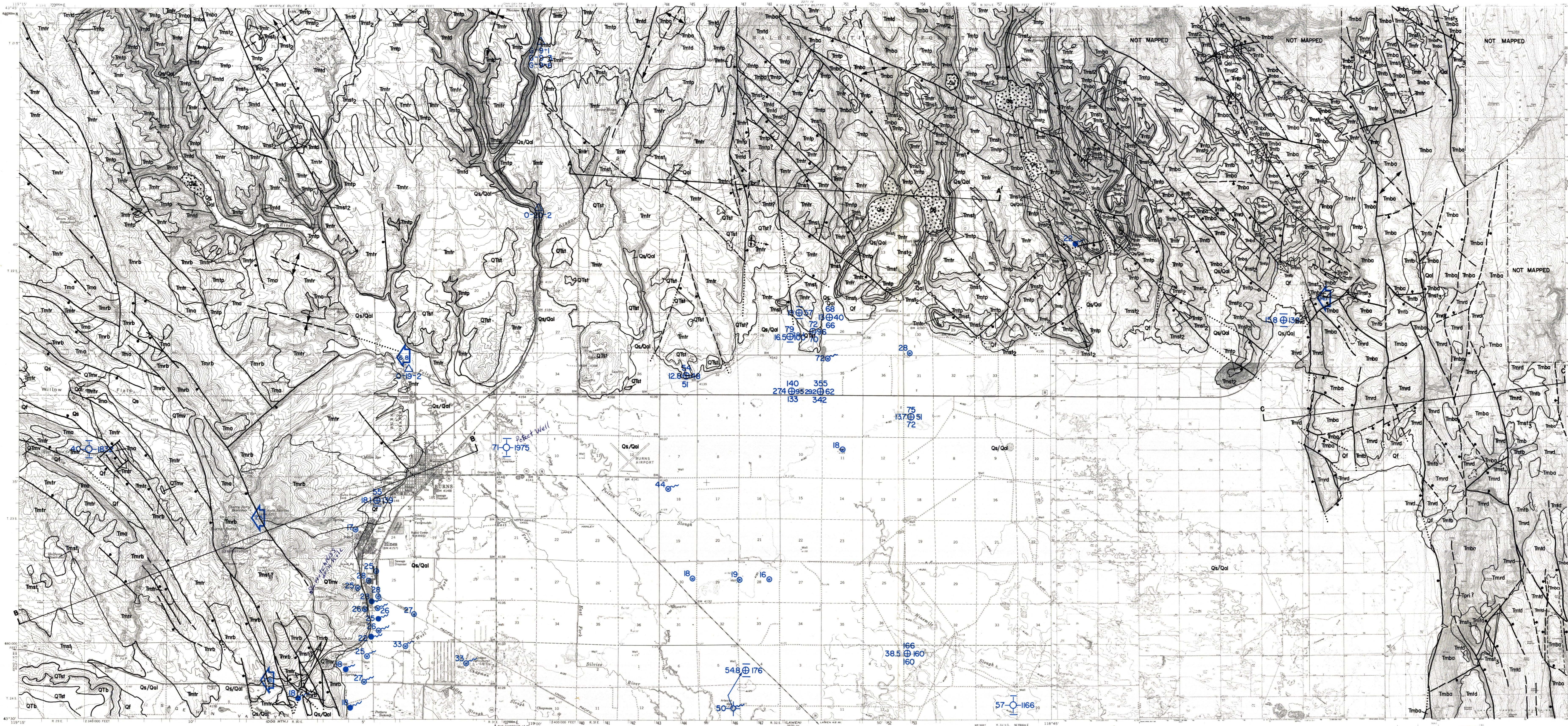


PLATE I



EXPLANATION

Qs/Qal Alluvium and Holocene sedimentary deposits, undifferentiated: Unconsolidated, locally stratified, white to buff silt, sand, and gravel; found in recent stream channels and throughout Harney Basin floor. Gravel composed of bed rock predominates in existing stream channels and in pre-existing stream channels buried under recent lake and fluvialite deposits. Approximately equivalent to Qal (alluvium) and Qs (sedimentary deposits) of Greene (1972); Greene, Walker, and Corcoran (1972); and Walker (1977).

Qf Alluvial fan deposits: Unconsolidated to partially cemented, stratified, poorly sorted mixtures of silt, sand, and gravel; found at mouths of elevated canyons and drainages. Partial cementing by caliche common. Approximately equivalent to Qf (alluvial fan deposits) of Greene (1972) and Greene, Walker, and Corcoran (1972).

Qls Landslide deposits: Unconsolidated blocks of bed rock and debris moved downslope via debris flow and slumping from undercutting by stream action. Sliding is most common in unconsolidated sediments directly overlain by more resistant welded ash-flow tuffs. Approximately equivalent to Qls (Landslide deposits) of Greene (1972) and Greene, Walker, and Corcoran (1972).

Qp Playa deposits: Unconsolidated to cemented clay, silt, and sand, with some evaporite deposits; found in closed, undrained basins in bed rock and Holocene sediments.

Qtb Upper Pliocene basalt: Upper Pliocene, medium-gray, diktyxtal, olivine-bearing vesicular basaltic flows; occurs as series of thin flows generally overlying unit Qs in extreme southwestern corner of study area only. Partially equivalent to Th (Harney Formation) of Piper, Robinson, and Park (1939); Qb (basalt) of Greene (1972); and Qb (basalt) of Greene, Walker, and Corcoran (1972) and Walker (1977).

Qtnv Upper Pliocene mafic vent complexes: Upper Pliocene basaltic and andesitic scoria, cinders, agglomerate, ash, and tuffaceous flows; occurs as cones and low mounds west of Burns. Thought to be source for flows of unit Qb. Partially equivalent to Qbn (late basalt) of Piper, Robinson, and Park (1939); Qtnv (mafic vent complex) of Greene (1972); Qtnv (mafic vent complexes) and Qts (pyroclastic rocks of cinder cones) of Greene, Walker, and Corcoran (1972); and Tns (mafic vent complexes) and Tps (pyroclastic rocks of basaltic cinder cones) of Walker (1977).

QTst Tuffaceous sedimentary rocks: Pliocene, white to buff, semiconsolidated, stratified, pumiceous sandstone, siltstone, and conglomerate; underlies unit Qb in southwest corner of study area and forms uplifted terraces in northern portion of study area. Includes deposits of cobble-sized pumice at Sand Hill and east of Devine Creek. Partially equivalent to Tf (fanglomerate near Coffey Creek) and Th (Harney Formation) of Piper, Robinson, and Park (1939); QTs (terrace gravels) and QTs (sedimentary rocks) of Greene (1972); QTg (terrace gravels) and QTs (sedimentary rocks) of Greene, Walker, and Corcoran (1972); and QTg (terrace gravels) and QTs (sedimentary rocks) of Walker (1977).

Intrusive rhyodacites: Pliocene (?), red to gray, aphanitic rhyodacitic rocks of uncertain age. Intrudes unit Qb in east portion of study area north of Crowcamp Creek and unit Tm2 in north-central portion of study area near Soldier Creek along north-south-trending fault. Partially equivalent to Tsr (intrusive rhyodacite) of Greene, Walker, and Corcoran (1972).

Tmtr Rattlesnake Ash-Flow Tuff: Upper Miocene, light-brown to red-brown to gray, pumice-rich, rhyolitic, welded ash-flow tuff. Commonly zoned into recognizable basal vitric, spherulitic, lithophysal, and upper devitrified zones. Visible phenocrysts consist of sanidine, plagioclase feldspar, quartz, and pyroxene. Pumice is eutaxitic and generally light brown in color, and fragments range from 2 to 20 cm in longest dimension. Partially equivalent to Td (Danforth Formation) of Piper, Robinson, and Park (1939); Tmtr (tuffaceous sedimentary rocks) of Greene (1972); Tst (tuffaceous sedimentary rocks) of Greene, Walker, and Corcoran (1972); and Tst (tuffaceous sedimentary rocks and tuff) of Walker (1977).

Tmst1 Tuffaceous sedimentary rocks: Upper Miocene, white to buff, semi- to well-consolidated, stratified, poorly sorted, tuffaceous, pumiceous siltstones, sandstones, and conglomerates. Generally lacustrine, with some fluvialite and air-fall deposits. Includes all sedimentary rocks occurring between unit Tm2 and unit Tm3. Partially equivalent to Td (Danforth Formation) of Piper, Robinson, and Park (1939). Approximately equivalent to Tst (tuffaceous sedimentary rocks) of Greene (1972); Tst (tuffaceous sedimentary rocks) of Greene, Walker, and Corcoran (1972); and Tst (tuffaceous sedimentary rocks and tuff) of Walker (1977).

Tma Andesites: Upper Miocene (?), dark-gray, dense, aphyric andesitic flows; underlies unit Tm2 west and north of Burns. Approximately equivalent to Tm2 (andesite) of Greene (1972) and Tm2 (andesite) of Greene, Walker, and Corcoran (1972) and Tm2 (andesite) of Walker (1977).

Tmrb Rhyodacite of Burns Butte: Upper Miocene, gray to brown to red, flow-banded, locally vesicular, aphanitic, vesicular, rhyodacitic rocks, commonly with black obsidian flow tops; occurs as exogenous domes and flows forming Burns Butte and surrounding low hills. Mapped separately from unit Tm2 on basis of stratigraphic position and K/Ar age dates. Partially equivalent to Td (Danforth Formation) of Piper, Robinson, and Park (1939) and Tvs (silicic vent rocks) of Walker (1977). Approximately equivalent to Tr (rhyodacite) of Greene (1972) and Tmrb (rhyodacite) of Greene, Walker, and Corcoran (1972).

Tmtp Prater Creek Ash-Flow Tuff: Miocene, light-reddish-brown to light-gray, pumice-poor, rhyolitic, welded ash-flow tuff. Generally devitrified and crystal poor with dense lithophysal zone developed west of Devine Canyon and near Soldier Creek. Rare pumice fragments are generally eutaxitic, light brown in color, and 1 to 3 cm in longest dimension. Partially equivalent to Td (Danforth Formation) of Piper, Robinson, and Park (1939) and Tst (silicic ash-flow tuff) of Walker (1977). Approximately equivalent to Tmtp (welded tuff of Prater Creek) of Greene, Walker, and Corcoran (1977).

Tm2 Tuffaceous sedimentary rocks: Miocene, white to buff, semi- to well-consolidated, stratified, poorly sorted, tuffaceous, pumiceous siltstones, sandstones, and conglomerates. Generally lacustrine, with some fluvialite and air-fall deposits. Includes all sedimentary rocks occurring between unit Tm2 and unit Tm3. Partially equivalent to Td (Danforth Formation) of Piper, Robinson, and Park (1939); Tm2 (tuffaceous sedimentary rocks) of Greene (1972); Tst (tuffaceous sedimentary rocks) of Greene, Walker, and Corcoran (1972); and Tst (tuffaceous sedimentary rocks and tuff) of Walker (1977).

Tmtd Devine Canyon Ash-Flow Tuff: Middle Miocene, light-gray to greenish-gray, crystalline, pumiceous, rhyolitic, welded ash-flow tuff. Found as either devitrified or vitric units, with no lithophysal or spherulitic zones recognized. Pumice fragments are generally eutaxitic, light brown in color, and 1 to 5 cm in longest dimension. Appears to represent multiple-flow, simple cooling units. Partially equivalent to Td (Danforth Formation) of Piper, Robinson, and Park (1939); Tmtd (silicic ash-flow tuff) of Walker (1977); and Tmtd (welded tuff of Devine Canyon) of Greene (1972) and Greene, Walker, and Corcoran (1972).

Tm3 Tuffaceous sedimentary rocks: Middle Miocene, white to yellow, semi- to well-consolidated, poorly sorted, poorly stratified, tuffaceous siltstones and sandstones, with some air-fall pumice deposits. Includes all sedimentary rocks found beneath unit Tm2, including those that interfinger with units Tm2 and Tm3, and may represent several discrete sedimentary events. Partially equivalent to Td (Danforth Formation) of Piper, Robinson, and Park (1939); Tm3 (tuffaceous sedimentary rocks) of Greene (1972); Tm3 (tuffaceous sedimentary rocks) of Greene, Walker, and Corcoran (1972); and Tm3 (tuffaceous sedimentary rocks, pumicites, and silicic flows) of Walker (1977).

Tmrd Rhyodacite: Middle Miocene, light-gray to brownish-red, flow-banded, locally vesicular, aphanitic, rhyodacitic rocks, with associated vitrophyres and obsidian. Occurs in exogenous domes forming low, rounded hills south of Buchanan and as small, highly altered, spherulitic, wedge-shaped intrusions near Rock Creek and Pine Creek. Mapped separately from unit Tm2 on basis of stratigraphic position and K/Ar age dates. Approximately equivalent to Td (older silicic extrusives) of Piper, Robinson, and Park (1939); Tmrd (rhyodacite) of Greene, Walker, and Corcoran (1972); and Tmrd (silicic vent rocks) of Walker (1977).

Tmb Buchanan ash-flow tuff: Middle Miocene, light-gray to black, pumice-rich, crystalline, dacitic to andesitic, welded ash-flow tuff. Forms either thin devitrified flows or thick vitric flows in the area around Buchanan.

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt ———
U.S. Route ——— State Route ———

Geologic Cross Sections

A VERTICAL EXAGGERATION 2:1

B VERTICAL EXAGGERATION 2:1

C VERTICAL EXAGGERATION 2:1

TIME ROCK CHART

3-4 Ma AGES

Geologic symbols: Contacts - dashed where inferred or generalized; arrow indicates plunge. Normal faults - solid where exposed, dashed where inferred, dotted where concealed, ball and bar on down-dropped side. Anticline - dashed where inferred or generalized; arrow indicates plunge. Syncline - dashed where inferred or generalized; arrow indicates plunge. Structural basin - doubly plunging syncline. Structural dome - doubly plunging anticline. Volcanic center - small shield volcanoes.