5583

Diag. Cht. No. 6380.

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey Topographic

Field No. Ph-26(47) *Office No.* T-5583 N & S

LOCALITY

State Washington

General locality Bellingham

Locality Lummi Bay

1947 49-52

CHIEF OF PARTY

C.W.Clark; Chief of Field Party
H.A.Paton, Baltimore Photo. Office

LIBRARY & ARCHIVES

DATE June 24, 1959

8-1870-1 (1)

5583

DATA RECORD

T - 5583

Project No. (II): PH-26(47) Quadrangle Name (IV): LUMMI BAY

Field Office (II): Bellingham, Washington Chief of Party: Lt. Comdr. C. W. Clark

Photogrammetric Office (III): Baltimore, Md. Officer-in-Charge: Hubert A. Paton

Instructions dated (II) (III): 31 August 1949
Letter No. 731-aal, Dated 24 October 1949
Supp. 1, dtd 21 July 1950
Supp. 2, dtd 16 Jan 1951

Copy filed in Division of Photogrammetry (IV)
Office Files

Method of Compilation (III): Air photographic (multiplex)

Manuscript Scale (III): 1:10,000 Stereoscopic Plotting Instrument Scale (III): 1:10,000

Scale Factor (III): 1.000

Date received in Washington Office (IV): JUN 25 1951 Date reported to Nautical Chart Branch (IV): JUN 29 1951

Applied to Chart No. Date: Date registered (IV): 19 Mar 1959

Publication Scale (IV): Publication date (IV):

Geographic Datum (III): N.A. 1927 Vertical Datum (III): MSL

Mean sea level except as follows:
Elevations shown as (25) refer to mean high water
Elevations shown as (5) refer to sounding datum
i.e., mean low water or mean lower low water

Reference Station (III): SANDY, 1949

Lat.: 48° 47' 16.100" Long.: 122° 42' 23.466" Adjusted

Plane Coordinates (IV): State: Washington Zone: North

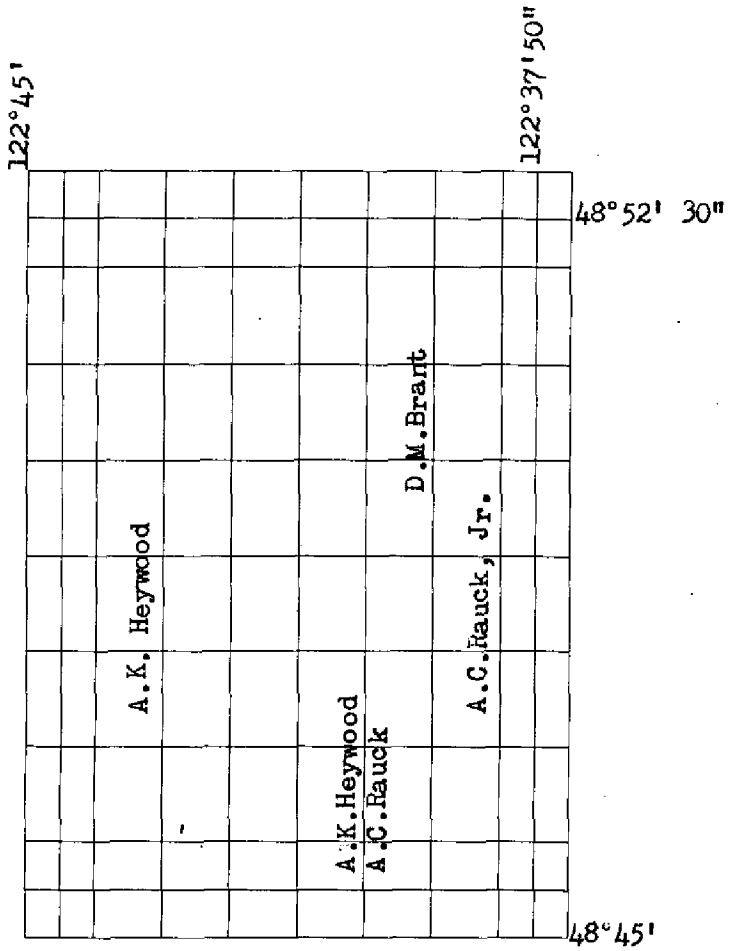
Y= X=

Roman numerals indicate whether the item is to be entered by (II) Field Party, (III) Photogrammetric Office, or (IV) Washington Office.

When entering names of personnel on this record give the surname and initials, not initials only.

1

M-2618-12(4)



Areas contoured by various personnel
(Show name within area)
(II) (III)

DATA RECORD

Field Inspection by (II): John C. Lajoye
Roy A. Davidson
Date: Dec. 1949

Planetable contouring by (II):
Date:

Completion Surveys by (II): Ray H. Skelton II
Date: Mar 1952

Mean High Water Location (III) (State date and method of location):
June 4, 1949 (Date of photography)

Projection and Grids ruled by (IV): A. K. Heywood
Date: Sept. 1950

Projection and Grids checked by (IV): H.P.Eichert
Date: Sept. 1950

Control plotted by (III): A. K. Heywood
Date: Sept. 1950

Control checked by (III): H.P.Eichert
Date: Sept. 1950

Radial Plot or Stereoscopic Control extension by (III): A.K.Heywood, A.C.Rauck, Jr.
Date: Oct. 1950
Aug. 1950

Stereoscopic Instrument compilation (III):
Planimetry A.K.Heywood, A.C.Rauck, Jr.
Contours D.M.Brant
Date: Oct.1950
Aug. 1950
Date:

Manuscript delineated by (III):
A.K.Heywood
A.C.Rauck,Jr.
D.M.Brant, Jr.
B.A. Dew
Oct. 1950
Date: Aug. 1950
Nov.1950
Dec.1950 - Jan.1951

Photogrammetric Office Review by (III):
A.K.Heywood
Date:
Feb. 1951

Elevations on Manuscript checked by (II) (III):
A.K.Heywood
Date:
Feb. 1951

Camera (kind or source) (III): U.S.C.& G.S. Camera Type "O" focal length 152.37

PHOTOGRAPHS (III)

Number	Date	Time	Scale	Stage of Tide
1161-1165	6-4-49	12:00	1:24,000	4.2 above MLLW
1157-1158	6-4-49	11:52	"	5.4 " "
1185-1190	6-4-49	12:18	"	4.1 " "
1193-1202	6-4-49	12:27	"	3.9 " "
1374-1375	6-4-49	14:32	"	1.9 " "

Tide (III)

From table of predicted tides

Reference Station: PORT TOWNSEND, WASH.
Subordinate Station: BELLINGHAM, WASH. **
Subordinate Station: BLAINE, SEMIAMOO BAY

Diurnal

Ratio of Ranges	Mean Range	Great Diurnal Range
	5.1	8.3
1.0	5.2	8.6
1.2	5.9	9.5

Washington Office Review by (IV): Everett H. Ramey Date: 4 Aug 1954

Final Drafting by (IV): John H. Frazier T-5583-S Date: JAN 6, 1959
John H. Frazier T-5583-N FEB 24, 1959

Drafting verified for reproduction by (IV): Date:

Proof Edit by (IV): Date:

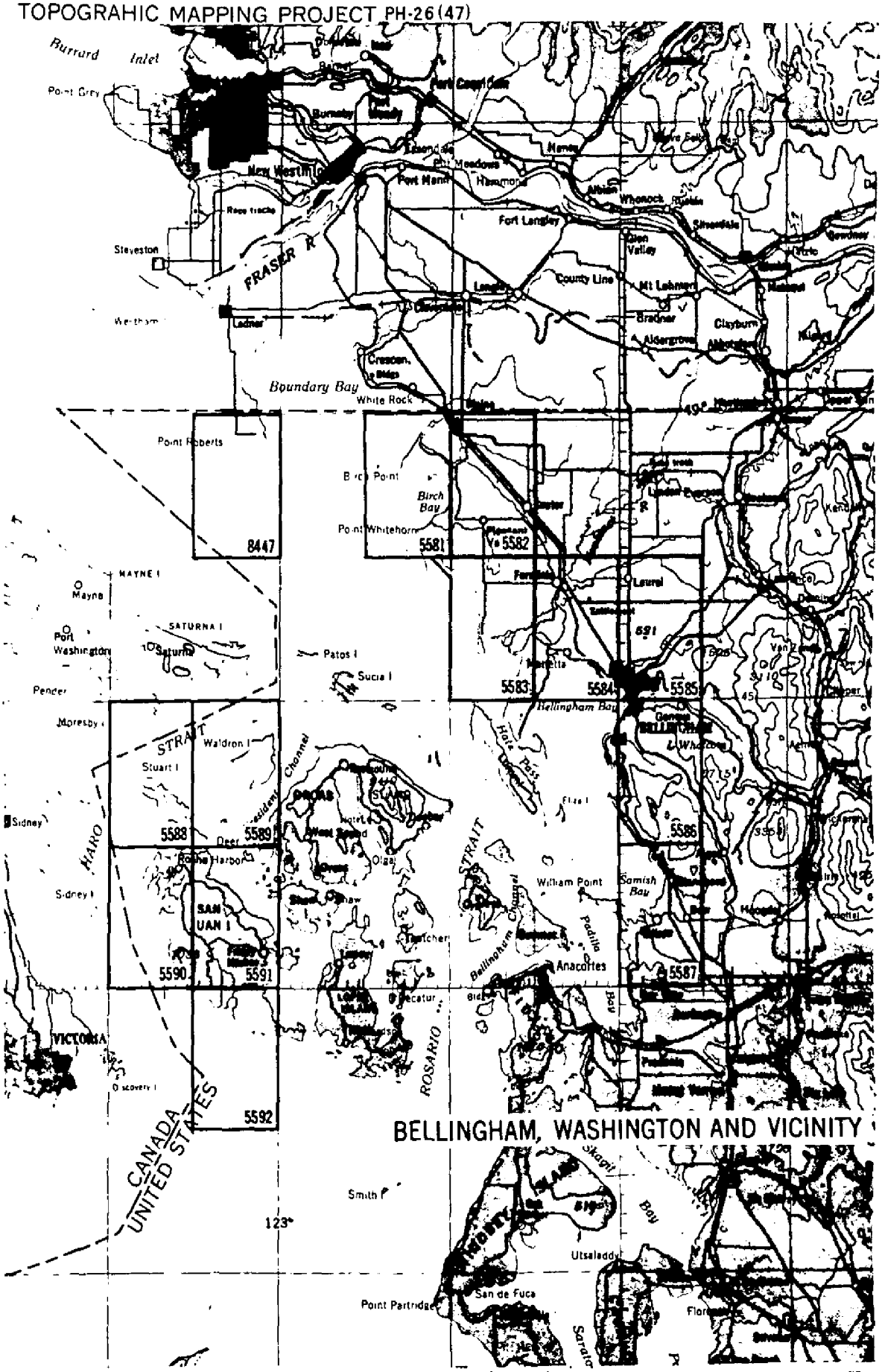
Land Area (Sq. Statute Miles) (III): 31
Shoreline (More than 200 meters to opposite shore) (III): 15.2
Shoreline (Less than 200 meters to opposite shore) (III): 7.6
Control Leveling - Miles (II): 22
Number of Triangulation Stations searched for (II): 15 Recovered: 7 Identified: 2
* Number of BMs searched for (II): 7 Recovered: 5 Identified: 5
Number of Recoverable Photo Stations established (III): 14
Number of Temporary Photo Hydro Stations established (III): 0

* Remarks: Numbers of BMs searched for - 6

The difference is due to BM 66 R.S. USGS being listed with this quadrangle while actually its location is within T-5584.

** The height of MHW referenced to MLLW is 7.8 ft. ENR

TOPOGRAHIC MAPPING PROJECT PH-26(47)



Summary To Accompany Topographic Map T-5583

Topographic map T-5583 is one of thirteen similar maps in project Ph-26(47). It covers Lummi Bay and vicinity, all within Whatcom County, Washington.

Project Ph-26 is a multiplex mapping project. Field work in advance of compilation included the establishment of some additional control, shoreline and interior inspection and the investigation of political boundaries, land lines and geographic names.

Map T-5583 was compiled in two parts at a scale of 1:10,000 using single-lens aerial photography taken in 1949. The contour interval is 20 feet. The entire map was field edited. After the addition of hydrographic information the map will be forwarded to the Geological Survey for publication as a standard topographic quadrangle map covering 7½ minutes in latitude by 7½ minutes in longitude.

Items registered under T-5583 will include a descriptive report and ~~cloth backed~~ Ozalids copies of the map manuscript (2 parts) and the published map.

FIELD INSPECTION REPORT
for
Quadrangles T-5583 and T-5584

2: Areal Description:

The area covered by these sheets roughly follows the alluvial plain of the Nooksack River, and covers the northwestern portion of the city of Bellingham.

In T-5583, the major portion of the sheet lies in the delta area of the Lummi River. This area is low, flat and largely agricultural. Toward the west, the land rises to form the south projection of the ridge lying between the Nooksack River and Georgia Strait, mentioned in the report for Sheets T-5581 and T-5582. In the southeastern section of this sheet and in the extreme southwest portion of T-5584, the Lummi Peninsula rises above the delta area of the Lummi and Nooksack Rivers and continues southwesterly to the shores of Hale Passage.

The low areas of these sheets are drained by numerous small ditches which flow into existing sloughs, the remnants of the original drainage pattern. In T-5583, the low area at the mouth of the Lummi River has been recently reclaimed and is protected from the tidal effects of Lummi Bay by an earthen dike, augmented in places by an outer line of piling driven to protect the dike from erosion. The drainage is accomplished through tide gates and culverts raised slightly above the normal water table of the area.

In the drainage plain of the Nooksack River, near the mouth, and on the west side, from the confluence of the Nooksack and Lummi Rivers to Ferndale, a small low dike has been built which varies in height from three to eight feet.

The balance of the flood plain is subject to seasonal inundation caused by excessive rain or melting snow in the mountains of the Cascade Range.

The principal streams in the area are the Nooksack River and the Lummi River. At one time the Lummi River was the westernmost mouth of the Nooksack but during the reclamation of the delta area, this stream was blocked by an earth and pile dike, and now serves only to carry off drainage from the area west of the Nooksack River.

The Lummi Indian Reservation falls in the south portion of T-5583 and extends into the southwest portion of T-5584. The reservation office, school, and church are located at the junction of Lummi Shore Road and Chief Kwina Road.

Through intermarriage, and through the sale or lease of various lands, portions of the reservation have passed to private ownership, as Neptune Beach, a small group of summer cottages on Georgia Strait, just north of Sandy Point.

The principal industries in the area of these quadrangles are agriculture and lumbering. The higher areas have been extensively logged, and, where not cultivated, are now covered by brush and second growth conifers.

The largest town in the area is Bellingham, Washington, the north portion of which falls in the southeast corner of T-5584.

Ferndale, a corporate town, lies in the northwest portion of T-5584. It has no industries, other than a milk conversion plant, and subsists primarily on the business of the surrounding agricultural area.

Marietta, in the southwest corner of T-5584, is a small settlement of fishermen and part Indians. There is no large industry, although an area of abandoned piling at Fish Point, on Lummi Peninsula, indicates that this was an important log storage area.

U.S. Highway 99 runs diagonally across sheet T-5584 to Ferndale where it turns and runs north to the limits of the sheet. This is the principal road in the area, although the old road system, existing prior to the construction of the highway is still in use and in good condition.

The entire area is interlaced with well maintained gravel, concrete or macadam roads which follow the sectionalized pattern of the country.

The Great Northern Railway runs along the east side of Bellingham Bay, in the southeast corner of T-5584, leaves the bay and runs northwest to Ferndale, where it turns north and leaves the area.

In the vicinity of the portion of Bellingham which appears on the southeast corner of T-5584, there are several features which are worthy of note. The first, and most important of these is the Squalicum Creek Waterway and Fill. This is a large area of land reclaimed and filled by dredged material. The deep area, accomplished by the dredging, has been well bulkheaded and jettied and now provides docking facilities for numerous yachts, and fishing boats. The land area has developed into an area of small shipyards, gasoline storage tank, lumber mills, stores and fish canneries. There is also an ice plant, operating in conjunction with the canneries. The entire area is under the jurisdiction of the Port Authority of the City of Bellingham.

In the same area, slightly northwest of the above mentioned feature lies the large plant of the Olympic Portland Cement Company. This plant has been variously identified by previous parties as a grain elevator or a sugar refinery. It was definitely determined by this party to be a cement plant.

There is considerable new construction of residence type in the area adjacent to the urban limits of the town of Bellingham and special attention should be paid to this phase during field edit.

Photograph coverage within the project limits was complete and adequate.

With regard to the interpretation of detail on the photographs, a densely wooded area of deciduous trees has a lighter grey and more uniform tone than a corresponding area of coniferous trees. Deciduous trees, mostly about 40 feet high abound in the areas which have been extensively logged, and in lower areas without definite drainage. Conifers are generally found in isolated groups where cutting has not been as extensive, or in private wood lots.

A mottled area of light grey, and dark lines indicates a mixture of deciduous and coniferous trees, while a solid light grey indicates a brushy area.

In areas near the water, a light pebbled effect indicates a mixture of brush and small willows, grey or white spots indicate rocks, and white along the shoreline indicates small boulders and gravel along the beaches.

The various natural features have been delineated on the field inspection photographs a sufficient number of times so that the office personnel should be able to interpret any unnoted feature.

3: Horizontal Control:

(a) Supplemental Control established by this party is as follows:

T-5583

Sandy 1949 - established in the vicinity of "Lummi South Base 1853" as required by Project Instructions.

T-5584

Pearson 3, 1949 - established in the vicinity of Pearson (IBC) 1905 as required by Project Instructions.

T-5584

Bellingham Breakwater Entrance Light, 1950 - established to locate fixed aid to navigation.

Squalicum Creek Entrance Light, 1950 - established to locate fixed aid to navigation.

Lumi, 1949 (Topographic) - for photograph control as required by Project Instructions.

Positions were determined by third-order triangulation methods except Lumi, which is fourth-order.

(b) No datum adjustments were made by the field party. Positions of all horizontal control recovered are on N.A. 1927 datum.

(c) Control stations used and not established by the Coast and Geodetic Survey are all U.S. Engineer Department triangulation and traverse stations.

Traverse stations T-1, T-2, T-9, T-10, T-21, T-22 and T-29, are all on a traverse along the Nooksack River. These stations are reported to be of third-order accuracy.

Traverse stations M-1 to M-13, inclusive and several others in the vicinity of Bellingham Airport were established during a survey of Bellingham Airport. All stations on the airport survey are reported to be of third-order accuracy.

Station BUSWELL is a third-order triangulation station.

Geographic positions or plane coordinates of U.S.E. stations are all on N.A. 1927 datum and no datum adjustment is necessary.

Additional U.S. Engineer Department control in the Nooksack River valley shown on Project Index and U.S. Engineer Department sketches was reported to be of less than third-order accuracy and not permanently marked. No search was made for stations not reported on Form 526.

All U.S.E. control data was obtained from the Seattle office of the U.S. Engineer Department. An itemized list of the data furnished is listed under side heading 14: "Special Reports and Supplemental Data".

(d) All stations required by the project instructions and several others were identified.

(e) All Coast and Geodetic Survey Stations within the project limits were searched for. Recovery was extended to the northern portions of Lummi Island, which lies outside the western and southern limits of T-5583 in order to control a diagonal flight strip in the area.

The following Coast and Geodetic Survey stations in the area were not recovered.

Quadrangle T-5583

Bend 2, 1859
Fern 1888
Lummi Astro Station 1853
Lummi North Base 1853
Lummi North 1853
River 2, 1859
Village Point 1887
Lummi South Base 1853

These old stations have not been adjusted to 1927 NA datum. EWR

Quadrangle T-5584

Seattle-Vancouver Airway Beacon No. 9, 1941
Bank, 1927
Crib 2, 1914
Pearson (IBC), 1905
Bellingham, Derrick, 1914
Bellingham, Meander Corner, 1927

Seattle-Vancouver Airway Beacon No. 9, 1941 (at Bellingham Airport)* is reported destroyed and has been identified. It was destroyed in a storm in January 1950 after identification.

* A third-order position was established for the rebuilt beacon in 1950. EWR

4: Vertical Control:

(a) List of Bench Marks Recovered:

T-5583

	B.M.	Est. By	Accuracy	
	188 B	USGS	3rd Order	
T-5584	66 RS	"	" "	
	76 RS	"	" "	S. of T-5583
	9.0	"	" "	
	68 RS	"	" "	

T-5584

49.93	USGS	3rd Order	
21 5R	"	" "	
31.01	"	" "	
L-6 (Reset)	?	?	

T-5584

B.M.	Est. By	Accuracy
64 RS	USGS	3rd Order
35.1	"	" "
128.1	"	" "
63 BRS	"	" "
63.2	"	" "
BUSWELL	USE	" "
49 3 R 1938	USGS	" "
65 RS	"	" "
63 4R	"	" "

Elevations of all bench marks are based on the 1929 General Adjustment.

No bench marks were established by this party.
Additional BMS established by C&GS in 1952. Listed under § 69, Descriptive Report for T-5584 title.
U.S. Engineer Department bench marks in the Nooksack River valley shown on the Project Index and U.S. Engineer Department sketches were reported to be of less than third-order accuracy. These were not searched for except for several traverse stations used for horizontal control.

(b) All topographic levels in this area were run by trigonometric methods, using Kern Theodolite #36563. All lines started and closed on USE or USGS bench marks, or on fly line level points established and adjusted in accordance with the Project Instructions.

Elevations were established within the squares, which were blocked off in blue on the 1:25,000 contact prints, on points which were level for a distance of at least 3 meters in all directions. These points were numbered consecutively on the photographs, the points shown at the intersection of the crosslines inked in brown being the center of the level spot. Elevations in T-5583 were computed and checked in "Wye Leveling Book A", then transferred to the photographs and verified. A complete index of all points established in Quadrangles T-5581, T-5582, T-5583 and two points in T-5584 with the elevation and the photograph number of the picture bearing the data is listed in the front of the book. Each point whose elevation is recorded in this volume has the suffix "A" indicating the volume in which the line is recorded. viz.8301 A.

Elevations in T-5584, with the exception of the two points recorded in Vol. A were recorded in "Wye Leveling Book B" after being computed and verified. All points in this quadrangle were transferred to the photographs and verified. An index of the points established in T-5584, with the exception of the two points previously mentioned, with the elevation and the photograph number of the picture bearing the data is listed in front of the book.

Topo level points recorded in Level Book B include 8501 in T-5585 and 8421 north of T-5585.

Each point recorded in Volume B has the suffix B. Viz. 8403 B.

Where the trigonometric level lines were not used as a basis for further leveling, and where the error was less than two feet, as specified in the Project Instructions, the lines were not adjusted.

In addition to the elevations established by trigonometric leveling, areas near recovered bench marks were noted and the difference in elevation between the bench mark and the area was listed on the ratio prints.

(c) The first and last designated level points for each sheet are as follows:

T-5583	8301 A - 8321 A Incl.
T-5584	8401 A, 8402 A to 8433 B Incl.
T-5585	8501 B

5. Contours and Drainage:

Contouring is inapplicable. See §34

All drainage was investigated in the field and verified under the stereoscope. Small ditches in fields, where the drainage had no pattern, or was of minor importance, were omitted or deleted.

6. Woodland Cover:

Woodland cover was classified in accordance with Photogrammetry Instruction 21, dated 8-18-48. In areas where it was felt that the multiplex would be unable to read a ground elevation occasionally, the height of trees was estimated and was recorded on the field photographs.

7. Shoreline and Alongshore Features:

The shoreline was inspected in accordance with "Supplemental Instructions - Shoreline Inspection" dated 18 March 1944, by walking the shoreline, and from a boat kept close to shore.

The datum plane of the photographs is such that the low water line is not visible, and it was not delineated. Where extreme low tides exposed mud flats, sand or gravel bars, these were noted on the field photographs.

At the north limit of T-5583, high bluffs front along Georgia Strait to the north limit of Neptune Beach, where the bluff line turns to the southeast. These bluff heights were estimated and noted on the field photographs.

The continuation of the shoreline south of the bluff area referred to above is a low sand and silt covered area of gravel known as Sandy Point, which forms the west limit of Lummi Bay. At the north end of this low area, and on the east side of the point, the bluff area referred to, again fronts on the high water line and turns northeast away from the shore. At the point where the bluffs leave the high water line, an earthen dike, protected by a bulkhead of driven piling protects the reclaimed area at the head of Lummi Bay and the mouth of the Lummi from erosion and the tidal effects of the bay. This dike area extends to the east for about 2 miles until it reaches the higher land that forms the west side of Lummi Peninsula and the east side of Lummi Bay. The shoreline from the east edge of the dike, along the peninsula to the south limit of the sheet is along banks of varying height from 5 to 20 feet. The shoreline was classified beyond this point to assist in chart revision if desirable.

Lummi Bay is a shallow expanse of extended mud flats at low water and is navigable only by small boats and experienced boatmen.

On the west side of Bellingham Bay, at the southwest edge of T-5584, the shoreline runs along the base of bluffs at 30 to 60 foot heights. This bluff area continues north to Fish Point, where the sedimentary deposits of the Nooksack River have formed a low marshy and muddy area. The various mouths of the river, have at one time or another, scoured out innumerable channels, and are continually building further into the bay. In the past 20 years, an attempt was made to more properly direct the scouring action with the result that several of the mouths of the river were closed, and the greater volume of water concentrated into one stream. However, this has merely resulted in extending the delta area further into the bay and in building the low flat area to the east of the present river mouth. It is interesting to note that the mouth of the original channel of the Nooksack River is, to all intents and purposes, the mouth of the present channel.

The west shoreline of the Nooksack River, from its confluence with the Lummi River, now blocked by a dam, to the town of Ferndale, runs along a dike varying in height from 3 to 6 feet. Above Ferndale, and all along the east side of the river, no dikes have been built. In some areas piling have been driven to counteract the erosive action of the water. In its high stages, the river rises above its banks, flooding the area northeast and southeast of Ferndale. Twice, in the time that this party has been in the area, the fishing village of Marietta has been flooded to a depth of two feet.

From the easterly mouth of the Nooksack River, the shoreline runs east along the base of bluffs estimated from 40 to 80 feet in height to the mouth of Squalicum Creek.

At the mouth of this creek, a dredged fill and basin area have been constructed, protected by pile bulkheads and rock breakwaters. The creek itself has been diverted to the south to enter the bay parallel to the shoreline. A rock jetty runs almost east and west across the basin area, and another rock jetty runs southwest from the shore to offer protection from the southerly storms.

All features were carefully investigated and appropriate notes were made on the field photographs.

8. Offshore Features:

The piling noted at the head of Lummi Bay for protection of the earthen dike, and the mud flats in the area have already been mentioned. In the area offshore from Fish Point, at the west side of Bellingham Bay, there is a large area of old piling, used at one time as a storage area for log booms. However, the building of the Nooksack delta has made the area so shallow that it is no longer in use.

Offshore piling were noted in the area near the site of old Fort Bellingham and several piling were located by theodolite cuts from identifiable photo points.

Along the shores of Georgia Strait numerous rocks were noted offshore from the high water line. The height above the stage of tide and the time of observation were noted on the field photographs.

9. Landmarks and Aids:

(a) Three new landmarks for nautical charts were recommended. None were deleted. The several stacks listed on Form 567 are now charted as chimneys. These objects are stacks as defined on page 45 of the Nautical Chart Manual and are not chimneys.

Form 567 submitted with this report includes landmarks in T-5585 and T-5586 in addition to those in the area covered by this report.

(b) The control tower at the Bellingham Air field was identified as a recoverable topographic station.

(c) One aeronautical aid, Seattle Vancouver Airway Beacon No. 9 existed within the limits of these sheets but was destroyed prior to the completion of field work. *See §3.*

(d) Three fixed aids to navigation exist within the limits of these sheets. Squalicum Creek Entrance Light and Bellingham Breakwater Entrance Light were located by third-order triangulation methods.** Squalicum Creek Waterway Light was located by photogrammetric methods supplemented by a theodolite cut from topo station LUMI. One fixed aid southwest of T-5583, Lummi Point Light,* was located by photogrammetric methods supplemented by a theodolite cut from △ SANDY. All the above and two aids in T-5586 are listed on Form 567.

See side heading 3 of this report.

** See 957, Descriptive Report for T-5584 for new location. SHR
* Station was out of area of plot and could not be positioned. SHR

10. Boundaries, Monuments and Lines:

See "Special Report - Boundaries - Project Ph-26(47)" to be submitted later. See 914

The boundaries which fall within the limits of these quadrangles are the city limit boundaries of Ferndale and Bellingham, Washington, the boundaries Lummi Indian Reservation, Mountain View Township, Marietta Township, Ferndale Township, and Bellingham Airport.

The city limits of Ferndale and Bellingham are shown on the photographs.

The boundary of Lummi Indian Reservation is defined by Executive Order dated November 22, 1873 and published in "Executive Orders Relating to Indian Reservations from May 14, 1855 to July 1, 1912" dated 1912, page 196. In the vicinity of the mouth of Lummi River this boundary is further defined by what is known as the "Long Survey of 1930". This survey is plotted on a General Land Office Plot titled "Township No. 38 North, Range No. 2 East of the Willamette Meridian, Washington - Boundary of Lummi Indian Reservation in Sections 7, 17, and 18".

Election precinct (township) boundaries in these quadrangles are as follows: See Field Edit Report, part of Descriptive Report for T-5585 SHR

The south boundary of Mountain View Township follows the township line between T38N and T39N R1E. This line coincides with the north boundary of Lummi Indian Reservation.

The west boundary of Ferndale Township and the east boundary of Mountain View Township follows the range line between R1E and R2E T39N, and extends north out of the project.

The south boundary of Ferndale Township follows the township line between T38N and T39N R2E and extends east into T-5585. From section corner 31, 32, 6, 5, eastward this line coincides with the north boundary of Marietta Township.

The west boundary of Marietta Township coincides with the east boundary of Lummi Indian Reservation.

The boundary of Bellingham Airport is plotted on a U.S. Engineer Department sketch of Bellingham Airport furnished with horizontal and vertical control data.

The city limits of Ferndale were secured from a map in the Whatcom County Engineers Office. An attempt was made to secure this information from civic authorities but a copy of the legal description of the original town boundaries was not available. Copies, certified to by the town clerk, of two annexations were secured and by subtracting these from the layout furnished by the county the original town boundaries may be secured, if desired.

See 556, Descriptive Report for T-5584

The Bellingham City limits are contained in the "Charter of the City of Bellingham" and in the typewritten annexations thereto.

35 section corners have been recovered and identified. All recovered corners are apparently re-marked corners. Descriptions of the section corners were obtained from the County Engineer of Whatcom County. No further verification as to the authenticity of the recovered corners has been obtained to date. For more complete information on land lines, see "Special Report - Land Lines - Project Ph-26(47)" to be submitted later. In the majority of cases, the actual monuments were not found, as they were buried in road intersections. However, reference distances furnished by the Whatcom County Engineer were measured and the point of intersection was located.

Sec 514

11. Other Control:

Recoverable Topographic Stations were established to provide a spacing of control stations of about two miles along the shoreline. One was established near station "SANDY 1949" as a nautical landmark.*

* Station TREE 1950. EHE

One topographic station, LUMI 1949 was established in T-5584 by theodolite to assist in controlling the radial plot.

Two bench marks and twelve monumented section corners were identified and described as recoverable topographic stations for supplemental interior control.

Recoverable topographic stations not listed on Form 567 were established as follows:

T-5583

WATT, 1949 } See § 38
KYNE, 1949 }
*CORN, 1949
REST, 1950
DIKE, 1950
CAGE, 1949 — on T-5584 SHR
CLAM, 1950
TOWER NEPT, 1949
T39N R2E 10, 11, 15, 14
T39N R1E, 21, 22, 26, 27
T39N R1E, 23, 24, 26, 25
T39N R1E, 22, 23, 27, 26
T39N R1E & W 13, 18, 24, 19
T38N R1E, 3, 2, 10, 11
T38N R1E 4, 3, 9, 10

T-5584

LUMI, 1949 ✓
CONTROL TOWER, 1950
EDGE, 1950
AP 7, W.C.T38N, R2E, 7, 8
T38 & 39N R2E 31, 32, 6, 5
T39N R2E 8, 9, 17, 16
T39N R2E 17, 16, 20, 21
T39N R2E 21, 22, 28, 27
T39N R2E 19, 20, 30, 29 ✓
CITY, 1951 SHR
Squalicum Cr. Waterway Light 1950
T38N, R2E, 1/4 corner, 13-14

No photo hydro stations were established.

* No form 524 for station at time of review. SHR

12. Other Interior Features:

All roads were classified in accordance with instructions contained in Part II Chapters V and VII of the Topographic Manual.

Buildings to be shown on the map manuscript have been classified in accordance with instructions contained in Photogrammetry instructions 29, dated 10-1-48 and in the "Topographic Manual Part II, Chapters V and VII". All buildings of minor importance have been deleted with a green X.

All public buildings have been classified and named.

All vertical and horizontal clearances of bridges have been noted on the field photographs with the time and date of such measurements.

Bridge Data

Location	Type of Bridge	Horizontal Clearance	Vertical Clearance	
Ferndale Nooksack River Highway	Fixed	100 feet	21.4 feet	**

Bridge Data - continued

Location	Type of Bridge	Horizontal Clearance	Vertical Clearance	
Ferndale Nooksack River Great Northern Ry.	Swing	93 feet	25.2 feet	**
Ferndale Nooksack River U.S. Hwy. 99	Fixed	200 feet *	25.9 feet	**

*Horizontal Clearance limited to width of river.
** See §68, Descriptive Report for T-5584 regarding vert. clearances. SHR
The Nooksack River is navigable only to local small craft.

It was noted that two foot bridges exist across Lummi River near the mouth. These were investigated. From local information, it was learned that during the highest stages of the river, coinciding with extreme high tides, a yacht of about 25 feet in length has been taken up river to the dam which bars further progress. The dam is about one mile from the mouth. The foot bridges were dismantled, by removing the walk way to allow passage of the boat.

Conditions favorable to this enterprise exist only about twice a year and it is felt that this river should not be considered as navigable, nor the foot bridges as obstructions.

There are no cables, either suspended or submerged, in this area.

Bellingham (Whatcom County) Airport, about 3 1/2 miles northwest of Bellingham is a major airport and is served by commercial airlines. It is an airport of entry. This airport is the only landing field in the area covered by this report.

A visual omni range station exists in the flat area southwest of Ferndale and was classified as a C.A.A. installation. Five towers of a low frequency radio transmitter were located in the flat area to the south of Ferndale. The elevation of the center tower was noted on the field photographs. The outer and middle markers of the airport approach system are located north of the airport, and east of Ferndale. They were noted on the field photographs as C.A.A. installations.

The lighted aeronautical aid which existed at Bellingham Airport (Seattle-Vancouver Airway Beacon 9, 1941) was destroyed January 13, 1950 and has not been replaced. See §3

13. Geographic Names: On file 854

See special "Report on Geographic Names - Project Ph-26(47)" to be submitted later.

14. Special Reports and Supplemental Data:

Special Reports will be submitted later as follows:

(1) Special Report - Boundaries - Project Ph-26(47) } Combined. Filed in end
(2) Special Report - Land Lines - Project Ph-26(47) } Div. of Photogrammetry.
(3) Special Report - Geographic Names - Project Ph-26(47)
(4) Coast Pilot Report - Project Ph-26(47)

Original copies of geodetic records - record books, recovery notes, descriptions, abstracts and lists of directions, triangle computations, geographic position computations, etc., will be forwarded to the Division of Geodesy after completion of all field work in the vicinity of Bellingham. Duplicate copies of descriptions and list of geographic positions are forwarded to the Washington Office with this report.

Photographs and other photogrammetric records are forwarded to the Washington Office with this report except as noted below.

Part of the photogrammetric records for these quadrangles was forwarded to the Washington Office on Transmitting letter No. 5 dated 6 February 1950 and part on Transmitting letter no. 12, dated 21 February 1950. Some of these photographs were returned to the field party and are forwarded with this report.

Three copies of Form 567, Non-Floating Aids or Landmarks for Charts, were forwarded to the Washington Office 12 May 1950 in accordance with Subject 713 of the Topographic Manual. One copy of Form 567 is forwarded with this report.

Other supplemental data is submitted as follows:

U.S. Engineer Department Data:

Letter No. 812.3 (Bellingham Harbor) 4 NPSGA, dated 4 October 1949, from U.S. Engineer Department, Seattle District.

Letter No. NPSGA 812.3 (Bellingham Harbor) dated 10 May 1950, from U.S. Engineer Department, Seattle District.

1	print	File No. N-48-21, "Bellingham Airport, Horizontal and Vertical Control Map" with elevations and plane coordinates.
1	print	File No. E-9-1-52, "Bellingham Harbor, Washington, Survey Control" with attached descriptions, with plane coordinates.
1	set	Prints, File No. E-9-5-8, sheets 3 to 13, incl. "Nooksack River, Topography".
13	each	Photostats, descriptions of Stations M-1 to M-13, incl., Bellingham Airport, with plane coordinates.
1	each	Photostat, description of Station BUSWELL, with plane coordinates.
1	each	Photostat, descriptions of stations PEARSON and PEARSON 2.
1	each	Photostat, Horizontal Control Positions "S 10 - S = 1/4 Cor. 1/15, S 3 - SW = Sec. Cor. 4/3/9/10", with plane coordinates.
1	each	Photostat, field book descriptions of Stations T-1, T-2, T-9, T-10, T-21, T-22, T-39, T-40, T-47, T-48, T-58, T-68, Nooksack River Traverse, with plane coordinates.
1	each	Photostat, "Report of Survey Monument Establishment" for Int. Runways 1 and 3, Int. Runways 1 and 2, Int. Runways 2 and 3, Bellingham Airport.

Maps published by Whatcom County, Washington:

1	print	Lummi Indian Reservation
1	print	Marietta Township
1	print	Ferndale Township

Approved:

Charles W. Clark

Charles W. Clark
Chief of Party

Respectfully submitted:

John C. Lajoye

John C. Lajoye
Cartographer

PHOTOGRAMMETRIC PLOT REPORT

This report covers the plot for T-5581 thru T-5584 and is filed as part of the Descriptive Report for T-5581.

Photogrammetry

MAP T- 5583 PROJECT NO. Ph-26(47) SCALE OF MAP 1:10,000 SCALE FACTOR 1.000

STATION	SOURCE OF INFORMATION (INDEX)	DATUM	LATITUDE OR y-COORDINATE LONGITUDE OR x-COORDINATE	DISTANCE FROM GRID IN FEET. OR PROJECTION LINE IN METERS FORWARD	(BACK)	DATUM CORRECTION	N.A. 1927 - DATUM DISTANCE FROM GRID OR PROJECTION LINE IN METERS FORWARD	(BACK)	FACTOR DISTANCE FROM GRID OR PROJECTION LIN IN METERS FORWARD	(BACK)
SANDY, 1949	G.P. List	N.A. 1927	48 47 16.100	497.3	1356.1					
			122 42 23.466	479.0	745.7					

Page 22

23

1 FT. = .3048006 METER
COMPUTED BY: A.K. Heywood DATE 8/49 CHECKED BY: H.P. Eichert DATE 8/50

M-2368-12

COMPILATION REPORT T-5583

PHOTOGRAMMETRIC PLOT REPORT

The report was submitted with the Descriptive Report for Survey T-5581.

31. DELINEATION

Refer to Photogrammetric Plot Report covering quadrangles T-5581 to T-5584, item 22.

32. CONTROL

Refer to Field Inspection Report, items 3 and 4, and Photogrammetric Plot Report, item 23.

33. SUPPLEMENTAL DATA

Land Plats

1 - Township No. 39 North Range No. 1 West Willamette Meridian dated February 21, 1860.

1 - Township No. 39 North Range No. 1 East Willamette Meridian dated February 21, 1860.

1 - Lummi Indian Reservation Townships 37 and 38 North Range 1 & 2 East Willamette Meridian dated February 21, 1874.

1 - Township No. 38 N.R. No. 1 East Willamette Meridian dated February 21, 1860.

Township Layouts

1 - Mountainview township TWP 39 N.R. 1 W & 1E., W.M. Whatcom County, Wash.
1 - Lummi Indian Reservation TWP 37 & 38 N.R. 1 & 2 E., W.M. Whatcom County, Wash.

34. CONTOURS AND DRAINAGE

Multiplex model 1158-1159 contained about seventy-five per cent water area rendering the parallax, scale and level solutions difficult. Using this model planimetry, contours and drainage were compiled.

Detail points for shoreline compilation were dropped monoscopically from photograph 1158 holding model 1157-1158 to the scale of passpoints dropped from the extension. Using these detail points the shoreline for this area was compiled. See §53

35. SHORELINE AND ALONGSHORE DETAILS

The shoreline inspection was adequate. No low water or shoal lines were shown. Refer to Field Inspection report paragraph 7. See §56

Difficulty was encountered in the location of the MHW line south of

35. SHORELINE AND ALONGSHORE DETAILS (continued)

48°46'30" to the limits of the sheet. This was due to the field inspection being furnished in photograph 1191 which was eighty percent water area. Due to this extensive water area it was impossible to find a parallax solution in the multiplex. Detail points and the multiplex position of edge of the white sand beach for the compilation of this shoreline were dropped using model 1374-1375, a cross flight. It was found impossible to accurately transfer these detail points to photograph 1191 containing the shoreline inspection due to the heavy woods which overhang the bluff. Office interpretation was made of the MHW line with constant reference being made to that furnished by field inspection. Holding the configuration of the edge of white sand beach positioned by multiplex the MHW line was delineated.

36. OFFSHORE DETAILS

These are believed to be complete. See §56

37. LANDMARKS AND AIDS

Refer to item 9 of Field Inspection Report.

Form 567 has been submitted and forwarded to the Washington Office with this report, copy attached.

38. CONTROL FOR FUTURE SURVEYS

14 Forms 524 have been submitted with this report.

The positions of the following topographic stations were determined by stereoscopic instruments:

* CLAM 1950	WATT, 1949 *	T-38NR1E 3,2,10,11
DIKE 1950	GABLE~~KYNE~~, 1949 *	T-38NR1E 4,3,9,10
REST 1950	~~NEPT~~, ~~1949~~	T-39NR2E 10, 11, 15, 14
* TREE 1950	TOWER, 1949	T-39NR1E 21, 22, 28, 27
		T-39NR1E 23,24,26,25
		T-39NR1E 22,23,27,26
		T-39NR1E & W 13,18,24,19

* ~~Position doubtful, subject to verification by Field Edit~~
Sextant fixes furnished by Field Inspection were listed on Form M 2226-12.

* Third-order positions determined in 1953 in conjunction with hydrographic Survey H-7962. See §66, This report. SWK

39. JUNCTIONS

Junction was made to the north with manuscript T-5582, and to the east with manuscript T-5584.

There is no contemporary survey to the west and south.

40. HORIZONTAL AND VERTICAL ACCURACY

Refer to Photogrammetric Plot Report, item 23.

In view of the sparsity of control in this quadrangle and the necessary adjustment of 0.7 mm between strips mentioned in item 22 of the Photogrammetric Plot Report it is recommended that a close check of horizontal accuracy be made of this quadrangle. See §53

41. BOUNDARIES

Land Lines -

See "Special reports, Boundaries, PH-26(47)", Land Lines Project Ph-26(47), and item 10 of field inspection report.

For details of land line compilation, refer to Compilation Report, T-5584, item 41.* The graphically enlarged copies of the land plats of Townships 38 & 39 N Range No 1 East Willamette Meridian that cover this quadrangle is submitted with this report.

* Refers to method of using plats in compilation sht.

46. COMPARISON WITH EXISTING MAPS

Comparison was made with Geological Survey quadrangle "Blaine" edition of 1907, reprinted in 1947, scale 1:62,500.

See §62 & §63

Numerous roads were noted on the Geological Survey quadrangle just above 48° 45' in the eastern shore of Lummi Bay. Careful inspection was made of the photographs but due either to the very heavily wooded area or the roads being overgrown with trees no delineation of these roads on the map manuscript could be made.

47. COMPARISON WITH NAUTICAL CHARTS

Comparison was made with charts 6378, scale 1:40,000, June 1935 11th Edition corrected to August 5, 1949 and chart 6380 scale 1:80,000, March 1947, 8th edition corrected to March 3, 1947. See §65

Items to be applied to the nautical charts immediately: None.
Items to be carried forward: None

In the northeast portion of Lummi Bay extensive bulkheads and levees have been built reclaiming much of the land shown as grass in water on chart 6378.

Respectfully submitted

Albert K. Heywood
Carto. Photo. Aid

Approved and forwarded

Hubert A. Paton
Comdr., C&GS
Officer in Charge

19 June 1951

FIELD EDIT REPORT
Map Manuscript T-5583
Project Ph-26(47)

51. Methods.

No new or unique methods have been used in the completion of this sheet T-5583. Culture and topography was inspected visually from the truck and by walking. The single weight manuscript copy was used for this inspection. Corrections were noted directly thereon, reference being made to the appropriate photograph where necessary. A barometer was carried on the seat beside the inspector over much of the road to assist in topographic checking. Barometrically obtained elevations are shown in red on Field Edit sheets 1, 2, and 4. These lines were rerun with planetable where marked error was apparent.

A legend showing the colored inks used in field edit corrections has been added to Field Edit Sheet No. 1.

Field Edit corrections are shown on Field Edit Sheets 1 to 8 and on photographs 0-1158, 1162-1166 inc., 1185-1191 incl., 1194, 1195, 1198, 1199, and 1374.

52. Adequacy of compilation.

The compilation of planimetry was adequate considering the field inspection. A few buildings were omitted. Some of these were clearly visible if their position was known, but others might have been intensified by the field inspection.

The compilation of hypsography was not altogether adequate as indicated by the accuracy tests. In the northeast corner of the sheet is a continuation of the detailed topography of glacial till. The vertical error is not great in most cases, but the shapes and expression do not give the correct impression.

There is a area along Kickerville Road apparently caused by model distortions in models with large areas of water.

South of Slater Road, west of Red River Road and east of Neptune Beach was the poorest compilation of hypsography. True, it is a difficult area, heavily wooded, and stereoscopic study did not help the field editor very much. The topography presented, however, looked rather improbable, and was accordingly investigated with the barometer. The barometer indicated a 30

foot error. A reconnaissance sketching job might have shown the correct impression of the area, but to avoid the question of how good the barometric elevation might be, particularly with so large a discrepancy, a planetable line was run through the area.

53. Map accuracy.

The compilation is adequate as to horizontal position. A report on the combined horizontal and vertical accuracy tests has already been submitted separately. Over the whole line the mean square error in position was 16.6 feet and the probable error was 11.2 feet. Eight of these stations fall on this sheet; the mean square position error of these stations is 20.9 feet, the probable error is 14.2 feet.* SHR

* Horizontal accuracy discussed in Letter-Report which is part of Desc. Report for T-5581. See also 966

The compilation is not altogether satisfactory in vertical accuracy. About 37 miles of profile and traverse for resketching topography or adding 10's was run. About 5 sq. miles of topo. was resketched. Along this profile and traverse there were 412 shots, of which 83 shots or 20% were in error over a half contour interval, and 21 shots or 5% were in error over a full contour interval.

A few shots along profiles were omitted where the reviewer had questioned the topography. This was a little difficult, inasmuch as the reviewer did not question extensive areas, a few shots in areas of questionable topography were included; in these cases the expression and shapes were wrong, but the vertical accuracy was not bad, and the inclusion of some of these shots helps, not hurts, the summary.

A listing and tabulation of the profiles, and an index of profiles is submitted.

An area of about 2.5 square miles in the northeast corner of the sheet was recontoured. In general, the area was poorly expressed, rather than lacking in vertical accuracy. About 2 square miles along Kickerville Rd. were recontoured; the topo. had no marked detail but there was considerable vertical error. This was probably owing to the large proportions of water in these models.

54. Recommendations.

No substantial recommendations are submitted at this time, Further training or closer supervision of field personnel seems desirable. Presentation of shoreline data is not altogether in accordance with instructions.

It has not yet become very apparent on this sheet, but as the project progresses there has been an increasing tendency on the part of the compiler to omit buildings which were not X'ed on the photographs. A closer check should be made of this in the compilation office.

55. Examination of Proof Copy.

Mr. Ray Doubt, Route I, Blaine, Washington has agreed to examine a proof copy of the manuscript.

There are no additions to geographic names.

56. Shoreline and alongshore features.

Refer to paragraphs 7 and 8 of FIELD INSPECTION REPORT. The reviewer called for the completion of shoreline data submitted by the field inspection. The location of the questioned rocks was such that virtually all of the rocky shoreline was walked again, and considerable additional rocks were added. This sheet was inspected late in the fall. The tides at this time of year are too high in the daytime to do a good shoreline inspection in this area. The higher low is usually in the daytime and is only a foot lower than the lower high. These are very unfavorable conditions for presenting a good picture of offshore rocks, and a complete and accurate shoreline inspection cannot be expected here at this time of year.

As stated in paragraph 8, the height of rocks above the stage of tide and the time of observation were not invariably stated on the photographs, although there was considerable improvement over the shoreline inspection on sheets previously submitted. This shoreline presentation must be closely watched by the field supervisor.

57. New construction.

The Lake Terrell State Game Range purchase is more or less complete and the boundaries of the range are indicated on the appropriate photographs. Lake Terrell has been raised four feet, and the new shoreline is delineated on the photographs.

Approved and Forwarded:

Charles W. Clark

Charles W. Clark
Lt. Comdr.-USC&GS
Chief of Party

Respectfully submitted.

Ray H. Skelton II
Cartographer (Photo)

TABULATION OF VERTICAL ACCURACY TESTS
Map Manuscript T-5583
Project Ph-26(47)

Profile elev. (ft)	Map elev.	± Error	± Error after 40 ft. shift	Remarks
1. Combined horizontal and vertical accuracy test, east along THORNTON ROAD to NORTH STAR ROAD, thence north to sheet edge.				
343	351	± 8	± 7	
330	345	±15	± 14	
324	340	±16	± 13	
308	325	±17	± 14	
296	306	±10	± 8	
289	302	±13	± 11	
285	298	±13	± 13	
283	295	±12	± 12	
284	296	±12	± 12	
285	297	±12	± 12	
282	296	±14	± 14	
282	295	±13	± 13	
282	295	±13	± 13	This is just an unfortunate situation-can't be properly expressed with 20's
284	297	±13	± 13	
298	302	± 5	± 5	
296	301	± 5	± 5	
302	303	± 1	± 1	
298	303	± 5	± 5	
296	302	± 5	± 5	
293	299	± 6	± 6	
292	297	± 5	± 5	
292	297	± 5	± 5	
291	296	± 5	± 5	
291	296	± 5	± 5	
292	294	± 2	± 2	
292	294	± 2	± 2	
296	298	± 2	± 2	
300	300	0	0	
303	303	0	0	
312	305	- 7	- 7	
315	305	-10	- 9	
309	304	- 5	- 5	
306	304	- 2	- 2	
304	304	0	0	
303	303	0	0	
301	302	± 1	± 1	
299	302	± 3	± 3	
298	301	± 3	± 3	
297	301	± 4	± 4	

Profile elev. (ft)	Map elev.	℄ Error	℄ Error after 40 ft. shift	Remarks
297	301	℄ 4	℄ 4	
298	302	℄ 4	℄ 4	
294	301	℄ 7	℄ 6	
291	298	℄ 7	℄ 6	
289	296	℄ 7	℄ 6	
288	295	℄ 6	℄ 5	
286	294	℄ 8	℄ 7	
286	292	℄ 6	℄ 5	
279	290	℄ 11	℄ 10	
275	287	℄ 12	℄ 11	
275	284	℄ 9	℄ 8	
271	277	℄ 6	℄ 4	
267	269	℄ 2	0	
262	261	- 1	0	
257	256	- 1	0	
260	263	℄ 3	℄ 2	
260	268	℄ 8	℄ 7	
265	270	℄ 5	℄ 4	
260	274	℄ 14	℄ 12	
270	275	℄ 5	℄ 4	
271	276	℄ 5	℄ 5	
274	278	℄ 4	℄ 4	
274	279	℄ 5	℄ 4	
277	282	℄ 5	℄ 5	
278	282	℄ 4	℄ 4	
281	283	℄ 2	℄ 2	
280	284	℄ 4	℄ 4	
282	284	℄ 2	℄ 2	
286	284	- 2	- 2	
284	284	0	0	
285	283	- 2	- 2	
279	280	℄ 1	℄ 1	
274	280	℄ 6	℄ 5	
276	266	- 10	- 9	
286	291	℄ 5	℄ 4	
290	296	℄ 6	℄ 5	
292	298	℄ 6	℄ 5	

2. From BM 188B West along Mt. View Rd. to Hick Rd.

191	188	- 3	- 3	
193	188	- 5	- 5	
193	194	℄ 1	℄ 1	T-rd. N
194	192	- 2	- 2	
195	198	℄ 3	℄ 3	
215	217	℄ 2	℄ 1	X-rd.

3. From North Star Rd. west along Mt. View Rd. to Kickerville Rd.

219	222	℄ 3	℄ 1	
227	237	℄ 10	℄ 7	
212	221	℄ 9	℄ 8	

Profile elev. (ft.)	Map elev.	± Error	± Error after 40 ft. shift	Remarks
212	221	+ 9	+ 8	
261	265	+ 4	+ 4	
247	247	0	0	
228	230	+ 2	+ 2	
234	242	+ 8	+ 8	

Balance of line omitted from summary - reviewer requested check of contouring.

4. North along Olson Rd. from Mt. View Rd.

207	206	- 1	- 1	
213	218	+ 5	+ 5	
281	284	+ 3	+ 1	
302	302	0	0	
312	303	- 9	- 9	
292	295	+ 3	+ 3	
286	295	+ 9	+ 9	
296	296	0	0	
310	303	- 7	- 7	
306	302	- 4	- 4	
300	304	+ 4	+ 4	
289	301	+ 12	+ 12	
280	286	+ 6	+ 6	
281	291	+ 10	+ 9	
312	315	+ 3	+ 3	
320	329	+ 9	+ 7	
326	322	- 4	- 3	
338	344	+ 6	+ 6	
312	318	+ 6	+ 6	
340	350	+ 10	+ 10	

5. North from Mt. View Rd. along road ½ mile west of BM 188B

197	204	+ 7	+ 7	
202	212	+ 10	+ 10	
216	234	+ 18	+ 17	
256	258	+ 2	0	
314	303	+ 11	- 10	
304	301	- 3	- 2	
296	286	-10	- 10	
315	302	- 13	- 12	
288	294	+ 6	+ 4	

6. From Mt. View Rd. north along Hick Rd. 1.7 miles, thence west to tie.

222	222	0	0	
212	221	+ 9	+ 9	
221	228	+ 7	+ 7	
241	238	- 3	- 3	
267	277	+ 10	+ 9	
302	303	+ 1	+ 1	
289	299	+ 10	+ 10	

Profile elev. (ft)	Map elev.	≠ Error	≠ Error after - 40 ft. shift	Remarks
272	295	≠ 23	≠ 23	
275	290	≠ 15	≠ 15	
285	286	≠ 1	≠ 1	
287	283	- 4	- 4	
282	282	0	0	
269	278	≠ 9	≠ 9	
284	282	- 2	- 2	
282	282	0	0	
279	283	≠ 4	≠ 4	

5A. Along North Star Rd. from Mt. View Rd. to Thornton Rd.

262	262	0	0	
254	261	≠ 7	≠ 6	
230	242	≠ 12	≠ 11	
213	225	≠ 12	≠ 12	
218	225	≠ 7	≠ 7	
229	242	≠ 13	≠ 12	
252	254	≠ 2	≠ 1	

6A. Northwest from pt. on North Star Rd. 0.6 miles north of Thornton Rd.

278	284	≠ 6	≠ 6	
256	258	≠ 2	≠ 2	
245	242	- 3	- 3	
2366	239	≠ 3	≠ 3	

7. Along Henry Johnson Rd. from Kickerville Rd. to Powder Plant Rd.

203	204	≠ 1	≠ 1	
171	186	≠ 15	≠ 12	
157	153	- 4	- 3	
142	142	0	0	
131	126	- 5	- 3	
97	90	- 7	- 6	

8. Along Kickerville Rd. from 0.2 miles south of Henry Johnson Rd. to Slater Rd. (Omissions where reviewer questioned topo.)

242	242	0	0	
229	242	≠ 13	≠ 13	
227	237	≠ 10	≠ 10	
201	222	≠ 21	≠ 20	
200	218	≠ 18	≠ 17	
202	210	≠ 8	≠ 8	
196	206	≠ 10	≠ 9	
191	201	≠ 10	≠ 10	
168	187	≠ 9	≠ 18	
163	177	≠ 14	≠ 13	
157	162	≠ 5	≠ 4	
134	140	≠ 6	≠ 6	

Profile elev. (ft)	Map elev.	± Error	± Error after - 40 ft. shift	Remarks
120	131	± 11	± 11	
11 113	125	± 12	± 12	

9. From Kickerville Rd. west along Gulf Rd. thence northwest, north and east to tie on Kickerville Rd.

195	207	± 12	± 12
188	193	± 5	± 5
196	205	± 9	± 9
210	222	± 12	± 12
193	200	± 7	± 7
170	184	± 14	± 13
149	158	± 9	± 6
103	117	± 14	± 11
165	154	- 11	- 10
181	189	± 8	± 4
203	211	± 8	± 6
217	224	± 7	± 7
206	226	± 20	± 20

10. Spur west of Kickerville at Douglas

181	194	± 13	± 11
173	173	0	0

11. Spur west of Kickerville at Unick

164	182	± 18	± 18

12. Spur west of Kickerville at Creamer

144	144	0	0
146	151	± 5	± 1
140	141	± 1	0

13. From X'n Kickerville and Slater Rds. south through Neptune Beach tying to MHW.

111	102	± 11	± 10
81	100	± 19	± 15
75	85	± 10	± 7
32	38	± 6	± 4
8	10	± 2	± 1
20	30	± 10	± 5
62	72	± 10	± 6
8			
10			
11			
7			
6			
6		All O.K.	
7			
6			
7			

Profile elev.(ft.)	Map elev.	∠ Error	∠ Error after - 40 ft. shift	Remarks
14. East 1 mile along Douglas Rd. from Kickerville Rd.				
235	250	∠ 15	∠ 13	
262	262	0	0	
250	256	∠ 6	∠ 6	
237	242	∠ 5	∠ 5	
278	284	∠ 6	∠ 5	
288	284	- 4	- 4	
232	238	∠ 6	∠ 6	
218	219	∠ 1	∠ 1	
15. Along Unick Rd. from Kickerville Rd. to Olson Rd.				
221	225	∠ 4	∠ 4	Shape is all wrong
211	222	∠ 11	∠ 11	
217	224	∠ 7	∠ 7	
230	238	∠ 8	∠ 8	
255	262	∠ 7	∠ 7	
225	232	∠ 7	∠ 6	
255	261	∠ 6	∠ 6	
259	263	∠ 4	∠ 4	
261	261	0	0	
236	244	∠ 8	8	
217	202	- 15	- 13	
196	201	∠ 5	∠ 5	
186	186	0	0	
176	178	∠ 2	∠ 2	
166	166	0	0	
161	161	0	0	
115	115	0	0	
84	87	∠ 3	∠ 3	
89	96	∠ 7	∠ 7	
111	104	- 7	- 7	
108	98	- 10	- 9	
107	95	- 12	- 12	
16. From Kickerville Rd. along Creamer Rd. Byers Rd, and Lake Terrell Rd. to tie on Slater Rd.				
164	164	0	0	
191	182	- 9	- 9	
180	189	∠ 9	∠ 9	
182	192	∠ 10	∠ 10	
194	202	∠ 8	∠ 8	
197	204	∠ 7	∠ 7	
199	204	∠ 5	∠ 5	
213	207	- 6	- 4	
242	242	0	0	

Profile elev.	Map elev.	≠ Error	≠ Error after - 40 ft. shift	Remarks
182	178	- 4	- 4	
169	172	≠ 3	≠ 3	
170	170	0	0	

17. From northwest to southeast across Section 34, T39N, R1E. (Suggested by reviewer.)

245	238	- 7	- 5
245	235	- 10	- 8
198	188	- 10	- 8
187	172	- 15	- 15
171	162	- 9	- 9
158	156	- 2	- 2
127	116	- 11	- 9
115	105	- 10	- 10
82	65	- 17	- 11
74	66	- 8	- 8
66	662	- 4	- 4
68	63	- 5	- 5

18. Along Slater Road east from Kickerville Road.

126	127	≠ 11	≠ 11
155	153	- 2	- 2
158	157	- 1	- 1
154	158	≠ 4	≠ 4
153	158	≠ 5	≠ 5
171	171	0	0
190	187	- 3	- 3
179	181	≠ 2	≠ 2
162	158	- 4	- 4
142	138	- 4	- 1
77	79	≠ 2	0
51	51	0	0
65	65	0	0
52	58	≠ 6	≠ 6
45	54	≠ 9	≠ 9
37	44	≠ 7	≠ 7
28	30	≠ 2	≠ 2
16	19	≠ 3	≠ 3
8			OK

19. From X'n Byers and Slater Rds south to tie to MHW.

153	151	- 2	- 2
156	149	- 7	- 7
148	144	- 4	- 4
151	140	- 11	- 11
152	145	- 7	- 7
146	140	- 6	- 6
146	138	- 8	- 7
147	136	- 11	- 11
141	138	- 3	- 2

Profile elev.	Map elev.	∠ Error	∠ Error after - 40 Ft. shift	Remarks
136	140	∠ 4	∠ 3	
138	138	0	0	
125	138	∠ 13	∠ 13	
121	138	∠ 17	∠ 17	
117	140	∠ 23	∠ 23	
115	141	∠ 26	∠ 26	
115	142	∠ 27	∠ 27	
114	142	∠ 28	∠ 28	
113	143	∠ 30	∠ 30	
111	145	∠ 34	∠ 34	
110	145	∠ 35	∠ 35	
109	144	∠ 35	∠ 35	
107	142	∠ 35	∠ 35	
108	141	∠ 33	∠ 33	
107	136	∠ 29	∠ 23	
107	122	∠ 15	∠ 11	
104	112	∠ 8	∠ 4	
105	112	∠ 7	∠ 2	
102	93	- 9	- 4	
102	110	∠ 8	∠ 4	
106	119	∠ 13	∠ 10	
108	133	∠ 25	∠ 20	
103	153	∠ 30	∠ 26	
104	141	∠ 37	∠ 34	
104	136	∠ 32	∠ 29	
101	131	∠ 30	∠ 28	
92	130	∠ 38	∠ 32	
86	118	∠ 32	∠ 24	
62	92	∠ 30	∠ 19	
28	66	∠ 38	∠ 31	
22	21	- 1	0	
12			OK	

20. From Slater Rd. south along Red River Rd. thence northeast along northwest edge of Lummi River bottom.

164	166	∠ 2	0	
155	168	∠ 13	∠ 12	
119	116	- 3	- 3	
133	143	∠ 10	∠ 10	
117	120	∠ 3	∠ 2	
84	95	∠ 11	∠ 9	
46	51	∠ 5	∠ 3	
43	56	∠ 13	∠ 10	
36	36	0	0	
44	52	∠ 8	∠ 6	
42	45	∠ 3	∠ 2	
5			OK	
43	43	0	0	
27	27	0	0	

Profile elev.	Map elev.	℄ Error	⌿ Error after - 40 ft. shift	Remarks
8				
6				
6				
6				
6				
4				
4				OK
3				
3				
4				
11	21	⌿ 10	⌿ 9	

21. From X'n Olson and Unick Rds south and east to sheet edge.

84	81	- 3	- 2	
57	57	0	0	
66	66	0	0	
43	48	⌿ 5	⌿ 4	
26	29	⌿ 3	⌿ 2	
6				
6				OK
6				
7				
4				
9	21	⌿ 12	⌿ 12	
8	21	⌿ 13	⌿ 13	
8	21	⌿ 13	⌿ 13	
8				
9				
9				
8				
8				
10				OK
4				
8				

23. From X'n Kwina and Red River Rd. south, then east to sheet edge.

4				
5				
4				
4				OK
3				
6				
21	23	⌿ 2	⌿ 2	
34	37	⌿ 3	⌿ 3	
40	46	⌿ 6	⌿ 6	

241. From east sheet southwest along southeast side of Lummi River bottom.

Profile elev.	Map elev.	± Error	± Error after - 40 ft. shift	Remarks
3				
1				
3				
3				
4				
5				
3				All OK
14				
6				
3				
18	10	- 8	- 8	
19	10	- 9	- 9	
21	15	- 6	- 6	
27	15	- 12	- 12	
34	-16	- 18	- 18	
43	17	- 26	- 26	
40	18	- 22	- 22	
37	19	- 18	- 18	
28	15	- 13	- 13	
32	15	- 17	- 17	
24	15	- 9	- 9	
3			OK	
20	15	- 5	- 5	
25	15	- 10	- 10	
4			OK	
21	15	- 6	- 6	
22	15	- 7	- 7	
23	15	- 8	- 8	
25	15	- 10	- 10	

25. From Kwina Rd. south along sheet edge to Cagey Rd.

45	54	± 9	± 9	
49	58	± 9	± 9	
111	90	- 21	- 19	
108	101	- 7	- 6	
74	74	0	0	
73	68	- 5	- 5	
75	77	± 2	± 2	
82	79	- 3	- 2	
98	98	0	0	
135	145	± 10	± 10	
156	161	± 5	± 5	
152	162	± 10	± 10	
128	143	± 15	± 14	

Summary

412 shots
83 shots (20%) in error over ½ interval.
21 shots (5%) in error over full contour interval

About 37 miles profile and traverse and 2.8 miles combined horizontal and vertical accuracy tests.
About 5 square miles topo. resketched.

Form T-2

50 PHOTOGRAMMETRIC OFFICE REVIEW

T-5583

1. Projection and grids ______ 2. Title ______ 3. Manuscript numbers ______ 4. Manuscript size ______

CONTROL STATIONS

5. Horizontal control stations of third-order or higher accuracy ______ 6. Recoverable horizontal stations of less than third-order accuracy (topographic stations) ______ 7. ~~Photo hydro stations~~ ______ 8. Bench marks ______ 9. Plotting of sextant fixes ______ 10. Photogrammetric plot report ______ 11. Detail points ______

ALONGSHORE AREAS

(Nautical Chart Data)

12. Shoreline ______ 13. Low-water line ______ 14. Rocks, shoals, etc. ______ 15. Bridges ______ ~~16. Aids to navigation~~ ______ 17. Landmarks ______ 18. Other alongshore physical features ______ 19. Other alongshore cultural features ______

PHYSICAL FEATURES

20. Water features ______ 21. Natural ground cover ______ 22. ~~Planetable contours~~ ______ 23. Stereoscopic instrument contours ______ 24. Contours in general ______ 25. Spot elevations ______ 26. Other physical features ______

CULTURAL FEATURES

27. Roads ______ 28. Buildings ______ 29. Railroads ______ 30. Other cultural features ______

BOUNDARIES

31. Boundary lines ______ 32. Public land lines ______

MISCELLANEOUS

33. Geographic names ______ 34. Junctions ______ 35. Legibility of the manuscript ______ 36. Discrepancy overlay ______ 37. Descriptive Report ______ 38. Field inspection photographs ______ 39. Forms ______

40. ______________________ Reviewer ______________________ Supervisor, Review Section or Unit

41. Remarks (see attached sheet)

FIELD COMPLETION ADDITIONS AND CORRECTIONS TO THE MANUSCRIPT

42. Additions and corrections furnished by the field completion survey have been applied to the manuscript. The manuscript is now complete except as noted under item 43.

Bernice Wilson

Compiler ______________________ Supervisor

43. Remarks: See attached remarks

M-2623-12

62. Comparison with Registered Topographic Surveys:

T-730	1:20,000	1858
T-1871	1:10,000	1888
T-1872	1:10,000	1888

Many changes in culture and shoreline have occurred since these surveys. Also shoreline and topography are mapped in greater detail on T-5583 than on the prior surveys. For the area it encompasses, T-5583 supersedes the above surveys for nautical charting purposes.

63. Comparison with Maps of Other Agencies:

Blaine, Wash. (USGS) 1:62,500 1907 reprinted 1947.

Many changes have occurred in culture since this survey. Contours are in general agreement between T-5583 and this map.

64. Comparison with Contemparary Hydrographic Surveys:

H-7962	1:10,000	1953

The following positions of rocks were in disagreement between the two surveys and could not be reconciled. They are: lat. 48° 50' 100 m - long. 122° 42' 836 m, lat. 48° 50' 03 m - long. 122° 42' 812 m, lat. 48° 49' 1147 m - long. 122° 42' 799 m, and lat. 48° 49' 1115 m - long. 122° 42' 759 m. Because some error was detected on T-5583, the rocks were deleted. The positions obtained by H-7962 should therefore be used. See item 66 below.

The low-water line which was sketched by the field editor was deleted from the map manuscript in areas where there was disagreement with H-7962.

65. Comparison with Nautical Charts:

6380	1:80,000	1947 cor. to 51-5/21

Some differences exist in shoreline in Lummi Bay between this chart and T-5583. Map T-5583 shows many alongshore rocks not shown on the chart. Changes made to the map manuscript since field edit are shown in red.

66. Adequacy of Results and Future Surveys:

In conjunction with Hydrographic Survey H-7962, five triangulation stations were established to control the shoreline west of Sandy Point. Three of these stations coinceded with identifiable features mapped on T-5583. These three stations were plotted on the map manu-

script during this review and a study was made of the discrepancies and the resultant effect on the compilation. The following discrepancies in common positions were noted:

Topographic station "WATT 1949" falls approximately 0.5 mm. northward from the position of triangulation station "WATT 1953".

Topographic station "GABLE 1949" falls approximately 0.7 mm. northeastward of triangulation station "KYNE 1953". This feature was difficult to identify on the photographs and may not be accurately located photogrammetrically.

The east gable of a building fell approximately 1.3 mm. northeastward of triangulation station "EAST GABLE 1953". This error resulted partly from poor detailing of the building. The building was redrawn holding to the triangulation position.

This investigation indicates that the features on T-5583 in the vicinity of Sandy Point are in error by approximately 0.7 mm. in a northeastwardly direction. It also indicates that the substitute station for triangulation station "SANDY 1949" which was used to control T-5583 is in error a similiar amount. This conclusion was verified by holding to topographic station "TREE 1950" which was repositioned by the field editor by referencing to triangulation station "SANDY 1949".

The position error of 0.7 mm referred to above is not prohibitive when this map is reduced for inclusion in the National Topographic Atlas or for nautical charting.

Although some errors are indicated above they are fairly local in extent and small in value. ~~This map meets the National Standards of Map Accuracy for publication at a scale of 1:24,000.~~ * It complies with Bureau requirements for current nautical charting purposes.

Reviewed by: Everett H. Ramey
Everett H. Ramey

L C Lande
Chief, Review Branch
Division of Photogrammetry

Mary B Roberts
Chief, Nautical Chart Branch
Division of Charts

* From the field editors report, it is doubtful if the vertical accuracy meets National Standards

Kelly Peterson
Chief, Div. of Photogrammetry

Chief, Div. of Coastal Surveys

25 June 1954

Form 567
April 1945

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

~~NONFLOATING AIDS OR~~ LANDMARKS FOR CHARTS

TO BE CHARTED / ~~TO BE DELETED~~ } STRIKE OUT ONE

Baltimore, Maryland March 19 5

I recommend that the following objects which have ~~been~~ been inspected from seaward to determine their value as landmarks be charted on ~~(deleted from)~~ the charts indicated.

The positions given have been checked after listing by Albert K. Heywood

Albert K. Heywood

Hubert A. Paton *Chief of Party.*

STATE / CHARTING NAME	DESCRIPTION	SIGNAL NAME	POSITION LATITUDE ° ′	LATITUDE D.M. METERS	LONGITUDE ° ′	LONGITUDE D.P. METERS	DATUM	METHOD OF LOCATION AND SURVEY No.	DATE OF LOCATION	HARBOR CHART	INSHORE CHART	OFFSHORE CHART	CHARTS AFFECTED
LONE ~~* TREE~~	Lone Tree (3.6 m NW of △ SANDY, ~~1949)ht 10'(30')~~	TREE	48 47	501 ~~505~~	122 42	479 ~~477~~	N.A. 1927	Multiplex 5583 **	1950	x	x		6378 6380
	*Position doubtful (to be verified by field edit) Note corrections.												
	** Position by azimuth and ~~direction~~ distance from △ Sandy 1949.												

This form shall be prepared in accordance with Hydrographic Manual, pages 800 to 804. Positions of charted landmarks and *nonfloating*

GEOGRAPHIC NAMES

Barr Road
Byers Road

Cagey Road
Cherry Point
Creamer Road

Douglas Road

Elder Road

Georgia Strait
Gulf Road

Henry Johnson Road
Hick Road

Kickerville Road
Kwina Road

Lake Terrell
Lake Terrell Road
Lummi Bay
Lummi Flats
Lummi Indian Reservation
Lummi River

Mountain View
Mountain View Road
Mountain View Township
Neptune Beach
North Star Road

Olson Road

Powder Plant Road

Rainbow Road
Red River Road

Sandy Point
Slater Road

Thornton Road

Unick Road

Walltine Road
Willamette Meridian

Names added during field edit
- Lake Terrell State Game Range
Johnson Road
Lampman Road

approved 7-19-51 L. Heck

Jackson Road

Lonseth Road

Mennonite Missionary Alliance Church

Names underlined in red are approved. 7-19-51 L. Heck
Based on names report for project. Road names from 1939 Whatcom Co. Itinerary Map.

DEPARTMENT OF THE ARMY
Corps of Engineers
Office of the District Engineer
Seattle District
4735 E. Marginal Way
Seattle 4, Washington

COPY

4 October 1949

Refer to File No. 812.3(Bellingham Harbor)4 NPSGA

Department of Commerce
U.S. Coast and Geodetic Survey
c/o Swan Island Postal Station
Portland 18, Oregon

ATTENTION: Lt. Commander Charles W. Clark

Gentlemen:

Reference is made to your letter, dated 26 September 1949, subject, "U.S. Engineer Department Control Data," wherein information is requested pertaining to Corps of Engineers, Seattle District triangulation, traverse and bench mark monuments.

In accordance with this request, the following data are submitted:

Print file No. N-48-21, "Horizontal and Vertical Control Map, Bellingham Airfield."

Report of Survey Monument Establishment, Bellingham Airfield, 13 sheets.

Print, File No. E-9-1-52, "Survey Control - Bellingham Harbor."

List of descriptions of Monuments - Bellingham Harbor.

Marked prints, File No. 3-9-5-8, Sheets Nos. 3, 5, 6, 7, 8, 9, 10, 11, 12 and 13, "Topography, Nooksack River."

The horizontal control work shown on the submitted data is of third order accuracy, although certain traverses in the Nooksack Valley were not executed by means of conventional third order methods.

Elevations in the Nooksack Valley are not of third order accuracy and data on such bench marks are therefore not included.

Information on G.L.O. 6, 6A and 4A is not available in this office. It is known, however, that positions on these three monuments are not of third order accuracy.

FOR THE DISTRICT ENGINEER:

Sincerely yours,

5 Incls
As listed in par. 2

/S/ PAUL H. SYMBOL
Lt. Colonel, Corps of Engineers
Executive Officer

4

CORPS OF ENGINEERS, U.S. ARMY
Office of the District Engineer
Seattle District
4735 E. Marginal Way
Seattle 4, Washington

COPY

NPSGA
812.3 (Bellingham Harbor)

10 May 1950

Department of Commerce
U.S. Coast and Geodetic Survey
c/o Swan Island Postal Station
Portland 18, Oregon

ATTENTION: Lt. Commander Charles W. Clark

Gentlemen:

Reference is made to your letter dated 21 April 1950, requesting horizontal and vertical control data of stations and bench marks in the vicinity of Bellingham, Washington.

The requested data are transmitted herewith. The inclosed "Shipping List" described the inclosures.

Information on station "Grant" is not available in this office.

For your information, the accuracy of the field work is as follows:

a. Triangulation in the Bellingham Bay area is to third order accuracy.

b. The horizontal control of the Bellingham Airfield is to third order accuracy.

c. The traverse work in the Nooksack Valley closed to third order accuracy; however, the field work itself was not executed by means of conventional third order methods.

d. Elevations shown on drawings, file No. E-9-5-8, sheets 3 to 13 inclusive, "Nooksack River, Topography," have been obtained by means of fourth order grade A levels (differential levels without distance balance adjustments).

FOR THE DISTRICT ENGINEER:

Sincerely yours,

9 Incls.
As per Shipping List

/S/ P.H. SYMBOL
Lt. Col., Corps of Engineers
Executive Officer

49. NOTES FOR HYDROGRAPHER

The following is a list of recoverable topographic stations within this quadrangle:

* CLAM, 1950
DIKE, 1950
REST, 1950
* TREE, 1950
WATT, 1949 } Third-order position determined in conjunction with H-7962 (1953). See p. 1406, Triangulation for Wash. EHR
KYNE, 1949 }
TOWER ~~NEPT~~, 1949
T-38-N R-1-E 4|3 / 9|10

T-38-N R-1-E 3|2 / 10|11 *

Section Corner T-39-N, R-1-E&W, 13|18 / 24|19

Section Corner T-39-N, R-1-E 21|22 / 28|27 *

" " T-39-N, R-1-E 22|23 / 27|26 *

T-38-N, R-1-E 10|11 / 15|14

Section Corner T-39-N, R-1-E 23|24 / 26|25 *

~~* Position doubtful, subject to verification by field edit.~~ EHR

* Interior stations - not well situated for hydrographic surveying. EHR

NAUTICAL CHARTS BRANCH

SURVEY NO. T-5583 N & S.

Record of Application to Charts

DATE	CHART	CARTOGRAPHER	REMARKS
8-13-65	6300	G. R. Johnson	~~Before~~ After Verification and Review T-5583-N
			fully applied thru cht 6380, drg #30
1-27-81	18430	C James 1/30/81 RDS	Before After Verification and Review T-5583S
			fully applied X drg
1-27-81	18431	C James 1/30/81 RDS	~~Before~~ After Verification and Review T-5583SN
			fully applied X drg #2
1-27-81	18424	C James 1-30/81 RDS	~~Before~~ After Verification and Review T-5583S
			fully applied drg #24
1-27-81 Inset	18424	C James 1-30-81 RDS	~~Before~~ After Verification and Review T-5583S
			fully applied drg #24
1-27-81	18423B	C James 1-30-81 RDS	~~Before~~ After Verification and Review T-5583S
IInset	2		fully applied X drg #21
1-28-81	18421	C James 1/30/81 RDS	~~Before~~ After Verification and Review T-5583S-N
			fully applied drg #47
			Before After Verification and Review
			Before After Verification and Review
			Before After Verification and Review

M-2168-1

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

History of Hydrographic Information
Quadrangle T-5583

Hydrography was applied to the north and south half of this quadrangle in accordance with Photogrammetry Division general specifications of 18 May 1949.

Soundings in feet and depth curves at 6, 12, 18, 30 and 60 feet at mean lower low water datum originate with the following USC&GS hydrographic surveys:

H-1953 (1889) 1:20,000
H-2079 (1889-91) 1:20,000
Chart 6378 54-8/9 1:40,000

Hydrography compiled by K. N. Maki and checked by O. Svendsen.
13 May 1954

K. N. Maki

K. N. Maki
Photogrammetry Division
25 April 1955