

# 5585

Diag. Cht. Nos. 6300-2 & 6380.

Form 504

U. S. COAST AND GEODETIC SURVEY  
DEPARTMENT OF COMMERCE

## DESCRIPTIVE REPORT

Type of Survey Topographic

Field No. Ph-26 Office No. T-5585 N&S

### LOCALITY

State Washington

General locality Bellingham

Locality King Mountain

194 9-54

### CHIEF OF PARTY

C.W.Clark, Chief of Field Party

E.H.Kirsch, Baltimore Photo. Office

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DATE December 17, 1959

# DATA RECORD

T - 5585

Project No. (II): Ph-26

Quadrangle Name (IV):

Field Office (II): Bellingham, Washington

Chief of Party: Charles W. Clark

Photogrammetric Office (III): Baltimore, Maryland

Officer-in-Charge: E. H. Kirsch

Instructions dated (II) (III): 31 August 1949, 24 Oct. 1949

Copy filed in Division of  
Photogrammetry (IV)

Supplement 1, dated 21 July 1950.

Supplement 2, dated 16 Jan. 1951

Letter 711-rs, dated 20 June 1950, Subject: Photogrammetric Field Surveys  
Project Ph-26

*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):

Date reported to Nautical Chart Branch (IV):

Applied to Chart No.

Date:

Date registered (IV): 19 Mar. 1959

Publication Scale (IV):

Publication date (IV):

Geographic Datum (III): NA 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): Kinghill, 1941

Lat.: 48° 48' 02.785"

Long.: 122° 27' 41.687"

Adjusted

~~Unclassified~~

Plane Coordinates (IV):

State: Washington

Zone: North

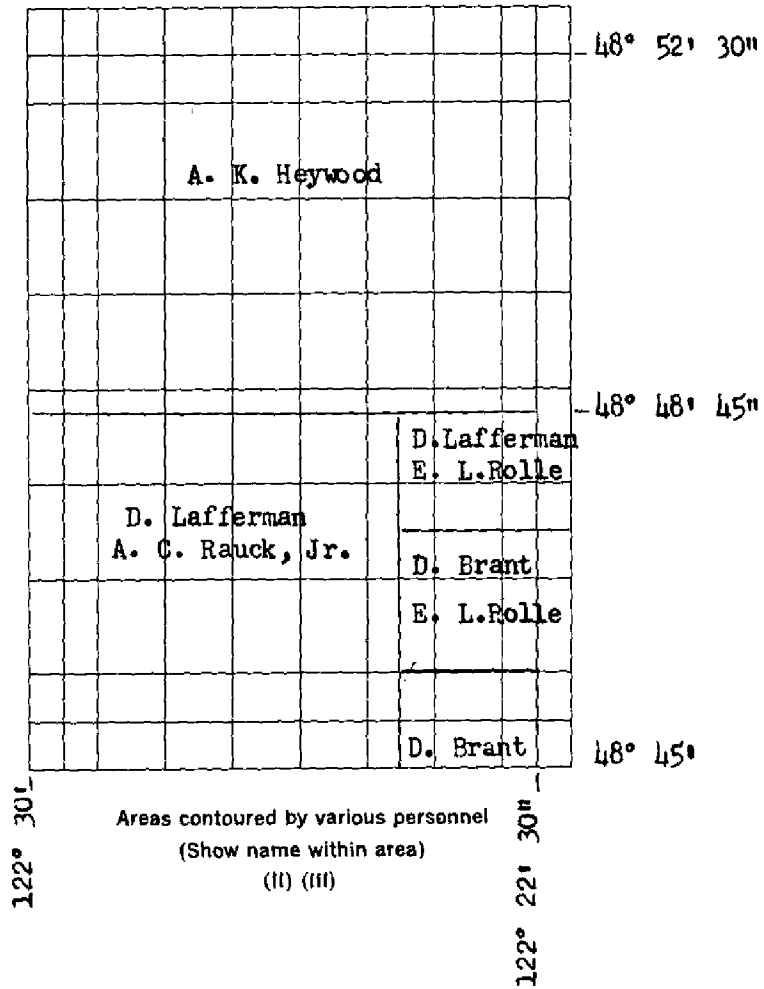
Y=

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.

T-5585



# DATA RECORD

Field Inspection by (II): J. H. Winniford, J. C. Lajoie  
H. R. Spies

Date: 1/15/51  
11/25/50  
11/20/51

Planetable contouring by (II):

Date:

Completion Surveys by (II): Ray H. Skelton II

Date: 1954

Mean High Water Location (III) (State date and method of location):  
June 1949 (Photogrammetric)

Projection and Grids ruled by (IV): T.L.J.

Date: 9/14/50

Projection and Grids checked by (IV): H.D.W.

Date: 9/15/50

Control plotted by (III): B. Wilson

Date: 6/51

Control checked by (III): W. F. Edinger

Date: 6/51

~~Control~~ or Stereoscopic E. L. Rolle  
Control extension by (III): D. M. Brant

Date: 8/51

Stereoscopic Instrument compilation (III):  
Planimetry ) A.K. Heywood, E.L. Rolle Date: 10/51  
                  ) D.M. Brant, D. Lafferman  
Contours ) and A. C. Rauck, Jr. Date: 10/51

Manuscript delineated by (III): W. F. Edinger and C. A. Lipscomb N/2  
C. A. Lipscomb & D. M. Brant S/2

Date: 3/10/52  
4/22/52

Photogrammetric Office Review by (III): D. M. Brant

Date: 3/2/55

Elevations on Manuscript D. M. Brant  
checked by (II) (III):

Date: 5/18/53

Camera (kind or source) (III): U. S. Coast and Geodetic Survey, Type "0"  
152.37 mm. focal length

PHOTOGRAPHS (III) (PST)

Number	Date	Time	Scale	Stage of Tide
1238 thru 1243	6/4/49	13:06	1:24,000	No tidal waters
1244 thru 1245	"	13:08	"	2.3' above MLLW
1281 thru 1289	"	13:30	"	No tidal waters
1298 thru 1305	"	13:42	"	2.7' above MLLW
1357 thru 1359	"	14:14	"	No tidal waters

Tide (III)  
From Predicted Tables

Reference Station: Port Townsend, Washington  
Subordinate Station: Bellingham  
Subordinate Station:

Ratio of Ranges	Mean Range	Spring Range
"	5.1	8.3
1.0	5.2	8.6

Washington Office Review by (IV): *Everett H. Ramey*

Date: 11 July 1955

Final Drafting by (IV): *R. A. Carter - S*

Date: 5-5-59

Drafting verified for reproduction by (IV): *M. E. Taylor - N*

Date: 6-1-59

Date:

Proof Edit by (IV):

Date:

Land Area (Sq. Statute Miles) (III): 48

Shoreline (More than 200 meters to opposite shore) (III): 5

Shoreline (Less than 200 meters to opposite shore) (III): -

Control Leveling - Miles (II): 43

Number of Triangulation Stations searched for (II): 23

Recovered: 15

Identified: 10

Number of BMs searched for (II): 17

Recovered: 14

Identified: 12

Number of Recoverable Photo Stations established (III): 29

Number of Temporary Photo Hydro Stations established (III): None

Remarks:

FIELD INSPECTION REPORT  
For  
Quadrangles Nos. T-5585, T-5586, T-5587  
Project Ph-26(47)

2: Areal Description

The area covered by these Quadrangles extends from the alluvial plain of the Nooksack River, across the intervening hills to the alluvial plain of the Samish River. This includes almost all of the City of Bellingham, and portions of the counties of Whatcom and Skagit.

Bellingham, the largest city in the area, has a population of about 34,000 and is the center of trade as well as the seat of the government of Whatcom County. The various industries concentrated in the area include a cement plant, a paper mill, sawmills, shipyards, canneries, and various port facilities. A new small boat haven, mentioned in the report for Quadrangle T-5584, is under revision and construction at Squaticum Creek Waterway. The city is also the site of Western Washington College of Education.

In the northern part of Quadrangle T-5585, that is, in the land bordering the Nooksack River, and in the area north of Bellingham, the principal industry is farming and dairying. The land, while not low, is flat or gently rolling and lends itself well to agricultural pursuits. Several small communities dot the area but there are no incorporated towns.

In the south part of this quadrangle, the northern and northwestern portion of Bellingham, and the northwestern part of Lake Whatcom constitute the principal topographic features. Lake Whatcom, one of the reservoirs for the city of Bellingham, drains through Whatcom Creek into Bellingham Bay. The city is rapidly growing to the north and east and many new residences are being built adjacent to the urban limits established for this party. Particular attention should be paid to this phase during field completion surveys in this area.

Just north of the city, an east-west ridge separates the drainage basin of the Nooksack River from that of Whatcom Creek and Lake Whatcom. In the northwest portion of T-5586, and in the southwest part of Bellingham, Sehome Hill rises to a height of about 650 feet. The lower portion of the slope is largely residential, while a park area occupies the top.

A little further to the south and southwest lies another part of Bellingham, now known as South Bellingham, but at one time a separate town, Fairhaven. During the late 1800's this was a prosperous community, being one of the stops on the trail to the gold fields of the Yukon. As Bellingham, grew and as commercial enterprises moved into that

area, Fairhaven declined until, at present, the business district is practically deserted and with the exception of a plywood mill and the Pacific American Fisheries the area is now residential and has been annexed to the city of Bellingham, although the name Fairhaven is still used in reference to the Junior High School located there.

Numerous mills, which dotted the waterfront area between the two towns, have either burned or have been torn down as the larger timber has been depleted in the area near the coast and the logging is done in the hills by portable mills.

Southeast and south of the area described above lies Lake Padden, another reservoir area of the city of Bellingham. South of Lake Padden an east-west projection of the Cascade foothills reaches out toward Bellingham Bay and separates the drainage of Lake Padden from that of Lake Samish.

Lake Samish, a large body of water, elevation 273 feet above sea level, is a resort and residential area for the city of Bellingham. The western shore of the lake is dotted with summer cottages although there are numerous permanent residences in the area. The lake lies in the saddle between Lookout and Chuckanut Mountains.

Lookout Mountain lies in the <sup>E</sup>western portion of Quadrangle T-5586. It rises to a height of 2680 feet and is heavily wooded. The sides of the mountain have been logged and are covered with a dense growth of deciduous brush, scattered fir and fallen trees. There are few roads in the area, but those are in fair condition being jointly maintained by the State Forest Service and the property owners.

Chuckanut Mountain to the west presents a like area except that it does not reach the height attained by Lookout Mountain, but seems to be more irregular. Roads in this area are practically non-existent and what few old logging railroad grades were found were almost impassible to foot traffic.

The difficulties encountered in vertical angle leveling in these two areas and the subsequent solution will be discussed under another heading.

The foothills of these mountains project south into the northern portion of Quadrangle T-5587. This sheet also covers the northern part of the low fertile Samish River plain. The character of this area is such that agriculture and cattle raising prosper. The land, low and flat, rises but a few feet above sea level and is protected by a system of dikes, ditches and floodgates which extend from the southwest end of Chuckanut Mountain to and through the southern limits of the project.

Joe Leary Hill dominates the southwest portion of the sheet extending above the alluvial plain and running to the east shore of Padilla Bay in the vicinity of Bayview.

Bellingham Bay lies to the west of this portion of the project and runs south to meet Samish Bay. On the west side of T-5586, Chuckanut Bay projects to the east of the general shoreline of Bellingham Bay. Samish Bay is a shallow body of water, merging with Bellingham Bay and lying between Samish Island and the mainland. Padilla Bay, to the south of Samish Island, borders the west side of T-5587.

The Great Northern Railway roughly parallels the shore line of Bellingham and Samish Bays from Bellingham to the south side of Chuckanut Mountain, where it turns to the southeast and leaves the project area.

Chuckanut Drive (U.S. Highway 99 A) follows the west side of Chuckanut Mountain to the flat area south of Colony Creek and roughly parallels the above mentioned railway.

The Samish Highway (U.S. Highway 99), a continuation of the Pacific Highway, discussed in the reports for Sheets T-5582 and T-5584, runs in a general southeasterly direction within the project limits to the east side of Lake Samish. It then continues south to junction with Highway 99 A near Burlington.

An interurban railroad grade, parts of which are readily discernible on the photographs, runs from the south edge of T-5587 to Bellingham and is now the right of way for a power transmission line.

As mentioned above, Bellingham is the largest and most prominent town in the project. The southern part of T-5586 and the northern part of T-5587 are but sparsely populated. In the Samish River area Edison, a small unincorporated village, is the most prominent but most of the commercial enterprises which service the area are located in Bellingham, Burlington or Mt. Vernon, the last two of which are out of the project limits.

The entire area of Quadrangle T-5585, the northern portion of T-5586 and the southern portion of T-5587 is interlaced by well maintained gravel, concrete, or macadam roads which generally follow the sectionalized pattern of the country.

The principal drainage in the area is supplied by the Nooksack River, Squalicum Creek, Whatcom Creek, Chuckanut Creek, Colony Creek, the Samish River and its northern tributaries.

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 a more uniform tone than a corresponding area of conifers. Deciduous trees, mostly about 40 feet high, abound in the areas which have been extensively logged and in low areas along drainage. Conifers are generally found in isolated groups where cutting has not been as extensive or where logging has not been as recent and the conifers are again replacing the deciduous. A mottled area of light grey and dark lines indicates the mixture described above while a solid light grey tone indicates a brushy area. In the area of Lookout and Chuckanut mountains, there are lines of clearing showing on the photographs, leading to a central area. These are the skid roads over which logs were assembled for shipping. In these light areas, there is only low brush, about one to two feet high, as the process of erosion has set in and the fertile top soil has been washed away.

In area 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 boulder and gravel beaches. Mud flats are apparent by a change in tone of the water surface.

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

### 3: Horizontal Control

(a) The following supplemental stations were established by third-order triangulation:

#### Quadrangle T-5584

Seattle-Vancouver Airway Beacon No. 9. (Located in 1951 after it was moved from the 1941 position.)

Bellingham Breakwater Entrance Light. (Originally located by this party in 1950. Relocated in 1951 after being moved from 1950 position.)

#### Quadrangle T-5585

None

#### Quadrangle T-5586

Bellingham, Larson Tank  
Bellingham, Sunset Heights Tank  
Whatcom Waterway Light

Quadrangle T-5587

Bayview Methodist Church Spire 1942, 1951. (An attempt was made to secure a check on the 1942 position. When this failed, the station was relocated.)

Swinomish Slough North Entrance Light 10. (Light 2, 1939.)

Swinomish Slough North Entrance Light 18.  
Swinomish Slough North Entrance Light 26.

In addition to the above triangulation stations, a number of positions were observed on temporary points, or natural objects, during the vertical angle leveling in this area, and several of the points were identified and may be used to supplement existing control. The stations follow:

BURL 1951 - Located with topographic accuracy as a recoverable topographic station.

LOOK 1950 - Located with topographic accuracy as a recoverable topographic station.

RHS 1 (temp.) - Located with topographic accuracy and identified on pricking card. Not described - not recoverable.

RHS 5 (temp.) - Located with topographic accuracy and identified on pricking card. Not described - not recoverable.

WOOD 1951 - Located with topographic accuracy as a recoverable topographic station.

(b) No datum adjustments were made by this party. All positions are on North American 1927 Datum.

(c) Control stations used but not established by the U.S. Coast and Geodetic Survey are U.S. Engineer Department Traverse Stations or U.S. Geological Survey Primary Traverse Stations.

U.S. Engineer Traverse Stations T-40, T-47, T-58, T-68 are all on a traverse along the Nooksack River. These stations are reported to be of third-order accuracy.

U.S. Geological Primary Traverse Stations PTS 8 and PTS 9 are included in "Triangulation and Primary Traverse, 1916-1918 Sumas Lake Quadrangle, Page 412, East along Northern Pacific Railway in south part of quadrangle (by F.J. McMaugh in 1917).

(d) All stations required by the Project Instructions, as well as several others, were identified.

(e) All Coast and Geodetic Survey stations within the project limits were searched for.

The following Coast and Geodetic Survey stations were not recovered:

Quadrangle T-5585

Bellingham, Catholic Church Cupola, 1914  
Bellingham, Whatcom Falls Mill Tank, 1927  
Bellingham, Whatcom Falls Mill Burner, 1927

Quadrangle T-5586

South Bellingham Burner, 1927  
Bellingham, Morrison Mill Stack, 1927  
Bellingham, Woods Mill Stack, 1927  
Bellingham, Stack, White Band, 1927  
Bellingham, Morrison Mill Burner, 1927  
Bellingham, Bloedel Donovan Burner, 1927  
Bellingham, Flagstaff on Street, 1914  
Bellingham, Wireless Pole, 1914  
Bellingham, Cannery Stack, 1914  
Bellingham, Municipal Dock Light 1927  
TOWN (IBC), 1905  
TOWN 2, 1914

Quadrangle T-5587

Swinomish Slough North Entrance Light No. 4, 1939  
Swinomish Slough North Entrance Light No. 6, 1939  
Black Cross, 1939  
Early, 1939  
Fosse, 1939  
Grain, 1939  
Lind, 1939  
March, 1886  
Padilla Bay Radio Pole, 1939  
William 2, 1939

4: Vertical Control

(a) List of bench marks recovered:

<u>Quadrangle</u>	<u>B.M.</u>	<u>Established by</u>	<u>Accuracy</u>
<u>T-5584</u>	M6 = 107B (USGS)	U.S.C. & G.S.	1st order
<u>T-5585</u>	N 6 RESET	G.N. Ry.	1st order
	Bellingham Tidal B.M.'s		
	6	U.S.C. & G.S.	Tidal B.M.
	7	"	" "
	8	"	" "
	BM 7 (USGS)	"	" "
	72 B	U.S.G.S.	3rd order
	82 B	"	" "
	95 B	"	" "
	186 B	"	" "
	187 B	"	" "
	313B = P.T.S. 8	"	" "
	319B = P.T.S. 9	"	" "
	18.4	"	" "
	48 6R	"	" "
<u>T-5586</u>	O6	U.S.C. & G.S.	1st order
	P6 = 44 B (USGS)	"	" "
	Q6	"	" "
	R6	"	" "
	Bellingham Tidal B.M.'s		
	1	"	Tidal B.M.
	2	"	" "
	4	"	" "
	554 B = P.T.S. 6	U.S.G.S.	3rd order
<u>T-5587</u>	S6	U.S.C. & G.S.	1st order
	U 6 = 14 B	"	" "
	X 6 = 35 B = PTS 16 (USGS)	"	" "
	D 13 RESET	"	" "
	E 13	"	" "
	F 13	"	" "
	G 13	"	" "
	J 13	"	" "
	Swinomish Slough (North End)		
	Tidal B.M. 5	"	Tidal B.M.
	123 B	U.S.G.S.	3rd order
	21 WASH	"	" "
	8 WASH	"	" "
	3 WASH	"	" "

Elevations of all bench marks, except tidal bench marks, are above mean sea level and are based on the 1929 General Adjustment. Datum adjustments were made on Bellingham Tidal Bench Marks reducing the elevations to mean sea level using the published value of 4.91 feet.

No bench marks were established by this party.

U.S. Engineer Department bench marks in the Nocksack River valley shown on the project index and on the 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 and for establishing one vertical point north of the project limit. This point was found on an unused photograph and was leveled to, despite the fact that it was not shown on the mosaic layout of vertical control points required in the area.

(b) All topographic levels in the area were run by trigonometric methods, using Kern Theodolite #P 36563. All lines started and closed on USC&GS or USGS bench marks or on fly line level points established and adjusted in accordance with the project instructions: the only exception being the vertical point mentioned in the previous paragraph.

Elevations were established within the squares which were blocked off in blue on the 1:24,000 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 crossed lines in brown being the center of the level spot.

#### T-5585

The topography in this quad is relatively flat and rolling with very little character or relief and presents no great problem in the extension of vertical control throughout the area. Vertical control has been provided by vertical angle leveling. Trunk lines of levels were run along the north and east edges of the quadrangle along roads. Two other trunk lines were run north and south through the quadrangle. Elevations of control points which did not lie close to these routes were established later from TBM's established at the time that the trunk lines were run. Elevations in this quad were computed and checked in "Wye Leveling Books G and H", then transferred to the photographs and verified. A complete index of all points established, with the elevation, and the photographs number of the picture bearing the data is listed in front of the book. Each point whose elevation is recorded in these volumes has the suffix "G" or "H" indicating the volume in which the line is recorded. One point

in this quad was leveled to in conjunction with the work in Quadrangle T-5584 and the elevation of point 8501 is recorded in levels for that sheet.

Statistics:

Elevations established - 53  
 Miles of trunk vertical angle levels - 37  
 Miles of spur leveling - 8.0  
 Average closure of trunk lines - 1.27 (no regard to sign)  
 Average closure loops - -0.97

T-5586

The rough terrain in the area covered by this quadrangle has presented a supplemental control problem unusual in the work of this party. The quadrangle rises from sea level on the west edge to about 1800 feet at the crest of the first ridge, dropping to about 1000 feet in a saddle, rising again to 2300 feet at the highest part of Chuckanut Mountain, dropping back to 300 feet in the Samish Lake bottom and rising finally to 2700 feet just east of the eastern limit of the sheet but still within the area to be controlled. Over many of the hills in the western portion of the quadrangle, there is still a fairly heavy cover of timber, making it very difficult to situate stations in the area.

Preliminary inspection of the area indicated that it would be feasible to run a trig level line from west to east across the mountain. After a day and a half of running on this line, an area was encountered where fallen timber and rock ledges slowed walking so that a rodman required 20 minutes to move 800 feet. At this point, it appeared that the rocky top where RHS 1 is located would see both WHATCOM, 1926 and LILY, 1941 and that an elevation could be established here by observing vertical angles over the sides of a triangle with the vertex at this rocky tip. Accordingly, this point was visited and a temporary signal was established here. The elevations of two nearby lakes were tied to the station. From this bare knoll, which is considerably more open than most of the tops in the area, the possibilities of a supplemental triangulation, with vertical angles to provide control in the area, became manifest; and the scheme was conceived at this time essentially as shown on the sketch forwarded with this report.

The trig line from the west was abandoned.

The scheme is intended only to furnish vertical control, any horizontal control furnished is in excess of requirements and is incidental to the primary purpose of the scheme. No attempt was made to adhere to rigid horizontal tolerances, stations were not revisited or reoccupied unless absolutely necessary. Because the signals were built at the same time that the stations were occupied most of the lines are observed in one direction only. There are no closed triangles in the whole scheme.

There was some difficulty in maintaining signals due to wind and to wire breakage. These were invariably at occupied stations and furnished no opportunities for new lines.

Due to the rebuilding of signals, the signal heights and dates must be watched very closely in the Abstract of Zenith Distances when the computations are checked.

The supplemental stations established were not permanently marked and were not described. Some signals settled several inches during observations, opening the checks somewhat.

The sketch for the supplemental triangulation for this quadrangle shows all horizontal directions observed, as well as computed lines. Vertical angles were observed over all lines whose direction was observed, as well as over the lines MORRIS 1939 - LILY 1941; LILY 1941 - MORRIS 1939; RHS 3 (Temp) - BELLINGHAM, MOUNT BAKER THEATER TOWER 1927; and WHATCOM 1926 - BELLINGHAM, OLYMPIC PORTLAND CEMENT CO. STACK SW OF 3, 1941. The two trunk lines through the net are MORRIS to LILY to RHS 3 to BELLINGHAM MOUNT BAKER THEATER TOWER and MORRIS to LILY to WHATCOM to BELLINGHAM OLYMPIC PORTLAND CEMENT CO. STACK SW OF 3. The former line is 16.6 miles long with a closure of 6 cms.; the latter is about 20.5 miles long with a closure of about 7 cms.

After the elevations along these two lines are determined, the elevation of RHS 1 can be determined. The elevations of RHS 4 and RHS 5 are then found by backing off previously determined stations. LOOK 1950 is an intersection station; the elevation can be computed direct after elevations of RHS 1, RHS 3, RHS 4, RHS 5, and LILY 1941 have been determined.

RHS 2 was not used in the triangulation because of local obstruction at station LILY 1941.

RHS 7 and RHS 8 are resections on the shore of Lake Samish and were established to make a vertical connection between the mountain top and the Samish lake bottom.

No single station could be established in the area which would see four other stations. To decrease the possibility of error in the vertical connection, two three-point stations were established close together and tied by leveling. The elevation of a T.B.M. established by this method was tied in to trigonometric leveling originating in South Bellingham and carried through PTS 6 (USGS), within the limits of accuracy specified for the project.

RHS 9 is a resection station added to replace RHS 2.

Elevations of RHS 7, RHS 8, and RHS 9 are all found by backing off stations previously observed and computed.

The balance of the control in the quadrangle was established by the more usual trigonometric leveling procedure.

Every refinement was observed in the vertical angle leveling over the triangulation to minimize the error in the result. Refractions were computed over all reciprocally observed lines. Refractions computed for the date of observation were used in computing non-reciprocal observations for that day. Otherwise, a good approximation of all values obtained was used. This value is considerably different from that given in the second order triangulation manual.

An additional tie was brought by trigonometric leveling from BM U-6 at Bow, Washington to the elevation established at Lake Samish. It is about 15 miles between bench marks along this route.

Spur loops from these trunk lines and from supplemental triangulation completed the vertical control.

Elevations in the quadrangle were computed and checked in "Wye Leveling Books J and K", then transferred to the photographs and verified. A complete index of all points established, 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 these volumes has the suffix "K" or "J" indicating the volume in which the line is recorded.

Horizontal angles used in the determination of the positions of temporary triangulation in the quadrangle are recorded in "Observations of Horizontal Directions Book E". Zenith Distances used in computing the elevations of the temporary triangulation were recorded in "Observations of Double-Zenith Distances Vol.F". Computations of Positions and Elevations are enclosed in a separate binder.



Statistics

Triangulation Stations occupied and flagged - 11  
 (Supplemental and Main Scheme)  
 Elevations established - 42  
 Miles of trunk vertical angle leveling - 25.5  
 Miles of spurs (vertical angle leveling) - 6.0  
 Average loop closure trunk lines without  
 regard to sign - 0.95 foot  
 \* Average loop closure trunk line - 0.15 foot  
 Maximum loop closure - -1.8 feet

\* N.B. One long line tying in from T-5587

Average spread of elevations in supplemental  
 triangulation - 14 cms.

Average side check in supplemental triangulation is  
 about 5.5 times the tabular difference for 1" of sine of  
 the smallest distance angle.

T-5587

In general the supplemental control problem in this quad-  
 rangle has been quite simple. Several lines were run in connec-  
 tion with the work in T-5586. Elevations established on MORRIS  
 1939 and BURL 1950 were for this purpose although BURL was not  
 used in T-5586. Fly leveling was used throughout the flat areas  
 and along the railroad. Vertical angle leveling was used cross-  
 ing Joe Leary Hill and at the south end of Chuckanut Mountain,  
 which extends into the north end of this quadrangle.

The only problem on the sheet is the single point on the  
 south slope of the mountain near the summit. This station was  
 established by a single triangle from BURL and MORRIS and the  
 elevation of the ground at the station (RHS 10) is the eleva-  
 tion of the required vertical point.

Some difficulty was encountered in the computation of this  
 point leading to the belief that the original observations with  
 Kern Theodolite # P-36563 might be in error. Accordingly, this  
 point was reobserved using 7-inch theodolite #231. The result-  
 ing observation confirmed the original, and the line is sub-  
 mitted as computed. The line from MORRIS to RHS 10 crosses a  
 large body of water and this may account, in some measure, for  
 the discrepancy.

Elevations in this quadrangle were computed and checked  
 in "Wye Leveling Book L", then transferred to the photographs  
 and verified. A complete index of all points established, with  
 the elevation and the photograph number of the picture bearing  
 the data is listed in front of the book.

Horizontal angles used in the determination of RHS 10 are recorded in "Observations of Horizontal Directions Book M" and in "Observations of Horizontal Angles Book N". Zenith distances used in the computations of the elevation are recorded in "Observations of Double-Zenith Distances Vol. F". The computation of position and elevation are enclosed in a separate binder.

### Statistics

Miles of trunk fly leveling - 30  
 Miles of spur fly leveling - 2  
 Miles of trunk vertical angle leveling - 21.5  
 Miles of spur vertical angle leveling - 6  
 Elevations established for vertical angle  
     leveling over supplemental triangulation - 2  
 Elevations established - 50  
 Supplemental positions established - 2  
 Average closure of vertical angle level lines - -0.54 ft.

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

T-5585	8501 B to 8550 H
T-5586	8601 J to 8641 K
T-5587	8701 L to 8750 L

### 5: Contours and Drainage:

Contouring is inapplicable.

All drainage was investigated in the field and verified under the stereoscope. Small ditches in fields, where 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 and with instructions contained in the Topographic Manual, Part II, Chapters V and VII. In a few cases, where it was felt that the multiplex would have difficulty in reaching the ground, the height of trees was estimated.

### 7: Shoreline

The shoreline was inspected in accordance with "Supplemental Instructions - Shoreline Inspection" dated March 18, 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.

The shoreline from the north portion of Bellingham Bay to the south limit of the project was inspected from a boat kept close to shore.

Bellingham Harbor has two main, well marked waterways, Squalicum Creek Waterway and Whatcom Creek Waterway. In addition, a less important area is known as "I" and "J" Street Waterway. A small boat haven has been built at Squalicum Creek Waterway and is protected from all directions by two rock and piling breakwaters. These are under construction at the present time and a map showing the projected changes is submitted. The high water line falls along the base of the wooden bulkhead at the basin. The mouth of Squalicum Creek has built up a delta area which now bares at low water, but it is believed that this area will be dredged in the near future. Special attention should be paid to this area during field completion surveys. Just south of the delta is an area of old piling, once the support piling for an old sawmill. *See 386*

"I" and "J" Street Waterway is foul with numerous piling extending about fifteen feet above the high water mark. This area is used primarily as a storage area for log booms and many deadheads are apparent. The channel is marked by buoys which were located by sextant fix. These buoys do not show on the charts and may have been installed in connection with the Naval Reserve Program, whose installation is on this portion of the shoreline.

Between "I" and "J" Street Waterway and Whatcom Creek Waterway there is a boom storage area, filled with numerous piling and dolphins. The corner dolphins were located by sextant fix and the area is foul and should be avoided by navigation of any type.

Whatcom Creek Waterway handles most of the shipping in and out of the port, with the exception of the loading facilities at the south side of the Municipal Dock. All of the piers are wooden, set on piling. There is a large dolphin near the entrance to this area which was located by sextant fix. The edges of the piers have been delineated as the mean high water line. There is a small boat moorage at the northeast side of the Municipal Pier and to the southeast is an area of log boom moorage. Whatcom Waterway Light is shown from the southwest corner of the Municipal Pier.

The abandoned and burned Bloedel-Donovan Mill, distinguished by a tall brick stack and an old wharf and dock area lies to the south of the Municipal Dock. This area is being cleared of obstructions and buildings at the present time. At the inshore end of the long pier, there is an unloading slip for a railroad car ferry.

Southwest of the Bloedel-Donovan Mill site is an area of log boom storage and numerous dolphins and piling. The mean high water line falls at the base of a small bluff of boulders and ballast put in by the Great Northern Railway as a retaining wall. South of this boom area are the Bellingham Warehouse Co. buildings, set on piling with a railroad spur on piling leading out to them. To the southwest of these buildings lies the plywood mill, offshore from which is a foul area of log booms, piling and dolphins. The mean high water line follows the base of a wooden bulkhead around the log basin to the plant of the Pacific American Fisheries. The P.A.F. maintains a marine way here for repair of its own vessels. South of the P.A.F. is a small lagoon, crossed by the railway on a rock fill and a small trestle. This lagoon is very shallow and is not navigable at low water although at high water, several boats are moored here.

Southward from the lagoon, the high water line follows along the base of a small bluff of boulders and railroad ballast, with areas of projecting ledge rock. A small pond east of the railway fill is not connected with the bay but rises and falls through seepage. About three miles south, another pond exists under similar circumstances.

Southeasterly of this point, to the north point of Chuckanut Bay, the mean high water line falls at the base of the ledge rock bluff.

Along the westerly side of the north end of Chuckanut bay, the high water line falls along the base of fifty-foot rock bluffs to the railway fill, then follows the base of the fill to the trestle area near the center. The head of the bay is very shallow and except for a small dredged boat basin which contains water at all tides, bares at low tide. The mean high water line follows along the shore to the east side of the railway fill, then to the trestle where it turns east to the natural shoreline of the bay. Along the east side of the bay, the high water line follows at the base of rock bluffs. Southeasterly of Chuckanut Island is a small settlement with small piers, rock and wooden bulkheads along the shoreline.

Chuckanut Rock is a bare ledge rock with reefs extending north and south. Chuckanut Island is a wooded islet of ledge rock, and the mean high water line falls at the base of the rocky bluff around the island.

Around Pleasant Bay and Chuckanut Point, the mean high water line falls at the base of rock bluffs and the foreshore consists of rocky ledges and boulders. At the head of Pleasant Bay, there are three small marine ways. At the heads of the small coves in the area, the beach areas are sand and gravel. The shoreline south to Clayton Bay is similar to that just described. At Clayton Bay, there is a railway fill and the abandoned trestle of the old interurban railroad and a powerline. These follow about 200 feet offshore, while the high water line follows the base of a small bluff. South of this point, the railroad trestle is in poor repair and the high water line follows the base of the present railway fill.

Samish Bay, to the south, is not navigable at lower tides. The entire area bares at low water. The southern part of Samish Bay is devoted to the cultivation of oysters in planted beds. Some beds are staked off, some are surrounded by wooden walls, while some are surrounded by six-inch concrete walls.

South of the area mentioned above, the high water line follows along the base of a small bluff to the west of the old interurban track and along the base of the railway fill. An oyster house has been built in the bay and a large sunken barge is used as a pier. The large white area here is oyster shells in piles. About one-half mile south of the oyster house is an old fill for the interurban. The mean high water line follows the west edge of the fill. A stagnant pond lies to the east and is not connected with the bay.

McElroy Slough, at the south side of Chuckanut Mountain, has a deep channel near shore which has silted up in the bay. It is navigable only at high water. The piling located at the east side of the slough are the remains of an old lumber mill. An oyster house with its attendant piles of shells lies on the south side of the entrance.

The head of Samish Bay, from McElroy Slough to Samish Island is all low flat diked land. The offshore side of the earthen dikes are usually protected by breakwaters of piling while the offshore side of the dike itself is supported by a wooden bulkhead. In some areas there are two or three rows of these offshore piling. Between the breakwaters and the bulkhead are areas of marsh grass. The mean high water line follows the offshore limits of the marsh area.

Edison Slough is navigable at higher stages of the tide. The banks of the slough are diked and the area offshore from the high water line is foul with piling. A tide gate has been built in the slough where the highway through Edison crosses.

West of the mouth of the slough, there are several small marshy islands connected to the mainland with foot bridges.

The entrance to the Samish River is very shoal and can be used by small boats only at high water. The mud flats at the mouth and along the banks of the slough are foul with piling.

In the southwest part of Samish Bay are a few small undiked marsh islands. The high water line follows the outer edge of the marsh.

The eastern end of Samish Island is all fast land with sand and gravel beaches and clay bluffs. On the eastern tip of the island is a small summer resort area.

Southeasterly from Samish Island, the eastern shore of Padilla Bay is essentially the same as the south part of Samish Bay with dikes supported by wooden bulkheads, protected by a pile breakwater. Marshland and grass are present in some places between the bulkhead and the breakwater, and the mean high water line follows the grass line.

Joe Leary Slough is very shoal and is not navigable except by very small boats. About one-half mile from the mouth, all navigation is terminated by a concrete culvert.

South of Joe Leary Slough, there is a small diked area, protected by a pile bulkhead, but in the south portion, the dikes are in ruins and the land is marshy.

At this point, the clay bluff which lies behind the low area from Joe Leary Slough south comes to the shoreline and the mean high water line follows along the bluff to the south limit of the project.

#### 8: Offshore Features

The principal features offshore from the high water line are the piers at Bellingham, the piling and the dolphins noted in the shoreline discussion, the old support piling on the interurban railroad grade (now abandoned) and the protective breakwaters of Squalicum Creek Waterway and of the low areas at the head of Samish Bay. *See § 56*

#### 9: Landmarks and Aids

(a) Landmarks for this portion of the project were furnished previous to this report. *Copies of forms 567 appended. ENR*

(b) The aeronautical beacon at Bellingham Airport (in T-5584) was located by triangulation as an aeronautical aid.

(c) Two aeronautical aids exist within the limits of the area discussed by this report. They are Seattle-Vancouver Airway Beacons Nos. 9 (in T-5584) and 8. In addition Seattle-Vancouver Airway Beacon No. 6 is located just south of the limits of the project on the grounds of Whidbey Island-Mount Vernon Outlying Field.

(d) Five fixed aids to navigation (including one aeronautical aid which serves a double purpose) exist within the limits of the project. Squalicum Creek Waterway Light was located by Photogrammetric Methods. Squalicum Creek Entrance Light was located by triangulation in 1950 but has been rebuilt, destroying the previous position.

Bellingham Breakwater Entrance Light was located by triangulation in 1950, moved and relocated in 1951. According to present plans the Port Commission expects to move these lights several times during the construction of the Breakwaters.

Whatcom Waterway Light was located by triangulation in 1950.

Seattle Vancouver Airway Beacon No. 8 was located by triangulation in 1941.

#### Adjacent to the project limits

William Point Light was located by triangulation in 1939.

March Point Light was located by triangulation in 1939 and was verified in 1951.

Swinomish Slough North Entrance Lights 10, 18, and 26 were located by triangulation in 1950.

10: Boundaries Monuments and Lines

See "Special Report on Boundaries and Land Lines - Project Ph-26(47). *(Filed under project data, Div. of Photogrammetry)*

The boundaries which fall within the limits of these quadrangles are:

1. The corporate limits of the City of Bellingham
2. The Whatcom-Skagit County Line
3. The boundary of Larrabee State Park
4. The boundaries of the various townships of Whatcom and Skagit Counties.

*(US Dept. of Agri. Soil Conservation Nursery Unit on T-55855) RHR*  
The corporate limits of the City of Bellingham are contained in "The Charter of the City of Bellingham" and the typewritten annexations thereto, which will be submitted with the Special Report. *See §58*

The Whatcom County - Skagit County line follows the ninth standard parallel, but as yet no legal foundation has been secured.

The boundary of Larrabee State Park is a mess. Efforts were made to secure some description of the limits of this park from the County Assessor of Whatcom County, the same official in Skagit County, the Supervisor of the park itself, the Larrabee Realty Company (the original donors) and the Whatcom County Engineer. An effort is now being made to get information from the Washington State Park Commission.

The various political subdivisions of Whatcom and Skagit County which fall within the limits of these Quadrangles are shown on plats which will be submitted with the special report.

54 section corners have been recovered and identified. All recovered corners are apparently remarked corners. Descriptions of the section corners were obtained from the Whatcom County Engineer, the Skagit County Engineer, the City of Bellingham Engineering Department and the Washington State Forest Service. These points were poorly described in most cases and some were found only with the aid of some person attached to the offices mentioned above. The corners which were recoverable i.e. marked in a permanent fashion, were described as recoverable topographic stations.

No further verification as to the authenticity of the recovered corners has been found nor does there seem to be any likelihood that any one will commit himself to vouch for points with which he is not personally familiar.

In the majority of cases, the reset marks were not found as they were buried in road intersections. Reference distances furnished by the authorities mentioned above were measured and the point of intersection of the arcs was located.

In the wooded area, planetable traverses were run from identifiable points to the corners. The traverses and any pertinent notes concerning the station are shown on the reverse of the Form 524 submitted for the station.

#### 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 at the U.S. Weather Bureau Signal mast in Bellingham for use as a nautical landmark.

Two were located by triangulation (supplementary) for use as additional horizontal control for the plot.

3 azimuth marks for triangulation stations and 46 section corners were identified and described for use as interior control.

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

#### T-5584

T38N, R2E, 1/4 corner sections 13-14  
CITY, 1951

#### T-5585

~~CITY, 1951~~

KINGHILL AZIMUTH MARK

TOAD AZIMUTH MARK

~~INT. PUMP, 1951~~  
STACK

- ✓T38N, R3E Section Corner 1-2-11-12 ✓
- ✓T-38N, R3E Section Corner 2-3-10-11 ✓
- ✓T-38N, R3E Section Corner 3-4-9-10 ✓
- ✓T-38N, R3E Section Corner 4-5-8-9 ✓
- ✓T-38N, R3E Section Corner 7-8-17-18 ✓
- ✓T-38N, R3E Section Corner 8-9-16-17 ✓
- ✓T-38N, R3E Section Corner 9-10-15-16 ✓
- ✓T-38N, R3E Section Corner 14-15-22-23 ✓

See § 38



T-5585 (continued)

- ✓ T38N, R3E Section Corner 20-21-28-29 ✓
- ✓ T38N, R2&3E, Section Corner 7-12-13-18 ✓
- ✓ T38N, R2&3E Section Corner 13-18-19-24 ✓
- ✓ T38&39N, R2&3E Section Corner 1-6-31-36 ✓
- ✓ T38&39N, R3E Section Corner 1-2-35-36 ✓
- ✓ T38&39N, R3E Section Corner 3-4-33-34 ✓
- ✓ T38&39N, R3&4E Section Corner 1-6-31-36 ✓
- ✓ T39N, R2&3E Section Corner 19-24-25-30 ✓
- ✓ T39N, R2&3E Section Corner 25-30-31-36 ✓
- ✓ T39N, R3E Section Corner 8-9-16-17 ✓
- ✓ T39N, R3E Section Corner 9-10-15-16 ✓
- ✓ T39N, R3E Section Corner 10-11-14-15 ✓
- ✓ T39N, R3E Section Corner 14-15-22-23 ✓
- ✓ T39N, R3E Section Corner 19-20-29-30 ✓
- ✓ T39N, R3E Section Corner 20-21-28-29 ✓
- ✓ T39N, R3E Section Corner 21-22-27-28 ✓

T-5586

- ✓CLAY, 1951  
✓HARD, 1951  
✓LOOK, 1951

- ✓ T36&37N, R3E Section Corner 1-2-35-36
- ✓ T36&37N, R3E 1/4 Corner Section 1-36
- ✓ T37N, R2&3E Section Corner 7-12-13-18
- ✓ T37N, R2&3E Section Corner 19-24-25-30
- ✓ T37N, R3E 1/4 Corner Section 7-8
- ✓ T37N, R3E 1/4 Corner Section 17-18
- ✓ T37N, R3E 1/4 Corner Section 26-27
- ✓ T37N, R3E 1/4 Corner Section 26-35

T-5587

- ✓BURL, 1950  
✓FLAT, 1951  
✓ISLE, 1951

## EDISON AZIMUTH MARK

- ✓T35N, R3E Section Corner 3-4-9-10  
✓T35N, R3E Section Corner 14-15-22-23  
✓T35N, R3E Section Corner 15-16-21-22  
✓T35N, R3E Section Corner 17-18-19-20  
✓T35N, R3E Section Corner 19-20-29-30  
✓T35N, R3E 1/4 corner section 14-23

T-5587 (continued)

- ✓T35N, R3E 1/4 Corner Section 15-22
- ✓T35N, R3E 1/4 Corner Section 23-24
- ✓T35N, R3&4E 1/4 Corner section 19-24
- ✓T35&36N, R3E Section Corner 1-2-35-36
- ✓T35&36N, R3E Section Corner 2-3-34-35
- ✓T35&36N, R3E Section Corner 3-4-33-34
- ✓T35&36N, R3E Section Corner 4-5-32-33
- ✓T36N, R3E Section Corner 26-27-~~34~~-35

No photo hydro stations were established.

12: Other Interior Features

All roads have been classified in accordance with instructions contained in the Topographic Manual Part II, Chapters V and VII.

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.

There are no bridges over navigable waters in the area.

A high tension power transmission line runs from southeast to northwest within the limits of T-5585.

A trunk power transmission line follows the abandoned interurban right of way from Bellingham to the south limit of the project.

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

13: Geographic Names:

See Special Report on Geographic Names - Project Ph-26(47).

(Report filed in Geographic Branch, Charts Division)

All geographic names within the entire area have been incorporated in the above report.

14: Special Reports and Supplemental Data

Special Report - Geographic Names - Project Ph-26(47) and name sheets were forwarded to the Washington Office on 7 May 1951.

Special Report on the Investigation of Boundaries and Land Lines - Project Ph-26(47) and accompanying maps were forwarded to the Washington Office on 14 May 1951.

Coast Pilot Report - Project Ph-26(47) will be submitted later.

Original copies of Recovery Notes, Bench Marks were forwarded to the Division of Geodesy on 9 April 1951.

Original copies of triangulation records were forwarded to the Division of Geodesy on 10 April 1951.

Duplicate copies of the above geodetic records are forwarded with this report.

Photographs and other photogrammetric records are forwarded with this report.

Three copies of Form 567, Non-Floating Aids or Landmarks for Charts, were forwarded to the Washington Office on 15 March 1951, 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:

- 1 Map of Larrabee Realty Company Chuckanut Bay Plat.
- 1 each Maps of Ten Mile, Van Wyck, Geneva, and  
Crescent Townships, Whatcom County, Washington.
- 1 Print of Port of Bellingham Plan of Proposed Small Boat  
Harbor
- 1 Print of Port of Bellingham - General Map - Bellingham  
Harbor
- 1 Sketch of scheme of Horizontal and Vertical Control

Approved:

*Charles W. Clark*  
Charles W. Clark  
Chief of Party

Respectfully submitted:

*John C. Lajoie*  
John C. Lajoie  
Cartographer

PROJECT Ph-26

Photogrammetric Plot Report

21. Area Covered

T-5585, T-5586, and T-5587.

22. Method

Multiplex bridging was done directly on the 1:10,000 scale manuscripts. Two cross-flights were used in addition to the north-south strips. See Sketch of Horizontal Control, attached, for layout of strips bridged and horizontal points held. The cross-flight 1362-69 was used to establish pass points. These were held with identified horizontal points to control the subsequent bridges. Bridging proceeded northward and southward from this cross-flight. At the south on T-5587 a shorter cross-flight 1341-45, was used also to establish some needed pass points.

Bridging was extremely troublesome because of poor photography (See item 25) and heavy woodland cover. Several of our strips had to be reset to obtain satisfactory ties. It was concluded that our difficulties were the result of poor parallax solutions and poor "tacks" between models. The latter was due to the lack of well-defined detail needed for strong "tacks" and accurate scale solutions. The more difficult areas were in the central and west portions of T-5586 and T-5587.

The average difference in pass points between strips was about 0.5 mm with a maximum of 1.0 mm. The weakest area is probably on the south half of T-5586 and T-5587.

23. Adequacy of control

Horizontal control complied with project instructions and may be adequate. It is fortunate that the field inspection party identified as much additional control as they did under the circumstances. The location of the control points is such that many are off the project limits or concentrated in one area. This leaves the north half of T-5585 without a single control station, and a large area in T-5587 void of control.

Those strips bridged on the north half of T-5585, nevertheless, tied well. Since LILY, 1941 was a key station in controlling T-5586S and T-5587, the fact that it was difficult to accurately identify, contributed to the aforementioned difficulties. This was not the fault of the field party. The area was such that a more well-defined sub-point was not available.

Refer to letter, attached, dated 11 September 1951 to Chief, Division of Photogrammetry regarding four (4) stations not held during bridging. In addition topo. station WOOD, 1951 could not be accurately identified in the multiplex model (1368-69). Top of stack could not be seen. An attempt was made to identify base of stack in model. Holding what was believed to be the base of the stack plotted about 0.5 mm north of its geographic position.

A number of topographic stations were established by multiplex. Among these were POLE, 1951; SAND, 1951, and ROCK, 1951. These three are on T-5587. Since these are not near enough to identifiable control it is not believed that they are located within the prescribed accuracy of 0.3mm.

24. SUPPLEMENTAL DATA

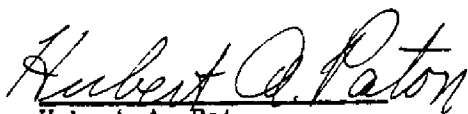
Not applicable.

25. PHOTOGRAPHY


Coverage and overlap of photography was adequate.

The quality of the photography was poor and consequently the diapositives. Refer to letter previously mentioned.

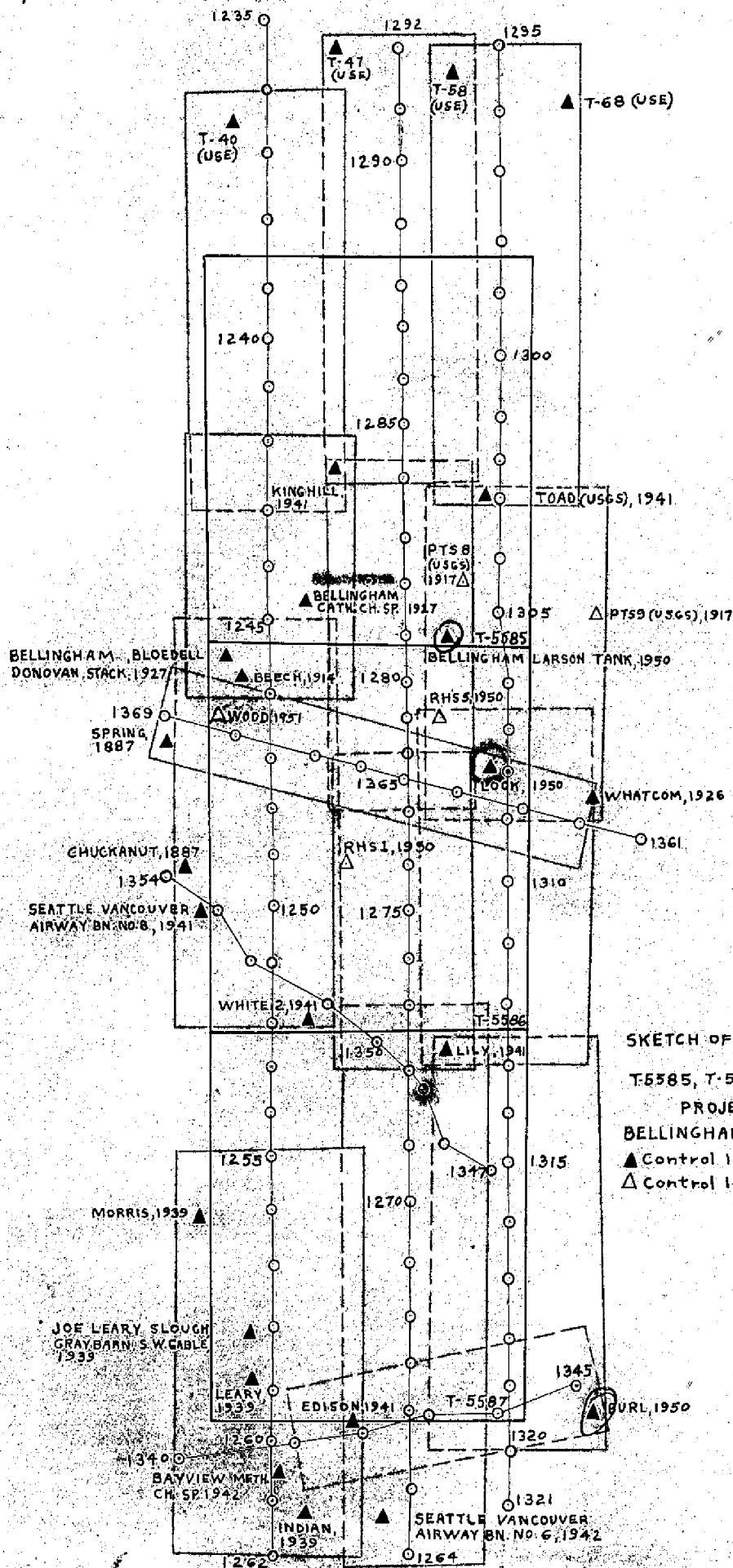
Approved and forwarded

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

Respectfully submitted  
2 June 1952

  
Henry P. Eichert  
Supervisory Cartographer

✓  
sm



MAP T. 5585

PROJECT NO. Ph-26(47)

SCALE OF MAP 1:10,000

SCALE FACTOR 1.000

STATION	SOURCE OF INFORMATION (INDEX)	DATUM	LATITUDE OR $\psi$ -COORDINATE LONGITUDE OR $\chi$ -COORDINATE		DISTANCE FROM GRID IN FEET, OR PROJECTION LINE IN METERS		DATUM CORRECTION	N.A. 1927 - DATUM DISTANCE FROM GRID OR PROJECTION LINE IN METERS		FACTOR DISTANCE FROM GRID OR PROJECTION LINE IN METERS	
BELLINGHAM, LARSON TANK, 1950	Field Comp.	N.A. 1927	48	45	16.778	518.3	(1335.1)				
			122	25	08.832	180.4	(1045.2)				
BELLINGHAM CATHOLIC CHURCH, SPIRE, 1927	G-5410 P. 603	"	48	45	29.096	898.8	(954.6)				
			122	28	24.311	496.6	(729.0)				
KINGHILL, 1941	G-5410 P. 598	"	48	48	02.785	86.0	(1767.4)				
			122	27	41.687	850.7	(373.7)				
TOAD (IBC-USGS 1905), 1941	"	"	48	47	39.312	1214.3	(639.1)				
			122	23	41.054	837.9	(386.7)				
PTS NO. 8, 1917 (USGS)	USGS P. 412	NA	48	45	59.4	1834.9	(18.5)	-35.5	1799.4	(54.0)	
			122	24	36.7	749.5	(475.8)	-29.0	720.5	(504.8)	
PTS No. 9, 1917 (USGS)	"	"	48	45	27.1	837.1	(1016.3)	-35.5	801.6	(1051.8)	E. of map limits
			122	21	16.0	326.8	(898.7)	-29.0	297.8	(927.7)	
BELLINGHAM, UPTOWN TANK, 1927	G-5600 P. 659	NA 1927	48	45	06.797	210.0	(1643.4)				
			122	28	45.889	937.5	(288.2)				
BELLINGHAM, PUBLIC MUSEUM, CLOCK TOWER 1914	G-5600 P. 660	"	48	45	10.121	312.6	(1540.8)				
			122	28	48.269	986.0	(239.7)				
BELLINGHAM, EPISCO- PAL CH, STEEPLE, 1927	G-5600 P. 658	"	48	45	29.828	921.4	(932.0)				
			122	29	26.822	547.8	(677.8)				
BELLINGHAM, MT. BAKER THEATRE, TOWER, 1927	G-5600 P. 659	"	48	45	08.117	252.4	(1601.0)				
			122	28	35.11	717.3	(508.4)				
T-40(USE), 1938	USE	"	702, 891.78			881.4	(642.6)				N. of map limit
			1604, 311.37			1314.1	(209.9)				
T-47(USE), 1938	USE	"	710, 070.05			21.4	(1502.6)				
			1611, 110.03			338.3	(1185.7)				

1 FT. = .3048006 METER

COMPUTED BY: H.P. Eichert

DATE June 1951

CHECKED BY: B. Wilson

DATE June 1951

M-2388-12





SCALE FACTOR 1.000

1 FT. = .3048006 METER	COMPUTED BY: Henry F. Eichert	DATE: June 1951	CHECKED BY: A. K. Heywood,	DATE: June 1951	COMM. DC. 5782
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DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

POST-OFFICE ADDRESS: BALTIMORE PHOTOGRAMMETRIC OFFICE  
518 East 32nd Street, Baltimore-18, Maryland.

TELEGRAPH ADDRESS:

EXPRESS ADDRESS:

11 September 1951

To: Chief, Division of Photogrammetry  
U. S. Coast and Geodetic Survey  
Washington-25, D. C.

Subject: Project Ph-26

Reference: Letter No. 711-jgh, dated 10 September 1951

Bridging for the remainder of this project has now been completed. The following horizontal stations established in the field during the 1950 season could be held with other control:

BURL, 1950  
BELLINGHAM LARSEN TANK, 1950  
LOOK, 1950

The following four (4) stations could not be held and multiplex positions plotted as indicated below:

RHS-1, 1950 -----0.7 mmSW  
RHS-5, 1950 -----0.5 mmNE  
PTS-8(USGS)1917-----0.8 mmNE  
PTS-9(USGS)1917-----1.0 mmNE

No direct datum correction had been furnished for PTS-8 and PTS-9. The correction for PTS-10 was applied to these stations.

The multiplex work for these quads was unusually difficult. Poor parallax solutions were the result, for one thing, of poor quality photography. Almost every plate had a fogged corner with resultant fuzzy images.

It had been believed at first that the position of Station BURL, 1950 was in error. This position subsequently proved to be correct. We finally were able to tie our multiplex strips with an error believed to be no greater than 0.5 mm.

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

n

COMPILATION REPORT  
Project No. Ph-26  
Survey No. T-5585

31. DELINEATION

This item applies to surveys T-5585, T-5586 and T-5587.

The surveys were delineated by multiplex methods. Models were set individually to horizontal control points and pass points established during bridging. All topography, except shoreline, was drawn by multiplex. Detail points were established during multiplex compilation for the graphic location of the MHWL.

32. CONTROL

Refer to Photogrammetric Plot Report for discussion of horizontal control.

Vertical control was satisfactory.

33. SUPPLEMENTAL DATA (See also § 14 for list) <sup>5112</sup>

Township layout - Geneva Township No. 37 and 38 North, Range 3 and 4 East, Willamette Meridian, Whatcom County, Washington, scale 2 in = 1 mile.

Township layout - Van Wick Township No. 38 North, Range 3 East, Willamette Meridian, Whatcom County, Washington.

Township layout - Tenmile Township No. 39 North, Range 3 East Willamette Meridian, Whatcom County Washington.

Land Plats:

Photostat copy - Township No. 38 North, Range 3 East, dated June 1, 1874.

Photostat copy - Township No. 39 North, Range 3 East Willamette Meridian Wash., dated June 1, 1874.

Photostat copy of Whatcom County layout. (General highway & transportation map).

Refer to item 41 of the Descriptive Report for T-5584 for a description of how these data were used.

34. CONTOURS AND DRAINAGE

Considerable difficulty was encountered in contouring all wooded areas for the entire project, notwithstanding a very thorough stereoscopic study of the 1:24,000 scale photographs. Contouring heavily wooded areas with stereoscopic instruments is difficult under the most favorable conditions. However, if every effort was made to take photographs during periods when little or no foliage was on the deciduous trees the results would be much improved. In this particular project the photographs were flown in June.

35. SHORELINE AND ALONGSHORE DETAILS

There is very little tide water within this survey. Approximately one mile of shoreline at Bellingham is delineated in the southwest corner of the manuscript.

Shoreline inspection was adequate.

36. OFFSHORE DETAILS

The offshore details are believed to be complete.

37. LANDMARKS AND AIDS

Three new landmarks which are triangulation stations, were recommended for charting by the field party. Forms 567 are submitted herewith (copies attached).

Two new Aeronautical Aids have been recommended for charting. Positions and descriptions were submitted on Forms 567, 19 Nov. 1952.

38. CONTROL FOR FUTURE SURVEYS

Forms 524 are submitted herewith for the 29 recoverable topographic stations applicable to this survey. The positions of all stations were plotted by multiplex.

In addition to the 27 recoverable topographic stations listed in item 11 of the Field Inspection Report, there are two new Aeronautical Aids. They are R. Tower N.W. and R. Tower S.E.

A list of all recoverable topographic stations is included in paragraph 49.

39. JUNCTIONS

Satisfactory junctions were made with the following surveys:

To the south with Survey No. T-5586

To the west with Survey No. T-5584

To the north and east is the limit of the project.

See 567

40. HORIZONTAL AND VERTICAL ACCURACY

Refer to item 23 of the Photogrammetric Plot Report.

41. BOUNDARIES

Refer to Special Report, Boundaries and Land Lines Ph-26(47) and item 10 of the Field Inspection Report.

The recovery of section corners for this survey was very thorough. Twenty-five corners in all being recovered as true standard corners or accepted standards corners.

See item 38 of this report for supplemental land line data and refer to item 41 of the Descriptive Report for T-5584, as to the method used.

Boundaries and Townships

Boundary lines of the following townships are shown:

*11/2*  
Marietta Township  
Van Wyck Township  
Geneva Township  
Tenmile Township

42. thru 45 - Inapplicable.

46. COMPARISON WITH EXISTING MAPS

Comparison was made with the U.S.G.S. 15 minute Sumas quadrangle, scale 1:62,500 dated August 1908 reprinted 1943.

Interior areas compare favorably. The usual cultural changes were noted. Contours are in fair agreement except in the flatter areas.

47. COMPARISON WITH NAUTICAL CHARTS

Harbor Chart No. 6378, scale 1:40,000 published June 1935.

Items to be applied to Nautical Charts immediately:  
None

*See 865*

Items to be carried forward:  
None

Respectfully submitted  
2 March 1955



Donald M. Brant,  
Carto. (Photo.)

Approved and forwarded

*E. H. Kirsch*  
E. H. Kirsch,  
Comdr. C&GS  
Officer in Charge  
Balto. Photo. Office

## PHOTOGRAMMETRIC OFFICE REVIEW

T. 5585

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 along-shore 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. Dwight M. Brant  
ReviewerHenry P. Esch  
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 (edit cor.)  
CompilerHenry P. Esch  
Supervisor

43. Remarks:

48. GEOGRAPHIC NAMES LIST

T- 5525.

- Axton Rd.\*
  - Bakerview Rd.\*
  - Battersby Field\* ✓
  - Bayview Cemetery\* ✓
  - Bellingham ✓
  - Bellingham Bay ✓
  - Bellingham Country Club\* ✓
  - Birchwood Ave.\* ✓
  - Bloedel Donovan Park\* ✓
  - Bonneville Power Line\*
  - Britton Rd.\* ✓
  - Cedarwood Ave.\* ✓
  - Central Ave.\*
  - Chasteen Rd.\*
  - Chicago, Milwaukee, St. Paul & Pacific Ry. R.R. ✓
  - Cornwall Memorial Park\* ✓
  - Cornwall Ave ✓ (from city map)
  - Deemer Rd.\*
  - Deer Cr.
  - Dewey
  - Dewey Rd.\*
  - Elizabeth Park\* ✓
  - Everson Goshen Rd.\*
  - Eureka
  - Ferndale Twp.\*
  - Fourmile Cr.\*
  - Geneva Twp.\*
  - Hannegan Rd.\*
  - Harmony School\*
  - Hemmi Rd.\*
  - Hillsdale Rd.\* ✓
  - Huntley Rd.\*
  - I & J Street Waterway\*
  - James Street Rd.\* ✓
  - Kelly Rd.\*
  - King Mountain
  - Kline Rd.\*
  - Lakeview Rd.\*
  - Lake Whatcom ✓
  - Larson Mill ✓
  - Laurel
  - Laurel Rd.\*
- Alabama St. (from city map) ✓
- Broadway (from city map) ✓
- Holly St. (from city map) ✓
- Laurel Grange

48. GEOGRAPHIC NAMES LIST (cont'd)

- Marietta Twp.\*
- McCloud Rd.\* ✓ *McLeod Road* ✓ (McCleod on City Map) <sup>ENR</sup>
- Medcalf Rd.\*
- Memorial Park\*
- Meridian Grade School\*
- Meridian High School\*
- Meridian Rd.--WASH PSH 1 ALT & US 99 ALT\* ?
- Mount Baker Highway--WASH PSH 1(AP)\* ✓
- Noon Rd.\*
- Northern Pacific Ry. ✓ *Needham Hospital* ✓
- North Shore Rd.\* ✓
- Northwest Rd.\* ✓
- Old Guide Rd.\*
- Pacific Highway--WASH PSH 1 & US 99
- Silver Beach
- Smith Rd.\*
- Squalicum Cr. ✓
- Squalicum Mountain
- Starry Rd.\*
- Sylvan Ave.\* ✓
- Tenmile
- Tenmile Cemetery
- Tenmile Chapel\*
- Tenmile Cr.
- Tenmile Rd.\*
- Tenmile Twp.\*
- Toad Lake ✓
- Toad Lake Rd.\* ✓
- USDA Soil Conservation Nursery Unit
- Van Wyck ✓
- Van Wyck Rd.\* ✓
- Van Wyck Twp.\*
- Victor
- Whatcom Cr.
- Whatcom Cr. Waterway ✓
- Whatcom Falls Park ✓

\*These names from township plats, field inspection, data or field edit.

*Names Checked  
5-26-55  
L. Heck*



# 49. NOTES FOR THE HYDROGRAPHER

The following is a list of recoverable topographic stations within the limits of this survey:

STACK, 1951		
R. TOWER, N.W., 1951	} Sta. KPUG <i>51/2</i>	} These are the only stations near shore - to be of value to the hydrographer.
R. TOWER, S. E., 1951		
T39N R3E		19-20-29-30, 1951
"		21-22-27-28, 1951
"		20-21-28-29, 1951
"		25-30-31-36, 1951
"		19-24-25-30, 1951
"		9-10-15-16, 1951
"		8-9-16-17, 1951
"		14-15-22-23, 1951
"		10-11-14-15, 1951
T38 & 39N R3E		1-2-35-36, 1951
"		3-4-33-34, 1951
T38 & 39N R3 & 3E		1-6-31-36, 1951
T38N R3E		9-10-15-16, 1951
"		14-15-22-23, 1951
"		8-9-16-17, 1951
"		7-8-17-18, 1951
"		2-3-10-11, 1951
"		4-5-8-9, 1951
"		3-4-9-10, 1951
"		1-2-11-12, 1951
"		20-21-28-29, 1951
T38N R2 & 3E		13-18-19-24, 1951
"		7-12-13-18, 1951
T38 & 39N, R3 & 4E		1-6-31-36, 1951 (Not plotted)
TOAD AZIMUTH MARK (1941), 1952		
KING HILL AZIMUTH MARK (1941), 1952.		

Reference is made to a letter dated 11 January 1955. (731-aal) stating that the photographs for the hydrographic party are being prepared by the Cartographic Branch of the Washington office.

## MONITORING AIDS OR LANDMARKS FOR CHARTS

**TO BE CHARTED  
TOXENDELCEFOX**

# ENO INO STRIKE OUT ONE

Baltimore, Maryland

7 - November 1952

I recommend that the following objects which have *(have not)* been inspected from seaward to determine their value as landmarks be charted on ~~the hydrographic~~ the charts indicated.

The positions given have been checked after listing by Albert C. Hauck, Jr.

Hubert A. Raton

**Chief of Party.**

[illegible]

This form shall be prepared in accordance with Hydrographic Manual, pages 800 to 804. Positions of charted landmarks and *nonfloating* *aids* to navigation, if redetermined, shall be reported on this form. The data should be considered for the charts of the area and not by individual field survey sheets. Information under each column heading should be given.

**STRIKE OUT ONE**

## NONROUTING CASES FOR LANDMARKS FOR CHARTS

**Baltimore, Maryland**

1 February 1955

I recommend that the following objects which ~~have~~ *(have not)* been inspected from seaward to determine their value as landmarks be charted on ~~(attached)~~ the charts indicated.

The positions given have been checked after listing by

**E. H. Kirsch** *Chief of Party*

[illegible]

This form shall be prepared in accordance with Hydrographic Manual, pages 800 to 804. Positions of charted landmarks and *nonfloating aids* to navigation, if redetermined, shall be reported on this form. The data should be considered for the charts of the area and not by



Station: Ken

State: Maryland

Chief of party: C. V. H.

Date: 1917

Computed by: O. P. S.

Observer: C. V. H.

Instrument: No. 168

Checked by: W. F. R.

OBSERVED STATION	Observed direction	Eccentric reduction	Sea level reduction	Corrected direction with zero initial	Adjusted direction
	° ' "	' "	"	° ' "	' "
Chevy	0 00 00.00	- 7.31	"	0 00 00.00	" "
Tank west of Δ Dulce	29 03 37.0	-1 09.8		29 02 34.5	
Ken (center), 3.469 meters	176 42				
Forest Glen standpipe	313 24 53.0	+3 01.2		313 28 01.5	
Home	326 31 30.21	+ 31.93		326 32 09.45	
Bureau of Standards, wireless pole	352 17 20.8	+ 5.7		352 17 33.8	
Reno	357 28 48.63	- 1.16		357 28 54.78	
Reference mark, 16.32 m	358 31 20				

This form, with the first three and fifth columns properly filled out and checked, must be furnished by field parties. To be acceptable it must contain every direction observed at the station.

It should be used for observations with both repeating and direction theodolites.

The directions at only one station should be placed on a page.

If a repeating theodolite is used, do not abstract the angles in tertiary triangulation. The local adjustment corrections (to close horizon only) are to be written in the Horizontal Angle Record, and the List of Directions is to be made from that record directly.

Choose as an initial for Form 24A some station involved in the local adjustment, and preferably one which has been used as an initial for a round of directions on objects not in the main scheme. Use but one initial at a station. Call the direction of the initial  $0^{\circ} 00' 00."$  00, and by applying the corrected angles to this, fill in opposite each station its direction reckoned *clockwise* around the whole circumference regardless of the direction of graduation of the instrument. The clockwise reckoning is necessary for uniformity and to make the directions comparable with azimuths.

If a station has been occupied eccentrically, reduce to the center and enter in this form, in ink, the resulting corrections to the observed directions in the column provided for them. If an eccentric reduction is necessary, but not made in the field, leave the column blank. If the station was occupied centrally, and no eccentric reduction is required, put dashes in the column to show that no corrections are necessary.

Directions in the main scheme should be entered to hundredths of seconds in first-order triangulation; otherwise to tenths only. Points observed upon but once, direct and reverse, should be carried to tenths in first-order and second-order triangulation, and to even seconds only in third-order triangulation. In general, but two uncertain figures should be given.

It is recommended that the following simple plan of observing be used with a repeating instrument: Measure each single angle in the scheme at each station and the outside angle necessary to close the horizon. *Measure no sum angles.* Follow each measurement of every angle immediately by a measurement of its explement. Six repetitions are to constitute a measurement. The local adjustment will consist simply of the distribution of the error of closure of the horizon.

FIELD EDIT REPORT  
Map Manuscript T-5585  
Project Ph-26(47)

51. Methods:

No new methods were used in the field edit of this sheet. Inspection was done from a small truck, dismounting and walking where necessary. Considerable plane table traverse was run during the resketching of topography. Limited use of the barometer was made in determining areas of error in topography.

Deletions, additions, and corrections to the manuscript have been noted on field edit sheets 1-7, or on the photographs. In each case where corrections are shown on the photographs a cross-reference is made on the appropriate field edit sheet.

A legend of the colored inks and pencils used is shown on field edit sheet No. 4.

Field edit notes are shown in the Discrepancy Prints, Field Edit Sheets Nos. 1-7 and photographs 1240-44, 1282-1289, and 1298-1304.

52. Adequacy of Compilation.

The adequacy of the compilation is more or less in line with previous sheets submitted on this project. Some planimetric detail, mostly houses, were omitted. This has been mostly an office error in not compiling all buildings that are not crossed out in green by the field inspection. Some of the extensive street detail is omitted or incorrectly delineated in the Bellingham area.

*(Compilation was corrected) MK*

53. Map Accuracy.

The nearest horizontal accuracy tests are in quadrangles T-5582 -T-5584. A special report on this accuracy test has been previously submitted. Horizontal accuracy in this quadrangle was questioned because of difficulty in holding P.T.S. 8, BM 313, (U.S.G.S.) 1917. A check was made in the area, but the apparent error was within limits.

The accuracy of the contouring is indicated by the profile summaries submitted with this report. Approximately 58 miles of plane table traverse was run and about 8 square miles of topography was resketched. Most of the resketching was in the woods or in very flat areas, where contouring is difficult at best. Some of the error, though, did seem rather excessive. One headout in a

creek bottom had to be shifted about 9000 feet horizontally to appear in its true position. While quite flat, this particular creek bottom was not heavily wooded throughout most of its length.

A plat of the quad showing the routes of all traverse run and the areas resketched is submitted with this report.

The field editor is unable to certify this sheet as meeting National Map Accuracy Standards without the expenditure of considerably more time. In the heavily wooded area around Squalicum Mountain there is so very much more topographic detail on the ground than is apparent on the manuscript that the observer is quite apt to get lost trying to find his way around by the map contours. The general picture presented by the contouring in the area is correct, but the great amount of detail would virtually require plane table lines at about 800 foot spacing all over Squalicum Mountain. The heavy woods would reduce progress to about 0.3 to 0.4 miles per day, which would mean three to four party weeks at least.

*See Supplemental F.E. Report and \$66*

54. Recommendations.

No further recommendations for improving the quality or accuracy of these maps are submitted at this time.

55. Examination of Proof Copy.

Mr. Alfred Tedford, 3302 Northwest Avenue, Bellingham, Washington, and Mr. Alfred B. Loop, City Comptroller of the City of Bellingham, have offered to examine proof copy of the map for errors and omissions. Each of these men is better acquainted with the south half of the sheet, but have a general knowledge of the country to the north.

The name Fournile Creek was added near the northwest corner of the sheet. The proper placement is shown on Field Edit Sheet No. 1. This name is in common local usage.

56. Shoreline.

Additional detailing of foul areas was completed on a composite sheet of portions of quadrangles T-5584, T-5585, and T-5586 which is submitted with this sheet.

57. Additional Control.

No new bench marks were established by this bureau on this

quad during new leveling in this area. There was a sufficient density of Tidal Bench Marks in the area which were used instead. Leveling for control of new Geological Survey work in this area ran along the east edge of this sheet. Descriptions for such marks falling within the limits of our work are enclosed, along with Geological Survey descriptions and elevations.

58. Political Boundaries and Land Lines.

Reference § 10 , Field Inspection Report. Land lines were in good order. No additional recoveries were made beyond those specifically requested by the reviewer.

The Bellingham City Limit has been discussed somewhat in the report for T-5584. The city limit as delineated on this quad was in good order, although not in complete agreement with descriptions submitted. No description was submitted for "McCue's Addition" in the neighborhood of the Larsen Mill. This was furnished with the other descriptions of the Bellingham Corporate Limit forwarded with T-5584. The portion of Lake Whatcom included within the city was added to the city by virtue of the Act of the State Legislature dealing with Riparian Boundaries of Municipal Corporations.

The township lines are very difficult to check in detail. The line between Van Wyck Township and the county\* in the middle of Lake Whatcom cannot be determined in detail without considerable search. These townships were described probably in the minutes of the County Commissioners meetings about sixty years ago. These books are rather inadequately indexed, and no search was undertaken. A plat made by a state tax bureau shows the line in the middle of the lake. Geneva Township no longer functions as a township. These small governments are now becoming rather purposeless and obsolete, and two years ago the State Legislature authorized their disorganization, with the return of their functions to the county. Marietta Township and Rome Township (outside the project limits) are the only really functioning townships in the county at this time, although Geneva Township is the only one so far disorganized. Ferndale Township does maintain a cemetery, but this is its only practical function beyond certain election duties.

\* city <sup>etc</sup>

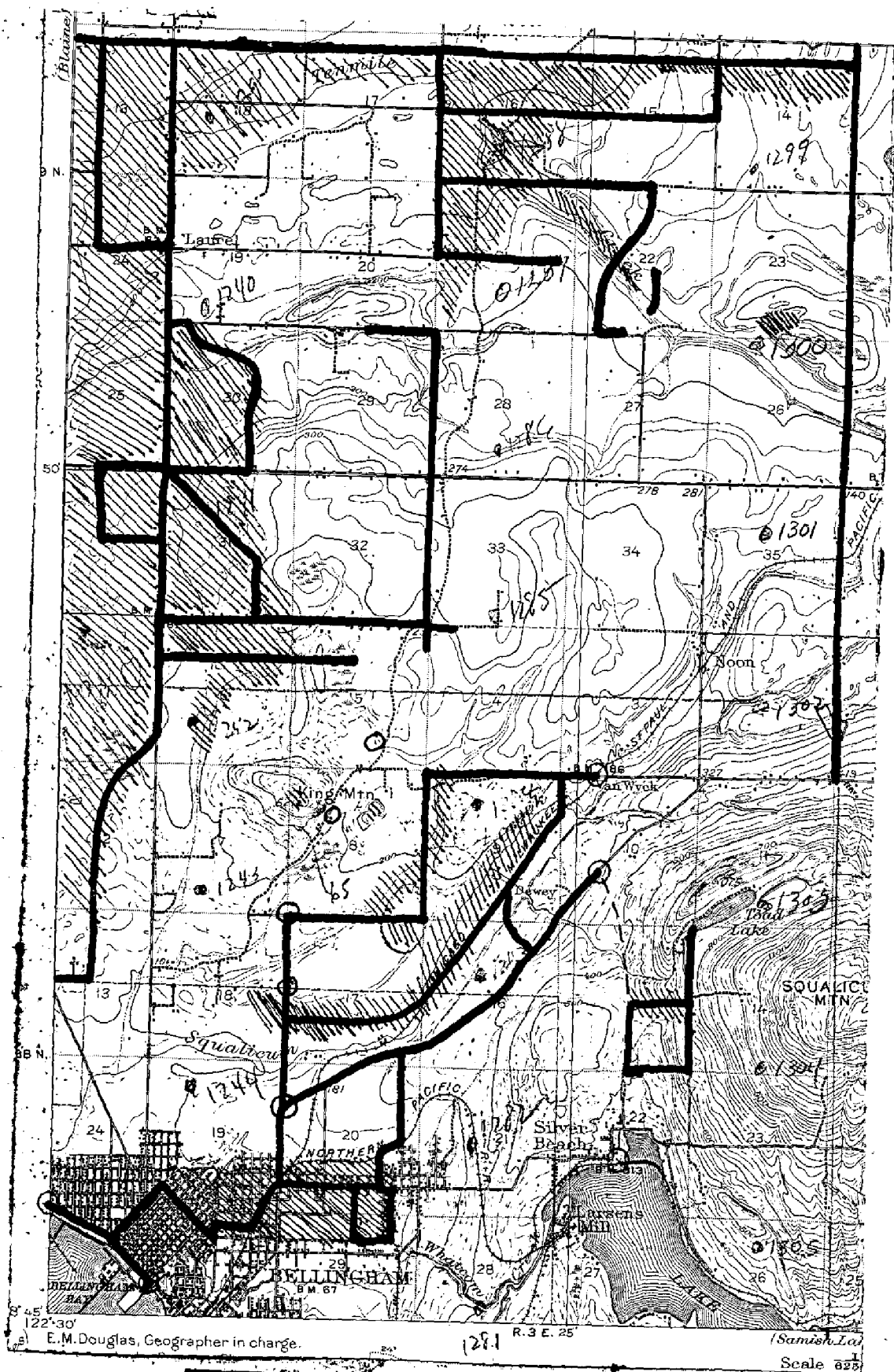
59. Washington State Highways.

Washington State Highways are designated as primary state highways and secondary state highways. These are abbreviated as P.S.H. and S.S.H. and common reference is made to them in this manner, so that U.S. 99 becomes Washington P.S.H. 1. U.S. 99 is also Washington P.S.H. 1 throughout its length. The Guide Meridian Road has been resurfaced during the past season, and has been designated U.S. 99 Alt. and also Washington P.S.H. 1 Alt.. The Mount Baker Highway is posted as Washington P.S.H. 1, but the State Highway office when pressed for a clarification of this duplication says it is actually Washington P.S.H. 1 (AP), the AP meaning Austin Pass.

Approved and Forwarded:  
*Charles W. Clark*  
Charles W. Clark  
Lt.-Comdr., USC&GS  
Chief of Party

Respectfully submitted:  
*Ray H. Skelton II*  
Ray H. Skelton II  
Cartographer (Photo)





- Plan table traverse summarized as profile tests. 58 mis.  
 Resketched topography. App. 8 sq. mis.  
 Good control points.  
 Bad control points received from field inspection.

Supplemental

FIELD EDIT REPORT

Map Manuscript T-5585

Project Ph-26(47)

References: Par. 53, Field Edit Report, T-5585  
Letters, Chief, Division of Photogrammetry to Comdr. Fred Natella  
dated 13 May 1954 and 11 August 1954.

The letter of the Chief, Division of Photogrammetry dated 11 August 1954 noted "Serious discrepancies in position of features and contours". This letter and the other reference letter gave no instructions for horizontal accuracy testing although they did lay out further vertical accuracy tests.

No further horizontal accuracy tests were attempted because of the dearth of horizontal control. Horizontal accuracy can be reliably tested in the vicinity of a known position with a plane table, but reliable horizontal accuracy tests can be extended great distances only with theodolite and tape traverse. The horizontal position discrepancies along the east edge of the sheet extend from Smith Road, about two miles south of the north edge of the sheet, south to Lake Whatcom. From Smith Road south to the Mt. Baker Highway the position discrepancy develops from zero to about sixty feet in latitude. The longitude check is good. From Mt. Baker Highway south over Squalicum Mountain there is no horizontal check point until the Bonneville Transmission Line is reached. Here the error is about 60 feet in a northeast-southwest direction. The road and railroad at the north shore of Lake Whatcom check almost perfectly. The Lake Whatcom shoreline is properly delineated on the photograph and no reason can be given for this discrepancy. The best evidence developed by plane table traverses in the area show that the road along the Plane Table Traverse No. 3 should be plotted farther to the south. Intensification of photo detail with pigment ink would indicate that this road was added by the compiler rather than by the multiplex operator. The corrected position of the road and the plotted position of the transmission line seem correct relative to each other.

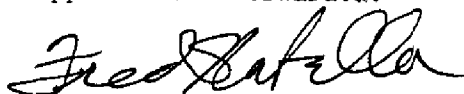
Vertical accuracy was tested by Plane Table profiles along routes specified in the reference letter. Plane Table Traverse No. 1 was 77 setups or 134 sides long. Replotted and corrected for paper distortion the closure with Geological Survey detail was about 1.6 mm. The

tie to our own detail was somewhat larger, but for consistency the traverse was adjusted to our own detail and plotted on Field Edit Sheet No. 4. The additional profiles on the mountain showed 35% of points in error over  $\frac{1}{2}$  contour interval and 12% in error over a full interval.

Plan and Profiles of the Bonneville Transmission Line are furnished. The P. I. near the Toad Lake Road should be noted.

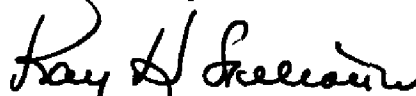
A reclassification of roads was made, and is discussed in a letter on that subject;

Approved and forwarded:



Fred Natella  
Comdr., USC&G Survey  
Chief of Party

Respectfully submitted:



Ray H. Skelton II  
Photogrammetric Engineer  
USC&GS

Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
Plane table traverse No. 1					620	705	+35	+32	
From Dellesta Park gate, east to sheet edge, thence north over Squalicum Mountain,					698	722	+24	+19	
along sheet edge to T-road, north on Mount. Baker Hwy. and BM. 24					725	740	+15	+12	
GWM. 1951					750	769	+19	+14	
349	356	+7	+7		790	799	+9	+3	
371	365	-6	-6		780	790	+10	+5	
352	354	+2	+2		798	820	+22	+12	
350	350	0	0		806	822	+16	+12	
350	350	0	0		796	802	+6	+2	
388	388	0	0		780	800	+20	+20	
398	392	-6	-6		786	807	+21	+19	
398	402	+4	+4		829	840	+11	+6	
386	416	+30	+23		846	858	+12	+9	
396	442	+46	+41		854	868	+14	+9	
406	448	+42	+36		864	876	+12	+5	
419	454	+35	+30		871	881	+10	+6	Tie to Plane
426	456	+30	+23		879	896	+17	+12	table trav. no. 3
422	470	+48	+45		899	907	+8	+3	
452	476	+24	+21		906	918	+12	+7	
465	488	+23	+18		922	928	+6	0	
487	508	+21	+13		938	940	+2	0	
518	512	-6	0		957	960	+3	0	
508	515	+7	0		974	976	+2	0	
503	516	+13	+6		977	981	+4	0	
531	540	+9	+6		1004	1013	+9	+2	Tie to plane
576	579	+3	0		1052	1078	+26	+18	table trav. No. 2
595	615	+20	+14		1084	1112	+28	+22	
622	646	+24	+19		1095	1124	+29	+25	
642	667	+25	+20		1112	1137	+25	+21	
662	678	+16	+12		1131	1150	+19	+15	
668	687	+19	+14		1151	1161	+10	+5	
678	697	+19	+14		1171	1181	+10	+4	sec. cor. 13, 14, 23, 24.
					1204	1222	+18	+12	G.S. control elev.
					1222	1242	+20	+14	equals 1208. ft.
					1241	1271	+30	+22	

Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
1284	1308	+24	+16		1184	1195	+9	+1	
1322	1336	+14	+6		1182	1185	+3	0	sec. cor. 11, 12, 13, 14.
1362	1378	+16	+6		1176	1176	0	0	
1385	1400	+15	+7		1162	1159	-3	0	
1415	1422	+7	0		1142	1132	-10	-6	
1420	1448	+28	+23		1106	1110	+4	0	
1426	1461	+35	+31		1109	1094	-15	-11	
1419	1458	+39	+31		1094	1086	-8	-4	
1424	1452	+28	+24		1050	1055	+5	0	
1424	1455	+31	+27		989	995	+6	0	
1424	1448	+24	+4		950	963	+13	+5	
1421	1438	+17	+9		931	945	+14	+6	
1418	1422	+4	+1		870	904	+34	+12	
1408	1418	+10	+9		871	901	+30	+9	
1405	1428	+23	+14		847	877	+30	+30	
1398	1418	+20	+19		857	877	+20	+20	
1395	1416	+21	+20		879	899	+20	0	
1394	1414	+20	+19		880	901	+21	+20	
1391	1401	+10	+8		880	895	+15	0	
1389	1398	+9	+9		842	867	+25	+3	
1388	1402	+14	+12		787	770	-17	0	
1390	1400	+10	+5		720	718	-2	0	
1383	1394	+11	+7		714	718	+4	0	
1383	1396	+13	+7		734	730	-4	-3	
1363	1378	+15	0		725	736	+11	+10	
1347	1365	+18	0		726	741	+15	+13	
1318	1325	+7	0		724	751	+27	+21	
1289	1295	+6	0		741	759	+18	+16	
1270	1276	+6	0		741	756	+15	+13	
1254	1259	+5	0		752	795	+43	+50	
1243	1242	-1	0		765	790	+25	+20	
1218	1228	+6	0		694	745	+51	+41	
1198	1198	0	0		670	696	+26	+19	
1194	1208	+14	+5		654	658	+4	0	
1192	1200	+8	+4		633	625	-8	0	

## TOPOGRAPHIC MAPPING

### Summary & Abstract of Vertical Accuracy Test

Project No. Ph.26(47) Quad. No. T-5585 Quad. Name Bellingham North  
Method of Testing Plane table traverse  
Tested by R.H.S. Date OCT.25 - Nov.5,54 Evaluated by R.H.S.  
Contour interval 20 ft. 1.22 M.M. allowable shift at 1/10,000  
map or manuscript scale.

179 Total number of points tested

65 % of points within  $\frac{1}{2}$  contour interval or better

117 Test points correct within  $\frac{1}{2}$  contour interval

41 Test points in error between  $\frac{1}{2}$  and full contour interval

21 Test points in error over full contour interval

[illegible]

Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
Along	220	0	0	On pill	270	170	0	0	On pill
Bolton Highway N. 100 about edge.	122	0	0	On pill	139	145	+ 26	+ 26	In drain
422	122	0	0	On pill	140	145	- 5	- 5	On pill
355	126	+ 1	0	On pill	142	142	0	0	In bottom
375	128	- 2	0		146	146	0	0	
361	148	- 3	- 1		200	204	- 4	- 4	
350	149	- 1	0		201	197	- 4	- 4	
346	147	- 9	- 6		181	178	- 3	- 3	On pill
313	146	+ 3	+ 1		204	202	- 2	0	Card C
321	142	- 2	- 1		223	227	+ 4	+ 4	Top
316	141	- 2	- 1		197	191	- 6	- 6	
302	302	0	0		150	152	- 2	- 2	
267	267	0	0	On pill	141	133	- 8	- 8	On pill
253	253	0	0	In drain	147	142	- 5	- 5	
272	265	- 7	- 7		151	149	- 2	- 2	
273	270	- 3	- 3		167	163	- 4	- 4	
265	262	- 3	- 3		170	170	0	0	
258	250	- 8	- 8	On pill	167	167	0	0	Card
252	250	+ 2	+ 2	Card	154	159	+ 5	+ 5	
259	266	+ 7	- 7		149	150	+ 1	+ 1	
245	254	+ 9	+ 9		143	157	+ 14	+ 14	
244	249	+ 5	+ 5		145	155	+ 10	+ 10	
244	242	- 2	- 2	Card N.	157	156	- 1	- 1	
218	219	+ 1	+ 1	On pill	165	157	- 8	- 8	
234	233	- 1	0		161	159	- 2	- 2	
245	239	- 6	- 5	NE 2-400	165	161	- 4	- 4	
257	262	+ 5	+ 5		From location - corner 1st along				
246	256	+ 10	+ 10		N. edge of ditch.				
259	261	+ 2	+ 2	Top	150	152	- 2	- 2	
265	263	- 2	- 2	Top	156	152	- 4	- 4	
264	262	- 2	- 2	Top	153	153	0	0	Across 140
245	253	+ 8	+ 8		140	140	0	0	at about edge
242	246	+ 4	+ 4	Card	134	142	+ 8	+ 8	
236	230	+ 6	+ 6		123	121	- 2	- 2	
226	230	+ 4	+ 4		125	130	+ 5	+ 5	

Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
171	165	- 6	- 6		90	100	+ 10	+ 9	
176	159	+ 3	+ 3		95	101	+ 5	+ 5	
181	162	- 19	- 19	Small top	93	93	+ 10	+ 30	Hammock Rd.
185	165	0	0		79	79	0	0	
180	173	- 7	- 7	Small top	77	77	- 2	- 2	
179	170	- 9	- 9	Small top	74	74	0	0	
184	159	- 2	- 1		78	78	+ 6	+ 6	
191	177	- 4	- 3	Small top	78	78	+ 6	+ 6	
180	159	- 1	- 1	Hoos Rd.	77	77	+ 3	+ 3	
171	160	- 11	- 10		77	77	+ 6	+ 6	
186	163	- 3	- 3		75	75	+ 6	+ 6	
198	156	+ 8	+ 8		77	77	+ 7	+ 7	
156	158	+ 2	+ 2		78	78	+ 2	+ 2	
182	178	- 4	- 4		77	77	+ 9	+ 9	
183	183	0	0		77	77	+ 11	+ 11	
198	187	- 1	0		74	74	+ 12	+ 12	In drain
130	137	+ 7	+ 7		75	75	+ 10	+ 10	
136	132	- 4	- 4		75	75	+ 9	+ 9	
120	134	+ 14	+ 13		75	75	+ 2	+ 2	
138	143	+ 5	+ 5		75	75	+ 7	+ 7	
100	99	- 1	- 1		77	77	+ 6	+ 6	Maridian Rd.
181	98	- 3	- 3		78	78	+ 12	+ 12	
102	98	- 5	- 5		78	78	+ 9	+ 9	
90	97	+ 7	+ 7		80	80	+ 2	+ 2	
89	97	+ 8	+ 8		82	82	0	0	
90	95	+ 5	+ 5		81	81	+ 1	+ 1	
101	97	- 4	- 4		81	81	+ 2	+ 2	
96	96	0	0		79	79	+ 3	+ 3	
100	90	- 2	- 2		76	76	+ 19	+ 19	
89	95	+ 6	+ 6		83	83	0	0	
94	102	+ 8	+ 8		76	76	+ 2	+ 2	Old Guido Rd.
86	95	+ 10	+ 10		74	74	+ 1	+ 1	
92	98	+ 6	+ 6		75	75	0	0	
86	96	+ 10	+ 10						
84	97	+ 13	+ 13						



Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
167	166	- 1	- 1	Drum H. sheet edge south along	97	108	+ 11	+ 12	3-nd
168	167	- 1	- 1	to Hammeran Rd. and N. to tie	98	109	+ 10	+ 10	
169	168	- 1	- 1		99	109	+ 10	+ 10	
170	169	- 1	- 1		100	103	+ 3	+ 3	
171	170	- 1	- 1		101	101	+ 11	+ 11	
172	171	- 1	- 1		102	102	+ 11	+ 11	
173	172	- 1	- 1		103	103	+ 11	+ 11	
174	173	- 1	- 1		104	104	+ 11	+ 11	
175	174	- 1	- 1		105	105	+ 11	+ 11	
176	175	- 1	- 1		106	106	+ 11	+ 11	
177	176	- 1	- 1		107	107	+ 11	+ 11	
178	177	- 1	- 1		108	108	+ 11	+ 11	
179	178	- 1	- 1		109	109	+ 11	+ 11	
180	179	- 1	- 1		110	110	+ 11	+ 11	
181	180	- 1	- 1		111	111	+ 11	+ 11	
182	181	- 1	- 1		112	112	+ 11	+ 11	
183	182	- 1	- 1		113	113	+ 11	+ 11	
184	183	- 1	- 1		114	114	+ 11	+ 11	
185	184	- 1	- 1		115	115	+ 11	+ 11	
186	185	- 1	- 1		116	116	+ 11	+ 11	
187	186	- 1	- 1		117	117	+ 11	+ 11	
188	187	- 1	- 1		118	118	+ 11	+ 11	
189	188	- 1	- 1		119	119	+ 11	+ 11	
190	189	- 1	- 1		120	120	+ 11	+ 11	
191	190	- 1	- 1		121	121	+ 11	+ 11	
192	191	- 1	- 1		122	122	+ 11	+ 11	
193	192	- 1	- 1		123	123	+ 11	+ 11	
194	193	- 1	- 1		124	124	+ 11	+ 11	
195	194	- 1	- 1		125	125	+ 11	+ 11	
196	195	- 1	- 1		126	126	+ 11	+ 11	
197	196	- 1	- 1		127	127	+ 11	+ 11	
198	197	- 1	- 1		128	128	+ 11	+ 11	
199	198	- 1	- 1		129	129	+ 11	+ 11	
200	199	- 1	- 1		130	130	+ 11	+ 11	
201	200	- 1	- 1		131	131	+ 11	+ 11	
202	201	- 1	- 1		132	132	+ 11	+ 11	
203	202	- 1	- 1		133	133	+ 11	+ 11	
204	203	- 1	- 1		134	134	+ 11	+ 11	
205	204	- 1	- 1		135	135	+ 11	+ 11	
206	205	- 1	- 1		136	136	+ 11	+ 11	
207	206	- 1	- 1		137	137	+ 11	+ 11	
208	207	- 1	- 1		138	138	+ 11	+ 11	
209	208	- 1	- 1		139	139	+ 11	+ 11	
210	209	- 1	- 1		140	140	+ 11	+ 11	
211	210	- 1	- 1		141	141	+ 11	+ 11	
212	211	- 1	- 1		142	142	+ 11	+ 11	
213	212	- 1	- 1		143	143	+ 11	+ 11	
214	213	- 1	- 1		144	144	+ 11	+ 11	
215	214	- 1	- 1		145	145	+ 11	+ 11	
216	215	- 1	- 1		146	146	+ 11	+ 11	
217	216	- 1	- 1		147	147	+ 11	+ 11	
218	217	- 1	- 1		148	148	+ 11	+ 11	
219	218	- 1	- 1		149	149	+ 11	+ 11	
220	219	- 1	- 1		150	150	+ 11	+ 11	
221	220	- 1	- 1		151	151	+ 11	+ 11	
222	221	- 1	- 1		152	152	+ 11	+ 11	
223	222	- 1	- 1		153	153	+ 11	+ 11	
224	223	- 1	- 1		154	154	+ 11	+ 11	
225	224	- 1	- 1		155	155	+ 11	+ 11	
226	225	- 1	- 1		156	156	+ 11	+ 11	
227	226	- 1	- 1		157	157	+ 11	+ 11	
228	227	- 1	- 1		158	158	+ 11	+ 11	
229	228	- 1	- 1		159	159	+ 11	+ 11	
230	229	- 1	- 1		160	160	+ 11	+ 11	
231	230	- 1	- 1		161	161	+ 11	+ 11	
232	231	- 1	- 1		162	162	+ 11	+ 11	
233	232	- 1	- 1		163	163	+ 11	+ 11	
234	233	- 1	- 1		164	164	+ 11	+ 11	
235	234	- 1	- 1		165	165	+ 11	+ 11	
236	235	- 1	- 1		166	166	+ 11	+ 11	
237	236	- 1	- 1		167	167	+ 11	+ 11	
238	237	- 1	- 1		168	168	+ 11	+ 11	
239	238	- 1	- 1		169	169	+ 11	+ 11	
240	239	- 1	- 1		170	170	+ 11	+ 11	
241	240	- 1	- 1		171	171	+ 11	+ 11	
242	241	- 1	- 1		172	172	+ 11	+ 11	
243	242	- 1	- 1		173	173	+ 11	+ 11	
244	243	- 1	- 1		174	174	+ 11	+ 11	
245	244	- 1	- 1		175	175	+ 11	+ 11	
246	245	- 1	- 1		176	176	+ 11	+ 11	
247	246	- 1	- 1		177	177	+ 11	+ 11	
248	247	- 1	- 1		178	178	+ 11	+ 11	
249	248	- 1	- 1		179	179	+ 11	+ 11	
250	249	- 1	- 1		180	180	+ 11	+ 11	
251	250	- 1	- 1		181	181	+ 11	+ 11	
252	251	- 1	- 1		182	182	+ 11	+ 11	
253	252	- 1	- 1		183	183	+ 11	+ 11	
254	253	- 1	- 1		184	184	+ 11	+ 11	
255	254	- 1	- 1		185	185	+ 11	+ 11	
256	255	- 1	- 1		186	186	+ 11	+ 11	
257	256	- 1	- 1		187	187	+ 11	+ 11	
258	257	- 1	- 1		188	188	+ 11	+ 11	
259	258	- 1	- 1		189	189	+ 11	+ 11	
260	259	- 1	- 1		190	190	+ 11	+ 11	
261	260	- 1	- 1		191	191	+ 11	+ 11	
262	261	- 1	- 1		192	192	+ 11	+ 11	
263	262	- 1	- 1		193	193	+ 11	+ 11	
264	263	- 1	- 1		194	194	+ 11	+ 11	
265	264	- 1	- 1		195	195	+ 11	+ 11	
266	265	- 1	- 1		196	196	+ 11	+ 11	
267	266	- 1	- 1		197	197	+ 11	+ 11	
268	267	- 1	- 1		198	198	+ 11	+ 11	
269	268	- 1	- 1		199	199	+ 11	+ 11	
270	269	- 1	- 1		200	200	+ 11	+ 11	
271	270	- 1	- 1		201	201	+ 11	+ 11	
272	271	- 1	- 1		202	202	+ 11	+ 11	
273	272	- 1	- 1		203	203	+ 11	+ 11	
274	273	- 1	- 1		204	204	+ 11	+ 11	
275	274	- 1	- 1		205	205	+ 11	+ 11	
276	275	- 1	- 1		206	206	+ 11	+ 11	
277	276	- 1	- 1		207	207	+ 11	+ 11	
278	277	- 1	- 1		208	208	+ 11	+ 11	
279	278	- 1	- 1		209	209	+ 11	+ 11	
280	279	- 1	- 1		210	210	+ 11	+ 11	
281	280	- 1	- 1		211	211	+ 11	+ 11	
282	281	- 1	- 1		212	212	+ 11	+ 11	
283	282	- 1	- 1		213	213	+ 11	+ 11	
284	283	- 1	- 1		214	214	+ 11	+ 11	
285	284	- 1	- 1		215	215	+ 11	+ 11	
286	285	- 1	- 1		216	216	+ 11	+ 11	
287	286	- 1	- 1		217	217	+ 11	+ 11	
288	287	- 1	- 1		218	218	+ 11	+ 11	
289	288	- 1	- 1		219	219	+ 11	+ 11	
290	289	- 1	- 1		220	220	+ 11	+ 11	
291	290	- 1	- 1		221	221	+ 11	+ 11	
292	291	- 1	- 1		222	222	+ 11	+ 11	
293	292	- 1	- 1		223	223	+ 11	+ 11	
294	293	- 1	- 1		224	224	+ 11	+ 11	
295	294	- 1	- 1		225	225	+ 11	+ 11	
296	295	- 1	- 1		226	226	+ 11	+ 11	
297	296	- 1	- 1		227	227	+ 11	+ 11	
298	297	- 1	- 1		228	228	+ 11	+ 11	
299	298	- 1	- 1		229	229	+ 11	+ 11	
300	299	- 1	- 1		230	230	+ 11	+ 11	
301	300	- 1	- 1		231	231	+ 11	+ 11	
302	301	- 1	- 1		232	232	+ 11	+ 11	
303	302	- 1	- 1		233	233	+ 11	+ 11	
304	303	- 1	- 1		234	234	+ 11	+ 11	
305	304	- 1	- 1		235	235	+ 11	+ 11	
306	305	- 1	- 1		236	236	+ 11	+ 11	
307	306	- 1	- 1		237	237	+ 11	+ 11	
308	307	- 1	- 1		238	238	+ 11	+ 11	
309	308	- 1	- 1		239	239	+ 11	+ 11	
310	309	- 1	- 1		240	240	+ 11	+ 11	
311	310	- 1	- 1		241	241	+ 11	+ 11	
312	311	- 1	- 1		242	242	+ 11	+ 11	
313	312	- 1	- 1		243	243	+ 11	+ 11	
314	313	- 1	- 1		244	244	+ 11	+ 11	
315	314	- 1	- 1		245	245	+ 11	+ 11	
316	315	- 1	- 1		246	246	+ 11	+ 11	
317	316	- 1	- 1		247	247	+ 11	+ 11	
318	317	- 1	- 1		248	248	+ 11	+ 11	
319	318	- 1	- 1		249	249	+ 11	+ 11	
320	319	- 1	- 1		250	250	+ 11	+ 11	
321	320	- 1	- 1		251	251	+ 11	+ 11	
322	321	- 1	- 1		252	252	+ 11	+ 11	
323	322	- 1	- 1		253	253	+ 11	+ 11	
324	323	- 1	- 1		254	254	+ 11	+ 11	
325	324	- 1	- 1		255	255	+ 11	+ 11	
326	325	- 1	- 1		256	256	+ 11	+ 11	
327	326	- 1	- 1		257	257	+ 11	+ 11	
328	327	- 1	- 1						

Test Elev.	Map Elev.	Error after shift	Remarks	Test Elev.	Map Elev.	Error after shift	Remarks
204	202	- 2		South along	1.2 mls N. of Baldwin Rd.		from N. sheet
116	120	+ 10		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
96	114	+ 18		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
91	114	+ 23		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
216	221	+ 5		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
212	222	+ 10		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
212	217	+ 5		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
210	210	0		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
South along	1.2 mls N. of Baldwin Rd.			edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
136	130	0		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
107	120	+ 13		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
134	142	+ 6		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
126	131	+ 5		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
110	119	+ 3		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
112	118	+ 6		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
South along	1.2 mls N. of Baldwin Rd.			edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
edge 1.5 mls N. of Baldwin Rd.				edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
72	76	+ 4		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
66	70	+ 4		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
62	66	+ 6		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
63	65	+ 2		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
55	64	+ 9		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
49	60	+ 11		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
61	60	+ 1		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
59	61	+ 6		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
70	65	+ 5		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
72	66	+ 6		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
73	66	+ 7		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
60	60	+ 10		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
70	66	+ 6		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
61	60	+ 11		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		
61	60	+ 10		edge to pt. of bridge	1.2 mls N. of Baldwin Rd.		

Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
192	201	+ 9	+ 9		165	176	+ 11	+ 9	
194	199	+ 5	+ 5		170	176	+ 13	+ 13	
200	205	+ 5	+ 5		173	173	0	0	
190	199	+ 9	+ 9		177	173	+ 4	+ 4	
160	170	+ 10	+ 10		171	170	+ 1	+ 6	
170	170	0	0		173	173	0	0	
177	173	+ 4	+ 4		166	169	+ 3	+ 6	2nd
171	171	0	0		173	173	0	0	2nd
165	172	+ 7	+ 5		163	163	0	0	
166	172	+ 6	+ 6		173	163	+ 10	+ 7	
169	172	+ 3	+ 3		173	173	0	0	
172	173	+ 1	+ 1		173	173	0	0	
176	174	+ 2	+ 2		173	173	0	0	
166	175	+ 9	+ 9		173	173	0	0	
164	176	+ 12	+ 12		173	173	0	0	
162	177	+ 15	+ 15		173	173	0	0	
159	177	+ 18	+ 18		173	173	0	0	
158	178	+ 20	+ 20		173	173	0	0	
153	179	+ 26	+ 26		173	173	0	0	
163	180	+ 17	+ 17		173	173	0	0	
160	182	+ 22	+ 22		173	173	0	0	
171	182	+ 11	+ 11		173	173	0	0	
175	182	+ 7	+ 7		173	173	0	0	
185	182	+ 3	+ 3		173	173	0	0	
173	182	+ 9	+ 9		173	173	0	0	
184	182	+ 2	+ 2		173	173	0	0	
187	182	+ 5	+ 5		173	173	0	0	
186	182	+ 4	+ 4		173	173	0	0	
189	183	+ 4	+ 4		173	173	0	0	
185	183	+ 2	+ 2		173	173	0	0	
186	182	+ 4	+ 4		173	173	0	0	
170	180	+ 10	+ 10		173	173	0	0	

Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
274	275	+ 5	+ 5		292	301	+ 2	+ 2	
293	303	+ 10	+ 10	2-nd H	319	323	+ 4	+ 4	
289	303	+ 14	+ 14		305	311	+ 6	+ 6	
299	299	0	0		299	309	+ 10	+ 10	
297				From intersection and Holly Hds	From intersection and Holly Hds	142	+ 10	+ 10	Eds. SE to tide.
303	305	+ 4	+ 4		165	171	+ 6	+ 4	
307	314	+ 7	+ 7		176	181	+ 5	+ 5	
317	321	+ 4	+ 4		172	175	+ 3	+ 1	
314	321	+ 7	+ 7		141	147	+ 6	+ 6	
279	284	+ 5	+ 4	2-nd	168	162	- 6	- 6	
261	277	+ 16	+ 16		170	162	- 8	- 8	
248	265	+ 17	+ 16		171	165	- 6	- 2	
223	250	+ 7	+ 6		164	172	+ 8	+ 8	
220	224	+ 4	+ 4		163	174	+ 11	+ 10	
208	210	+ 2	+ 2		165	176	+ 11	+ 10	
190	198	0	0		170	176	+ 6	+ 7	
190	195	+ 5	+ 5		171	181	+ 10	+ 10	
233	233	0	0		176	184	+ 8	+ 7	
205	205	0	0		160	165	+ 5	+ 5	
201	201	0	0		163	190	+ 2	+ 1	
191	185	- 6	- 6		186	192	+ 6	+ 5	
166	175	+ 7	+ 7		180	193	+ 13	+ 12	
From intersection and Holly Hds					183	197	+ 14	+ 13	
217	212	+ 15	+ 14		191	200	+ 9	+ 7	
235	242	+ 7	+ 7		200	205	+ 5	+ 3	
242	245	+ 3	+ 3		196	206	+ 10	+ 7	
235	250	+ 15	+ 15		261	263	+ 2	+ 0	
256	268	+ 10	+ 10		260	262	+ 2	+ 0	
265	276	+ 11	+ 10		221	225	+ 4	+ 2	
272	281	+ 9	+ 9		179	202	+ 23	+ 21	
279	287	+ 8	+ 8		185	195	+ 10	+ 10	
292	298	+ 6	+ 6						
300	302	+ 2	+ 2						
296	302	+ 4	+ 4						

Test Elev.	Map Elev.	Error	Error after shift	Remarks	Test Elev.	Map Elev.	Error	Error after shift	Remarks
From World on and Smith Rd. W 1/2 mi. along Smith Rd, then south, and east to 140									
161	172	+ 11	+ 11		224	224	+ 10	+ 10	
156	162	+ 6	+ 6		222	227	+ 5	+ 5	
157	163	+ 6	+ 6		231	235	+ 4	+ 4	road, spot elev
145	155	+ 10	+ 10		229	229	0	0	
145	147	+ 2	+ 2		239	242	+ 3	+ 3	
154	154	0	0		246	256	+ 10	+ 10	
149	145	- 3	- 3		266	268	+ 2	+ 2	
154	157	+ 3	+ 3		268	272	+ 4	+ 4	
133	140	+ 7	+ 7		252	252	0	0	
154	158	+ 4	+ 4		198	215	+ 17	+ 15	
154	170	+ 16	+ 16		207	203	- 4	- 4	
155	172	+ 17	+ 17		205	205	0	0	
154	179	+ 25	+ 25		From Van Hook Rd 0.5 mi. S of RR crossing at BU 186 N S to RR, thence SW along RR to James St. Rd.				
172	186	+ 14	+ 14		192	195	+ 3	+ 3	
172	182	+ 10	+ 10		186	186	0	0	
164	190	+ 12	+ 12		184	193	+ 5	+ 4	
East along Surveyor Road 1 mi.					170	179	+ 9	+ 9	
from James St. Rd, thence N along Hannagan Rd 1 mi., thence E along Van Hook Rd to BU 186 N.					162	173	+ 11	+ 11	spot elev.
191	201	+ 10	+ 10		166	170	+ 4	+ 4	
180	188	+ 8	+ 8		147	162	+ 15	+ 15	
176	182	+ 6	+ 6		141	155	+ 14	+ 14	
158	176	+ 18	+ 18	on fill	137	150	+ 13	+ 13	
160	182	+ 2	+ 2		131	142	+ 11	+ 11	
162	180	+ 4	+ 4		130	137	+ 7	+ 7	
164	186	+ 2	+ 2	road	123	133	+ 10	+ 10	
204	206	+ 2	+ 2		121	131	+ 10	+ 10	
202	222	+ 14	+ 14		129	129	+ 10	+ 10	
190	196	+ 10	+ 10	on fill	118	125	+ 7	+ 7	
207	217	+ 10	+ 10		115	123	+ 8	+ 8	
186	206	+ 20	+ 20	on fill	113	121	+ 8	+ 8	
					114	116	+ 5	+ 5	
					104	104	0	0	

Test Elev.	Map Elev.	Error after shift	Remarks	Test Elev.	Map Elev.	Error after shift	Remarks
From Dobby and Hammogan Rds 2				517	513	+ 26	
to RR				532	550	+ 18	
150	172	+ 14		550	556	+ 6	
160	154	+ 14	Br. Pl.	565	565	0	
132	147	+ 15	W.O.	575	575	0	
35 from Dobby along Dobby Rd to				591	582	- 9	
lt. Baker Hwy.				602	590	- 12	
167	172	+ 5		640	666	0	
215	212	- 3		732	750	+ 18	
211	203	+ 7		759	761	+ 2	
30 along R., Baker Hwy from				755	755	0	
station rd to 100 of Reno station				716	716	0	
1700				730	734	+ 4	
290	266	- 4		689	693	+ 4	
269	295	+ 6		672	679	+ 7	
272	204	+ 2		663	665	+ 2	
294	302	+ 8		507	507	0	
293	290	+ 3		511	513	+ 2	
267	293	+ 6		450	454	- 2	
277	277	0		432	430	- 2	
253	293	0		450	445	- 5	
253	230	+ 3		11, along road back			End of road loop above
252	232	- 2		to road loop.			
From station rd to 100 of				784	782	- 2	
station rd to 100 of				760	766	0	
station rd to 100 of				796	796	0	
(In question by reviewer.)				794	794	0	
446	446	0		796	802	+ 6	
450	403	+ 21		778	791	+ 23	
450	409	+ 19		745	754	+ 9	
456	400	+ 24		732	732	0	
469	401	+ 22		714	714	0	
468	502	+ 14					
505	515	+ 10					

Test Elev.	Map Elev.	Error after shift	Remarks	Test Elev.	Map Elev.	Error after shift	Remarks
Along James St. from 1st. Baker Hwy	233	0		233	233	0	
S to Alabama, L along Alabama 0.7 mi.	230	0		230	230	0	
thence NE with RR and clearing to	223	0		223	223	0	
1st. Baker Hwy, 3/4 along Hwy to	207	-3		207	204	-3	
James St. w/ spur shots (includes prof 10 requested by reviewer).	194	0		194	194	0	
166 162 - 4	183	0		183	183	0	
169 154 - 15	181	2	Control error	181	183	2	
164 148 - 16	184	-6		184	178	-6	
155 142 - 13	170	-2		170	168	-2	
123 105 - 18	Spur loop, Baker School area.			Spur loop, Baker School area.			
104 193 - 12	103	-10		103	93	-10	
157 146 - 11	115	-14		115	101	-14	
170 163 - 7	134	-20		134	114	-20	
102 90 - 12	119	-15		119	104	-15	
100 67 - 17	96	-10		96	86	-10	
105 124 - 19	68	-5		68	83	-5	
106 90 - 16	79	-2	RR crossing	79	77	-2	
77 65 - 12	78	-1		78	77	-1	
106 94 - 12	65	-4		65	61	-4	
105 95 - 10	61	-6		61	55	-6	
89 62 - 7	58	-6		58	52	-6	
151 130 - 13	77	-12		77	65	-12	
153 111 - 12	73	-9	RR crossing	73	64	-9	
156 114 - 12	N. along James St. Ed from 1st. Baker			N. along James St. Ed from 1st. Baker			
160 150 - 10	Hwy to Baker Hwy			Hwy to Baker Hwy			
167 144 - 3	159	2		159	161	2	
191 100 - 5	149	4		149	153	4	
201 205 - 4	139	11		139	130	11	
210 210 - 0	96	11		96	109	11	
219 215 - 4	102	-1		102	101	-1	
223 217 - 6	101	-2		101	99	-2	
220 219 - 1	102	-3		102	99	-3	
231 239 - 2	153	0		153	153	0	
	156	-4	Control error	156	152	-4	
	100	-5		100	155	-5	

Bottom of drain.

## TOPOGRAPHIC MAPPING

## Summary & Abstract of Vertical Accuracy Test

Project No. Ph-26(47) Quad. No. T-5585 Quad. Name \_\_\_\_\_  
Method of Testing Plane table traverse  
Tested by R. H. Shalton Date May and Oct. 1952 Evaluated by R. H. Shalton  
Contour interval 20 ft. 1.22 M.M. allowable shift at 1/10,000  
map or manuscript scale.

<u>579</u>	Total number of points tested
<u>80</u>	% of points within $\frac{1}{2}$ contour interval or better
<u>167</u>	Test points correct within $\frac{1}{2}$ contour interval
<u>112</u>	Test points in error between $\frac{1}{2}$ and full contour interval
<u>9</u>	Test points in error over full contour interval

[illegible]



## Summary to Accompany Topographic Map T-5585

Topographic map T-5585 is one of thirteen similar maps of Project Ph-26. It covers a portion of Bellingham, Washington and some land area to the northward and eastward.

Project Ph-26 is a stereoscopic mapping project. Field work in advance of compilation included the establishment of additional control, the inspection of shoreline and interior features, and the investigation of civil boundaries, section lines and geographic names.

Map T-5585 was compiled by multiplex, in two parts, at a scale of 1:10000 using single-lens photographs taken in 1949. After compilation, the map was completely field edited. With the addition of hydrography the map will be forwarded to the Geological Survey for publication as a 7½-minute topographic map.

Items registered under T-5585 will be a descriptive report, cloth-backed copies of the map manuscript (in two parts), and the published quadrangle.

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DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

POST-OFFICE ADDRESS:

TELEGRAPH ADDRESS:

9 December 1954

EXPRESS ADDRESS:

To: The Chief, Division of Photogrammetry  
U. S. Coast and Geodetic Survey  
Department of Commerce  
Washington 25, D. C.

Through: Comdr. Fred Natella, Officer in Charge

Subject: Road classifications Project Ph-26

Two prints headed "Print for use in checking discrepancies in road classification with GS" were forwarded to this field unit with no instructions or reference letter. The quads returned were T-5582 and T-5584. They were returned with data on T-5585 and all are being returned together.

Roads have been reclassified in such manner as to match the joining Geological Survey quadrangles, although to make the match I had to depart somewhat from the road classifications as set out in par. 5441 of the Topographic Manual. I have had junction trouble along the east edge of quad T-5587, and along with the usual field edit sheets classifying roads in compliance with Bureau instructions I submitted another sheet showing an alternate road classification which would be consistent with the Geological Survey classifications. I also submitted limited comments in the field edit report for that sheet.

The discrepancies invariably appear when it is a matter of whether or not a red fill shall be applied to a road, which is the difference in a Road 4 and a Road 6. The practice of Bureau field inspectors has been to put all hard-surfaced roads in "Class 4 - Hard surface, medium duty roads, two or three lanes wide", and all loose-surface-roads in "Class 6 - Loose surface, graded and drained roads, and improved dirt roads". The Geological Survey instructions, chap. 3A1, include in the latter classification "oiled gravel and water-bound macadam usually on a light foundation, suitable for light-duty traffic." Such surfaces have usually been considered Road 4's by our inspector.

Style sheets as late as 1947 used the red fill to show "Routes Usually Traveled", not "Road Classifications". The two are inter-

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To: Chief, Division of Photogrammetry

9 December 1954

dependent to a certain extent, but when the red fill is used to show "Routes Usually Traveled" a certain amount of license is allowed to emphasize the more important roads, and the red fill became essentially an editorial tool. This line of thought has persisted and the further refinement in Geological Survey definitions of road classes has permitted its use to a certain extent even now.

These differences in definition of road classification and the line of thought followed in applying road class criteria have been responsible for the discrepancies. These have now been resolved.

Respectfully,

Ray H. Skelton II  
Photo. Engr.

bpo/k

55

## L

### Record of Application to Charts

[illegible]

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.

Review Report  
Topographic Map T-5585  
11 July 1955

62. Comparison with Registered Topographic Surveys:

T-1798	1:10000	1887
T-2069	1:5000	1891
T-2920	1:10000	1909
T-3480	1:5000	1914
T-4277	1:10000	1927

T-4277 shows several offshore piling which were not located by this survey (see Sub-heading 56). Because there are possible underwater remains, these features are recommended for retention on nautical charts. Otherwise, the above surveys are superseded for nautical charting purposes by T-5585 for the area it encompasses. Numerous changes in alongshore areas have occurred since these surveys.

63. Comparison with Maps of Other Agencies:

Sumas, Washington (USGS, 1:62500) 1908, reprinted 1943

Numerous differences exist in shoreline and interior features. See Sub-heading 46.

64. Comparison with Contemporary Hydrographic Surveys:

None.

65. Comparison with Nautical Charts:

6378 1:40000 1935, corrected to 54-8/9

The chart should be corrected to show numerous features mapped by the field editor on a composite sheet made from portions of T-5584, T-5585 and T-5586 (see Sub-heading 56). Also, see Sub-heading 62, above.

66. Adequacy of Results and Future Surveys:

Vertical accuracy testing indicates that the southeast quarter of this map does not comply with National Map Accuracy Standards. The area was not generally corrected. Therefore, an accuracy statement will be omitted on the published map. However, the map is adequate for Bureau requirements as all features adjacent to the shoreline are accurate.

67. Junctions:

Except for discrepancies discussed below, junction was effected with U.S.G.S. quadrangle maps "Lynden, 1952, 1:24000" to the northward and

*L. These features will  
be on the registered copies  
of the maps.*

"Lawrence, 1952, 1:24000" to the eastward. This involved slight shifts or refinements in features and slight reshaping and shifting of contours. Discrepancies:

Lynden, lat.  $48^{\circ} 52' 30''$ :

at long.  $122^{\circ} 23.9'$ ,  $25.8'$  and  $26.1$  - difference in woodland limit of approximately 20 to 30 meters.

Lawrence, long.  $122^{\circ} 22' 30''$ :

at lat.  $48^{\circ} 45.0$  - Shoreline difference of approximately 60 meters.

Road and railroad within 200 meters of shoreline in agreement.

Shoreline discrepancy may be due to a difference in water level in Lake Whatcom between G. S. survey and C.&G.S. survey.

at lat.  $48^{\circ} 46.5'$  - Woodland limit. Clearing appears to have been omitted on Lawrence quad.

Reviewed by:

Everett H. Ramey  
Everett H. Ramey

APPROVED:

L. C. Lande  
Chief, Review Section  
Photogrammetry Division

Max Skelton  
Chief, Nautical Chart Branch  
Charts Division

Lee Swanson  
Chief, Photogrammetry Division

J. Bowie  
Chief, Coastal Surveys Division

4 Nov '59

*[Handwritten initials]*

## History of Hydrography Information for T-5585

Hydrography was added to the map manuscript for T-5585 in accordance with Photogrammetry Division General Specifications of 18 May 1949. Depths are shown in feet at mean lower low water and originate with the following sources:

H-3719	1:5000, 1914
H-3719 a	1:10000, 1927
Nautical Chart 6378,	1:40000, 1935, corrected to 54-8/9

Hydrography was compiled by Everett H. Ramey on 6 July 1955 and verified by O. Svendsen on 8 July 1955.

  
Everett H. Ramey