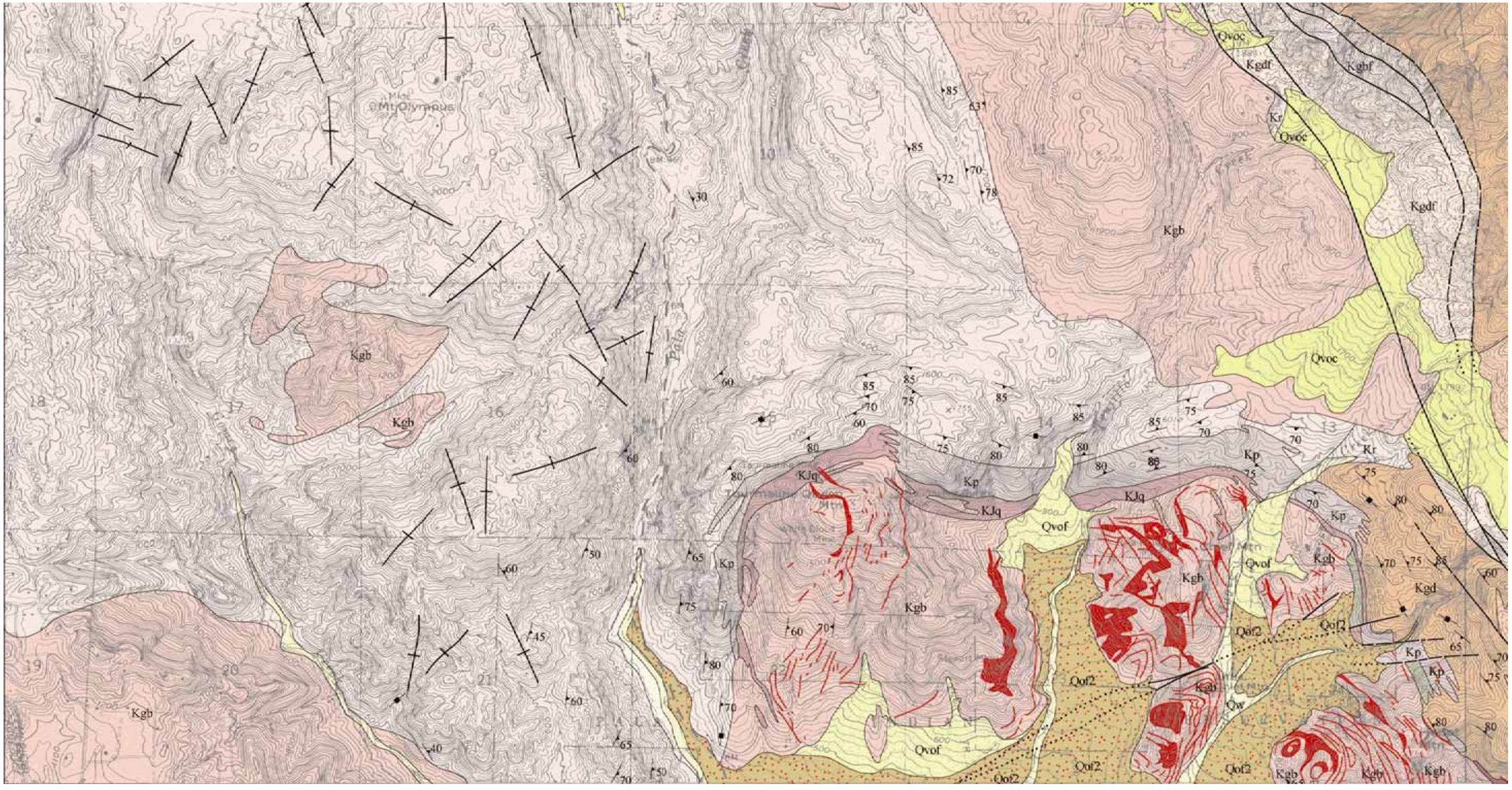
APPENDIX 6.3-B – GEOLOGIC MAPS (FIGURES 6.3-B.1 THROUGH 6.3-B.6)

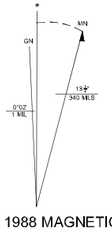


N

SOURCE:

United States Geological Survey
7.5 Minute Topographic Map:
Pechanga Quadrangle

Polyconic projection, contour interval 20 feet, dotted lines 10 feet.



UTM GRID AND 1988 MAGNETIC NORTH DECLINATION AT CENTER OF STREET

This geologic map was funded in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program, STATEMAP Award no. 99HQAG0134.

0 1/4 1/2 3/4 1 MILE

SCALE 1:24,000

TRC

PROJECT: 125158

FACILITY:

ORANGE GROVE PROJECT
SAN DIEGO COUNTY, CALIFORNIA

GEOLOGIC MAP
PECHANGA QUADRANGLE

FIGURE 6.3-B.1

GEOLOGIC MAP OF THE PECHANGA 7.5' QUADRANGLE SAN DIEGO AND RIVERSIDE COUNTIES, CALIFORNIA: A DIGITAL DATABASE

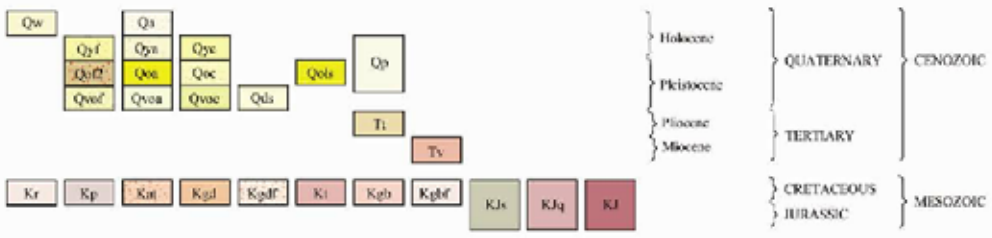
VERSION 1.0

By
Michael P. Kennedy[1]

Digital Database
by
Brad L. Nelson[2] and Rachel M. Hauser[2]
2000

1. California Division of Mines and Geology, Los Angeles, CA
2. U. S. Geological Survey, Riverside, CA

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

MODERN SURFICIAL DEPOSITS - Sediment that has been recently transported and deposited in channels and washes, on surfaces of alluvial fans and alluvial plains, and on hillslopes and in artificial fills. Soil-profile development is non-existant. Includes:

Qw — Active channel and wash deposits (late Holocene) - Unconsolidated to locally poorly unconsolidated sand and gravel deposits in active washes of streams.

Qs — Active alluvial flood plain deposits (late Holocene) - Unconsolidated to locally poorly unconsolidated sand and gravel deposits in active alluvial flood plains.

YOUNG SURFICIAL DEPOSITS - Sedimentary units that are slightly consolidated to cemented and slightly to moderately dissected. Alluvial fan deposits typically have high coarse/fine clast ratios. Younger surficial units have upper surfaces that are capped by slight to moderately developed pedogenic soil profiles. Includes:

Qya — Young alluvial flood plain deposits (Holocene and late Pleistocene) - Mostly poorly consolidated, poorly sorted, permeable flood plain deposits.

Qyc — Young colluvial deposits (Holocene and late Pleistocene) - Mostly poorly consolidated and poorly sorted slope wash and stream deposits.

Qyf — Young alluvial fan deposits (Holocene and late Pleistocene) - Mostly poorly consolidated and very poorly sorted sand, gravel, cobble and boulder deposits in young alluvial fans.

OLD SURFICIAL DEPOSITS - Sediments that are moderately consolidated and slightly to moderately dissected. Older surficial deposits have upper surfaces that are capped by moderate to well-developed pedogenic soils. Includes:

Qoa — Older alluvial flood plain deposits (Pleistocene, younger than 500,000 years) - Mostly moderately well consolidated, poorly sorted, permeable flood plain deposits.

Qoc — Older colluvial deposits (Pleistocene, younger than 500,000 years) - Mostly moderately well consolidated, poorly sorted slope wash and stream deposits.

Qof — Older fan deposits (Pleistocene, younger than 500,000 years) - Mostly poorly consolidated fan, debris flow and talus deposits. Clasts possess a moderately well developed clay coating but are otherwise fresh.

Qols — Older landslide deposits (Pleistocene, younger than 500,000 years) - Landslide slump and rock fall deposits.

VERY OLD SURFICIAL UNITS - Sediments that are slightly to well consolidated to indurated, and moderately to well dissected. Upper surfaces are capped by moderate to well-developed pedogenic soils. Includes:

Qvoa — Very old alluvial flood plain deposits (early Pleistocene) - Mostly well-indurated, poorly sorted, semi-permeable clay and sand flood plain deposits.

Qvoc — Very old colluvial deposits (early Pleistocene) - Mostly well-indurated, poorly sorted, hillslope, clay and sand colluvial deposits.

Qvof — Very old alluvial fan deposits (early Pleistocene) - Mostly very well-indurated, reddish-brown, sand and cobble, early Pleistocene alluvial fan deposits.

Qp — Pauba Formation (early Pleistocene) - Light-brown moderately well-indurated, extensively crossbedded, channeled and filled sandstone and siltstone that contains occassional intervening cobble-and -boulder conglomerate beds.

Qds — Dripping Springs Formation (early Pleistocene) - Pebble, cobble and boulder conglomerate in a reddish-brown, poorly consolidated, poorly sorted sandstone matrix.

BEDROCK UNITS

Ti — Temecula Arkose (Pleistocene) - Pale greenish-yellow, well-indurated, medium- and coarse-grained sandstone with thin interstratified beds of fine-grained, tuffaceous sandstone, siltstone, and claystone. Pebble and cobble conglomerate interbeds composed of locally derived basement rock clasts are also common and range in thickness from a few centimeters to a meter or more.

Tv — Basalt (Miocene) - Dark-gray and black, fine-grained basalt.

Kr — Granodiorite of Rainbow (Cretaceous) - Leucocratic hornblende-biotite granodiorite; medium- to coarse-grained, massive.

Kp — Granodiorite of Pala (Cretaceous) - Leucocratic granodiorite and migmatite; fine- to medium-grained.

Kat — Gabbro of Agua Tibia Mountain (Cretaceous) - Hornblende gabbro; medium- to coarse-grained, massive to foliate. This gabbro often contains minor biotite and quartz (quartz bearing gabbro).

Kgd — Granodiorite undivided (Cretaceous) - Mostly hornblende-biotite granodiorite; medium- to coarse-grained.

Kgdf — Granodiorite undivided fault part (Cretaceous) - Leucocratic hornblende-biotite granodiorite that has been extensively sheared along the Elsinore fault zone.

Ki — Tonalite undivided (Cretaceous) - Mainly hornblende-biotite tonalite; course-grained, light gray.

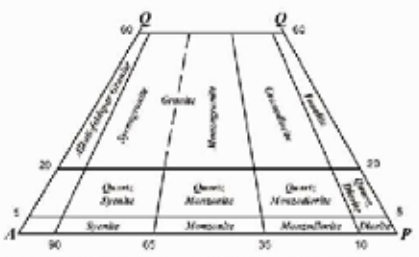
Kgb — Gabbro undivided (Cretaceous) - Mostly biotite-hornblende-hypersthene gabbro; coarse-grained, dark gray, massive.

Kgbf — Gabbro undivided fault part (Cretaceous) - Mostly biotite-hornblende-hypersthene gabbro that has been extensively sheared along the Elsinore fault zone.

KJq — Quartzite and quartz conglomerate (Cretaceous and Jurassic) - Mostly quartzite, quartz conglomerate and meta-arkose.

KJs — Schist with minor amphibolite and marble (Cretaceous and Jurassic) - Mostly quartz-mica schist, quartz-mica amphibole schist, and feldspathic amphibole schist.

KJ — Metavolcanic and metasedimentary rocks undivided (Cretaceous and Jurassic) - Low grade (greenschist facies) rocks that are in part coeval with and in part older than the Cretaceous plutonic rocks they lie in contact with.



Classification of plutonic rock types (from IUGS, 1973, and *Streckeisen, 1973). A, alkali feldspar; P, plagioclase feldspar; Q, quartz.

*Streckeisen, A.L., 1973, Plutonic rocks-Classification and nomenclature recommended by the IUGS Subcommission on Systematics of Igneous Rocks: Geotimes, vol. 18, pp 26-30.

MAP SYMBOLS

Contact between map units.

Fault - dashed where inferred, dotted where concealed. Arrow and number indicate direction and angle of dip of fault plane.

Antiform - solid where accurately located; dotted where concealed.

Syncline - solid where accurately located; dotted where concealed.

Strike and dip of inclined sedimentary beds.

Strike and dip of overturned sedimentary beds.

Strike and dip of foliation.

Strike of vertical foliation.

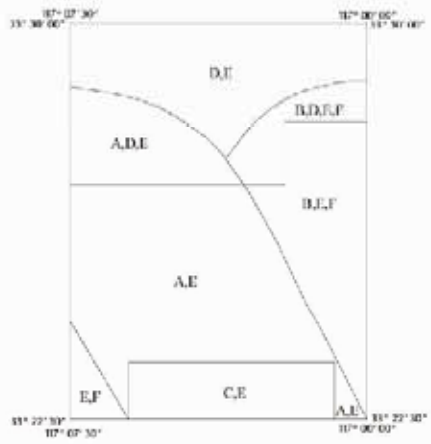
Landslide - arrows indicate principal direction of movement.

Air photo lineament - Mostly joints and minor faults.

Pegmatite dike.

Closed depression.

REFERENCES



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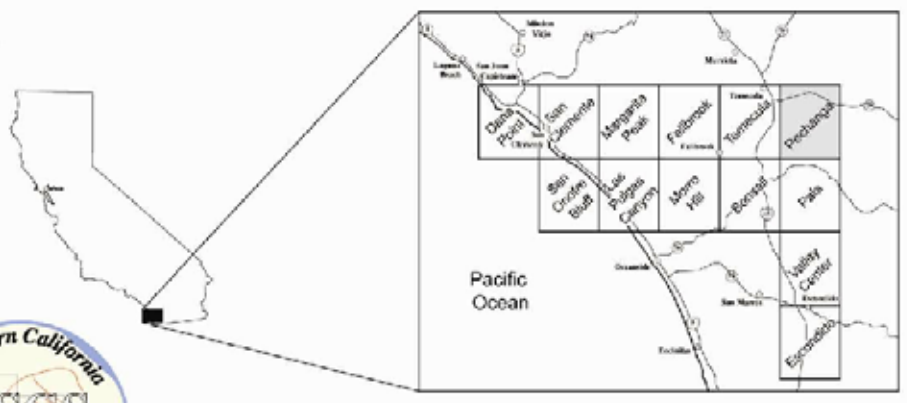
C. Jahns, R.H., and Wright, L.A., 1951, Gem- and lithium-bearing pegmatites of the Pala district, San Diego County, California: California Division of Mines and Geology Special Report 7-A, 72 p., map scale 1:48,000. This mapping was used with slight modifications for the pegmatites and adjacent bedrock geology in the Pala area district.

D. Kennedy, M.P., 1977, Recency and character of faulting along the Elsinore fault zone in southern Riverside County, California: California Division of Mines and Geology Special Report 131, 12 p., map scale 1:24,000. This mapping was used with slight modification for the northern half of the quadrangle.

E. Kennedy, M.P., 2000, New 1:24,000-scale geologic mapping completed between July 1999, and June 2000.

F. Larsen, E.S. Jr., 1948, Batholith and associated rocks of Corona, Elsinore and San Luis Rey quadrangles, southern California: Geological Society of America Memoir 29, 182 p., scale 1:125,000. This mapping was useful in depicting regional contacts between major plutons but the very small scale does not allow direct use of these contacts at 1:24,000.



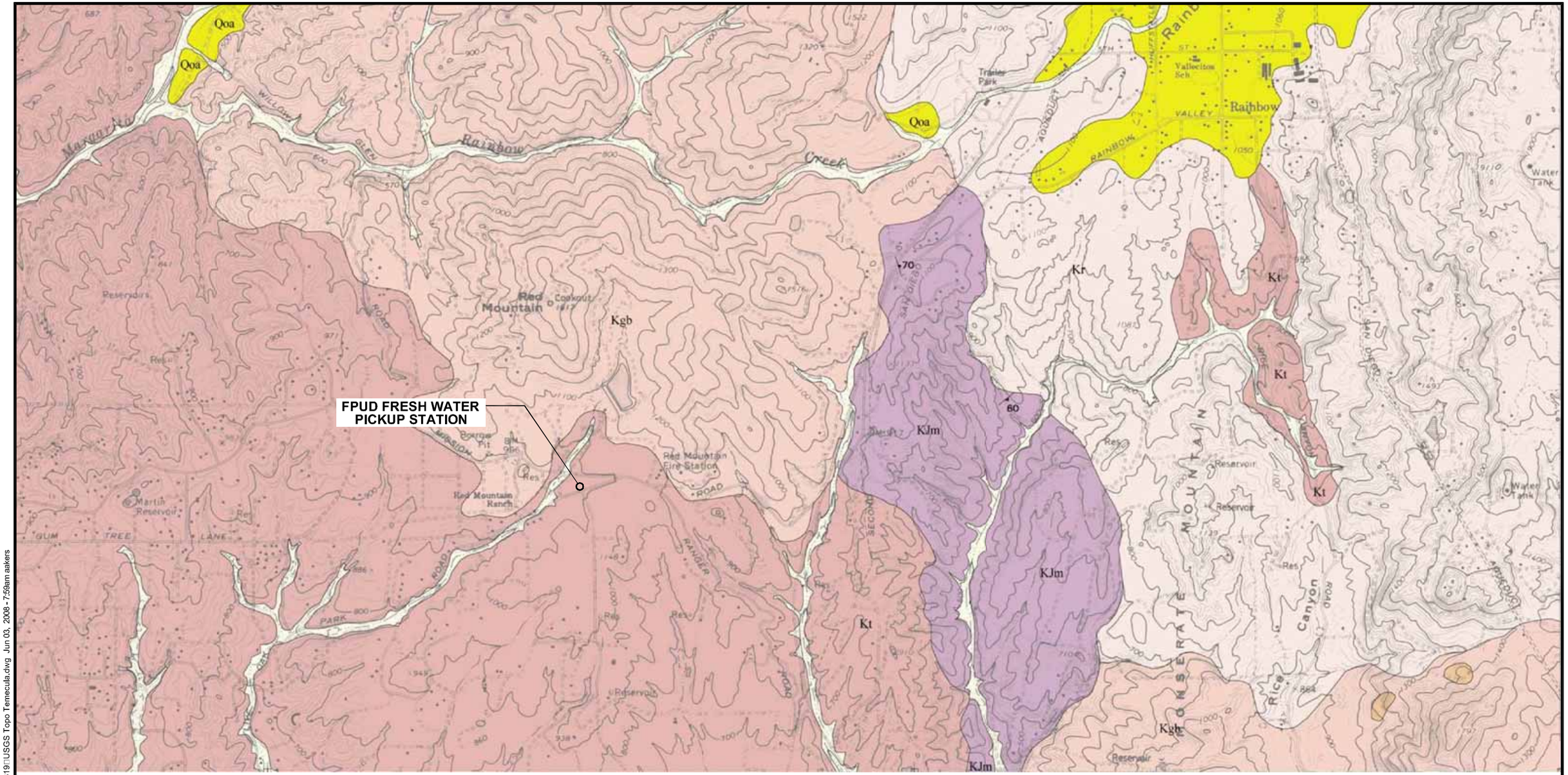
PROJECT: 125158

FACILITY:

ORANGE GROVE PROJECT
SAN DIEGO COUNTY, CALIFORNIA

GEOLOGIC MAP LEGEND
PECHANGA QUADRANGLE

FIGURE 6.3-B.2

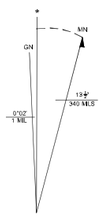


N

SOURCE:

United States Geological Survey
7.5 Minute Topographic Map:
Temecula Quadrangle

Polyconic projection, contour interval 20 feet, dotted lines 10 feet.



UTM GRID AND 1988 MAGNETIC NORTH DECLINATION AT CENTER OF STREET

This geologic map was funded in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program, STATEMAP Award no. 99HQAG0134.

0 1/4 1/2 3/4 1 MILE

SCALE 1:24,000

TRC

PROJECT: 125158

FACILITY:

ORANGE GROVE PROJECT
SAN DIEGO COUNTY, CALIFORNIA

GEOLOGIC MAP
TEMECULA QUADRANGLE

FIGURE 6.3-B.3

GEOLOGIC MAP OF THE TEMECULA 7.5' QUADRANGLE SAN DIEGO AND RIVERSIDE COUNTIES, CALIFORNIA: A DIGITAL DATABASE

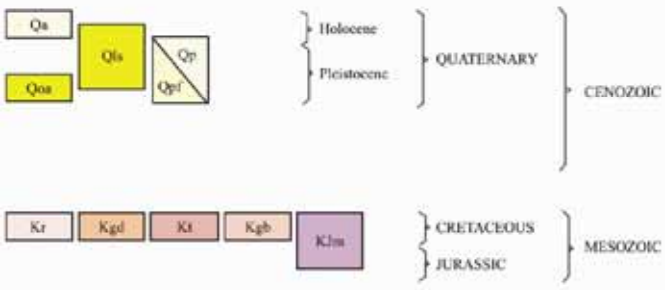
VERSION 1.0

By
Siang S. Tan[1] and Michael P. Kennedy[1]

Digital Database
by
Brad Nelson[2] and Gary Patt[2]
2000

1. California Division of Mines and Geology, Los Angeles, CA
2. U. S. Geological Survey, Riverside, CA

CORRELATION OF MAP UNITS



MAP SYMBOLS

Contact between map units; generally approximately located or inferred.

Faults, generally accurately located. Arrow and number indicate direction and angle of dip of fault plane.

Strike and dip of inclined sedimentary bed.

Strike and dip of metamorphic foliation.

Landslide; arrows indicate principal direction of movement.

EXPLANATION OF MAP UNITS

MODERN SURFICIAL DEPOSITS - Sediment that has been recently transported and deposited in channels and washes, on surfaces of alluvial fans and alluvial plains, and on hillslopes and in artificial fills. Soil-profile development is non-existant. Includes:

Qa — Active alluvial flood plain deposits (late Holocene) - Unconsolidated to locally poorly consolidated sand and gravel deposits in active alluvial flood plains.

Qls — Landslide deposits (Holocene to Pleistocene) - Landslide slump and rock fall deposits.

OLD SURFICIAL DEPOSITS - Sedimentary units that are moderately consolidated and slightly to moderately well dissected. Older surficial deposits have upper surfaces that are capped by moderately to well-developed pedogenic soils. Includes:

Qoa — Older alluvial flood plain deposits (Pleistocene, younger than 500,000 years) - Mostly moderately well consolidated, poorly sorted, permeable flood plain deposits.

Qp — Pauba Formation sandstone facies (Pleistocene) - Light-brown moderately well-indurated, extensively crossbedded, channeled and filled sandstone and siltstone that contains occasional intervening cobble-and-boulder conglomerate beds.

Qpf — Pauba Formation conglomerate facies (Pleistocene) - well-indurated poorly sorted sedimentary breccia and mudstone.

BEDROCK UNITS

Kr — Granodiorite of Rainbow (Cretaceous) - Leucocratic hornblende-biotite granodiorite; medium to coarse grained, massive.

Kgd — Granodiorite undivided (Cretaceous) - Mostly hornblende-biotite granodiorite; coarse to medium grained.

Kt — Tonalite undivided (Cretaceous) - Mostly hornblende-biotite tonalite; coarse grained, light gray.

Kgb — Gabbro undivided (Cretaceous) - Mostly biotite-hornblende-hyperthene gabbro; course grained, dark gray, massive.

KJm — Metavolcanic and metasedimentary rocks undivided (Cretaceous and Jurassic) - Low grade (greenschist facies) rocks that are in part coeval with and in part older than the Cretaceous plutonic rocks they lie in contact with.

REFERENCES

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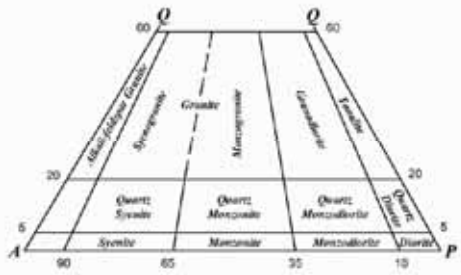
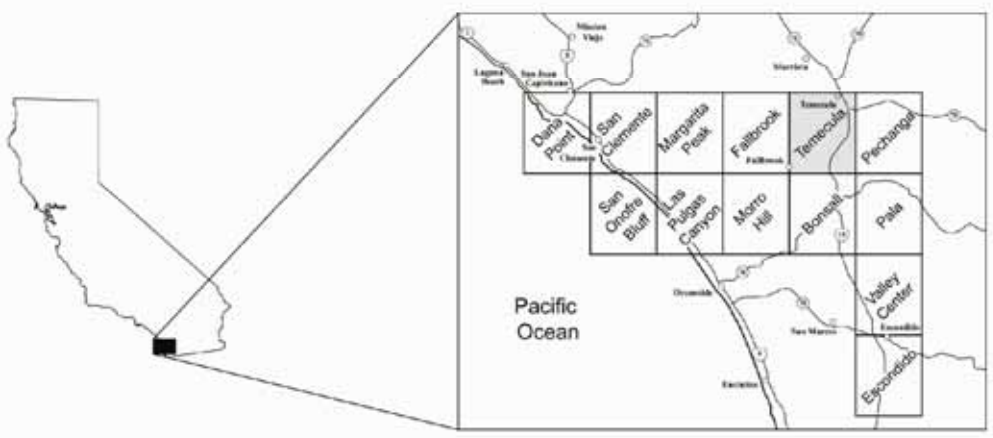
Larsen, E.S., Jr., 1948, Batholith and associated rocks of Corona, Elsinore and San Luis Rey Quadrangles, southern California: The Geological Society of America Memoir 29, Plate 1, scale 1:125,000.

Weber, H.F., Jr., 1963, Geology and mineral resources of San Diego County, California: California Division of Mines and Geology County Report 3, Plate 1, scale 1:120,000.



Classification of plutonic rock types (from IUGA, 1973, and *Streckeisen, 1973). A, alkali feldspar; P, plagioclase feldspar; Q, quartz.

*Streckeisen, A.L., 1973. Plutonic rocks--Classification and nomenclature by the IUGA Subcommission on Systematics of Igneous Rocks: Geotimes, vol.18, p.26-30.

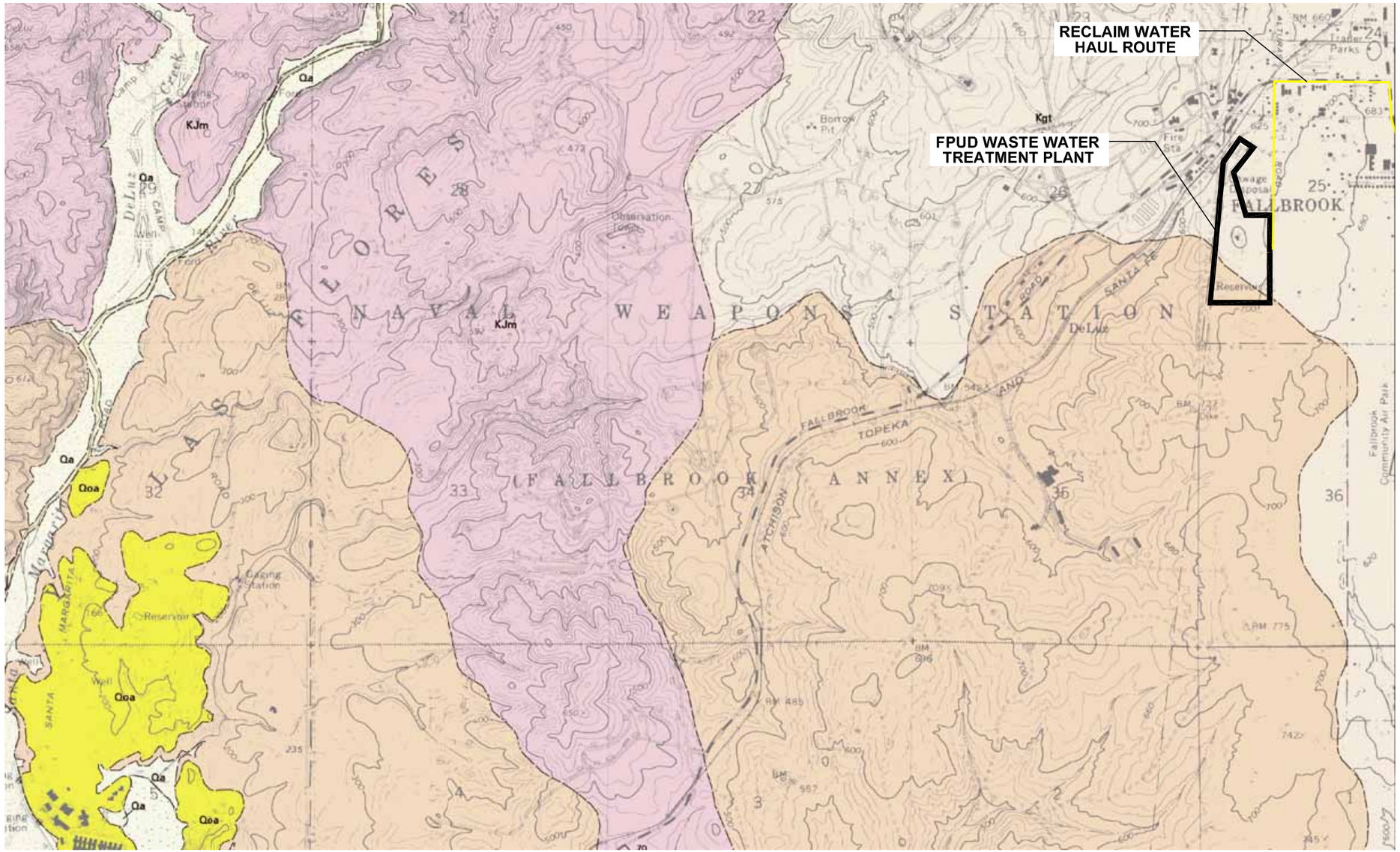


PROJECT: 125158

FACILITY: ORANGE GROVE PROJECT
SAN DIEGO COUNTY, CALIFORNIA

GEOLOGIC MAP LEGEND TEMECULA QUADRANGLE

FIGURE 6.3-B.4

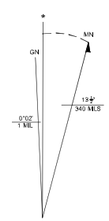


N

SOURCE:

United States Geological Survey
7.5 Minute Topographic Map:
Morro Hill Quadrangle

Polyconic projection, contour interval 20 feet, dotted lines 10 feet.



UTM GRID AND 1988 MAGNETIC NORTH
DECLINATION AT CENTER OF STREET

This geologic map was funded in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program, STATEMAP Award no. 99HQAG0134.

0 1/4 1/2 3/4 1 MILE

SCALE 1:24,000

TRC

PROJECT: 125158

FACILITY:

ORANGE GROVE PROJECT
SAN DIEGO COUNTY, CALIFORNIA

GEOLOGIC MAP
MORRO HILL QUADRANGLE

FIGURE 6.3-B.5

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GEOLOGIC MAP OF THE MORRO HILL 7.5' QUADRANGLE SAN DIEGO COUNTY, CALIFORNIA: A DIGITAL DATABASE

VERSION 1.0

By
Siang S. Tan[1]

Digital Database
by
Kelly Corriea[2]
2001

1. California Division of Mines and Geology, Los Angeles, CA
2. U. S. Geological Survey, Riverside, CA

DEPARTMENT OF CONSERVATION
Division of Mines and Geology

CORRELATION OF MAP UNITS

Qa, Qw, Ql, Qls, Qoa	Holocene	QUATERNARY	CENOZOIC
	Pleistocene		
Tv, Tsa, Tsi	Miocene	TERTIARY	
	Eocene		
	Paleocene		MESOZOIC
Kt, Kgt, Kgd, KJm		CRETACEOUS	
		JURASSIC	

MAP SYMBOLS

Contact between map units; generally approximately located.

Strike and dip of inclined sedimentary beds.

Strike and dip of foliation in metavolcanic and metasedimentary rocks.

Landslide - arrow(s) indicate principal direction of movement, outline includes headscarp of landslide. Querried where questionable.

DESCRIPTION OF MAP UNITS

MODERN SURFICIAL DEPOSITS - Sediment that has been recently transported and deposited in channels and washes, on surfaces of alluvial fans and alluvial plains, and on hillslopes. Soil-profile development is nonexistant. Includes:

Qw Active wash/stream deposits (late Holocene) - Along major drainage courses; unconsolidated gravelly sand with silt.

Ql Active lake/lacustrine deposits (late Holocene) - Unconsolidated sandy silt with clay and gravel.

Qa Active alluvial flood plain deposits (late Holocene) - Unconsolidated to locally poorly consolidated sand and gravel deposits in active alluvial flood plains.

Qls Landslide deposits (Holocene to Pleistocene) - Landslide slump and rock fall deposits.

OLD SURFICIAL DEPOSITS - Sedimentary units that are moderately consolidated and slightly to moderately dissected. Older surficial deposits have upper surfaces that are capped by moderately to well-developed pedogenic soils. Includes:

Qoa Older alluvial flood plain deposits (Pleistocene, younger than 500,000 years) - Mostly moderately well consolidated, poorly sorted, permeable flood plain deposits; sand, silt and clay.

BEDROCK UNITS

Tv Volcanic rocks undivided (Miocene) - Flows of dacitic composition.

Tsa Santiago Formation (Eocene) - Marine sandstone with siltstone interbeds.

Tsi Silverado Formation (Paleocene) - Sandstone and claystone.

Kt Trabuco Formation (Cretaceous) - Non-marine fanglomerate with unsorted subangular clasts.

Kgd Granodiorite undivided (Cretaceous) - Mostly hornblende-biotite granodiorite; coarse to medium grained.

Kgt Tonalite undivided (Cretaceous) - Mostly hornblende-biotite tonalite; coarse-grained, light gray.

KJm Metavolcanic and metasedimentary rocks undivided (Cretaceous and Jurassic) - Low grade (greenschist facies) rocks that are in part coeval with and in part older than the Cretaceous plutonic rocks they lie in contact with.

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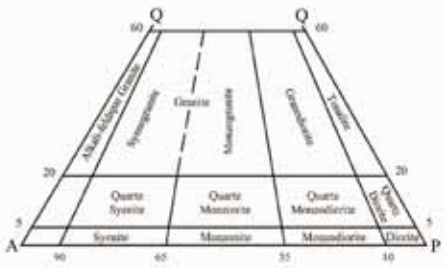
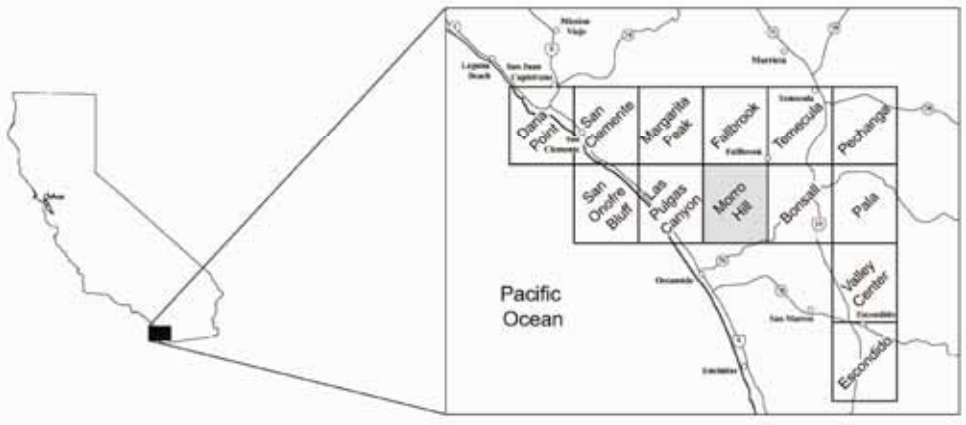
Weber, H.F., Jr., 1963, Geology and mineral resources of San Diego County, California: California Division of Mines and Geology County Report 3, Plate 1, scale 1:120,000.



Classification of plutonic rock types (from IUGA, 1973, and *Streckeisen, 1973). A, alkali feldspar; P, plagioclase feldspar; Q, quartz.

*Streckeisen, A.L., 1973, Plutonic rocks--Classification and nomenclature recommended by the IUGA Subcommission on Systematics of Igneous Rocks: Geotimes, vol.18, pp.26-30.



TRC

PROJECT: 125158

FACILITY:

ORANGE GROVE PROJECT
SAN DIEGO COUNTY, CALIFORNIA

GEOLOGIC MAP LEGEND
MORRO HILL QUADRANGLE

FIGURE 6.3-B.6