

3D geologic map of the Auburn quadrangle, King and Pierce Counties, Washington

3D PDF INSTRUCTIONS

OBJECT DATA

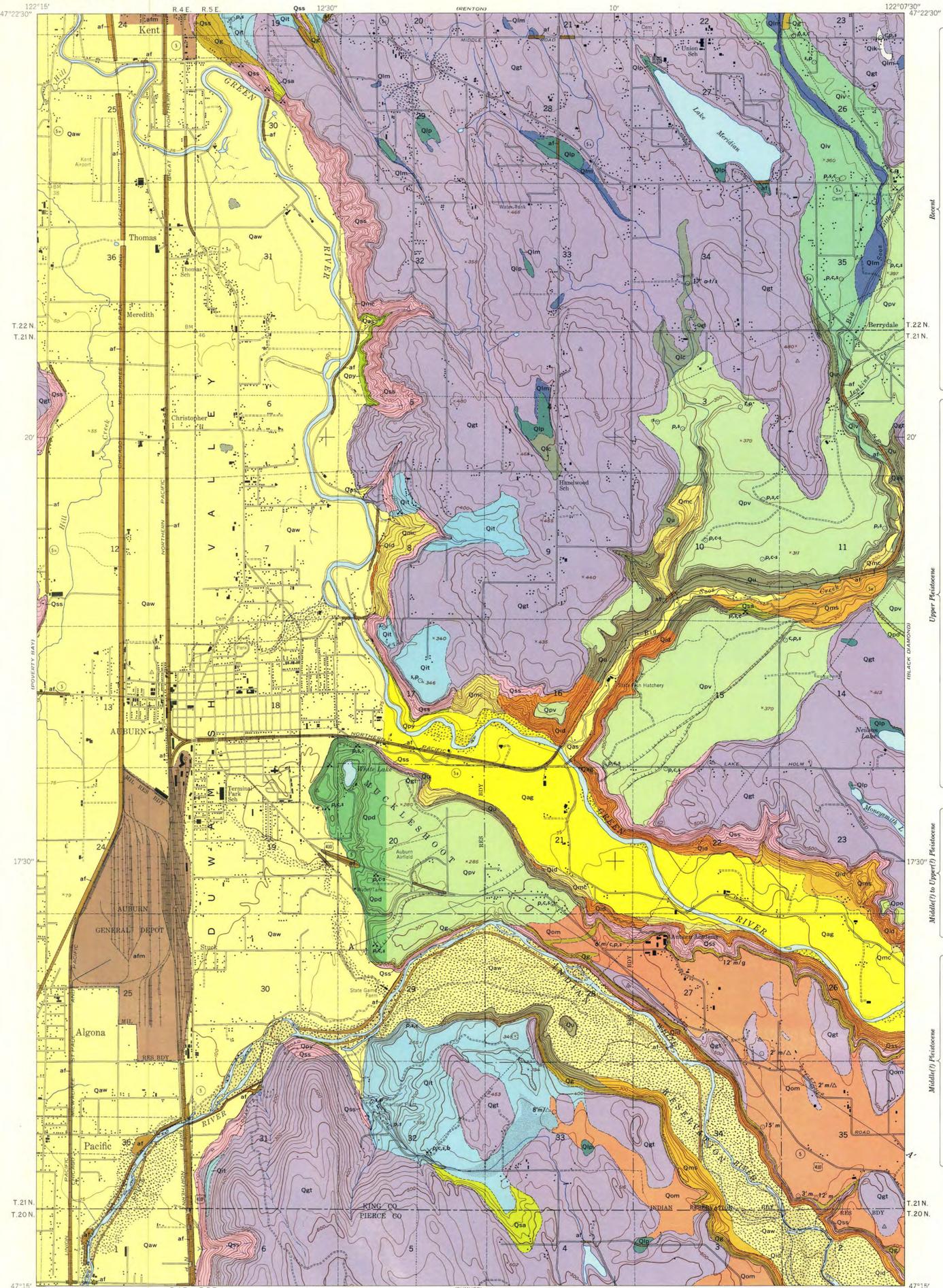
Layer001
 Layer002

No Separation 5% 50% 100%

5

Probe -

1x Z-Scale 10x Z-Scale Default Scale 10



EXPLANATION

- af Artificial fill
- afm Urban or industrial land modified by widespread or discontinuous artificial fill
- Qaw, Qag, Qas Alluvium
- Qmc, Qms Deposits of mass wasting processes
- Qip, Qim, Qic Lacustrine deposits
- Qom Oecola Mudflow
- Qpo, Qpv, Qpd Proglacial stratified drift
- Qsa Advance stratified drift
- Qss LOCAL DISCONFORMITY
- Qsu Undifferentiated deposits
- Qtd Intermediate drift
- Qu LOCAL DISCONFORMITY
- Qut Contact
- Qv Gravel or sand pit

Alluvium
Qaw, mostly gravel and sand deposited by White River. Boulder cobbles and pebble-cobbles gravel overlain by thin sand in Duwamish Valley at mouth of White River valley, grades outward to thick coarse and medium sand overlain by thin silt, clay, and peat. Forms distinct fan in Duwamish Valley at mouth of White River valley. Pattern indicates recent, unmodified channel deposits at surface. Maximum thickness in Duwamish Valley more than 100 feet. Contains glassy volcanic material possibly reactive in some concrete.

Qag, sand with lenses of pebble-cobbles gravel deposited by Green River; locally overlain by silt and clay, mostly near Auburn. Merges with and is minor constituent of gravel and sand deposited by White River in Duwamish Valley. Pattern indicates recent, unmodified channel deposits at surface. Maximum thickness probably more than 50 feet. Virtually unweathered; suitable for construction material.

Qas, mostly sand deposited by small streams; includes some silt and gravel. Generally thin, but relatively thick along lower reach of Big Soos Creek.

Oecola Mudflow
Qom, Unsorted unstratified mixture of granule-to-cobble-size rock fragments in clay, silt, and sand matrix; contains a few boulders. Characterized by abundant montmorillonitic clay and glassy volcanic rocks derived from Mount Rainier. Partly stained mottled brown and gray by oxidation of iron. Thickness 0 to about 20 feet; mapped only where 2.5 feet or more thick. Forms flat, poorly drained ground. Radiocarbon age about 4,000 years.

Proglacial stratified drift
Qpo, Mostly well-sorted, sandy pebble-and-cobble gravel deposited along and beyond retreating front of Puget glacial lobe by large ice-marginal stream that included melt water from Puget lobe and discharge from rivers draining the Cascade Range. Virtually unweathered; major source of construction material.

Qpv, outwash plain deposits; westernmost part of local outwash plain of broad, terraced, cut-and-fill deposits. Maximum known thickness about 50 feet.

Qpd, valley train deposits; linear, terraced, cut-and-fill deposits formed in troughs in ground moraine and outwash plain beyond ice front. Generally 10 to 40 feet thick. Grade westward to delta deposits.

Qps, delta deposits; thick fill deposited in ice-dammed lake. Maximum exposed thickness about 150 feet.

Ground moraine deposits
Qgt, Mostly thin ablation till over lodgment till, deposited by Puget glacial lobe. Lodgment till generally compact, coherent, unsorted mixture of sand, silt, clay, and gravel; commonly termed hardpan. Ablation till similar, but much less compact and coherent. Highly variable in thickness and in relative proportion of lodgment to ablation till; lodgment till generally 5 to 30 feet thick, ablation till 2 to 10 feet. Moderately unsorted, forms undulating, locally irregular surface characterized by southeastward-trending hills and valleys; in valleys, commonly overlain by thin sand, clay, or peat. Pattern indicates older sediments crop out in patches through moraine. Surface drainage locally poor. Lodgment till nearly impermeable and relatively difficult to excavate, but relatively stable in cut slopes.

Advance stratified drift
Qsa, Pebble-and-cobble gravel and sand; generally well sorted, but poorly sorted in the exposure south of White River.

LOCAL DISCONFORMITY
Qss, Salmon Springs Drift
Chiefly fluvial sand and gravel derived from British Columbia and northern and central Cascade Range; also includes till deposited by Puget glacial lobe, and thin beds of silt, clay, and peat. In Duwamish Valley, two lenses of till and interbedded outwash are overlain and underlain by deposits derived from central Cascade Range. In valleys of Green and White Rivers, sand and gravel includes only one lens of till. Partly well sorted, locally contains light silt and clay matrix. Generally stained brown by oxidation of iron; contains scattered soft stones. Maximum known thickness along Duwamish Valley about 200 feet, generally 50 feet or less elsewhere. Source of fill.

LOCAL DISCONFORMITY
Qsu, Puyallup(?) Formation
Mostly fluvial sand derived from Mount Rainier and central Cascade Range; includes peaty silt and clay, lignitic peat, volcanic ash, and volcanic mudflow. Deposited in part during warm, interglacial time. Generally not iron stained; contains scattered soft stones. Maximum known thickness about 50 feet. Contains abundant glassy volcanic material possibly reactive in some concrete.

Intermediate drift
Qtd, Includes two clayey till sheets deposited by Puget glacial lobe, separated by and locally overlain by lacustrine sand, silt, and clay, and relatively thin, lenticular deposits of fluvial sand and gravel. Gravel and sand generally stained brown by oxidation of iron; silt and clay generally gray. Contains scattered soft stones. Exposed thickness of lower till generally 30 to 60 feet, upper till generally 20 to 30 feet thick. Maximum known thickness about 300 feet. Outcrop areas on valley walls characterized by many small and some large landslides.

Contact
Qut, Dashed where approximately located, short-dashed where indefinite or inferred.

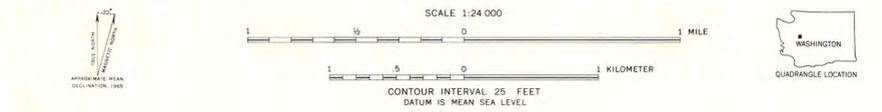
Scarp between terraces, ticks point toward lower terrace.

Gravel or sand pit: p.c.s.b.

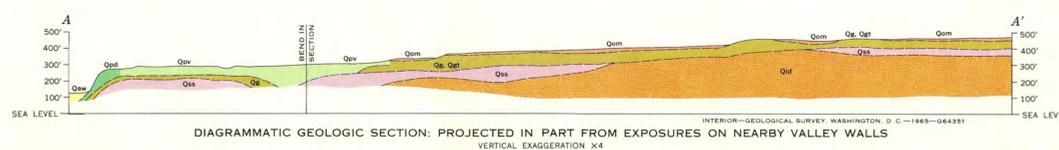
Letters indicate size of principal constituents in estimated order of decreasing abundance: b, boulders; c, cobbles; p, pebbles; s, sand.

Material classification
© 17 a/b/s, p.c.s.b.
Numbers indicate thickness in feet, letters indicate type of deposit exposed or identified in shallow auger holes: g, gravel; s, sand; t, silt; c, clay; p, peat; m, mudflow; a, till. Letters also indicate size of principal constituents of sand and gravel deposits, in estimated order of decreasing abundance: b, boulders; c, cobbles; p, pebbles; s, sand. Read stand line as "over," hyphen as "and."

Base by Army Map Service, 1949
Revised topography, 1956, and river boundaries, 1959, by D. R. Mullineux shown by dotted contours and dashed shorelines, respectively.



Geology by D. R. Mullineux, 1964-66, assisted by D. A. Kapphahn, 1955, and L. A. Palmer, 1956



DIAGRAMMATIC GEOLOGIC SECTION: PROJECTED IN PART FROM EXPOSURES ON NEARBY VALLEY WALLS
VERTICAL EXAGGERATION X4

GEOLOGIC MAP OF THE AUBURN QUADRANGLE, KING AND PIERCE COUNTIES, WASHINGTON

By
D. R. Mullineux
1965

Washington State (Auburn quad) Geol. 1:24,000. cap. 2.



QUATERNARY

For sale by U.S. Geological Survey, price \$1.00