

PRELIMINARY SERIES

- LEGEND**
- PLEISTOCENE AND RECENT**
- POST-GLACIAL**
- 20 SALISH GROUP (13-20)
Swamp Deposits: 20a, lowland peat; clayey peat and peaty clay up to 35 feet thick, in most places resting on silty clay, and clayey silt, in some places overlies sand and sandy silt; 20b, upland peat; clayey peat and peaty clay up to 25 feet thick resting on ABBOTSFORD OUTWASH (11) and lacustrine deposits (13).
 - 19 Slopewash deposits: 19a, slopewash sand up to 10 feet thick resting on silty clay and clayey silt; 19b, slopewash clayey silt and silty clay up to 5 feet thick overlying ABBOTSFORD OUTWASH (11); 19c, fan gravel and sand up to 50 feet thick resting on FRASER FLOODPLAIN (15) and lacustrine deposits (13).
 - 18 FRASER FLOODPLAIN (15) lacustrine (13) and stream deposits (14) (deltaic, channel, floodplain and lacustrine deposits); 18a, silty clay, clayey silt and silt up to 10 feet thick resting on sand and in a few places gravel; 18b, sand up to 30 feet thick resting on gravel.
 - 17 FRASER FLOODPLAIN (15) and stream deposits (14) (deltaic, channel, and floodplain deposits); mixed areas of channelled FRASER FLOODPLAIN DEPOSITS (15c) and mountain stream deposits (14); sand, gravel, silt, silty clay, and clayey silt.
 - 16 Lacustrine (13) and stream deposits (14) (deltaic, channel and lacustrine deposits); stream deposited sand up to 25 feet thick overlying silt, clayey silt, silty clay, and sand of lacustrine origin.
 - 15 FRASER FLOODPLAIN (15) and stream deposits (14) (deltaic, channel, and floodplain deposits); mixed areas of channelled FRASER FLOODPLAIN DEPOSITS (15c) and mountain stream deposits (14); sand, gravel, silt, silty clay, and clayey silt.
 - 14 Stream deposits: mountain stream deposits consisting of gravel and sand up to 50 feet or more thick, in most places gravel at surface.
 - 13 Lacustrine deposits: 13a, silt, clayey silt, and silty clay up to 50 feet or more thick, but normally less than 10 feet thick and overlying sand; 13b, sand up to 15 feet thick overlying silt, clayey silt, and silty clay; 13c, sand up to 25 feet thick forming beaches and spits.
- GLACIAL**
- 11 SUMAS GROUP (8-12)
ABBOTSFORD OUTWASH (glacio-fluvial deposits): 11a, recessional outwash sand and gravel up to 125 feet thick, sand at surface, in most places sand only a few feet thick; 11b, recessional outwash gravel and sand, gravel at surface; 11c, sand 1 to 10 feet thick overlying WHATCOM GLACIO-MARINE DEPOSITS (8); 11d, ice-contact deposits, gravel, sand, and lenses of till and glacio-marine stony clayey silt; 11e, pitted outwash gravel at surface; 11f, pitted outwash sand at surface; 11g, ABBOTSFORD OUTWASH overlain by dune sand up to 25 feet thick, dune sand is post-glacial in age and was deposited by westerly winds blowing across outwash.
 - 12 Glacial complex (glacial, glacio-fluvial, glacio-lacustrine, and minor glacio-marine deposits): gravel, sand, sandy till, varve-like silt and clayey silt, stony clayey silt, and till-like mixtures belonging to ABBOTSFORD OUTWASH (11), SUMAS TILL (9), glacio-lacustrine deposits (10), and minor WHATCOM GLACIO-MARINE DEPOSITS (8). Includes some mountain stream deposits (14) and probably includes VASHON GROUP DEPOSITS (2-4). Areas mapped as Glacial complex restricted to narrow mountain valleys exposed only in north-eastern part of map-area.
 - 10 Glacio-lacustrine deposits: silt, clayey silt, silty clay, fine sand, and minor coarse sand and gravel.
 - 9 SUMAS TILL (glacial deposits): 9a, sandy till and substratified drift 5 to 35 feet thick; 9b, sandy till and substratified drift less than 5 feet thick. Isolated patches of till lie to west of area mapped as till and have been included with WHATCOM GLACIO-MARINE DEPOSITS (8).
 - 8 WHATCOM GLACIO-MARINE DEPOSITS: stony clayey silt and silty clay, clay, silt and sand 25 to 300 feet thick; minor SUMAS TILL (9).
 - 7 CAPILANO GROUP (5-7) (in part older, in part contemporaneous, and in part younger than SUMAS GROUP (8-12))
BOSE GRAVEL (raised marine shore deposits): gravel and sand up to 25 feet or more thick. Included here may be some areas of HANEY OUTWASH (4), ABBOTSFORD OUTWASH (11) and Slopewash deposits (19).
 - 6 SUNNYSIDE SAND (raised littoral and beach deposits): medium to coarse sand up to 25 feet thick. Exposed only in northwest part of map-area.
 - 5 HUNTINGDON GRAVEL (channel and floodplain deposits): 5a, gravel and sand up to 100 feet thick; underlies WHATCOM GLACIO-MARINE DEPOSITS (8); 5b, gravel and sand up to 100 feet thick; underlies SUMAS TILL (9) and rests on glacio-marine deposits presumed to be NEWTON STONY CLAY (3). Some glacio-fluvial deposits may be included here.
- GLACIAL AND INTERGLACIAL**
- 4 HANEY OUTWASH (glacio-fluvial deposits): recessional outwash gravel and sand up to 100 feet thick. Exposed only in extreme northwest corner map-area.
 - 3 NEWTON STONY CLAY (glacio-marine deposits): 3a, stony clayey silt and poorly sorted till-like mixtures, minor clayey silt, silty clay, and sand, up to 200 feet thick; 3b, similar deposits that may be WHATCOM GLACIO-MARINE DEPOSITS (13). Exposed locally to west of Hatzic Lake.
 - 2 SURREY TILL (glacial deposits): sandy to silty till and minor substratified drift up to 75 feet but generally less than 25 feet thick.
 - 1 Glacio-fluvial, marine, and non-marine deposits: sand, gravel, silt and clay.
 - R Areas of bedrock at or within 25 feet of surface (see G.S.C. Map 8-1956): drift mantle, consists of SURREY TILL (2), HANEY OUTWASH (4), SUMAS TILL (9), and ABBOTSFORD OUTWASH (11).



- Geological boundary, mainly gradational**
- Pleistocene fossil wood locality**
- Locality from which wood obtained for radiocarbon dating**
- Pleistocene fossil shell locality**
- Sand and gravel pit**
- Clay pit**
- Rock quarry, shale, granite**
- Dry hole drilled in search for oil and gas**
- Shoreline of former Sumas Lake drained in 1926**
- Deep water wells referred to in report**

Geology by J.E. Armstrong, 1953-1955

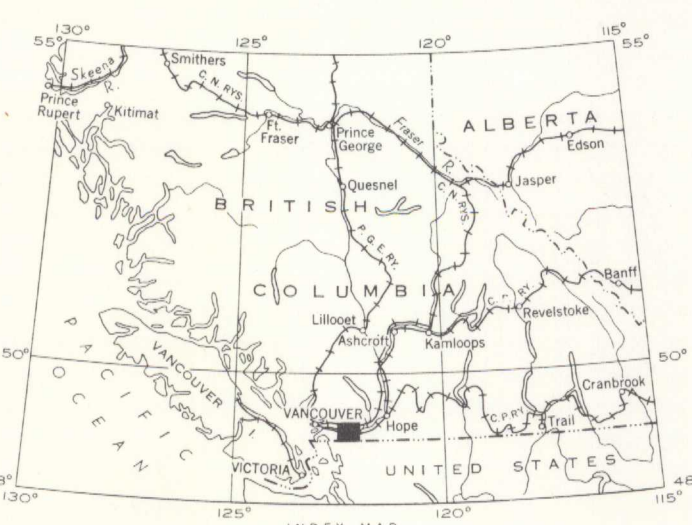
Cartography by the Geological Survey of Canada, 1960

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-colored.

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MAP 44-1959
TO ACCOMPANY PAPER 59-9
SURFICIAL GEOLOGY
SUMAS
NEW WESTMINSTER DISTRICT
BRITISH COLUMBIA

Scale: One Inch to One Mile = $\frac{1}{63,360}$ Miles

Approximate magnetic declination, 23° 18' East

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- LEGEND**
- Main highway
 - Other roads
 - Railway
 - Post Office
 - Electric power line, along road
 - International boundary
 - Municipal boundary
 - Indian Reserve boundary
 - Intermittent stream
 - Marsh
 - Tidal flat
 - Contours (interval 100' below 500' level; interval 500' above 500' level)

MAP 44-1959
SUMAS
BRITISH COLUMBIA
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GEOGRAPHICAL
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