6200

Form 504
Rev. April 1935
DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

DESCRIPTIVE REPORT

~~Topographic~~
Hydrographic } Sheet No. 4

State Washington

LOCALITY

Puget Sound

Tacoma Harbor
~~Commencement Bay~~

1936.

CHIEF OF PARTY

G. C. Jones

U. S. GOVERNMENT PRINTING OFFICE

6200

r 3 4 6

Form 537
Ed. Sept., 1929

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO.

HYDROGRAPHIC TITLE SHEET

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. 4

REGISTER NO. H6200

State Washington

General locality Puget Sound

Locality ~~Commencement Bay~~ Tacoma Harbor

Scale 1:5,000 Date of survey August, 1936

Vessel EXPLORER

Chief of Party G. C. Jones

Surveyed by L. C. Wilder

Protracted by Edwin C. Baum

Soundings penciled by Edwin C. Baum

Soundings in ~~fathoms~~ feet

Plane of reference M.L.L.W.

Subdivision of wire dragged areas by

Inked by Leonard A. McGann

Verified by Leonard A. McGann.

Instructions dated March 29, 1934. Oct 16, 34

Remarks:

U. S. GOVERNMENT PRINTING OFFICE: 1929

DESCRIPTIVE REPORT

TO ACCOMPANY HYDROGRAPHIC SHEET NO. 4

COMMENCEMENT BAY - PUGET SOUND

WASHINGTON

1936

AUTHORITY:

This survey was made under instructions to the Commanding Officer, Ship EXPLORER, dated March 29, 1934.

LIMITS:

It covers the hydrography of Commencement Bay south and southeast of the limits of Sheet No. 5932 (1935), to the limits of Sheet No. H628 ~~5~~ (1936). This includes the area along the waterfront on the southwest side of the bay to the entrance to the City Waterway and to the pier heads at the southeast end of the bay.

SCALE:

The scale is 1:5,000.

CONTROL:

Standard control of three point fixes on topographic and triangulation stations was used. The topography was done on a scale of 1:5,000 except at the north (west of topographic signal HOW) and northwest (northwest of topographic signal OB) edges of the sheet which were stepped up from 1:10,000 scale surveys of 1935 by this party. Shore line and signals in these areas should be checked in the office as originals are filed in Washington.

checked in office. See Rev., par. 1 for differences H.W.M.

METHODS:

Accepted Coast Survey methods were used throughout, three point fixes, ten pound handlead up to fifteen fathoms and an eighteen pound lead and machine in deeper water.

LOW WATER LINE:

The low water line for the most part was sketched along the entire southwest side of Commencement Bay, since fixes were difficult to get in the slips between docks, there were log rafts in many of the slips, and the low water line was known to be close to the high water line in most places and it would not be obtained on regular sounding lines.

In sketching, the party ran along the shore at a zero tide, carefully estimating the distance from high water to low water and in some places where uncertain, pulling in with a skiff and obtaining a fix. The low water line obtained should be good.

The line of piles close to the high water line around filled land in Latitude 47° 16.5', Longitude 122° 25.0', retains the rock fill in back thereof and the low water line is along this line of piles where indicated.

GENERAL CHARACTERISITICS OF THE SHORELINE AND BOTTOM:

Along the southwest shore of the bay where the high water line is, not a dock or wooden bulkhead ~~is located,~~ it is a rock fill breakwater or seawall of rip-rap. Between the high and the low water marks are sand and gravel; occasionally boulders or mud.

The high water line along the northeast shore of the bay is sand and gravel. The same between the high and low water marks.

The bottom of Commencement Bay is mostly mud; sand and gravel in places.

DANGERS, OBSTRUCTIONS AND SHOALS:

Under this subhead the only important feature to which attention should be called is the shoal in Latitude 47° 16.3' and Longitude 122° 25.~~8'~~9 which was dredged to a minimum of 30 feet at M.L.L.W. between August 14th and August 23, 1936, after the hydrography on this sheet was completed. This dredging was done by the St. Regis Kraft Co. of Tacoma and a channel was also dredged to and alongside the dock adjacent to the west jetty of the Puyallup River.

See Hydrographic Sheet No. H-6201 ~~5~~ as all work on that sheet, except position 73 "b", was done after dredging was complete. A survey by St. Regis Kraft Co. after dredging also accompanies that sheet.

A 32 foot spot is located on this shoal in Latitude 47° 16.32', Longitude 122° 25.87' on H-6201(1936).

Shoaling is evident to the northwest of the Hylebos Waterway South Entrance Light. The north end of this shoal area, (26 to 24 feet at M.L.L.W.) is a ~~25~~ 26 foot spot 85 meters, 312° ~~315°~~ true from this light. The shoaling extends from this position in a general southerly direction. The least water on the entire shoal is 24 feet, the bottom is mud.

Logs are stored in the northeast area covered by this sheet. The launch could not reach this area for sounding. The limits of this area which ~~are~~ is changeable, are heavy log booms attached to raft buoys on which white lights (lanterns) are generally hung. These buoys are moved from time to time. The topographic limits of this area differ from those of the hydrographer for this reason.

CHANNELS, AIDS AND RANGES:

There are no channels in this area which require description. See Sheet No. 5 for description of channels into the various waterways. (H 6201)

The aids to navigation within the area sounded, consist of;

Henry Mill Fog Signal, a fog siren in Latitude 47° 16.6', Longitude 122° 27.7'.

Wapato Waterway Light, a flashing red light on a pile dolphin at the entrance to Wapato Waterway.

The two Hylebos Waterway Entrance Lights, the northerly flashing white and the southerly flashing red, at the entrance to the waterway of that name.

Milwaukee Waterway Buoy 2, a red spar on the west side of the channel approaching the waterway of that name.

A red spar numbered "2" in Latitude 47° 16.5', Longitude 122° 27.4', in 12 feet of water.

The balance of the aids about the Tacoma waterfront are mentioned in the descriptive report for Sheet No. 5. H-6201

No ranges are maintained within the area covered by this sheet.

ANCHORAGES:

The only anchorage used at present is in Latitude 47° 16.35', Longitude 122° 25.87', in about 8 fathoms of water, mud bottom, but since the shoal has been dredged to 30 feet vessels may anchor closer in.

An anchorage may be had in Latitude 47° 17.5', Longitude 122° 25.3', in from 10 to 12 fathoms of water, mud bottom.

There is only one mooring buoy off Tacoma's waterfront and this is within the area of Sheet No. 5. (H-6201)

CURRENTS AND TIDE RIPS:

No definite information on currents was obtained. There is a considerable current from the mouth of the Puyallup River. Its muddy fresh water is evident for one-half mile from its mouth. 30 25

It is believed that the tidal current along the southwest shore of Commencement Bay does not reverse but always flows from southeast to northwest. 25'

No important tide rips were noticed.

DISCREPANCIES:

No important discrepancies have been found on this sheet. Overlapping soundings do not always check but the agreement is reasonably good.

COMPARISON WITH EXISTING SURVEYS:

Comparison with Hydrographic Sheet Register No. 4752 reveals no important differences except in the structures along the high water line.

A least depth of 60 feet was obtained on the 63 foot spot on Chart 6407 in Latitude 47° 17.6', Longitude 122° 25.1'.

In the vicinity of the 51 foot spot on Chart 6407 in Latitude 47° 16.8', Longitude 122° 25.85', a least depth of 32 feet was obtained in the 1936 survey.

LANDMARKS:

See descriptive report for Sheet No. (H-6201) 5 for landmarks on Sheets 4 and 5.

GEOGRAPHIC NAMES:

See descriptive report for Sheet No. (H-6201) 5 for geographic names for sheets 4 and 5.

Respectfully submitted,

L. C. Wilder

L. C. Wilder,
H. & G. E., C. & G. S.,
U.S.C. & G.S.S. EXPLORER.

Approved and forwarded:

G. C. Jones

G. C. Jones,
Chief of Party, C. & G. S.,
Comdg. Str. EXPLORER.

NOTE: Reduced soundings in the sounding volumes were entered in the "Leadline Corrections" column as soundings were first reduced in fathoms and then converted to feet.

STATISTICS

Number of positions..................................	759
Number of soundings (handlead)......................	1102
Number of soundings (machine).......................	1001
Statute miles of sounding lines.....................	74.1

REPORT ON H- 6200 (1936)

The records conform to the requirements of the Hydrographic Manual. ~~However on this sheet (H-6200)~~, contrary to the ~~in-~~ ~~structions~~ the limits ~~of work~~ of the ~~adjoining~~ sheets H-5932(1935) and H-6201 (1936) had ~~not been~~ shown by a ~~dashed~~ pencil line. As a ~~result of~~ this a very irregular junction has been ~~made with~~ ~~H-6201 (1936)~~. ~~There is some unnecessary~~ overlap, too.

The depth curves cannot be completely drawn due to interruptions in the lines caused by logs and log booms being in the way. They can be satisfactory drawn, however, within the area covered. H.W.M.

The signals originate with T-6444 (1935), T6540 (1935-1936) T-6541 (1936), T-6542 (1936), and T-6543 (1936). On T6444 (1935) the signals bear different names than is shown on H-6200(1936) Signals AMOS, BUS, CART, and DOCK (other names on T-6444) lat. 47° 17.8', long 122° 25.8' have been transferred incorrectly from T-6444 (1935). The maximum error is about 4m. to scale. These signals have been replotted in this office. See Rev. (par. 1) for further remarks

On T-6540 (1935-1936) Triangulation station Fill, 1935 has been plotted incorrectly. This error introduces an error in the position of signals HOW, IT, BOY, and ANDY if they have been located by a traverse from Δ Station Fill, 1935. The field party shows the adjusted position of those signals on H-6200 (1936) as they have evidently been located by traverse. Incorrectly plotted 2 m. East of correct position. Δ corrected on Topo sheet. The resultant error in the signals is too small to merit further mention. H.W.M.

A satisfactory junction has been made with H-5932 (1935) on the north. A junction with H-6201 (1936) on the south awaits the verification of the latter survey. Junction shown. H.W.M. See Rev., par. 6b

Leonard A. McGann
Leonard A. McGann
September 10, 1937.

Field Records Section (Charts)

HYDROGRAPHIC SHEET NO. H.6200

The following statistics will be submitted with the cartographer's report on the sheet:

Number of positions on sheet	..759
Number of positions checked	..34.
Number of positions revised	....1.
Number of soundings recorded	..1102
Number of soundings revised	..14.
Number of signals erroneously plotted or transferred	7 revised (see Rev.)

Date: September 10, 1937

Verification by Leonard A. McGann Time: 51.5 hours.

Review by Harold W. Murray Time: 27 "

Ver. Corrections by " " 4 "

Hydrographic Sheet No. 4 and all records pertaining thereto have been examined by me and are approved.

G. C. Jones

G. C. Jones,
Chief of Party, C. & G. S.

HYDROGRAPHIC SURVEY NO. **H6200**

Smooth Sheet **Yes**

Boat Sheet **Yes**

Sounding Records **3** Vols.

Descriptive Report **Yes**

Title Sheet **Yes**

List of Signals **Yes (Vol. #1)**

Landmarks for Charts (Form 567) **Yes**

Statistics **Yes**

Approved by Chief of Party **Yes**

Recoverable Station Cards (Form 524) **None**

Special Chart for Lighthouse Service **None**
(Circular Nov. 30, 1933)

Remarks HYDROGRAPHY

Total Days 9

Last Date Aug. 28, 1936

705

	Remarks	Decisions
1		See T-
2	For Title	See T-6542
3		" "
4	For Title	USGB decision
5	" "	" "
6		
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M 234

6200

GEOGRAPHIC NAMES
Survey No. H-6200

Name on Survey	A, On Chart No. 6460	B, On previous survey No.	C, On U. S. quadrangle Maps	D From local information	E On local Maps	F P. O. Guide or Map	G Rand McNally Atlas	H U. S. Light List	K	
Commencement Bay	✓ app'd									1
Tacoma Harbor	✓ app'd									2
Tacoma (city)	✓ app'd									3
Puget Sd.	✓ app'd									4
Washington	✓ app'd									5
										6
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										27

Names underlined in red approved
by [illegible] on 6/9/37

M 234

CS

R.a.C.

Form 712
DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY
Ed. Feb. 1935

TIDE NOTE FOR HYDROGRAPHIC SHEET

June 11, 1937.

Division of Hydrography and Topography:

Division of Charts: Attention: Mr.E. P. Ellis.

Tide Reducers are approved in
3 volumes of sounding records for

HYDROGRAPHIC SHEET 6200

Locality Tacoma Harbor, Puget Sound, Washington.

Chief of Party: G. C. Jones in 1936.
Plane of reference is mean lower low water, reading
3.5 ft. on tide staff at Tacoma
18.5 ft. below B.M. 19

Height of mean high water above plane of reference is 10.9 feet.

Condition of records satisfactory except as noted below:

Hall

Acting Chief, Division of Tides and Currents.

Form M-238

MEMORANDUM

IMMEDIATE ATTENTION

SURVEY
DESCRIPTIVE REPORT
~~PHOTOSTAT OF~~

No. H -6200
~~No. T~~

received May 20, 1937
registered June 3, 1937
verified
reviewed
approved

This is forwarded in order that your attention may be directed to the matters as indicated below. Please initial in column 3 as an acknowledgement that your attention has been thus directed. The complete original records are available if desired. If you cannot give this your immediate attention, please initial, note, and forward to the next section marked, calling for the records at your convenience.

ROUTE		Initial	Attention called to
20			
22			
24			
✓ 25		CKG	sent notice
26			
✓ 30		ws	page 4
40			
62			
63			
82			
83			
88			
90			

RETURN TO

82	C. K. Green

page 4

Section of Field Records

REVIEW OF HYDROGRAPHIC SURVEY NO. H-6200 (1936) FIELD NO. 4

Tacoma Harbor, Puget Sound, Washington
Surveyed in August 1936, Scale 1:5,000
Instructions contained in letters dated Mar. 29 and Oct. 16, 1934
(EXPLORER)

Hand Lead and Machine Soundings. 3 Point fixes on shore signals.

Chief of Party - G. C. Jones.
Surveyed by - L. C. Wilder.
Protracted by - E. C. Baum.
Soundings plotted by - E. C. Baum.
Verified and inked by - L. A. McGann.

1. Condition of Records.

The records are neat and legible and conform to the requirements of the Hydrographic Manual.

The Descriptive Report (page 2, Control) requests that the transfer of shoreline and topographic signals from T-6444 (1935) on the north be checked in the office from the original survey. This was accomplished; of these, signal Amos, Bus, Cart and Dock in the vicinity of latitude 47° 18', longitude 122° 26' were found to be about 5 m. S, SE or E of their correct position and signals Mac, Cork and Lena in the vicinity of latitude 47° 17.2', longitude 122° 29.2', being 3 to 5 m. S or W of their correct position. These were corrected in the office. Since these differences affected the hydrography but very little (about 5 m.) no changes in smooth plotting were made.

The Descriptive Report is clear and satisfactorily covers all items of importance, except that no mention or disposition was made of charted items discussed in paragraph 8a(1) of this review.

2. Compliance with Instructions for the Project.

The plan, character and extent of the survey satisfy the instructions for the project.

3. Shoreline and Signals.

The shoreline and signals are from plane table surveys: T-6444 (1935), T-6540 (1935-36), T-6541 (1936), T-6542 (1936) andT-6543 (1936).

4. Sounding Line Crossings.

No general system of cross lines was run but those that were, as well as the adjacent lines show good agreement.

5. Depth Curves.

Within the limits of the survey, the usual depth curves may be satisfactorily drawn.

6. Junctions with Contemporary Surveys.

a. The junction on the north with H-5932 (1935) is satisfactory.

b. The junction on the south with H-6201 (1936) is satisfactory. The shoal area (inclosed by 30 foot curve) with least depth of 14 feet in latitude 47° 16.25', longitude 122° 25.9' was dredged to a depth of 30 feet at MLLW subsequent to the present survey (see Descriptive Report, page 2). The condition after dredging is shown on H-6201 (1936). The major portion of the overlap between the two surveys is shown on the present survey but in the vicinity of the dredged area the overlap is shown on H-6201 (1936), a junction having been made with the soundings from the present survey just outside the dredged area. For charting purposes, H-6201 (1936), including the soundings transferred from H-6200 (1936) should supersede the latter survey in the dredged area.

7. Comparison with Prior Surveys.

a. H-1381 (1877).

A portion of this 1:10,000 scale survey covers the entire area of the present survey. Considerable changes in shoreline are noted to the southeastward, none of the dock improvements shown here on the present survey being shown on the old survey. In the inshore area, a number of depths vary 1 to 25 feet deeper than the present survey and are probably due to the rapidly sloping character of the bottom since the present survey usually shows similar depths just close by. In the deeper part of the bay most of the soundings fall in depths as much as 70 feet shoaler on the present survey. These discrepancies are probably due to the different methods of sounding. The soundings on the present survey were obtained with a sounding machine and would be less affected by currents, because of the heavier lead, than the leadline used on the 1877 survey. The present survey should supersede this survey in future charting.

b. H-1426a (1875).

A small portion of this 1:20,000 scale survey falls just within the northwestern limits of the present survey. A comparison of the soundings with the present survey shows disagreements varying 20 to 35 feet shoaler than the latter survey. These differences noted are probably partly the result of enlarging the old survey to the scale of the present survey and partly the result of the rapidly sloping bottom.

The present survey should supersede H-1426a (1878) in future charting.

c. H-2204 (1895).

A portion of this 1:2,500 scale survey covers a small part of the present survey in latitude 47° 16.0', longitude 122° 26.3'. The sheet contains no projection although the work is based on two triangulation stations spaced about 1/4 mile apart. On the west shore, general changes in dock detail are noted. In the deeper portion of the bay, the depths are generally borne out by the present survey. Although the 1895 survey is on a larger scale, the present survey bears out the essential details and is adequate for charting purposes in this area on the present scale of the chart (1:15,000). The present survey should supersede this survey in future charting.

d. H-2251 (1892) and H-2986 (1909)

These 1:10,000 scale surveys each contain fringes of soundings extending 100 meters to 1/2 mile offshoreward in Commencement Bay, most of which fall within the area of the present survey. Inasmuch as the area covered is in the vicinity of a rapidly sloping bottom, no adequate comparison of depths can be made. It is noted, however, that the depths are generally borne out by the present survey except in latitude 47° 16.3', longitude 122° 25.9' where the present survey shows an extensive shoal area with a least depth of 14 feet where formerly depths of 100 to 150 feet were shown on H-2251 (1892). Several important soundings noted on H-2251 (1892) are:

(1) A 29 foot sounding (not charted) in latitude 47° 16.85' longitude 122° 28.3', falls in depths of 50 to 60 feet on the present survey and is too shoal. The 29 is a single sounding on line (pos. 9 to 10b red), other soundings on which line are in good agreement with the present survey depths. The original recorder's entry, however, is 7 fathoms, 4 feet and was possibly confused with 11 fathoms 4 feet since the latter depth (53 feet, reduced) would agree favorably with the surrounding depths. The 29 should be disregarded in future charting.

(2) An 110 foot sounding (not charted) in latitude 47° 16.6', longitude 122° 27.5', falls in undeveloped depths of 140 to 250 feet on the present survey. The 110 is a single sounding on line, pos. 17k, green, which position is noted as being "at 2nd buoy from north" and is not accompanied by a 3 point fix. The buoy, however, was located at pos. 82a, red and the accompanying sounding of 138 feet (not plotted) corroborates the original 110 shoal indication. The possibility of a shoal existing here is further borne out by the fact that other sound-

ings on line 82 to 83a show deeper depths on the inshore side. The 110 has been carried forward on the present survey and should be used in future charting.

(3) The 117 foot sounding (not charted) in latitude 47° 16.5', longitude 122° 27.2', falls in an open area in depths of about 180 feet on the present survey. The 117 is a single sounding on line (pos. 73-74a, red) run in an inshore direction. The next inshore sounding after the 117, however, is 146 feet and indicates that the 117 is a detached shoal indication. Inasmuch as the development on the present survey, as well as other surveys in this area is not sufficient to verify or disprove the 117, it is being carried forward and should be used in future charting. In this connection, no reliance can be placed in the recorded time intervals as a means of plotting because the soundings as plotted appear to be obtained at definite intervals whereas actually the depths are such that the boat would be required to stop, the interval consumed in stopping not being recorded. In transferring the 117 to the present survey, the other soundings on line were plotted on the present survey in relation to the intermediate depth curves and the 117 then placed in relation to the other soundings on line which position differs slightly from that on the old survey.

(4) The 117 foot sounding (not charted) in latitude 47° 16.5', longitude 122° 27.1' falls in undeveloped depths of 160 to 300 feet on the present survey and is too shoal. The 117 is a single sounding on a line (pos. 22 to 23 k, green) run in an inshore direction, other soundings on which vary 20 to 130 feet deeper than the surrounding depths on both the present survey and the 1892 survey, and indicate a general displacement in position. The location of this line is further questioned by the fact that the offshore end, pos. 22k, is noted as being "at 4th buoy" and is not accompanied by a 3 point fix. Furthermore, a search of the sounding records failed to reveal a position for or mention of a buoy in this location. This shoal line should be disregarded in future charting.

Except as noted above, the present surfey should supersede these surveys in future charting.

e. <u>H-3426 (1912-13) and H-4079 (1918-19).</u>

These 1:5,000 scale sheets are each developments of portions of or the entire area between the docks and the 150 foot curve, portions of each falling within the limits of the present survey to the south and southeastward. The depths are generally borne out by the present survey except in latitude 47° 16.25', longitude 122° 25.9' and latitude 47° 17.2', longitude 122° 24.8', where the present survey shows a shoaling of 9 to 27 feet and 1 to 10 feet in general depths of 40 to 110 feet and 25 to 34 feet respectively on H-4079 (1918-19)

The 54 foot sounding (not charted) on H-3426 (1912-13) in latitude 47° 16.3', longitude 122° 25.7' falls in depths of 88 feet, sloping bottom, on the present survey. The 54 is a single sounding on line (pos. 23 to 24d, green) and is accompanied in the sounding records by the notation "Leadsman said OK at time but the difference is too great. See Pos. 10f day". On f day, a detached position with a no-bottom sounding of 102 feet was obtained directly on the 54 but no disposition was made of the original 54. Inasmuch as other surveys covering this area show no indication of a shoal here, the 54 is considered erroneous and should be disregarded in future charting.

The present survey should supersede these surveys in future charting.

f. <u>H-4751 (1927-28) and H-4752 (1928)</u>.

These surveys are on scales of 1:5,000 and 1:10,000 respectively and taken together cover the inshore area inside of the 60 foot curve in Commencement Bay. Some displacements are noted due to the rapidly sloping bottom near shore, but the essential hydrographic details are borne out by the present survey. The shoal with 23 feet over it on H-4751 (1927-28) in latitude 47° 16.3', longitude 122° 25.9' has shoaled to 14 feet on the present survey. Other matters of importance are:

(1) The unsurveyed booming ground on the present survey in approximate latitude 47° 17.5', longitude 122° 24.75' is covered by the above 1927-28 surveys. A comparison of depths at the junctions of the present survey with these surveys shows agreements within 1 to 3 feet. Until this area is resurveyed, the soundings on H-4751 and H-4752 should be used to supplement the present survey for charting purposes in this area.

(2) The 7 mooring buoys (charted) on H-4751 (1927-28) in latitude 47° 16.6', longitude 122° 25.2' were not verified on the present survey. The Descriptive Report states that there is only one mooring buoy off Tacoma's waterfront (on H-6201) and ~~that~~ it is assumed that this reference also includes the seven mooring buoys falling within the limits of the present survey.

Except as noted above (par. (1)), the present survey should supersede the above surveys in future charting.

8. Comparison with Chart 6407 (New Print dated July 27, 1937).

a. Hydrography.

Hydrography shown on the chart originates with surveys discussed in previous paragraphs of this review and portions of several U. S. Engineers' surveys. Inasmuch as the few soundings from the Engineers' surveys also fall in the common area at the junction with H-6201 (1936) and have been discussed in the review of that sheet (par. 8a), further discussion in this review is omitted. An exception, however, is the charted 52 and 53 foot soundings in latitude 47° 16.9', longitude 122° 24.9', which originate with blueprint 29427 (March 1936) and fall outside the limits of H-6201 (1936). These soundings are in good agreement with the present survey depths. The present survey should supersede this Engineers' survey in future charting. Other matters needing consideration in this paragraph are:

(1) A number of charted piles or dolphins originating with T-4321 (1927) are not shown on the present survey or on T-6444 (1935). They should have been mentioned or disposed of in the respective Descriptive Reports. However, since other charted piles were located on the present survey or on T-6444 (1935) it is assumed that the present survey correctly shows these features. The piles have not been carried forward and should not be charted.

(2) The booming ground limits as well as the two mooring buoys to the NW in latitude 47° 17.4', longitude 122° 24.8' originate with Chart Letter 663 of 1933. The Descriptive Report (page 3) states that the limits of this area is changeable, that the buoys or aids are moved from time to time and that the limits on the hydrographic sheet which is subsequent (2 months) to the delineation on T-6540 (1936) differs slightly for this reason. The present survey verifies the northwestern most buoy but not the other which has undoubtedly been removed. The booming ground limits also differ considerably from that charted and slightly from the topographic delineation. The present survey delineation should supersede the above information in future charting.

b. Aids to Navigation.

Buoys and beacons located on the present survey are in substantially the same positions as charted except the two beacons in latitude 47° 17.2', longitude 122° 24.7' which were located 25 to 35 m. SE of their charted positions. The charted position of the northeasterly and southerly beacons originate with Lighthouse Notice to Mariners 48 (1929) and 24 (1934) respectively and are based on bearings and distances to known features which are NOT as accurate as the triangulation positions on the present survey. These two aids in either case as well as the others satisfactorily mark the features intended.

The fog siren shown on the present survey in latitude 47° 16.6', longitude 122° 27.6', was located 100 m. NW of its charted position. The charted position which originates with Notice to Mariners 31 of 1930 is located by a single bearing and distance (2650 yards) from another known feature and is not as accurate as the present survey information.

9. Field Plotting.

Field protracting and plotting were accurate and conform to the requirements of the Hydrographic Manual.

10. Additional Field Work Recommended.

When work is again resumed in this locality, the following additional work should be accomplished:

a. An examination should be made of the undeveloped 110 foot sounding in latitude 47° 16.6', longitude 122° 27.5' and the 117 in latitude 47° 16.5', longitude 122° 27.2', which were carried forward to the present survey and are discussed in paragraphs 7d (2) and 7d (3) respectively of this review.

b. If feasible, the booming ground area in the vicinity of latitude 47° 17.5', longitude 122° 24.75', discussed in par. 7f(1), this review, should be developed in more detail.

11. Note to Compiler.

The compiler's attention is called to the following paragraphs of this review:

a. Par. 6b, regarding the use of soundings on the dredged shoal.

b. Par. 7f(1) relative to the use of H-4751 (1927-28) and H-4752 (1928) for charting purposes.

c. Par. 7f(2) relative to the charted mooring buoys in latitude 47° 16.6', longitude 122° 25.2'.

d. Par. 8a(1) relative to charted piles.

e. Par. 8a(2) relative to the more recent booming ground limits and associated aids to navigation shown on the present survey in the vicinity of latitude 47° 17.4', longitude 122° 24.8'.

12. Superseded Prior Surveys.

Within the area covered the present survey, with the indicated additions from previous surveys, supersedes the following surveys for charting purposes:

H-1381	(1877)	in part	
H-1426a	(1878)	" "	
H-2204	(1895)	" "	
H-2251	(1892)	" "	
H-2986	(1909)	" "	
H-3426	(1912-13)	" "	
H-4079	(1918-19)	" "	
H-4751	(1927-28)	" "	(except as noted in par. 7f(1) this review)
H-4752	(1928)	" "	" " " " " 7f(1) " "

13. Reviewed by - Harold W. Murray, Oct. 28, 1937.

Inspected by - A. L. Shalowitz.

Examined and approved:

C. K. Green, C. K. Green
Chief, Section of Field Records.

L. O. Colbert
~~Fred. R. Peacock~~
Chief, Section of Field Work.

Chief, Division of Charts.

G. T. Rude
Chief, Division of H. & T.

Applied to Cht. 6407 May 19, 1938 K.P.
" " " 6460 July 12, 1938 K.P.