

deposits. Stabilized by vegetation and apparently no longer active, and locally incised by drainages floored with QHa. Only mapped along major drainages where geomorphic expression is clear on aerial photos, and along steep slopes of Vera Cruz and Church Mountains . Thickness: 0 to 8 (?) meters.

Qbt – Bajada and fan toe deposits (middle to upper Pleistocene) - Low gradient, coalesced fan deposits at the base of large alluvial fans shed from Vera Cruz and Church Mountains. Contacts identified on aerial photographs. Similar in composition to adjacent alluvial fans. Thickness: 0 to 10 (?) meters.

Qls – Landslide deposits (lower to middle Pleistocene (?)) - Intact, back-rotated toreva blocks and irregular slumps and rubble piles of Dakota Sandstone and Gallup Sandstone that have collapsed onto underlying Triassic and Cretaceous shales and mudstones. Thickness: 0 to 40 (?) meters.

Rio Bonito terrace deposits Qbt4 – Lowest terrace deposit of Rio Bonito (Holocene) – Poorly to well-sorted alluvial deposits composed of interstratified fine to coarse tan sand and sandy cobble to boulder gravel. Deposit is approximately at grade of the Rio Bonito and only present within small meander bends of the active stream channel. Mapped from aerial photographs. Thickness: 0 to 2 (?)

Qbt3 – Intermediate terrace deposit of Rio Bonito (Uppermost Pleistocene to Holocene) – Poorly to well-sorted alluvial deposits composed of interstratified fine to coarse tan sand and sandy cobble to boulder gravel. Deposit is similar to **Qbt4** in geomorphic appearance and vegetative cover but has a terrace tread above stream grade. Mapped from aerial photographs. Thickness: 0 to 3 (?) meters

Qbt2 – Intermediate terrace deposit of Rio Bonito (Upper Pleistocene) – Poorly to well-sorted alluvial deposits composed of interstratified fine to coarse tan sand and sandy cobble to boulder gravel. Deposit forms a terrace whose tread is generally preserved and is 3 – 4 meters above present stream grade. Mapped from aerial photographs. Thickness: 0 to 4 meters.

Cenozoic Igneous Rocks Tiu – undetermined igneous rocks, undivided (Oligocene) – comprises dikes identified on aerial photos, probably largely Tdd, the most common dike rock observed in the field.

Tdd - Diabase/diorite and associated rocks, undivided (Oligocene) - Aphanitic to very fine-grained phaneritic and phaneriticporphyritic mafic igneous rocks forming dikes, sills, and less commonly, irregular intrusive masses. Generally light to dark gray on fresh surfaces and brown to black on weathered surfaces. When phaneritic, often has a "salt and pepper" appearance due to fine-grained equigranular white feldspar and black to brown augite (?). Phenocrysts include augite, hornblende, and tabular intermediate (?) plagioclase. Tabular plagioclase phenocrysts are up to 4 cm in diameter and are usually aligned with the dike margins. Thickness: dikes are < 1 to 5 meters wide.

Tml – Monzonite/latite and associated rocks (Oligocene) – Tan to brown aphanitic to very fine-grained phaneritic igneous rocks forming dikes, sills and irregular intrusive masses. Typically composed of approximately equal amounts of white feldspar and tan to brown mafic minerals with little or no quartz. Feldspar is largely intermediate (?) plagioclase with lesser amounts of potassium feldspar and forms a felted network of interlocking crystals. Includes rocks ranging from syenite to diorite in composition. Thickness: dikes are < 1 to 5 meters wide; base and top of larger igneous masses are not exposed.

Tcd – Diorite of Champ Hill (Oligocene) - Dark gray to grayish-brown fine-grained phaneritic diorite with 10-35% phenocrysts of augite up to several centimeters across. Named for Champ Hill, a stock in the Angus quadrangle to the southwest. Rocks of similar appearance but varying phenocrysts percentage form dikes, sills, and irregular intrusive masses. Thickness: dikes are < 1 to 5 meters; base and top of larger igneous masses are not exposed.

Trt - Rhyolite/Trachyte and associated rocks (Oligocene) - White to pale orange, aphanitic and usually aphyric igneous rocks forming dikes, sills and irregular igneous masses, often associated with faults. Where present phenocrysts are limited to quartz, usually less than 10%. Liesegang bands, flow-banding, and vesicles are common. Thickness: dikes are < 1 to 5

meters; base and top of larger igneous masses are not exposed.

may be monolithologic or varied. Outcrops are massive to crudely bedded and individual flow units are generally 2 to 3 meters thick. Shallow intrusive sills are light to dark gray and aphanitic. Lahar deposits and volcaniclastic sedimentary rocks are red to purple muddy sandstones to conglomerates with variably developed bedding and sorting. Sandstones are well-bedded, often with fining-upward graded beds less than 0.5 cm thick. Natural exposures of all units are poor and individual units are not laterally traceable. Thickness: ~ 50 meters are exposed in the quadrangle.

**Cenozoic Sedimentary Rocks** Tcm - Cub Mountain Formation (Eocene) – White to tan sandstones, dark red sandy mudstones, and purplish-red silty mudstones. Sandstones are medium- to thick- bedded, cross-bedded, medium-grained, and arkosic to volcaniclastic. Pebble conglomerate lenses, mudballs, and ripup clasts of red mudstone, and olive, black, and gray siltstone and shale are locally common. Sandstones are more friable, and contain more varicolored lithic grains than than underlying sandstones of the Cretaceous Crevasse Canyon Formation. Sandy and silty mudstones are thick-bedded to massive and micaceous. Several

outcrops are volcaniclastic in nature, and the unit thus includes the Sanders Canyon Formation of Cather (1991), but the two formations are not mappable separately. Unit is ubiquitously intruded by igneous dikes, sills and irregular masses. Thickness: ~ 140 meters are exposed in the quadrangle. **Mesozoic Sedimentary Rocks** Kcc - Crevasse Canyon Formation (upper Cretaceous) - Interbedded olive drab to gray to buff medium- to fine-grained

generally friable sandstone, gray to black fissile carbonaceous shale, and coal. Unit is ubiquitously intruded by dikes, sills, and

irregular igneous masses. Thickness: ~ 250 meters based on cross-section A-A in the Capitan quadrangle'; this estimate is

Kgs – Gallup Sandstone (upper Cretaceous) – Pale lavender to pale gray to tan, medium- to very thick-bedded, trough crossbedded, clean quartz sandstone and minor chert and quartzite pebble conglomerate. Sandstones are noncalcareous and composed of moderately sorted subangular to subrounded quartz grains with 1-2% chert grains. Four major sandstone beds are present, separated by recessively weathering sandstones and minor shales that are poorly exposed. The unit forms

probably high to due to numerous dikes, sills, and unmapped faults.

prominent cliffs and ridges. Thickness: ~ 75 meters.

only appears as dark red soils and subcrop. Combined thickness: 23 to 48 meters.

Trsr - Santa Rosa Formation (upper Triassic) – Medium brown, yellowish-brown, and orange to tan sandstone, conglomerate, and conglomeratic sandstone. Sandstones are medium to fine-grained, broadly trough-cross-bedded and composed of rounded to subrounded quartz, black chert, and altered ferromagnesian minerals and/or lithic fragments. Base of the unit is often marked by a gray, orange, or red medium-to thick-bedded quartzite and chert pebble conglomerate with a matrix of coarse chert-rich sand. Conglomerate is frequently scoured into underlying Grayburg Formation. Thickness: 30 to 77 meters.

Paleozoic Sedimentary Rocks **Pg - Grayburg Formation (upper Permian)** – White, pale orange, and tan fine- to very fine-grained friable clean quartz sandstone and subordinate siltstone. Quartz grains are well-sorted and well-rounded. Limy sandstone and dolomite beds are

locally present at the at the top of the unit. Very poorly exposed and highly variable in thickness and extent due to deposition

brecciated, white to orange-brown, relatively soft rock. Associated iron mineralization forms irregular masses of magnetite.

in karst depressions on the San Andres Formation and truncation by the basal Triassic unconformity. Unit is the lower

Psa - San Andres Formation (middle to upper Permian) - Light to dark gray and bluish-gray thin- to very thick-bedded limestone and dolomite. Limestones and dolomites are carbonate mudstones, wackestones, and grainstones. Freshly broken surfaces are darker gray than weathered surfaces and are commonly fetid. Silty and sandy beds common. Top of formation is a paleokarst surface, with local silicified, angular breccia. Dark brown irregular chert nodules are sparse. Fossils are sparse and are dominantly crinoid stem fragments. Adjacent to the Capitan pluton the unit is metamorphosed into a sugary,

Pyu – Yeso Formation and older rocks, undivided - cross-section only

Thickness: 305 meters, based on mapping in the Ruidoso area to the south.

member of the Artesia Group. Thickness: 0 to 53 meters

compilation of published work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic basemap; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologists

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Cross-sections are constructed based upon the interpretations of the author made from geologic mapping and subsurface (drillhole) data. Cross-sections should be used as an aid to understanding the general geologic framework of the map area, and not be the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

Cather, S. M., 1991, Stratigraphy and provenance of Upper Cretaceous and Paleogene strata of the western Sierra Balca Basin, New Mexico, in Barker, J. M., Kues, B. S., Austin, G. S., and Lucas, S. G., eds., Geology of the Sierra Blanca, Sacramento, and Capitan Ranges: New Mexico Geological Society, Guidebook 42, p. 265-275. Thompson, T. B., 1972, Sierra Blanca Igneous Complex, New Mexico: Geological Society of America Bulletin, v. 83, p. 2341-2356.

U D dip-slip movement on concealed fault, U and D indicate upthrown and downthrown sides, respectively ————————fault, solid where exposed, dashed where intermittanly exposed, dotted where concealed

