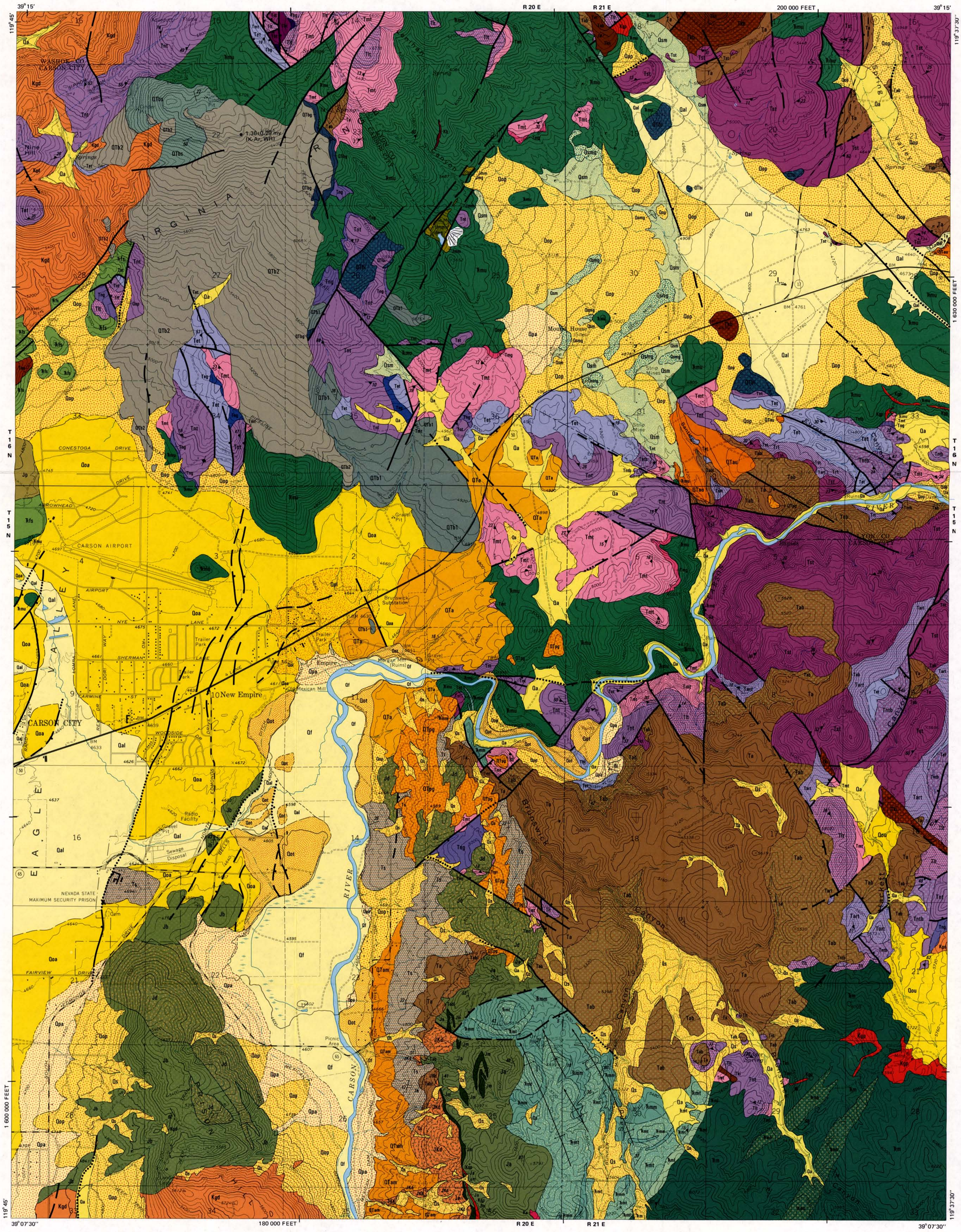
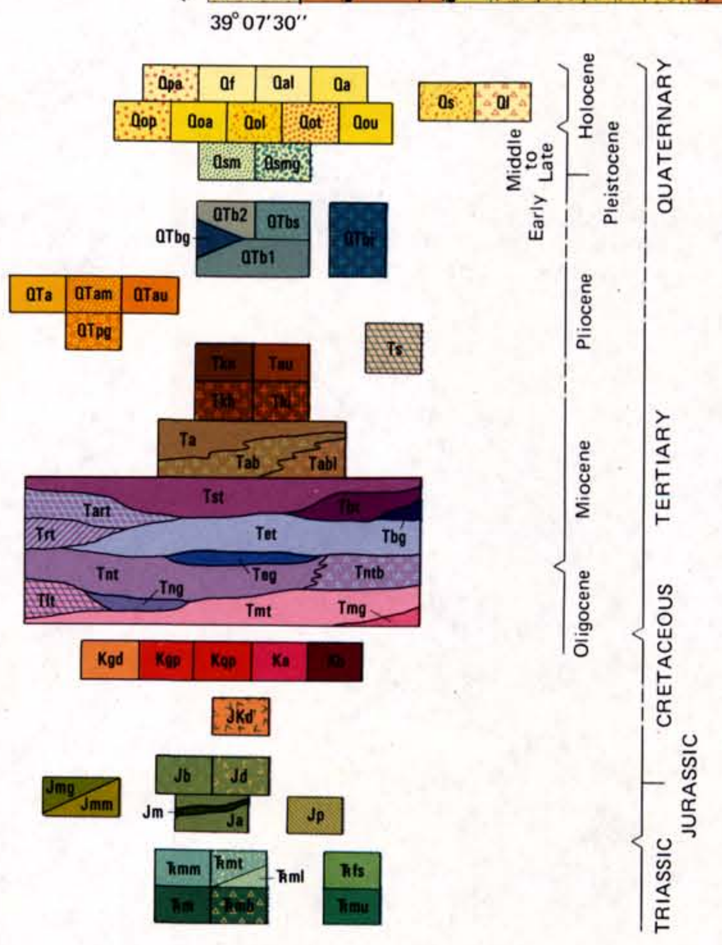
NEW EMPIRE GEOLOGIC MAP





Qpa **Pediment and alluvial-fan deposits.** Grayish-orange, tan, and gray-brown granular muddy coarse sand and sandy gravel in small fans, bajadas, and minor pediment veneers.

Qal **Alluvial-plain deposits.** Unbedded to poorly bedded, poorly to moderately sorted, yellowish-brown to gray fine silty sand, sandy silt, granular muddy coarse sand, and minor sandy gravel.

Qf **Flood-plain deposits of the Carson River.** Gray, gray-brown, and brown silty fine sand and sandy mud interbedded with coarse sand and pebble gravel.

Qa **Alluvial deposits, undifferentiated.** Unbedded to poorly bedded, poorly sorted silty gravelly sand and sandy pebble to cobble gravel. Includes mainstream gravel deposits of the Carson River.

Qs **Windblown sand.** Pale yellowish-gray to yellow-brown, well-sorted arkosic medium to fine sand and fine silty sand in thin discontinuous deposits.

Ql **Landslide deposits.** Small block slide of tuff and gravel.

Qop **Older pediment gravel.** Grayish-orange to dark yellow-brown small cobble to muddy sandy pebble gravel and minor very poorly sorted bouldery cobble gravel. Clasts angular to subrounded and similar in composition to nearby bedrock. Laterally transitional into Qoa.

Qoa **Older alluvial-plain deposits.** Similar to Qop except thicker, finer grained, and better bedded and sorted.

Qou **Older alluvial deposits, undifferentiated.** Yellowish-brown to gray-brown gravelly coarse to medium arkosic sand and sandy small pebble gravel.

Qot **Terrace deposits of the Carson River.** Dark to light gray-brown to brown interbedded silty sand and sandy pebble to cobble gravel in strath- and fill-terrace remnants. Locally interbedded with coarse colluvium along steep canyon walls.

Qol **Lake deposits.** Homogeneous, unconsolidated, pinkish-gray to very pale-orange silt. Upper part of the deposits marked by nodular calcium carbonate and powdery gypsite probably of pedogenic origin.

Qsm **Silt of Mound House.** Unconsolidated and weakly bedded, well-sorted, pale-brown, gray, and greenish-gray silty fine sand, sandy silt, and pebbly sand.

Qsmg **Gypsite.** White to pale grayish-white, fine-grained, powdery gypsum. Grades downward and laterally into Qsm.

QTb2
QTbs
QTbg **Basaltic andesite vent complex. QTb2:** Thin (10-15 m) flows of medium- to dark-gray, sparsely porphyritic, locally flow-banded and vesicular, very fine-grained basaltic andesite. Interlayered with

QTb1 QTbs near the vent. **QTbs:** Gray to dark-gray, black, and red, well-bedded basaltic andesite scoria. **QTbg:** Bouldery pebble to cobble gravel. 80 to 90% scoriaceous basaltic andesite and 10 to 20% ash-flow tuff and basement rock types. **QTb1:** Flows slightly older than QTb2 but lithologically similar.

QTbi **Basaltic andesite intrusives, undifferentiated.** Plugs of very fine-grained, medium-gray, sparsely porphyritic, platy-weathering basaltic andesite. Age uncertain.

QTa **Alluvial-fan deposits of Morgan Mill.** Yellowish-brown to yellowish-gray, well-bedded sandy pebble to cobble gravel and pebbly coarse sand. 0-20 m thick.

QTam **Alluvial-fan deposits of Mexican Dam Road.** Grayish-orange to pale grayish-brown, locally well-bedded, weakly lithified muddy sandy pebble gravel and pebbly muddy sand. Locally contains rare boulders of metavolcanic rock up to 1 m diameter. Limestone clasts dominent in southernmost exposures. 0-30 m thick.

QTau **Alluvial-fan deposits, undifferentiated.** Isolated remnants of moderately sorted, weakly bedded cobbly muddy sandy pebble gravel composed predominently of metavolcanic and Tertiary volcanic rock types. 0-20 m thick.

QTpg **Pediment gravel.** Yellowish-gray to pale orange-brown bouldery sandy cobble gravel. Most clasts subrounded. Contains numerous very large boulders of Jb and Jd. 0-20 m thick.

Ts **Sedimentary rocks.** Yellowish-brown to greenish-white arkosic sandstone and sandy conglomerate, pinkish-tan tuffaceous pebbly sandstone, and greenish-gray siltstone. 0-250 m thick.

Tkn **Knickerbocker Andesite.** Very dark-gray to black, tan-weathering, sparsely porphyritic glassy andesite. About 10 m thick.

Tau **Andesite, undifferentiated.** Thin (< 10 m) flow of medium-gray andesite containing scattered phenocrysts of quartz, plagioclase, and hornblende.

Tkb
Tki **Kate Peak Formation. Tkb:** Gray to brownish-gray hornblende andesite mudflow and epiclastic breccia. **Tki:** Plugs of pale bluish-gray, coarse-grained hornblende-plagioclase andesite porphyry.

Ta
Tab
Tabl **Alta Andesite. Ta:** Gray-brown, dark-brown, and black, thin, platy-weathering, porphyritic and locally vesicular pyroxene-plagioclase andesite flows and minor flow breccia. 0-100 m thick. **Tab:** Pale-gray to bluish-gray, pink, and pale-green coarse mudflow and epiclastic breccia of fine- to medium-grained, sparsely porphyritic pyroxene-plagioclase andesite. 0-100 m thick. **Tabl:** Tuffaceous sandstone, bouldery conglomerate, and landslide breccia composed dominently of metavolcanic rock. 0-30 m thick.

Tst **Santiago Canyon Tuff.** Hornblende-biotite quartz latite crystal-vitric ash-flow tuff. Gray to pale lavender- or brownish-gray, moderately to strongly welded, and largely devitrified. About 300 m thick.

Tart **Augite rhyodacite tuff-breccia.** Non-welded, pale greenish-gray pumice- and lithic-rich, augite-biotite rhyodacite crystal tuff-breccia. 0-170 m thick.

Trt **Rhyolite tuff.** Non-welded, gray-white to yellowish-gray, pumiceous, fine-grained, sparsely porphyritic glassy rhyolite vitric-crystal tuff. 0-40 m thick.

Tbt
Tbg **Biotite dacite tuff.** Reddish-brown, moderately welded and devitrified biotite dacite crystal-vitric tuff. 0-10 m thick. **Tbg:** Underlying bouldery cobble gravel.

Tet
Teg **Eureka Canyon Tuff. Tet:** Pale yellowish-white to pale-gray, lavender, and tan rhyolite vitric tuff. Pale yellowish white, devitrified, and weakly welded in most exposures. 0-130 m thick. **Teg:** Underlying bouldery cobble gravel.

Tnt
Tntb
Tng **Nine Hill Tuff. Tnt:** Pale orange-red to reddish-purple, densely welded, stretched, devitrified, very pumiceous rhyolite vitric tuff. Grades upward into weakly welded to non-welded, pumice-poor vitric tuff. 0-300 m thick. **Tntb:** Pale pinkish-brown, non-welded, pumiceous vitric tuff and lapilli-tuff breccia. 0-100 m thick. **Tng:** Underlying interformational bouldery cobble gravel locally containing boulders of Tlt and Tmt up to several meters in diameter.

Tlt **Lenihan Canyon Tuff.** Pale-lavender to purplish-tan, moderately to densely welded, devitrified, fine-grained hornblende quartz latite crystal-vitric tuff. 0-300 m thick.

Tmt
Tmg **Mickey Pass Tuff. Tmt:** Tan to reddish-brown, moderately to strongly welded, devitrified biotite quartz latite vitric-crystal tuff. Grades downward into a basal few meters of rhyodacitic crystal-rich vitrophyre and upward into pumice- and crystal-rich rhyolite. 0-200 m thick. **Tmg:** Underlying bouldery cobble gravel.

Kgd **Hornblende-biotite granodiorite.** Grayish-white to gray and greenish-gray, medium- to coarse-grained, equigranular to porphyritic, locally foliated and lineated granodiorite.

Kgp **Granodiorite porphyry.** Dikes and small plugs of light grayish-brown to pale pinkish-green, medium- to coarse-grained granodiorite and quartz monzonite porphyry. Locally aplitic near the Bidwell Mine.

Kqp **Quartz monzonite porphyry.** Grayish white to white, medium grained, bleached and albitized. Contains zoned, euhedral alkali feldspar phenocrysts 2-3 cm in diameter.

Ka **Granite aplite.** Yellowish-tan to pinkish-tan, very fine-grained, homogeneous aplite plug.

Kb **Tourmaline breccia.** Felsite fragments set in granular tourmaline.

JKd **Diorite.** Pale-green to dark greenish-gray, fine-grained, equigranular, homogeneous diorite.

Jb **Metavolcanic breccia.** Gray to greenish-gray and greenish-black, very poorly sorted coarse andesitic mud-flow breccia.

Jd **Dacite porphyry.** White to pale bluish-gray, fine-grained dacite to quartz latite porphyry.

Jmg
Jmm **Metasedimentary rocks. Jmg:** Coarse-grained gypsum. **Jmm:** Yellowish-tan, medium-grained marble.

Ja **Calcareous argillite.** Fine-grained, dense, bluish-black to bluish-gray, thin-bedded, calcareous to siliceous argillite and silty limestone. Equivalent to the Gardnerville Formation of Noble (1962).

Jm **Calcite marble.** Thin (0-3 m) beds of coarse-grained white marble.

Jp **Phyllite.** Dark gray-brown andalusite phyllite and slate.

Rmm
Rmt
Rml **Metasedimentary rocks. Rmm:** Gray, fine- to medium-grained, mottled calcite marble. **Rmt:** Pale-green to pale bluish-gray recrystallized tuff, lithic-tuff breccia, and graded chert interbeds. **Rml:** Bluish-gray to bluish-black, fine-grained recrystallized limestone. Equivalent to the Oreana Peak Formation of Noble (1962).

Rfs **Felsic schist, undifferentiated.** Gray-white to pale bluish-gray, siliceous, fine-grained flaser schist and banded flaser gneiss.

Rm
Rmb **Metavolcanic rocks of Brunswick Canyon. Rm:** Interbedded porphyritic flows of dark orange-brown to dark greenish-gray quartz latite, latite, and andesite. Includes welded tuff and tuff-breccia near the top of the map unit and thin beds of epiclastic and mud-flow breccia throughout. **Rmb:** Volcanic breccia.

Rmu **Mafic metavolcanic rocks, undifferentiated.** Grayish-green to greenish-black, fine-grained, sparsely porphyritic, dense and hard metamorphosed mafic andesite flows and volcanic breccia.

Contact. Long dashes where approximately located; short dashes where transitional; dotted where concealed.

Fault. Long dashes where inferred or approximately located; dotted where concealed.

62 **Bedding.**

33 **Foliation.** Schistosity in metamorphic rocks; compaction foliation in ash-flow tuffs.

E. C. Bingler, 1977

Mapped 1975-77. Correlation of selected Mesozoic rocks based on Noble, D. (1962) Mesozoic geology of the southern Pine Nut Range, Douglas County, Nevada: Stanford Univ., unpub. Ph.D. dissertation.

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Scale 1:24,000

0 0.5 1 KILOMETER

0 1000 METERS

0 0.5 1 MILE

0 2000 4000 FEET

CONTOUR INTERVAL 40 FEET

DOTTED LINES ARE 20-FOOT CONTOURS

DATUM IS MEAN SEA LEVEL

Topographic base from U. S. Geological Survey New Empire 7½' quadrangle, 1968

Cartography by Susan L. Nichols

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