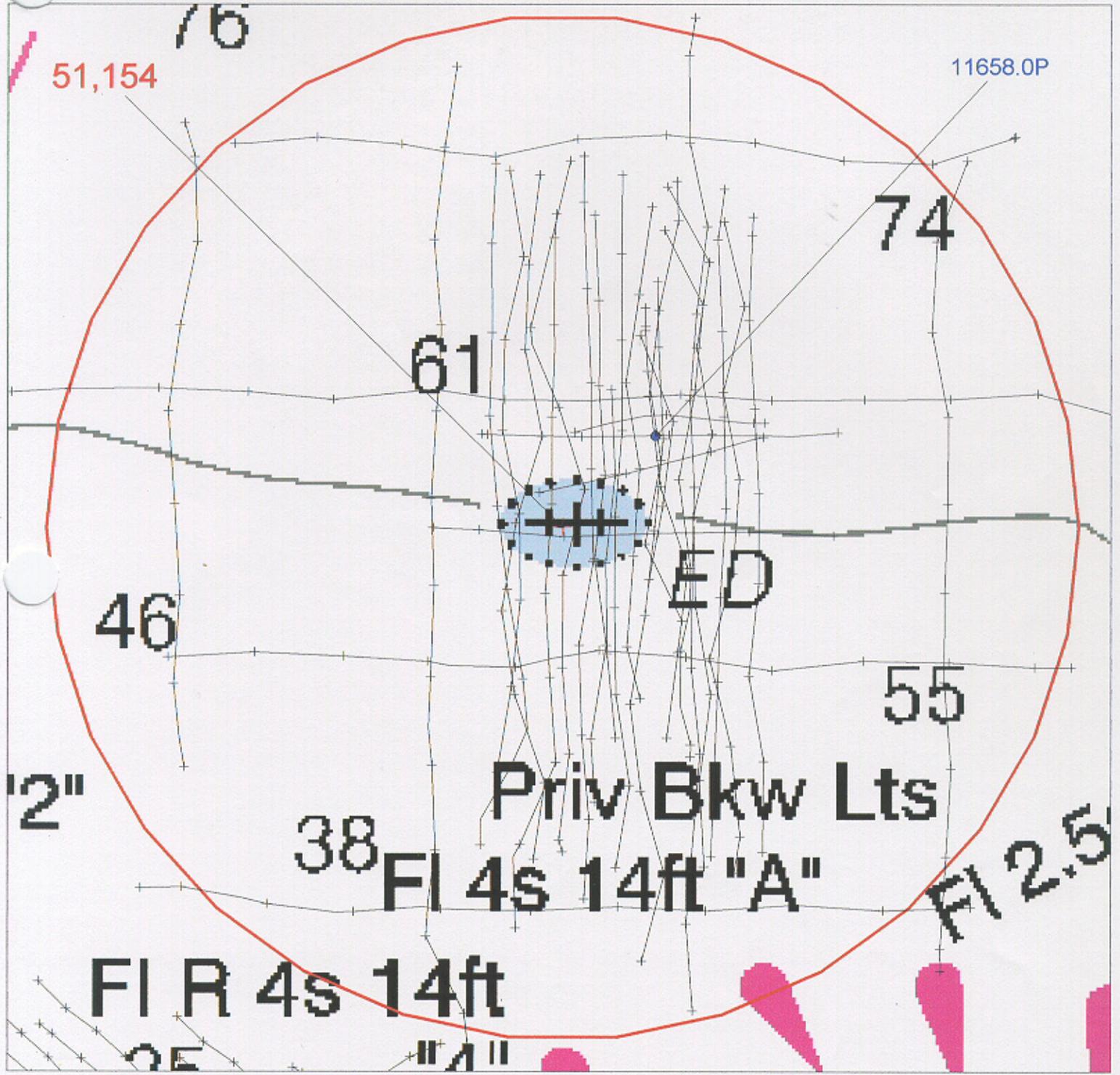
38

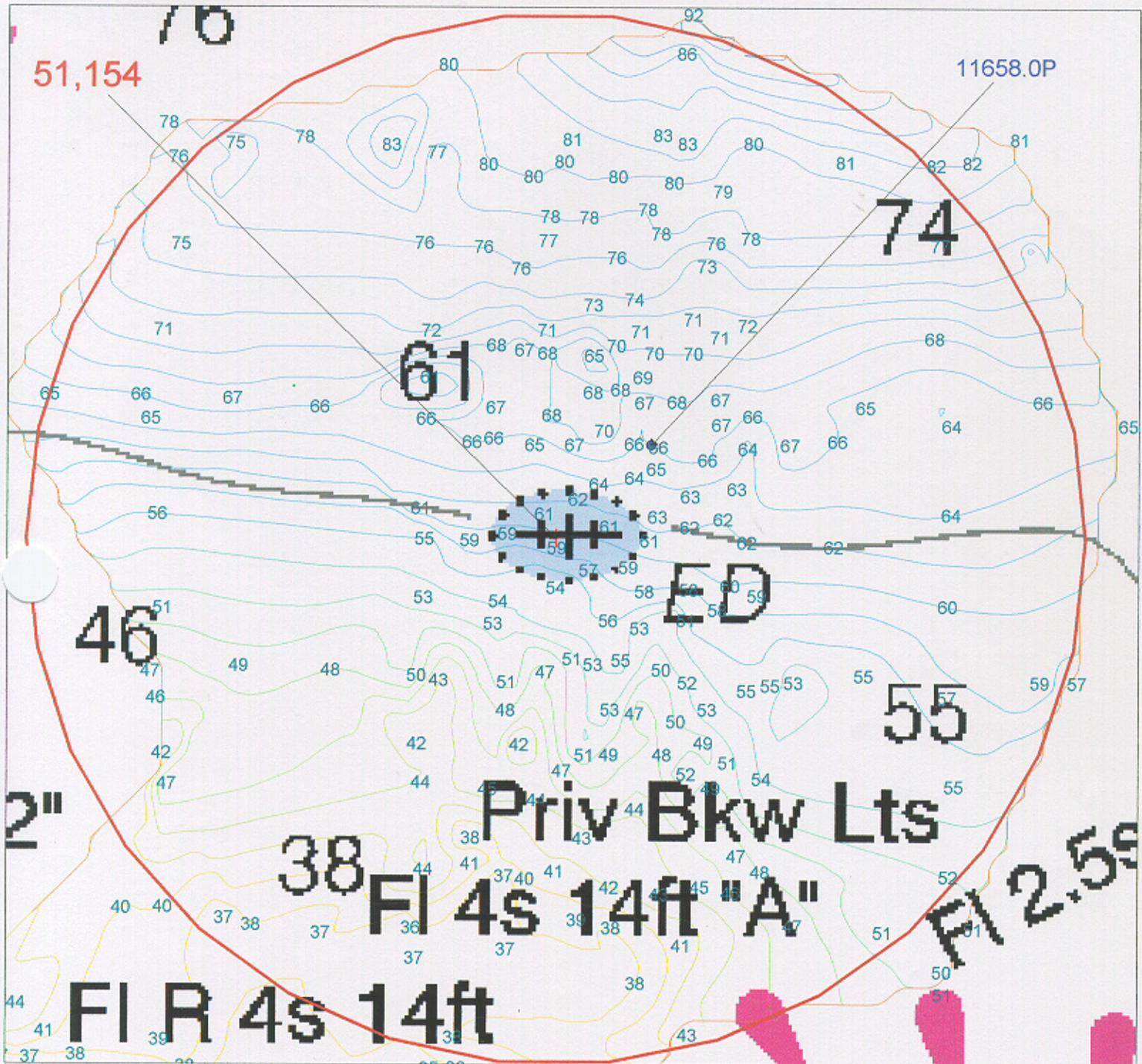
FI 4s 14ft "A"

FI 2.5

FI R 4s 14ft

2"





51,154

11658.0P

74

61

ED

46

55

38

Priv Bkw Lts

FI 4s 14ft "A"

FI 2.59

FI R 4s 14ft

RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

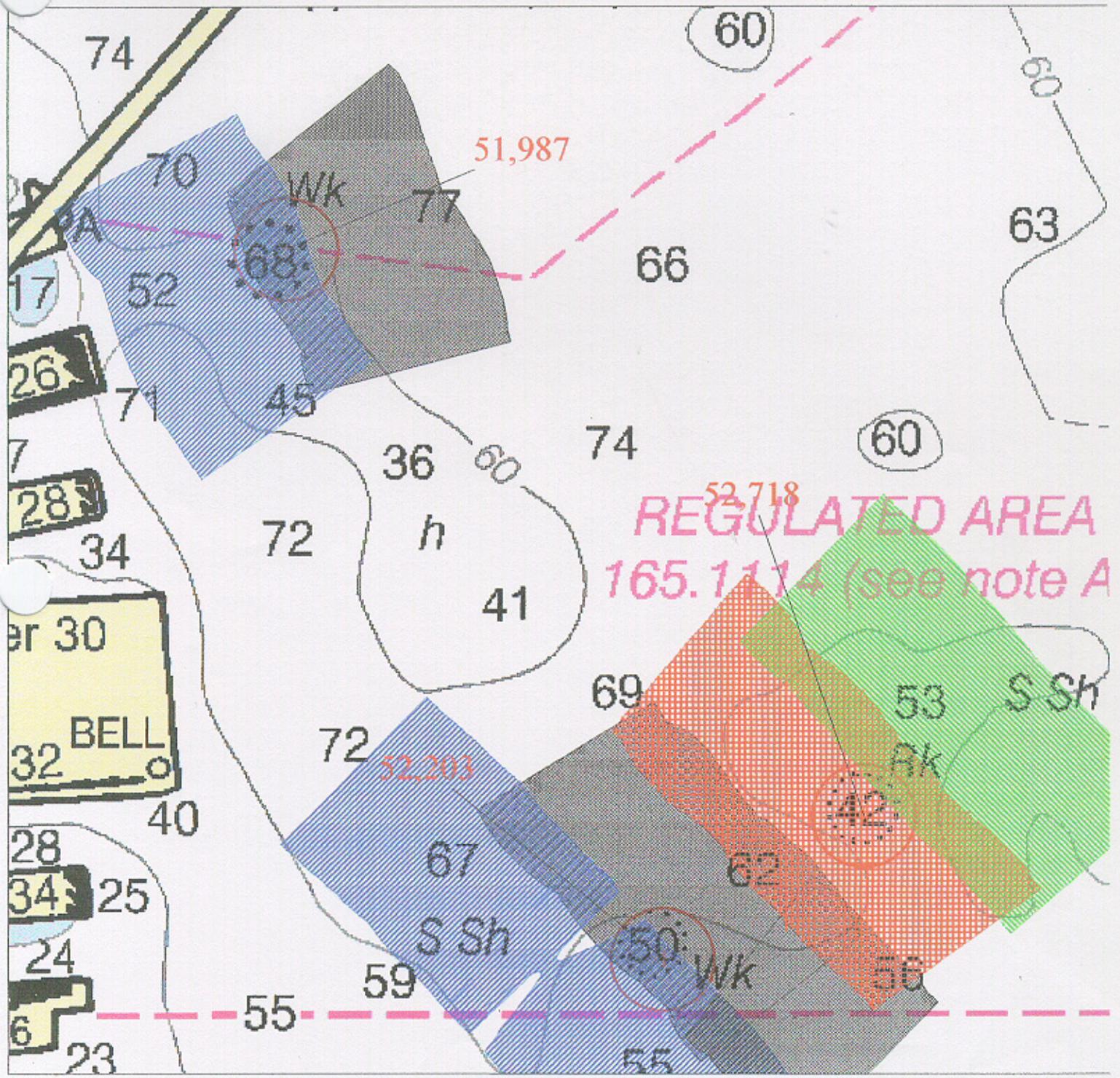
PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ
Techniqnote

History HISTORY
H9844/79-81--47-75FT DEPTHS EXIST IN VICINITY.
LNM21/90(5/21/90)--11TH CGD; DANG. SUBM WK (ACCOMMODATION BARGE) REPORTED (PA), SUNK IN LAT 37-47-24N,
LONG 122-22-54W(NAD83). (ENTERED 11/92 RWD)
H10456/93--DANG WRECK (SUBM 20.7M(68FT) AT MLLW), 12M ES INVESTIGATION ON AN APPROX 12X25M BARGE,
POSITION GIVEN IN LAT 37-47-26.18N, LONG 122-22-59.01W. (UPDATED 1/95 RWD)

Fieldnote INVESTIGATION
DATE(S): 06/26/01, 07/03/01, 08/01/01 (DN: 177, 184, 213)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: 1212 TIME:
INVESTIGATION METHODS USED: 200% SIDE SCAN SONAR, ECHO SOUNDER
SURVEYED POSITION: LAT. 37:47:27.227 LON. 122:22:59.212, position number 13628/2
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: On DN 177 the wreck was located with 200% side scan sonar. (Contacts 11761.1p, 11782p, 11760.9p) The wreck which is now in two pieces was fully developed at 5-to-10-meter line spacing and a least depth of 71 feet was located at the above position. The wreck lies against a shoal which was also developed to 5-to-10-meter line spacing; the shoal has a least depth of 50 feet located at latitude 37:47:24.80, longitude 122:23:02.110.
CHARTING RECOMMENDATION (HYDROGRAPHER): Delete the dangerous wreck symbol; chart a submerged wreck at the surveyed location and chart the soundings from this survey.
EVALUATOR COMMENTS: Concur with clarification, chart a submerged wreck with a least depth of 71 feet. Least depth on the shoal ranges from 46 to 50 feet at MLLW. Chart area according to the smooth sheet.

Proprietary

YEARSUNK NIMANUM



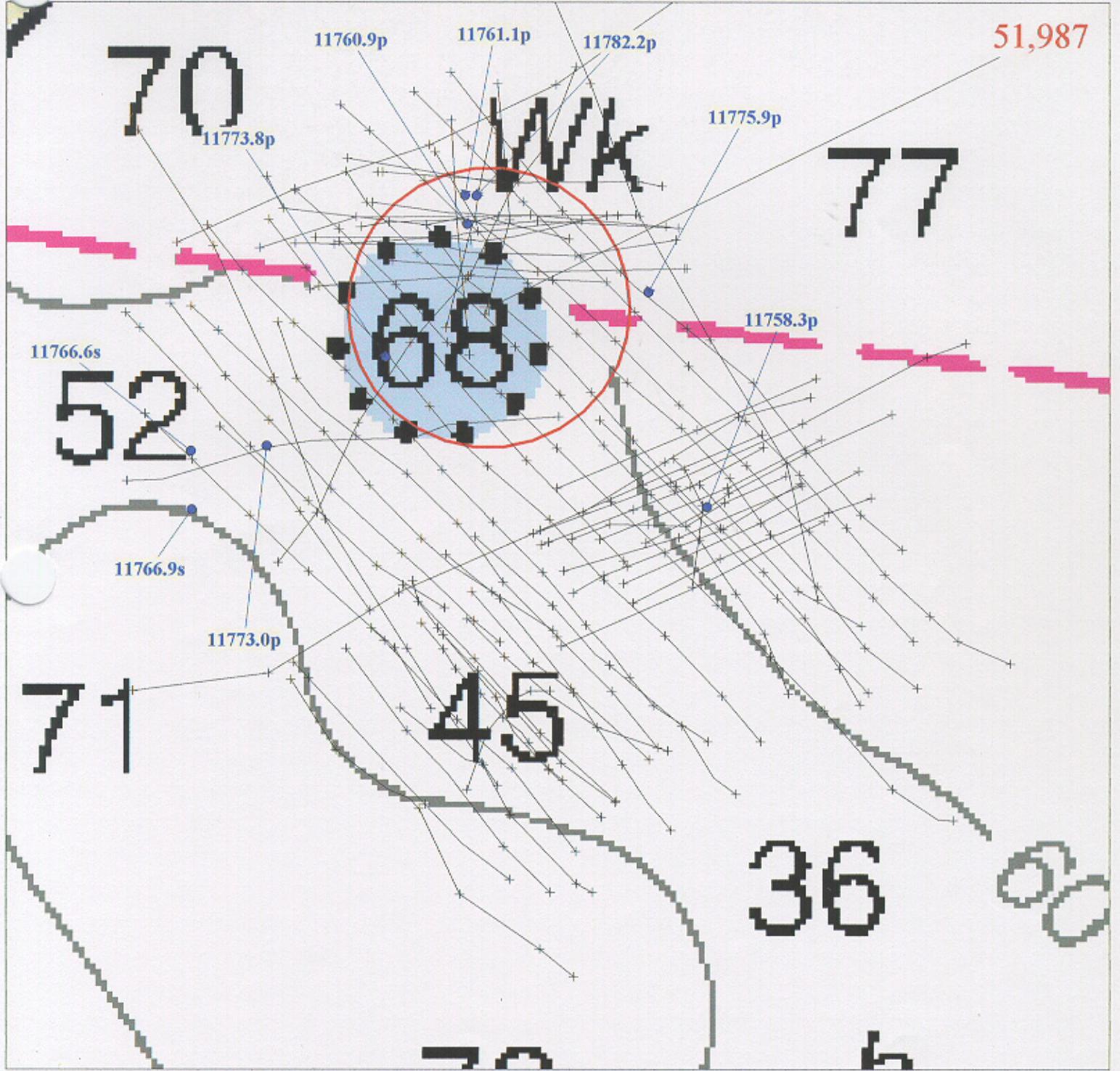
REGULATED AREA
165.1114 (see note A)

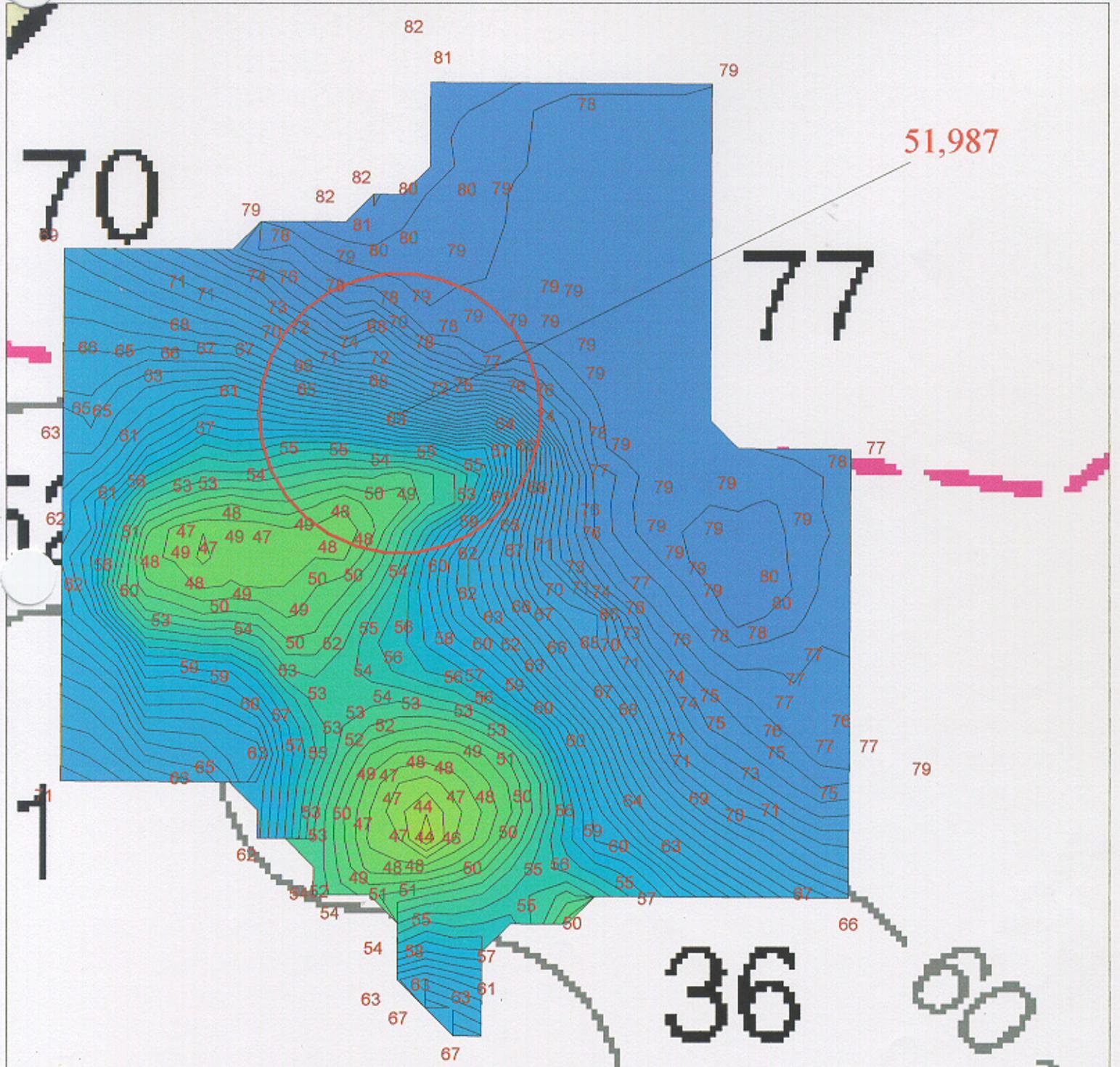
51,987

52,718

52,203

er 30
BELL





82

81

79

51,987

70

77

36

80

67

66

79

77

76

75

74

73

72

71

70

69

68

67

66

65

64

63

62

61

60

59

58

57

56

55

54

53

52

51

50

49

48

47

46

45

44

43

42

41

40

39

38

37

36

35

34

33

32

31

30

29

28

27

26

25

24

23

22

21

20

19

18

17

16

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

0

-1

-2

-3

-4

-5

-6

-7

-8

-9

-10

-11

-12

-13

-14

-15

-16

-17

-18

-19

-20

-21

-22

-23

-24

-25

-26

-27

-28

-29

-30

-31

-32

-33

-34

-35

-36

-37

-38

-39

-40

-41

-42

-43

-44

-45

-46

-47

-48

-49

-50

-51

-52

-53

-54

-55

-56

-57

-58

-59

-60

-61

-62

-63

-64

-65

-66

-67

-68

-69

-70

-71

-72

-73

-74

-75

-76

-77

-78

-79

-80

-81

-82

-83

-84

-85

-86

-87

-88

-89

-90

-91

-92

-93

-94

-95

-96

-97

-98

-99

-100

RECRD VESSLTERMS CHART AREA
CARTOCODE SENDINGCODE DEPTH

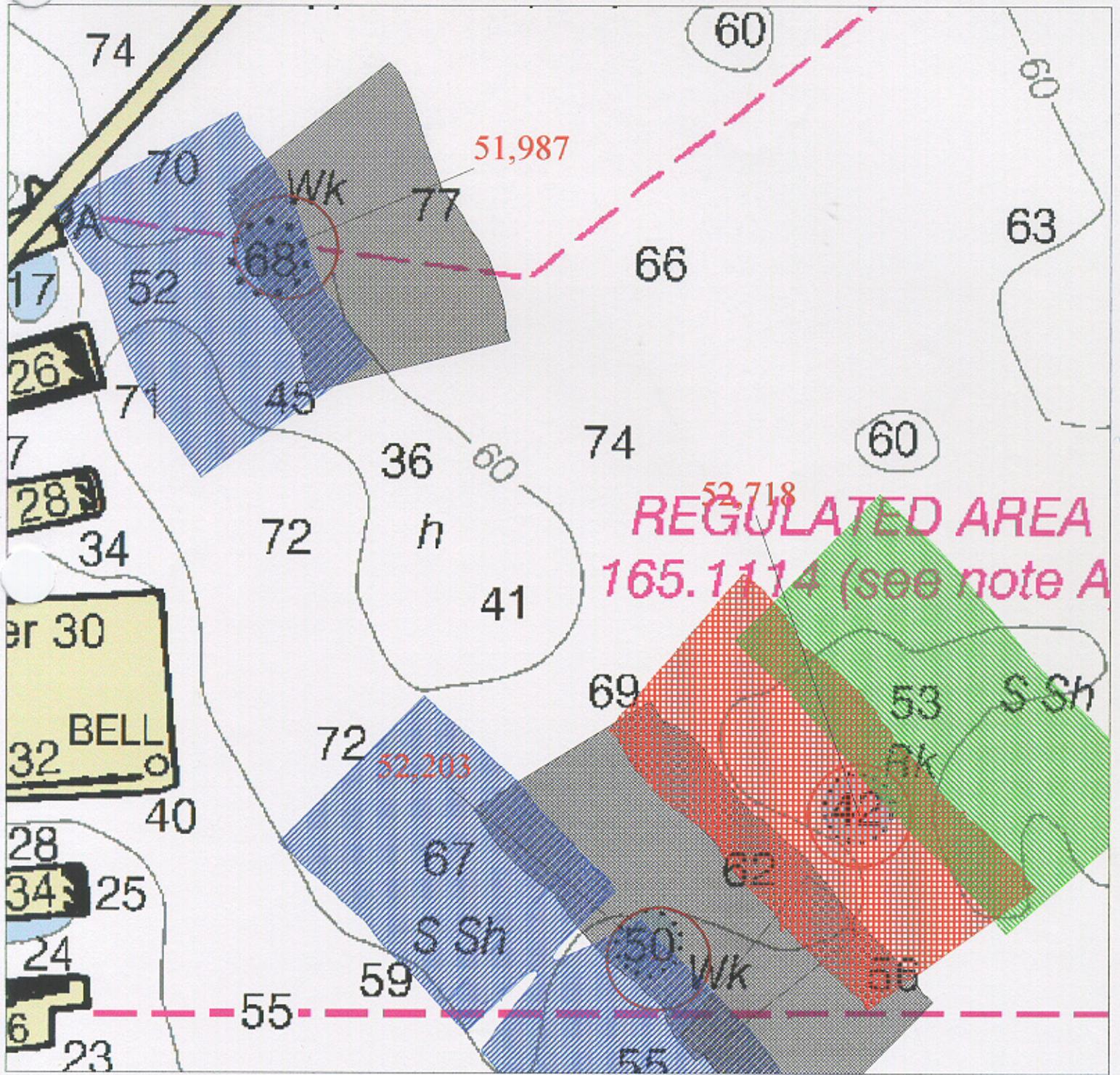
LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ
Techniqnote

History HISTORY
H10494/93--DANG WRECK (SUBM 15.2M (50FT) AT MLLW), WAS LOCATED WITH ES/SS. POSITION GIVEN IN LAT 37-47-03.77N, LONG 122-22-44.2W. WRECK WAS FOUND WHILE LOOKING FOR AWOIS ITEM 51988. (UPDATED 3/95 RWD)

Fieldnote INVESTIGATION
DATE(S): 06/26/01, 07/03/01, 08/01/01 (DN: 177, 184, 213)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: 1212 TIME:
INVESTIGATION METHODS USED: 200% SIDE SCAN SONAR, ECHO SOUNDER (2.5-to-5-meter line spacing)
SURVEYED POSITION: LAT. 37:47:03.912 LON. 122:22:45.048
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: The wreck was located with Side Scan Sonar on DN 177; nine contacts were recorded and fully developed with echo sounder. The wreck as defined by hydrography is approximately 375 feet long and is oriented SW/NE. Least depth is 48 feet located at the above position.
CHARTING RECOMMENDATION (HYDROGRAPHER): Retain the charted wreck; chart the least depth from the current survey.
EVALUATOR COMMENTS: Concur with clarification, remove charted wreck and chart submerged wreck with a least depth of 49 feet a latitude 37/47/03.785N, longitude 122/22/44.721W.

Proprietary
YEARSUNK NIMANUM



RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

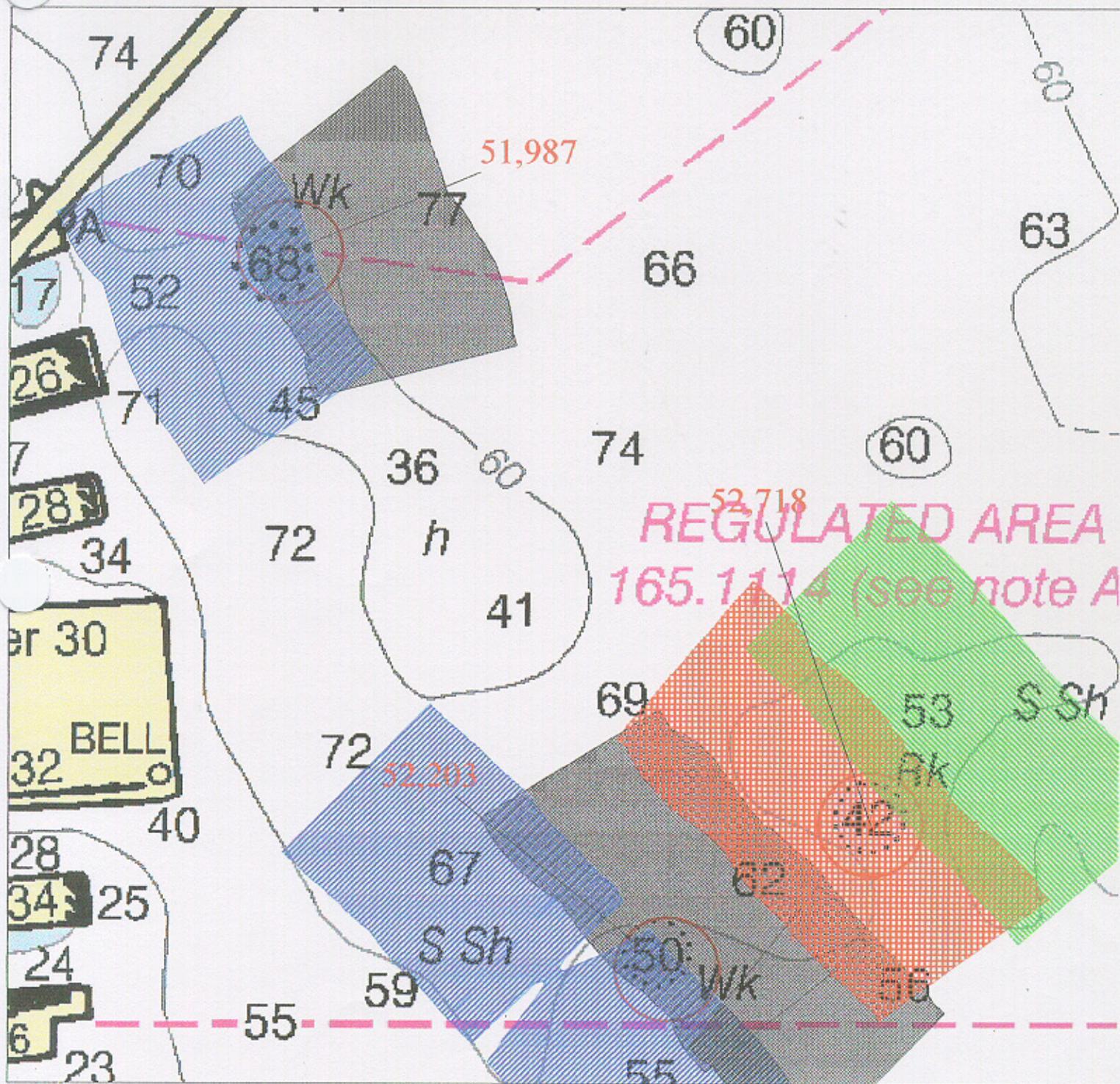
LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ
Techniqnote

History HISTORY
H10494/93-- ROCK WITH A ECHO SOUNDER LEAST DEPTH OF 13M (42 FT) WAS LOCATED IN LAT 37 47 08.32N, LONG 122 22 36.27W.

Fieldnote INVESTIGATION
DATE(S): 06/26/01, 07/03/01, 08/01/01 (DN: 177, 184, 213)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: 1212 TIME:
INVESTIGATION METHODS USED: 200% SIDE SCAN SONAR, ECHO SOUNDER (2-to-5-meter line spacing)
SURVEYED POSITION: LAT. 37:47:07.248 N LON. 122:22:34.537 W , Pos. No. 13895
LAT. 37:47:09.266 N LON. 122:22:36.715 W, Pos. No. 13863/1
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: The diameter of the 43-foot contour at the top of the rock is approximately 100 meters at its greatest. The charted least depth of 43 feet was confirmed at the above two positions.
CHARTING RECOMMENDATION (HYDROGRAPHER): Retain the rock as charted
EVALUATOR COMMENTS: Concur with clarification, delete charted 42 Rk at latitude 37/47/08.62N, longitude 122/22/36.32W. Chart rock with a least depth of 43 at latitude 37/47/7.248N, longitude 122/22/34.537W. See smooth sheet for depiction of the area.

Proprietary
YEARSUNK NIMANUM



74

60

51,987

70

Wk

77

63

66

17

52

68

26

71

45

36

74

60

28

34

72

h

52,718

REGULATED AREA
165,114 (see note A)

41

er 30
32 BELL

69

53

S Sh

72

52,203

Rk

42

28
34 25

67

S Sh

62

24
6

25

50

Wk

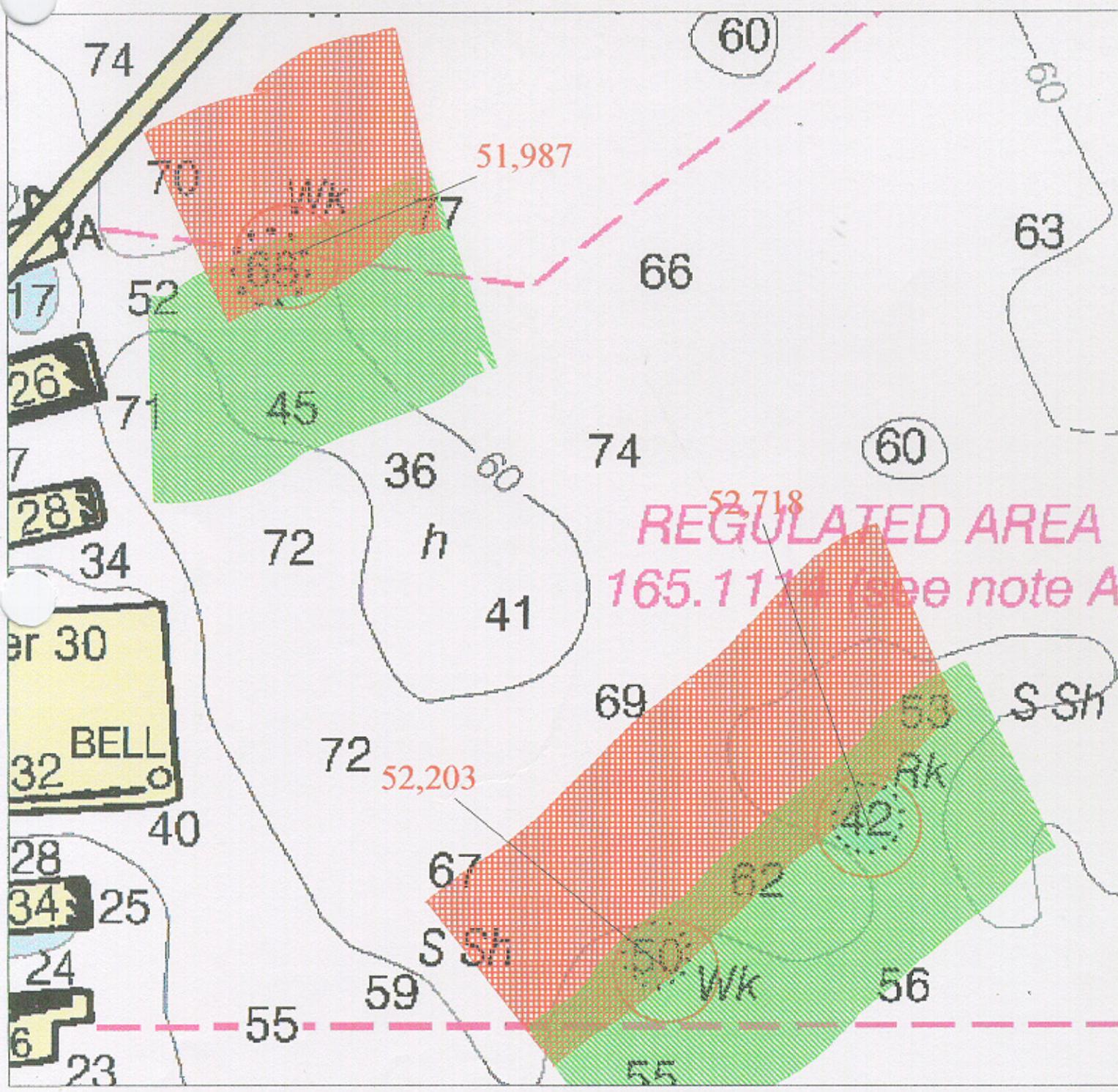
56

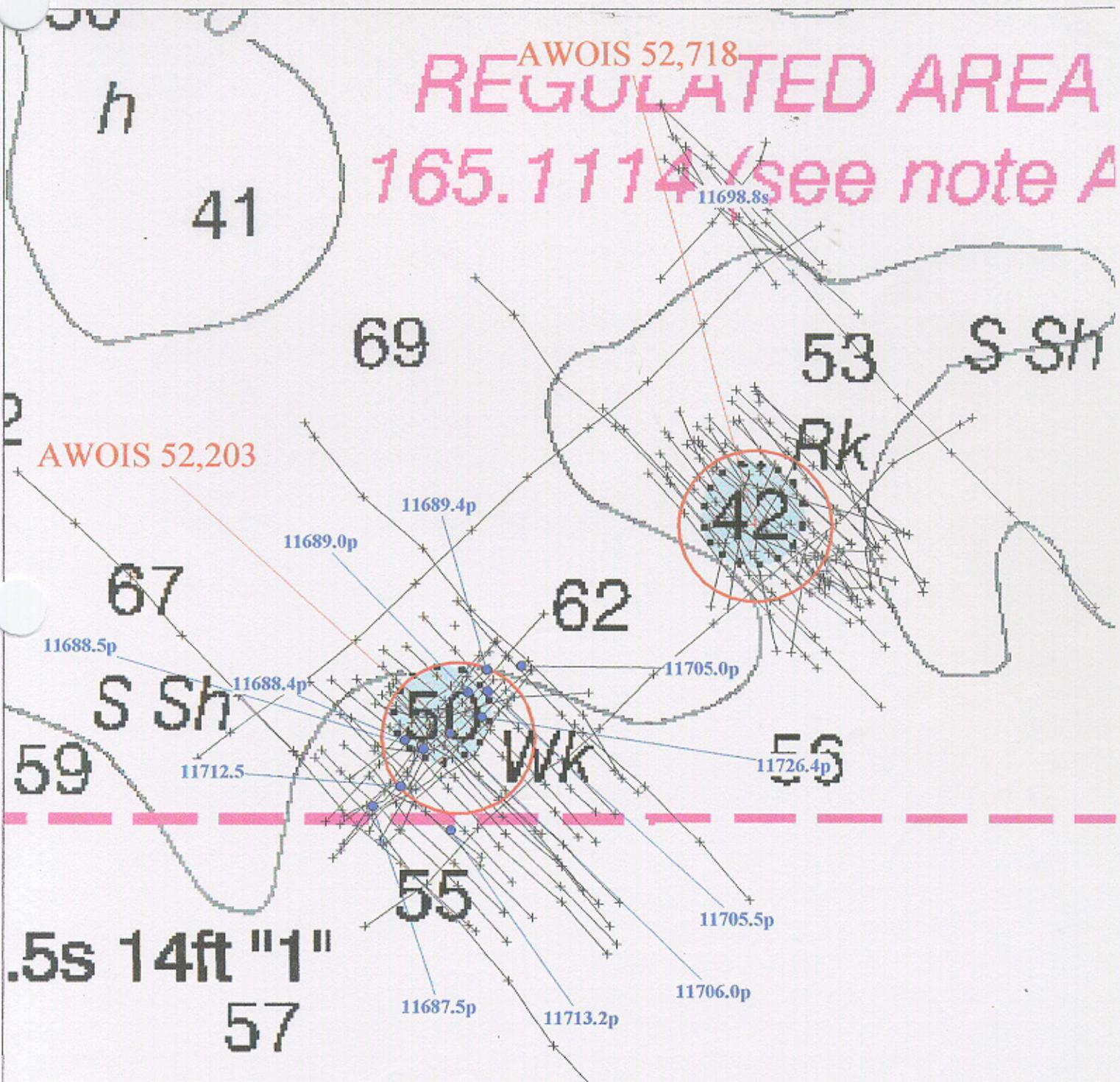
55

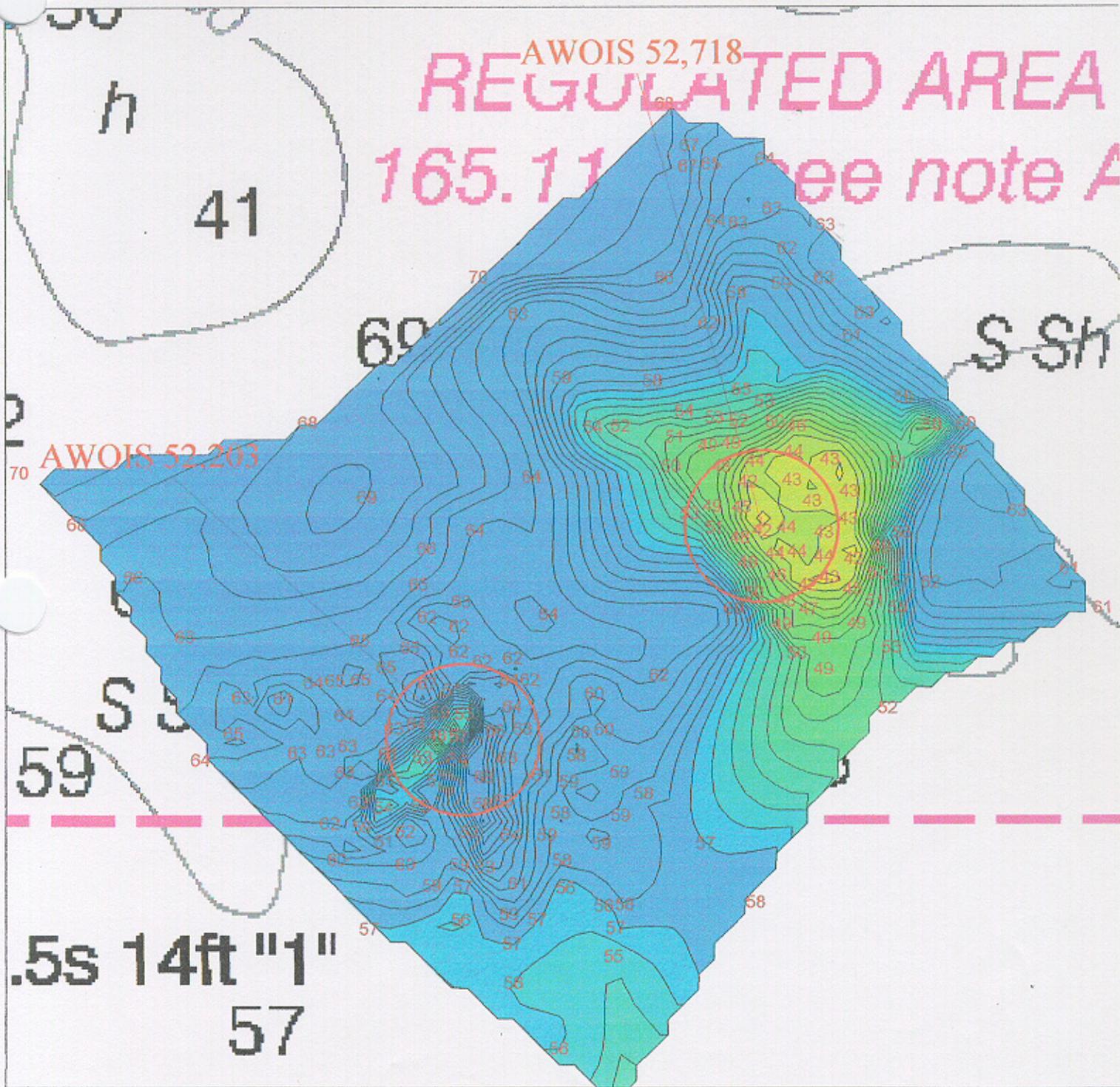
59

55

23







RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

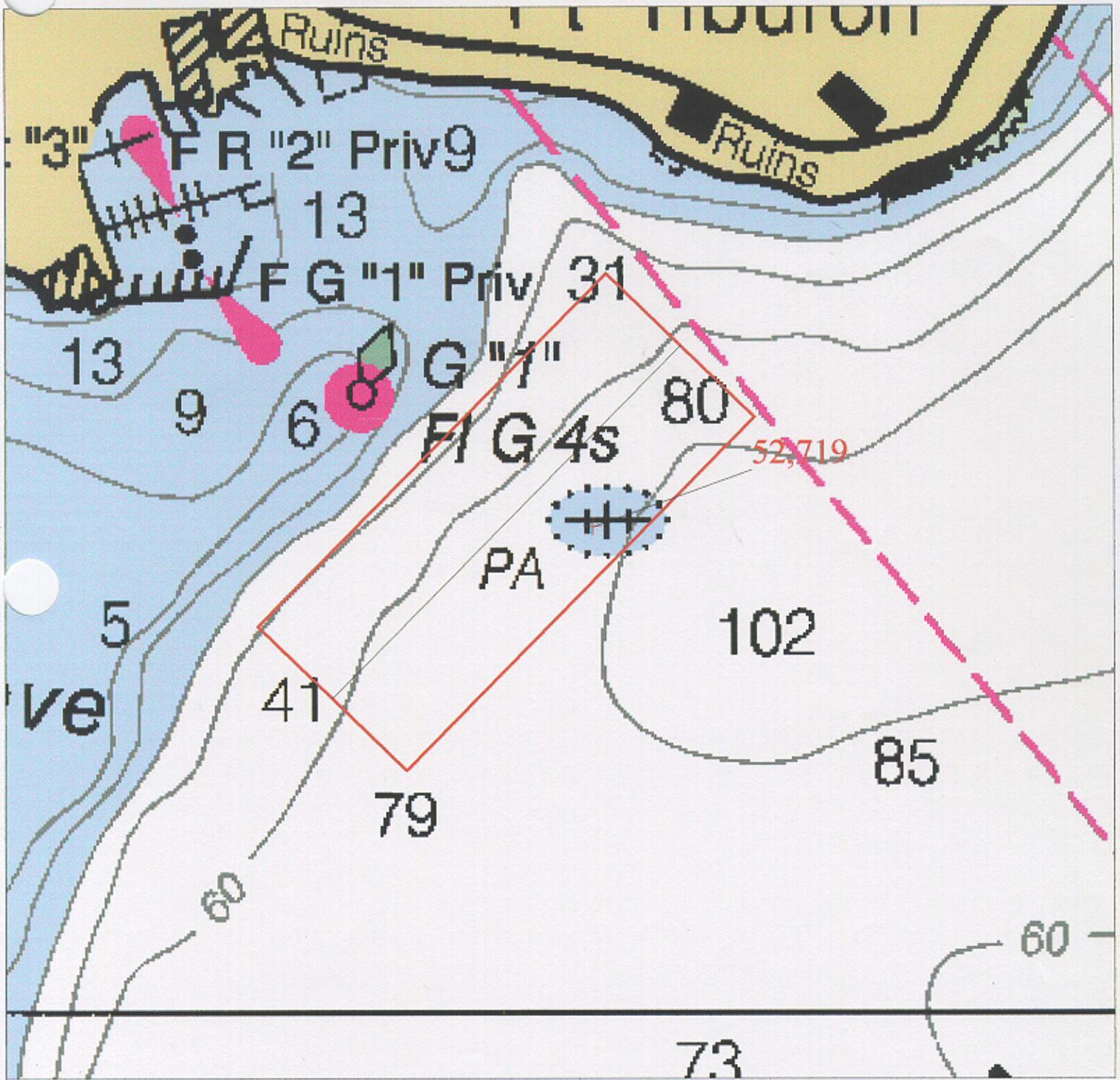
PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History HISTORY
LNM36/83--12TH GGD, 9/9/83; THE M/V SHADOW SUNK IN 60 FT OF WATER 300 YARDS OFF THE CORINTHIAN YACHT CLUB MARINA. A DREDGING PIPE THE SHADOW WAS WORKING WITH SUNK IN THE SAME POSITION.

Fieldnote INVESTIGATION
DATE(S): // (DN:)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: TIME:
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER)
SURVEYED POSITION: LAT. LON.
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: Located in 80 feet of water with ebb strong current - not investigated.
CHARTING RECOMMENDATION (HYDROGRAPHER):
EVALUATOR COMMENTS: Retain as charted.

Proprietary
YEARSUNK NIMANUM



RECRD VESSLTERMS CHART AREA
CARTOCODE SENDINGCODE DEPTH

LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

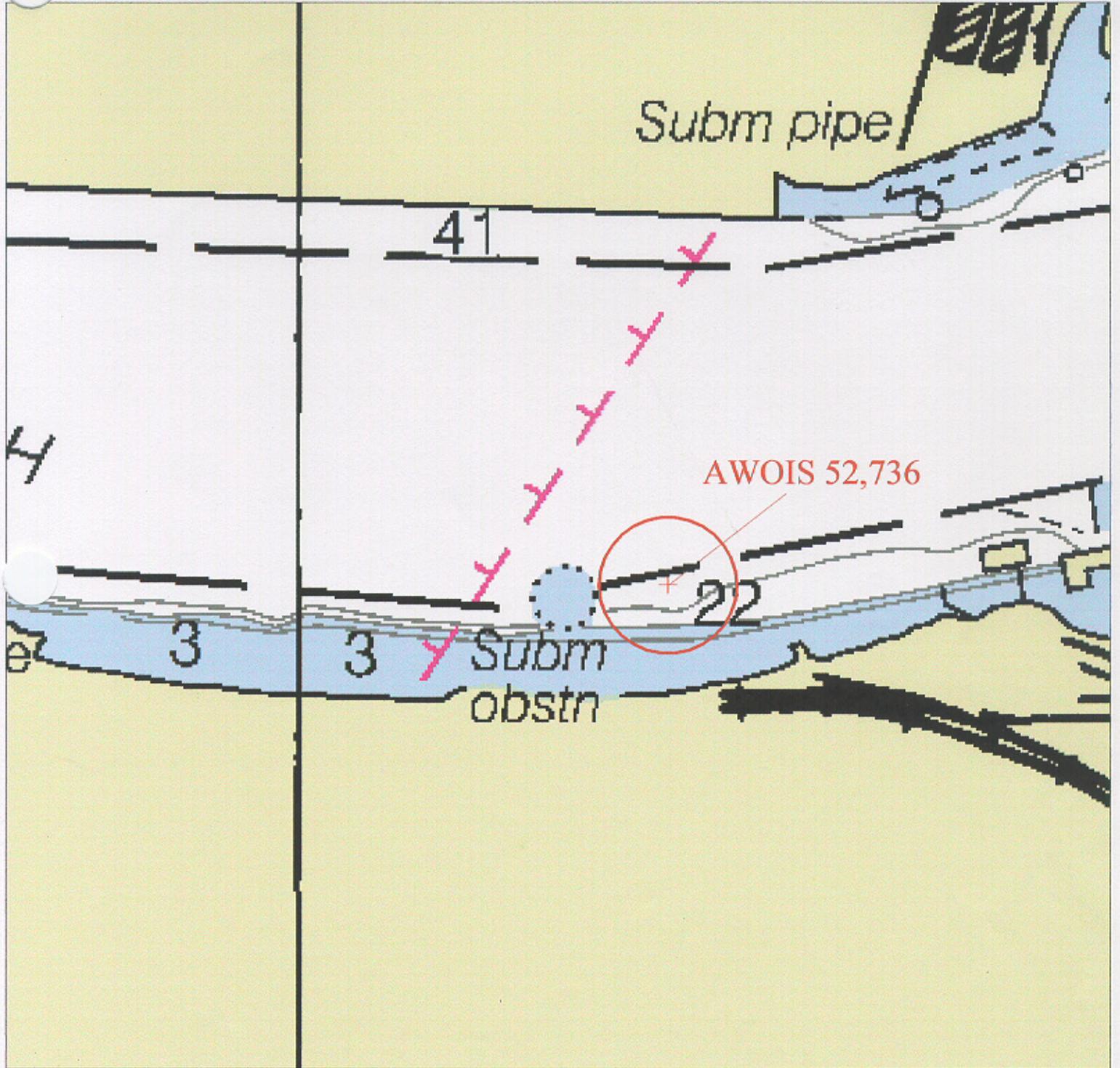
Techniqnote

History **HISTORY**
F00310/1987; PHP-5-1-87; DURING A BOTTOM DRAG INVESTIGATION TO LOCATE PIER RUINS A HANG OCCURRED ON A UNKNOWN OBSTRUCTION IN 37 47 27.60N, 122 17 48.91W AND DIVER INVESTIGATED FOR LEAST DEPTH. AN ERROR IN PROCESSING THE DATA PREVENTED LEAST DEPTH INFORMATION TO BE RECORDED.

Fieldnote **INVESTIGATION:**
DATE(S): // (DN:)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: TIME:
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER)
SURVEYED POSITION: LAT. LON.
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: Not investigated. Area under construction. Navigation Manager Mike Gallagher following up with Port of Oakland for next edition of chart.
CHARTING RECOMMENDATION (HYDROGRAPHER):
EVALUATOR COMMENTS: Retain as charted

Proprietary

YEARSUNK NIMANUM



RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

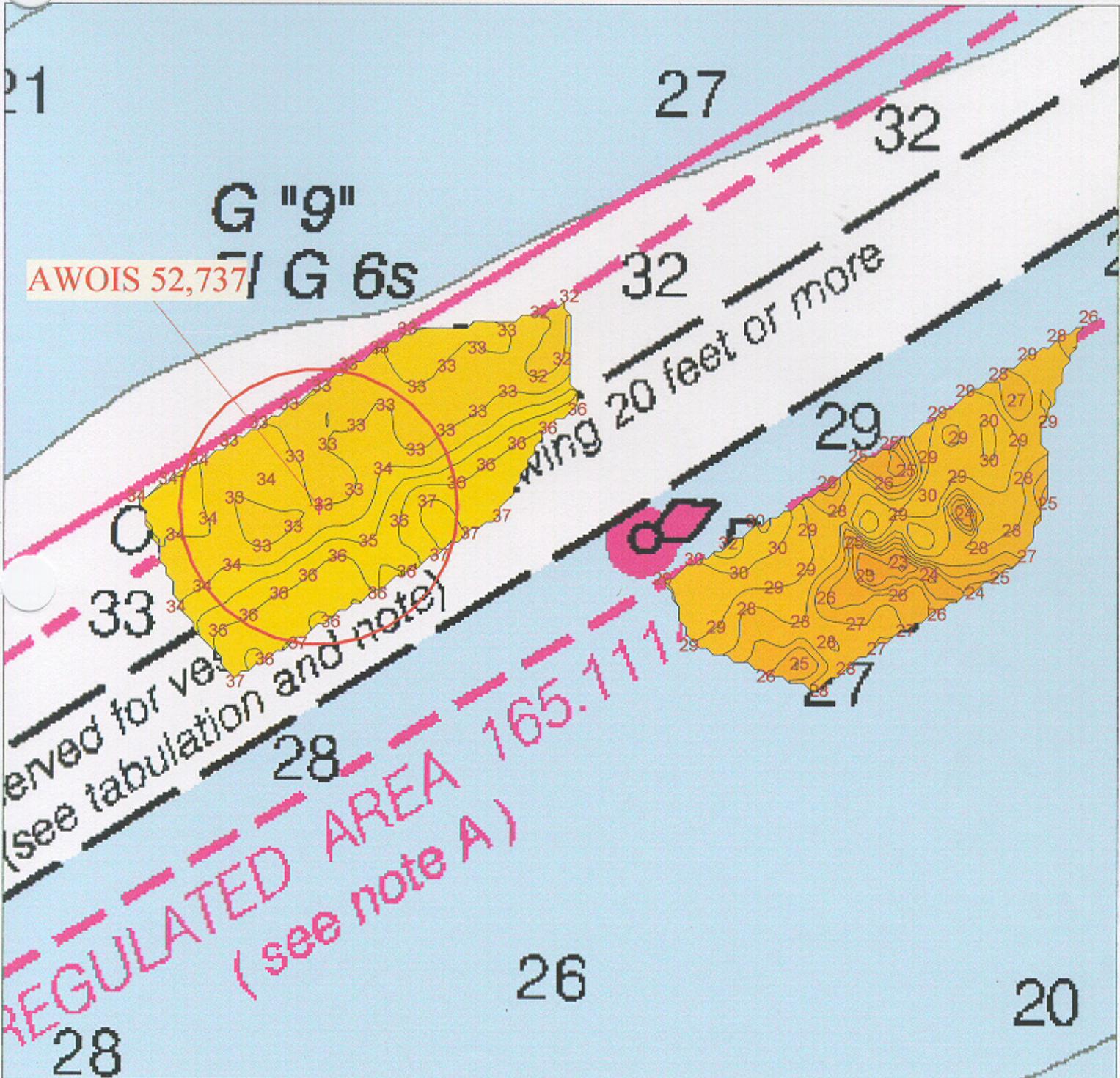
PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History HISTORY
LNM29/91--11TH CGD, 7/15/91; A SUBMERGED PILING HAS BEEN LOCATED IN THE VICINITY OF SAN PABLO BAY CH LIGHTED BUOY 10. THE BUOY HAS BEEN RESET INSIDE THE CHANNEL LINE APPROX. 40 YDS AT 270 DEG T FROM THE PILING IN POS. 38 02 22.4N, 122 21 02.1W. THE TOP THREE FEET OF THE PILING HAVE BEEN PAINTED RED TO MARK THE OBSTRUCTION. OBSTRUCTION CHARTED IN 38-02-23.7 N 122-21-23.3 W
**** OBSTRUCTION DOES NOT SEEM TO BE CHARTED IN THE REPORTED POSITION, AND SHOULD HAVE BEEN IDENTIFIED AS "PA".

Fieldnote INVESTIGATION
DATE(S): 10/23/2001 (DN: 296)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: 1212 TIME: NA
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER) 200% SSS
SURVEYED POSITION: NA
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: No piling was visible nor was a piling observed on the sonargram.
CHARTING RECOMMENDATION (HYDROGRAPHER): Delete the charted obstruction.
EVALUATOR COMMENTS: Concur

Proprietary YEARSUNK NIMANUM



AWOIS 52,737

G "9"
G 6s

(see tabulation and note)

REGULATED AREA 165.111
(see note A)

26

20

21

27

32

G "9"

AWOIS 52,737

G 6s

32

20 feet or more

33

Obstr

erved for vessels or tows
(see tabulation and note)

29

R "10"

FI R 6s

27

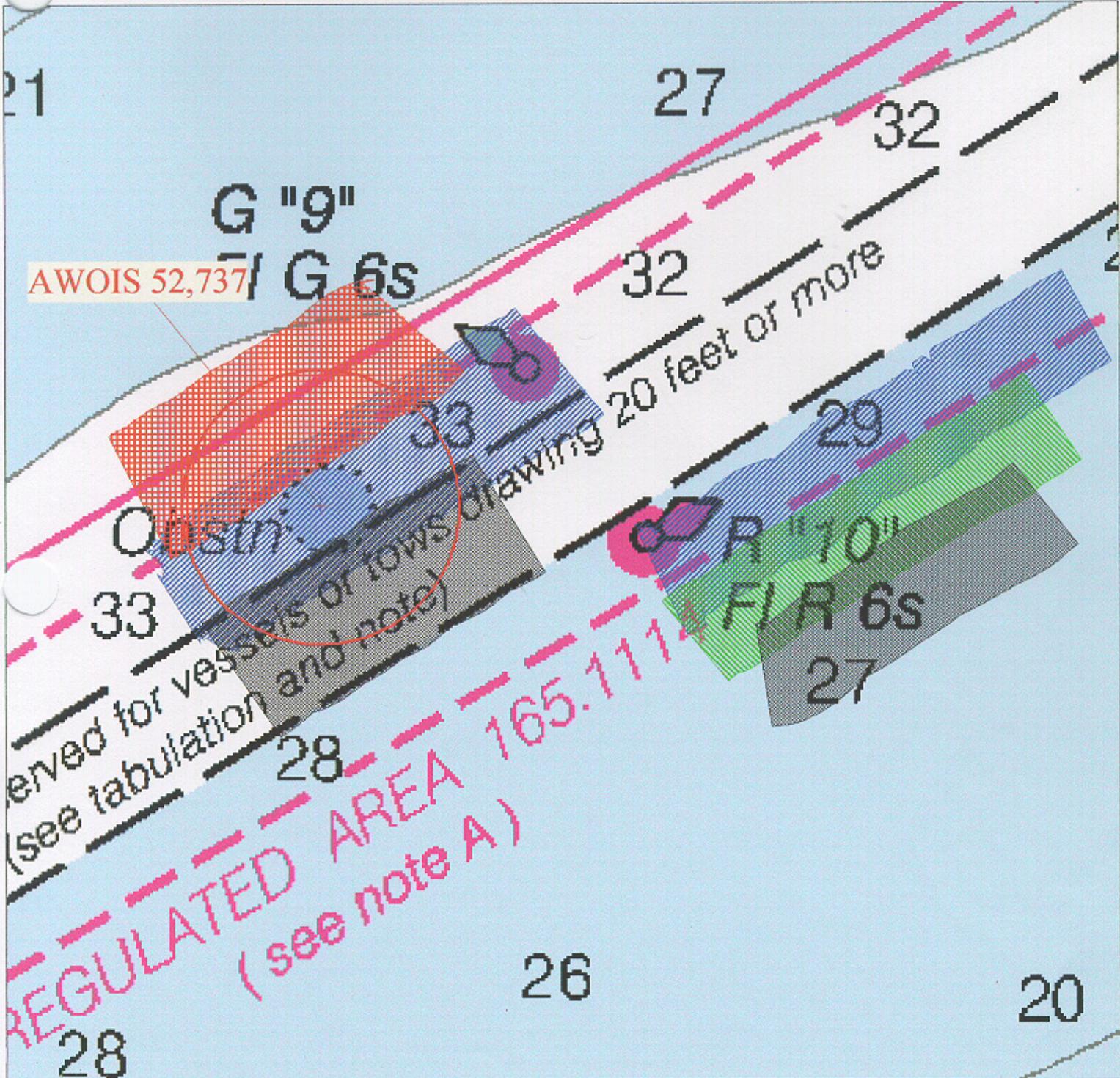
28

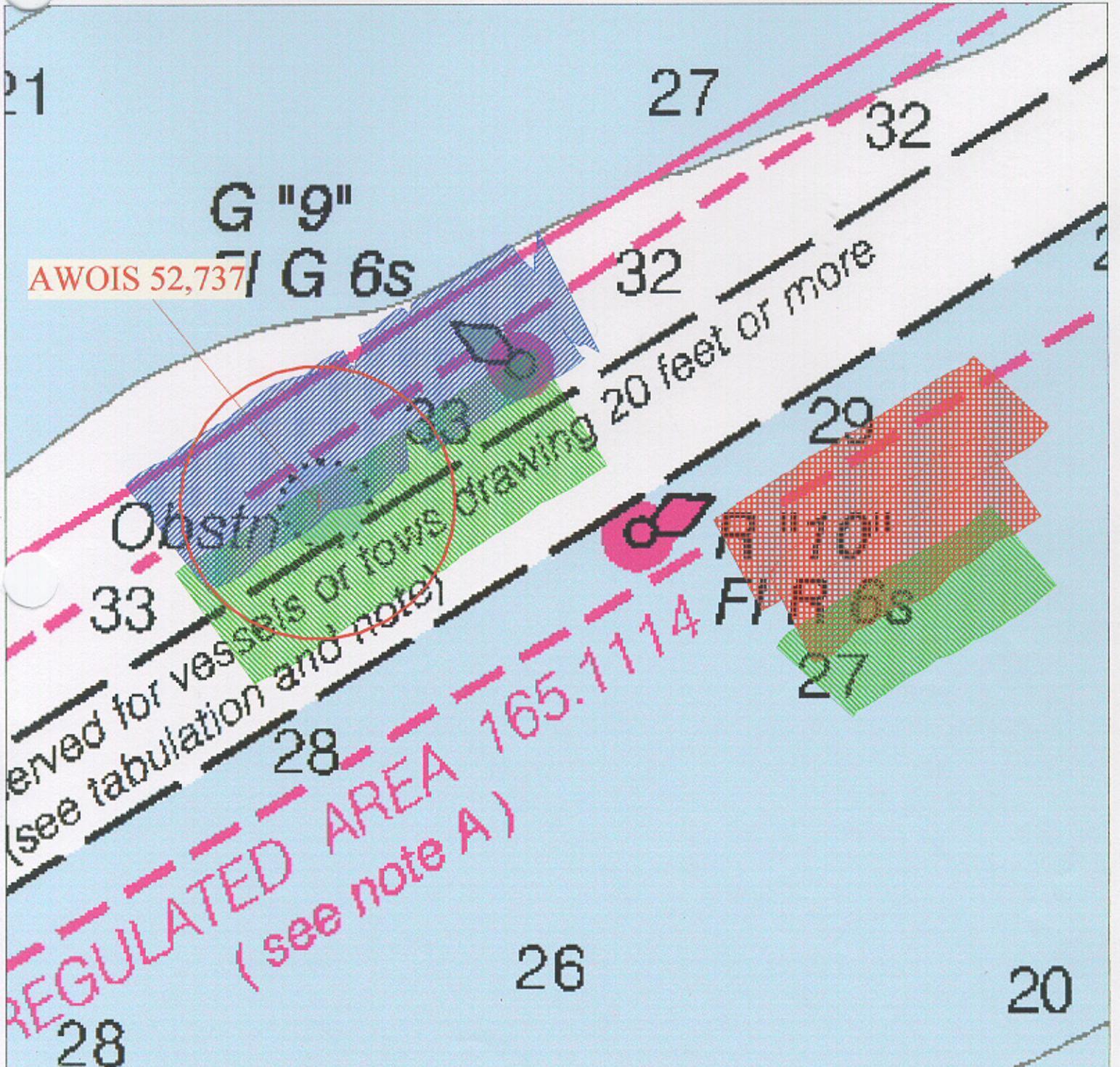
REGULATED AREA 165.1114
(see note A)

26

20

28





RECRD VESSLTERMS CHART AREA
CARTOCODE SENDINGCODE DEPTH

LAT83 LONG83 NATIVDATUM
LATDEC: LONDEC: GPQUALITY
GPSOURCE

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History HISTORY
LNM15/88--11TH CGD, 7/15/91; THE USGS HAS INSTALLED AN UNDERWATER DOPPLER SONAR PLATFORM, 3 FT IN
HEIGHT IN POS. 38 03 34N, 122 14 19W NAD 27

Fieldnote INVESTIGATION
DATE(S): 10/24/2001 (DN:)
HYDROGRAPHIC SURVEY NUMBER: F00477
VN: TIME:
INVESTIGATION METHODS USED: Direct Inquiry
SURVEYED POSITION: NA
POSITION DETERMINED BY: DIFFERENTIAL GPS
INVESTIGATION SUMMARY: Jon Burau, Hydrologist, USGS, Sacramento, CA, confirmed that the equipment was his and that it was
removed many years ago. See attached correspondence.
CHARTING RECOMMENDATION (HYDROGRAPHER): Delete charted obstruction.
EVALUATOR COMMENTS: Concur

Proprietary

YEARSUNK NIMANUM

From "Michael Gallagher" <Michael_Gallagher@hazmat.noaa.gov>

Date Wednesday, October 24, 2001 11:19 am

To Kathryn.Simmons@noaa.gov

Subject Fwd(2): AWOIS Item

Attachments [text/plain](#)

1K [text/plain](#)

1K

I spoke to Jon Burau about this AWOIS item. He verbally confirmed that it was his ADCP site and that the ADCP had been removed many years ago. His contact info;

Jon Burau
Hydrologist
USGS, Sacramento, CA
Work: (916) 278-3127
E-Mail: jrburau@usgs.gov

>Hi Jon,

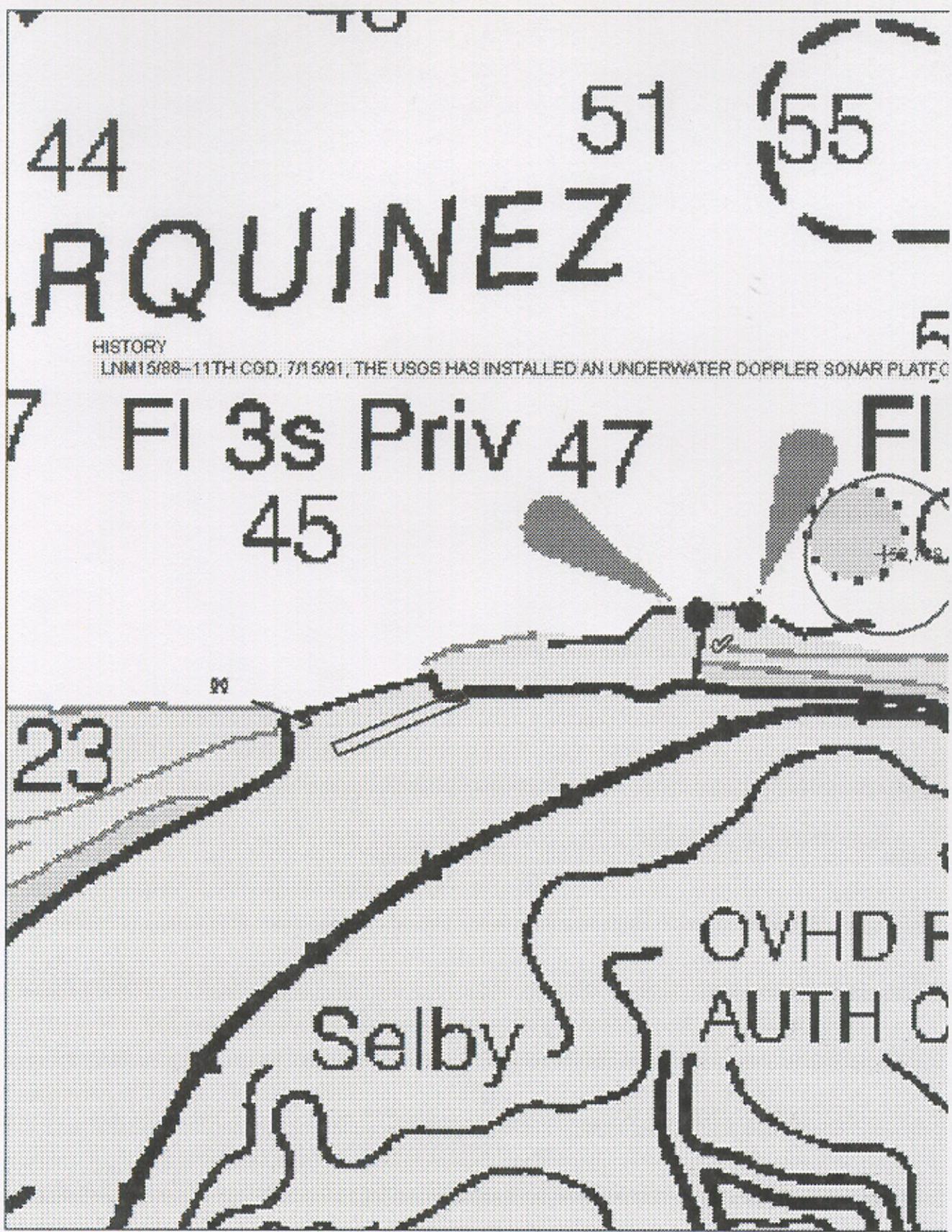
>As I mentioned in our conversation, once an obstruction gets placed on
>the chart, we have to document its removal or spend costly boat time side
>scanning the area to prove that it is no longer there. The attached JPG
>shows the location of the obstruction and the Local Notice to Mariners
>citation that first appeared in 1991. If this was your site and you can
>verify that the ADCP and housing have been removed, it would save us a
>lot of work. Thanks.

>
>From: <Kathryn.Simmons@noaa.gov>
>To: Michael.Gallagher@hazmat.noaa.gov
>Message-ID: <3faa241d67.41d673faa2@noaa.gov>
>Date: Mon, 22 Oct 2001 12:21:34 -0700

>
>Mike,

>
>Attached is a jpeg of a section of Carquinez Strait which shows an
>obstruction - a doppler sonar platform - installed by the Coast Guard.
>Do you have a contact at the Coast Guard who could confirm - or deny -
>that the platform is still there?

>
>Kathryn
>NOTE NEW PAGER NUMBER
>LCDR Michael Gallagher, NOAA
>National Ocean Service
>San Francisco Bay Regional Officer
>NOAA Pier One Project Office, Fort Mason (Bldg 201)
>San Francisco, CA. 94123
>(415) 556-0858 Pager: 800-386-6709
>fax (415) 556-8507 Mobile phone:
>206-499-1118
>michael.s.gallagher@noaa.gov



File: AWOIS Item.jpg

VEZ S

51

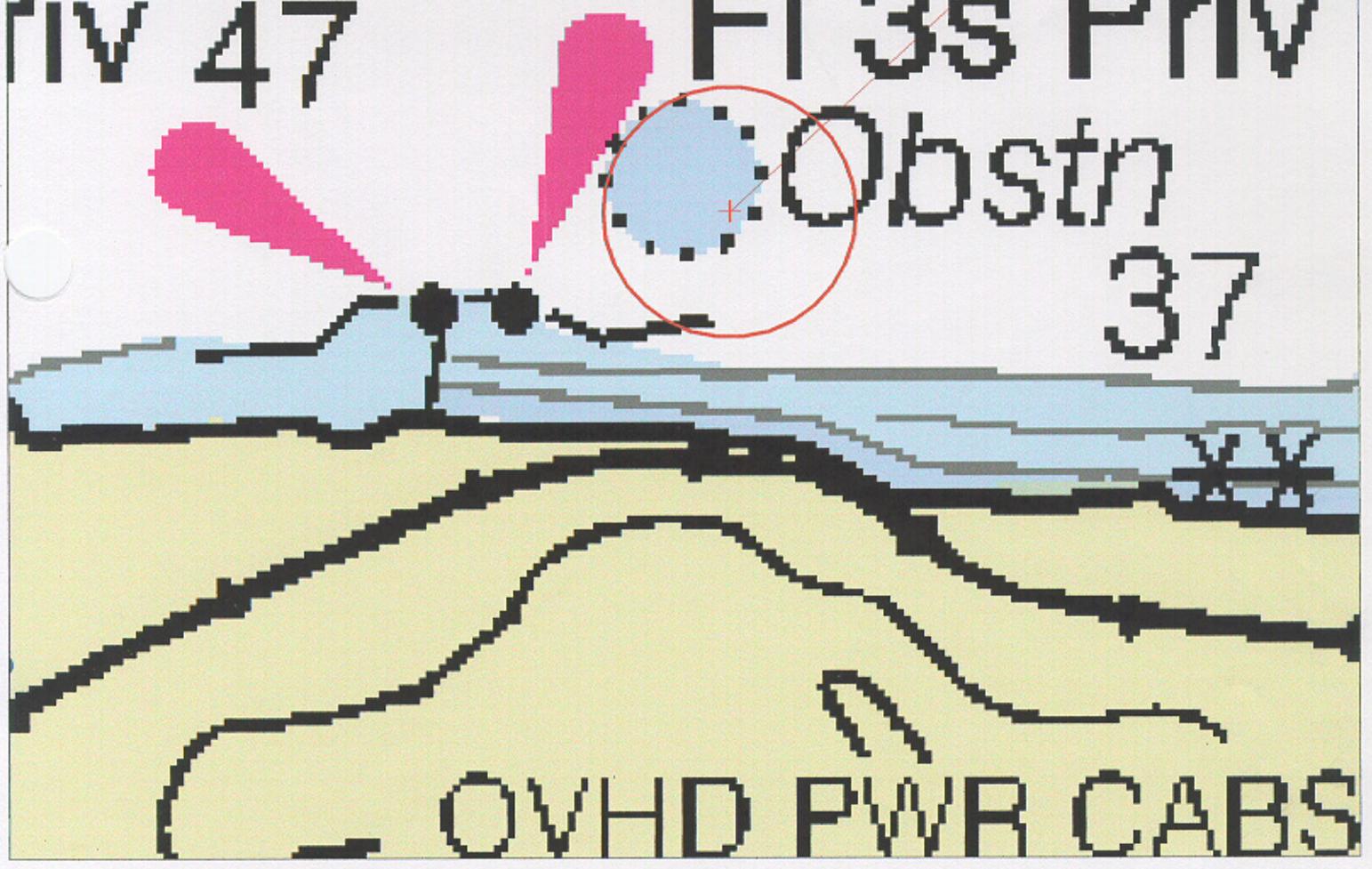
AWOIS 52,738

Priv 47

Fl 3s Priv

Obstr

37



OVHD PWR CABS

Danger to Navigation Report

Hydrographic Survey Registry Number: F00477

Survey Title: State: California
 Locality: San Francisco Bay
 Sub-locality: Chart Evaluation for Port of San Francisco and Vicinity

Project Number: OPR-L430-NRB

Survey Dates: May - October, 2001

Depths are reduced to Mean Lower Low Water using real, unverified tides, downloaded from from the NOAA, NOS, CO OPS web site (<http://www.opsd.nos.noaa.gov/cgi-bin/prelimqry.pl>).. Positions are based on the NAD83 horizontal datum.

CHARTS AFFECTED:

<u>Chart</u>	<u>Scale</u>	<u>Edition</u>	<u>Date</u>
18653	1:20,000	9 th	Sept. 30, 2000
18649	1:40,000	61 st	Jan. 22, 2000

DANGERS:

<u>Feature</u>	<u>Depth(ft or fms)</u>	<u>Latitude</u>	<u>Longitude</u>
Wreck	22 ft	37°55'24.24"N	122°22'25.25"W.

COMMENTS: Dive investigation revealed a submerged wreck approximately 25 feet long oriented in a northwest/southeast direction.

[Click here for chartlet.](#)

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 526-6836.

Chart 18653

9th edition, Sept. 30, 2000

Scale 1:20,000

Survey F00477

Pacific Hydrographic Branch

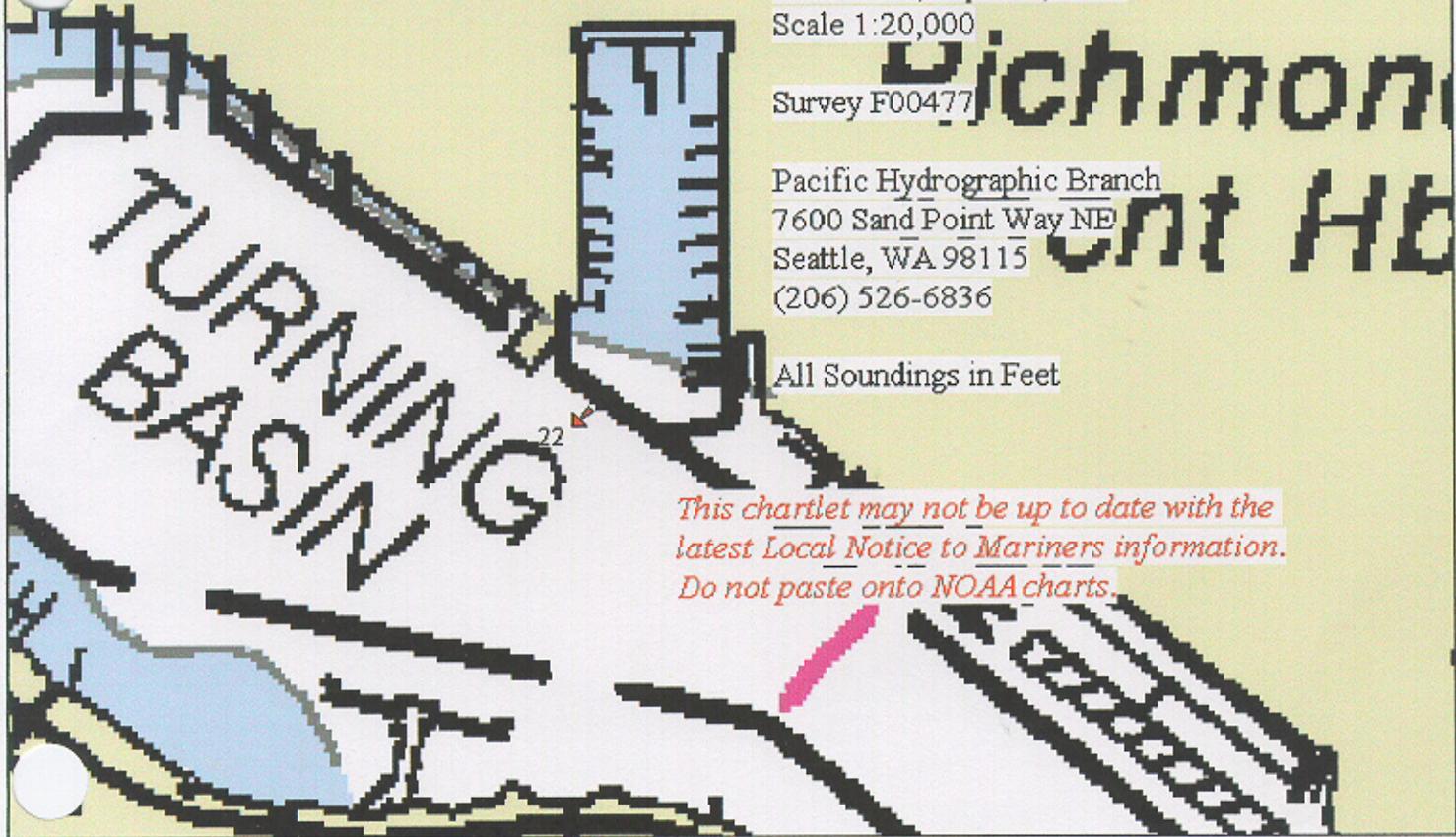
7600 Sand Point Way NE

Seattle, WA 98115

(206) 526-6836

All Soundings in Feet

This chartlet may not be up to date with the latest Local Notice to Mariners information. Do not paste onto NOAA charts.



LEAST DEPTH REPORT, VELOCITY PROGRAM, Version 6.01

PROJECT: OPR-L430-NRB SURVEY: F00476 DATE OF DIVE: 10-26-2001

NOAA UNIT: NRT-3 PACIFIC YEAR 2001
AWOIS NUMBER: NONE FIX NUMBER: NONE CONTACT NUMBER: NONE

CAST TABLE NUMBER: 05 CAST INSTRUMENT: SEACAT S/N:1892 CD:8/17/2000
DAY OF CAST (UTC): 213 TIME OF CAST (UTC): 16:48

DIVER GAUGE SERIAL NUMBER: 68335
DAY OF DIVE (UTC): 299 TIME OF LD MEASUREMENT (UTC): 1600
LATITUDE OF DIVE: 37/55/22.00 N
LONGITUDE OF DIVE: 122/22/22.00 W
PREDIVE GAUGE PRESSURE (psia): 14.74
GAUGE PRESSURE AT DESIGNATED LEAST DEPTH (psia): 26.63

RESULTS

COMPUTED LEAST DEPTH (m): 8.24
TIDE CORRECTOR (m): -1.50
CORRECTED LEAST DEPTH (m): 6.74

COMMENTS AND RECOMMENDATIONS: The decayed hull of a metal vessel was found but its extents could not be determined due to poor visibility (less than 1 ft.) A pipe-like feature rising vertically out of the wreck, possibly a broken mast, was found and the least depth taken at its peak.

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: **F00477**

Survey Title: State: **CA**
Locality: **San Francisco Bay**
Sub-locality: **Port of San Francisco and Vicinity**

Project Number: **OPR-L430-NRB**

Survey Dates: **05/14/01 - 10/26/01**

Depths are reduced to Mean Lower Low Water using final approved tides. Positions are based on the NAD83 horizontal datum.

CHARTS AFFECTED:

CHART	EDITION	DATE	SCALE
18650	50 th	January 13, 2001	1:20,000

DANGERS:

FEATURE	DEPTH (Chart Units)	LATITUDE(N)	LONGITUDE(W)
Sounding	38.4 feet	37/49/43.113	122/24/45.599
Obstruction, subm.	13.1 feet	37/46/09.660	122/18/20.291

COMMENTS:

The obstruction, submerged pile is what remains of Alameda Naval Air Station Channel Daybeacon 8.

Questions concerning this report should be directed to the Pacific Hydrographic Branch (N/CS34) at (206) 526-6836.

HYDROGRAPHIC SURVEY STATISTICS

F00477

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		3	SMOOTH OVERLAYS: POS., ARC, EXCESS		
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	2				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					
SHORELINE DATA					
SHORELINE MAPS (List):					
PHOTOBATHYMETRIC MAPS (List):					
NOTES TO THE HYDROGRAPHER (List):					
SPECIAL REPORTS (List):					
NAUTICAL CHARTS (List):					
OFFICE PROCESSING ACTIVITIES					
<i>The following statistics will be submitted with the cartographer's report on the survey</i>					
PROCESSING ACTIVITY			AMOUNTS		
			VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET					
POSITIONS REVISED					
SOUNDINGS REVISED					
CONTROL STATIONS REVISED					
			TIME-HOURS		
			VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION					
VERIFICATION OF CONTROL					
VERIFICATION OF POSITIONS					
VERIFICATION OF SOUNDINGS					
VERIFICATION OF JUNCTIONS					
APPLICATION OF PHOTOBATHYMETRY					
SHORELINE APPLICATION-VERIFICATION					
COMPILATION OF SMOOTH SHEET					294
COMPARISON WITH PRIOR SURVEYS AND CHARTS					
EVALUATION OF SIDE SCAN SONAR RECORDS					
EVALUATION OF WIRE DRAGS AND SWEEPS					
EVALUATION REPORT					49
GEOGRAPHIC NAMES					
OTHER* (Chart Compilation)					90
*USE OTHER SIDE OF FORM FOR REMARKS					
TOTALS					433
Pre-processing Examination by			Beginning Date		Ending Date
Verification of Field Data by R. Davies			Time (Hours) 294		Ending Date
Evaluation Check by			Time (Hours)		Ending Date
Evaluation and Analysis by R. Davies			Time (Hours) 49		Ending Date 09/03/2003
Inspection by B. Olmstead			Time (Hours) 40		Ending Date 09/03/2003



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: June 10, 2002

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-L430-NRB-2001
HYDROGRAPHIC SHEET: F00477

LOCALITY: San Francisco Bay, CA
TIME PERIOD: May 22 - Oct 25, 2001

TIDE STATION USED: 941-4290 San Francisco, CA
Lat. 37° 48.4'N Lon. 122° 27.9'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.594 meters

TIDE STATION USED: 941-4750 Alameda, CA
Lat. 37° 46.3'N Lon. 122° 18.0'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.792 meters

TIDE STATION USED: 941-4863 Richmond, CA
Lat. 37° 55.4'N Lon. 122° 24.5'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.666 meters

TIDE STATION USED: 941-5144 Port Chicago, CA
Lat. 38° 3.4'N Lon. 122° 2.4'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.329 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SFB4, SFB5, SFB6, SFB9, SFB10, SFB11,
SFB12, SFB12A, SFB13, SFB13A, SFB14, SFB14A, SFB32, SFB35, SFB36,
SFB39, SFB41 & SFB42.

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units
(meters), relative to MLLW and on Greenwich Mean Time.





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

Page 2 of 2 for OPR-L430-NRB-2001

Thomas V. Meo 6/11/02

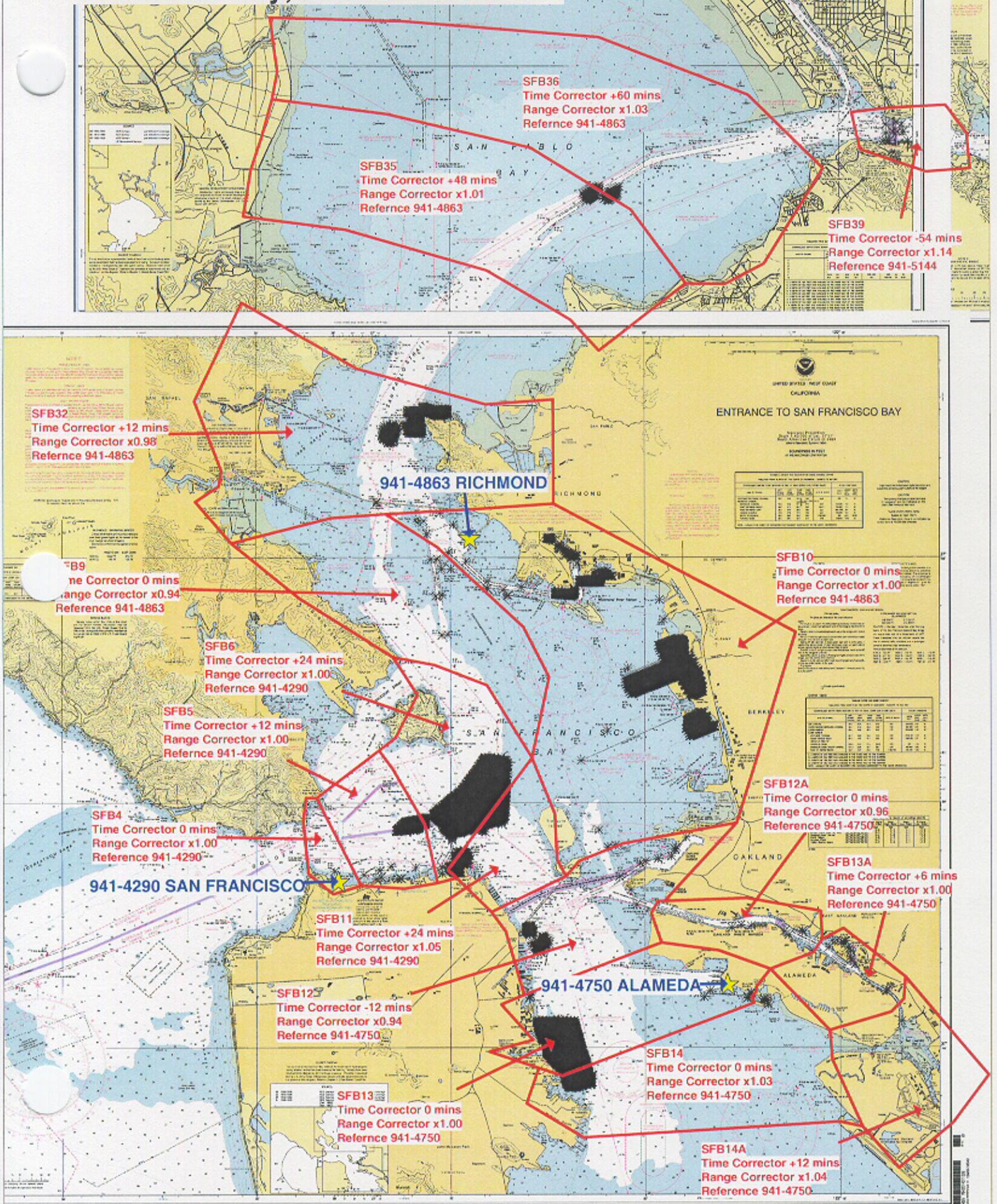
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION



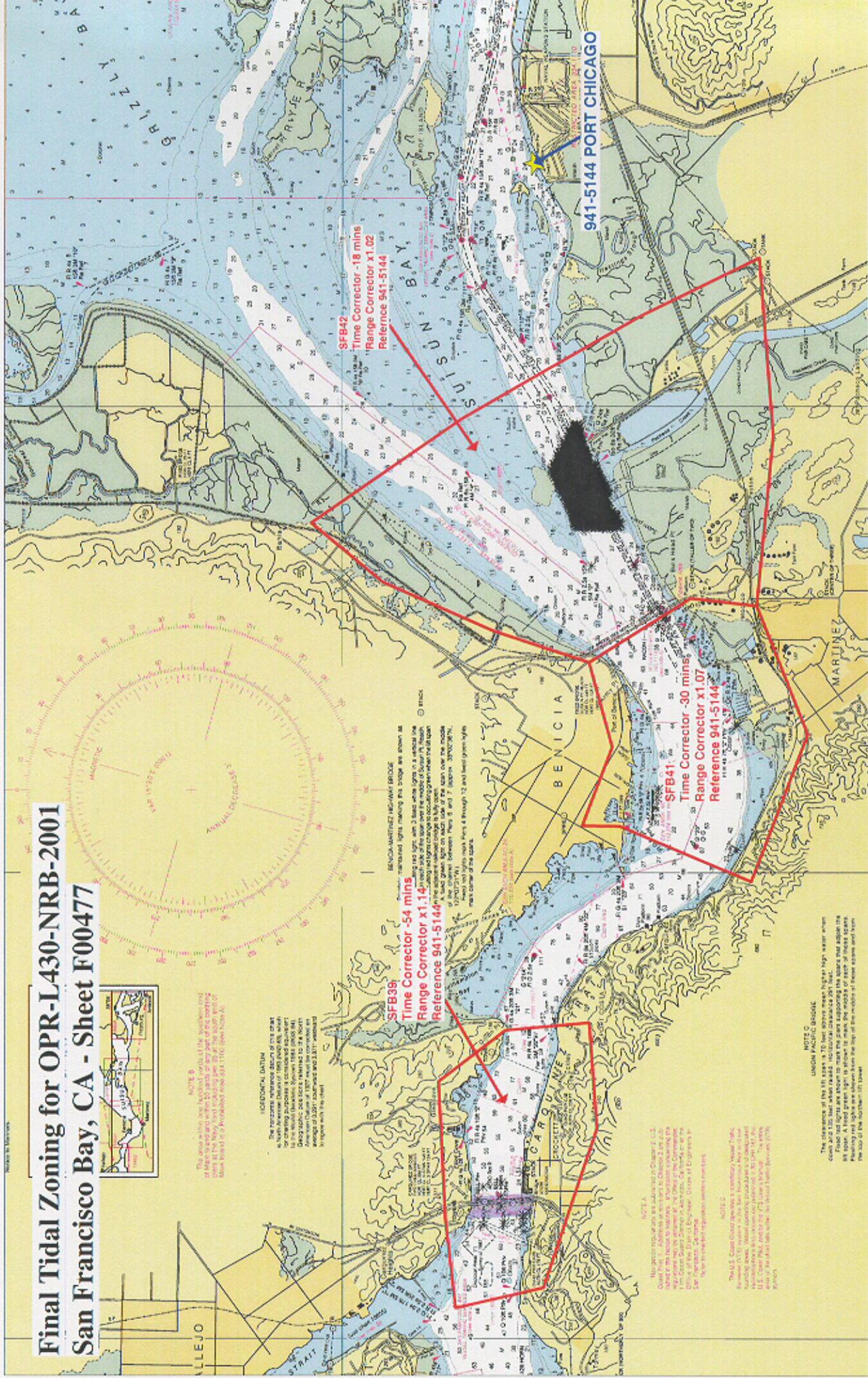
Printed on Recycled Paper



Final Tidal Zoning for OPR-L430-NRB-2001 San Francisco Bay, CA - Sheet F00477



Final Tidal Zoning for OPR-L430-NRB-2001 San Francisco Bay, CA - Sheet F00477



NOTE B
This area within the National Wetlands of the San Francisco Bay Area is shown in green on the 1984 National Wetlands Inventory. The National Wetlands Inventory is available on the Internet at www.fws.gov. (See Note A)

LEGEND
The following symbols are used on this chart:
A North Arrow (shown in 1985) and the datum for sounding purposes is indicated by the symbol. Geographic coordinates are given in degrees and minutes. The datum for the sounding is the datum of the chart. The datum for the sounding is the datum of the chart. The datum for the sounding is the datum of the chart.

SFB39
Time Corrector -54 mins
Range Corrector x1.14
Reference 941-5144
BENICIA-MARTINEZ HIGHWAY BRIDGE
The structure shown is a concrete bridge with a steel deck. The bridge is 1.14 miles long and has a time corrector of -54 minutes. The range corrector is x1.14. The reference number is 941-5144.

SFB42
Time Corrector -18 mins
Range Corrector x1.02
Reference 941-5144
The structure shown is a concrete bridge with a steel deck. The bridge is 0.02 miles long and has a time corrector of -18 minutes. The range corrector is x1.02. The reference number is 941-5144.

SFB41
Time Corrector -30 mins
Range Corrector x1.07
Reference 941-5144
The structure shown is a concrete bridge with a steel deck. The bridge is 0.07 miles long and has a time corrector of -30 minutes. The range corrector is x1.07. The reference number is 941-5144.

941-5144 PORT CHICAGO

NOTE A
This chart is a reproduction of the original chart published by the U.S. Coast and Geodetic Survey. It is not a substitute for the original chart. The original chart is available from the U.S. Coast and Geodetic Survey, Washington, D.C. The original chart is available from the U.S. Coast and Geodetic Survey, Washington, D.C.

NOTE C
The U.S. Coast and Geodetic Survey is responsible for the accuracy of the data shown on this chart. The U.S. Coast and Geodetic Survey is responsible for the accuracy of the data shown on this chart. The U.S. Coast and Geodetic Survey is responsible for the accuracy of the data shown on this chart.

NOTE D
UNION PACIFIC BRIDGE
The structure shown is a steel truss bridge. The bridge is 1.14 miles long and has a time corrector of -54 minutes. The range corrector is x1.14. The reference number is 941-5144.

Final tide zone node point locations for OPR-L430-NRB-2001,
Sheet F00477.

Format: Longitude in decimal degrees (negative value denotes
Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone SFB4	941-4290	0	1.00
-122.477734 37.809083			
-122.467075 37.802282			
-122.455204 37.805204			
-122.474227 37.834964			
-122.478736 37.835137			
-122.479965 37.826788			
-122.477734 37.809083			
Zone SFB5	941-4290	+12	1.00
-122.441554 37.844907			
-122.427797 37.826064			
-122.42225 37.806038			
-122.43647 37.804183			
-122.455204 37.805204			
-122.474227 37.834964			
-122.44747 37.85125			
-122.441554 37.844907			
Zone SFB6	941-4290	+24	1.00
-122.441479 37.88287			
-122.423511 37.880216			
-122.400898 37.873308			
-122.381685 37.84869			
-122.417965 37.810456			
-122.41415 37.807744			
-122.42225 37.806038			
-122.427797 37.826064			
-122.441554 37.844907			
-122.44747 37.85125			
-122.440313 37.855566			
-122.430994 37.870167			

-122.441479 37.88287

Zone SFB9

941-4863

0

0.94

-122.374309 37.876052

-122.38528 37.89304

-122.422269 37.92014

-122.444512 37.931323

-122.467627 37.930034

-122.51058 37.921506

-122.481631 37.902892

-122.441479 37.88287

-122.423511 37.880216

-122.400898 37.873308

-122.381685 37.84869

-122.374309 37.876052

Zone SFB10

941-4863

0

1.00

-122.407831 37.932914

-122.372194 37.9348

-122.269084 37.891201

-122.294341 37.826391

-122.343155 37.819306

-122.361495 37.813471

-122.36706 37.808304

-122.370991 37.813891

-122.371912 37.829515

-122.381685 37.84869

-122.374309 37.876052

-122.38528 37.89304

-122.422269 37.92014

-122.444512 37.931323

-122.407831 37.932914

Zone SFB11

941-4290

+24

1.05

-122.41415 37.807744

-122.417965 37.810456

-122.381685 37.84869

-122.371912 37.829515

-122.370991 37.813891

-122.36706 37.808304

-122.399182 37.796189

-122.41415 37.807744

Zone SFB12

941-4750

-12

0.94

-122.399182 37.796189

-122.39304 37.789561

-122.385248 37.767899
-122.326356 37.785665
-122.33078 37.795706
-122.327747 37.799847
-122.324989 37.799783
-122.294341 37.826391
-122.343155 37.819306
-122.361495 37.813471
-122.36706 37.808304
-122.399182 37.796189

SFB12A

941-4750

0

0.96

-122.326356 37.785665
-122.33078 37.795706
-122.327747 37.799847
-122.324989 37.799783
-122.290011 37.800763
-122.258525 37.796371
-122.257899 37.786778
-122.261686 37.782229
-122.280076 37.776698
-122.302132 37.782979
-122.326356 37.785665

Zone SFB13

941-4750

-6

1.00

-122.385248 37.767899
-122.395068 37.764668
-122.38133 37.752598
-122.400119 37.748626
-122.378907 37.743089
-122.368853 37.740464
-122.287044 37.765127
-122.287986 37.76709
-122.286141 37.768991
-122.286102 37.77058
-122.280076 37.776698
-122.302132 37.782979
-122.326356 37.785665
-122.385248 37.767899

Zone SFB13A

941-4750

+6

1.00

-122.257899 37.786778
-122.248625 37.790453
-122.222065 37.773921
-122.222684 37.766344
-122.228157 37.761965

-122.254628 37.755718
-122.280076 37.776698
-122.261686 37.782229
-122.257899 37.786778

Zone SFB14

941-4750

0

1.03

-122.368853 37.740464
-122.378907 37.743089
-122.384168 37.731079
-122.359853 37.719463
-122.250218 37.724694
-122.240504 37.722927
-122.253523 37.745662
-122.254628 37.755718
-122.280076 37.776698
-122.286102 37.77058
-122.286141 37.768991
-122.287986 37.76709
-122.287044 37.765127
-122.368853 37.740464

Zone SFB14A

941-4750

+12

1.04

-122.254628 37.755718
-122.253523 37.745662
-122.240504 37.722927
-122.224911 37.708844
-122.201507 37.724257
-122.186347 37.740351
-122.222065 37.773921
-122.222684 37.766344
-122.228157 37.761965
-122.254628 37.755718

Zone SFB32

941-4863

+12

0.98

-122.51058 37.921506
-122.525995 37.935525
-122.515821 37.940789
-122.514795 37.945881
-122.526298 37.969554
-122.506048 38.002931
-122.456683 37.980577
-122.40134 37.968426
-122.372397 37.97012
-122.372194 37.9348
-122.407831 37.932914
-122.444512 37.931323

-122.467627 37.930034
-122.51058 37.921506

Zone SFB35

941-4863

+48

1.01

-122.505218 38.03222
-122.501937 38.048083
-122.497361 38.058939
-122.492839 38.071941
-122.443623 38.066968
-122.381826 38.055556
-122.338902 38.034485
-122.315589 38.009308
-122.352671 37.986612
-122.364808 37.997085
-122.400856 38.013862
-122.461588 38.027684
-122.505218 38.03222

Zone SFB36

941-4863

+60

1.03

-122.492839 38.071941
-122.490557 38.081196
-122.492098 38.090077
-122.493719 38.099584
-122.437044 38.098399
-122.352535 38.092933
-122.288958 38.07341
-122.256948 38.048495
-122.282235 38.01602
-122.298848 38.009161
-122.315589 38.009308
-122.338902 38.034485
-122.381826 38.055556
-122.443623 38.066968
-122.492839 38.071941

Zone SFB39

941-5144

-54

1.14

-122.244529 38.067327
-122.228633 38.068791
-122.203985 38.069769
-122.194851 38.060274
-122.193516 38.048375
-122.212388 38.04728
-122.240889 38.054852
-122.244529 38.067327

Zone SFB41

941-5144

-30

1.07

-122.158212 38.049366
-122.144164 38.045095
-122.129042 38.048373
-122.11764 38.034014
-122.119003 38.024701
-122.141868 38.017447
-122.168246 38.025474
-122.158284 38.044077
-122.158212 38.049366

Zone SFB42

941-5144

-18

1.02

-122.129042 38.048373
-122.123384 38.062014
-122.114722 38.077643
-122.104062 38.087827
-122.085627 38.066581
-122.06697 38.040938
-122.056667 38.024261
-122.088517 38.0223
-122.119003 38.024701
-122.11764 38.034014
-122.129042 38.048373

APPROVAL SHEET
F00477

Initial Approvals:

The survey and associated records have been inspected with regard to survey coverage, delineation of the depths curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

for *Barce A. Omsstead*
Dennis Hill
Chief, Cartographic Team
Pacific Hydrographic Branch

Date: *9/12/2003*

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Descriptive Report.

J. E. Lowell Jr.
John E. Lowell, Jr.
Commander, NOAA
Chief, Pacific Hydrographic Branch

Date: *SEPT 22/2007*

*AWOIS check
11/3/03 mCR*

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. F00477

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
18650	7/10/02	Russ Davis	Full Part Before After Marine Center Approval Signed Via Drawing No.
18653	7/3/02	Russ Davis	Full Part Before After Marine Center Approval Signed Via Drawing No.
18654	7/3/02	Russ Davis	Full Part Before After Marine Center Approval Signed Via Drawing No.
18655	7/2/02	Russ Davis	Full Part Before After Marine Center Approval Signed Via Drawing No.
18657	7/2/02	Russ Davis	Full Part Before After Marine Center Approval Signed Via Drawing No.
18650	12/1/03 12/10/03	J. Sherry T. Alexander	Full Part Before After Marine Center Approval Signed Via Drawing No. full application of sounding and features.
18653	12/1/03 12/10/03	J. Sherry T. Alexander	Full Part Before After Marine Center Approval Signed Via Drawing No. full application of sounding and features.
18654	12/1/03 12/10/03	J. Sherry T. Alexander	Full Part Before After Marine Center Approval Signed Via Drawing No. full application " "
18655	12/1/03 12/10/03	J. Sherry T. Alexander	Full Part Before After Marine Center Approval Signed Via Drawing No. " " " "
18649	12/1/03 12/10/03	J. Sherry T. Alexander	Full Part Before After Marine Center Approval Signed Via Drawing No. " " " "