

**Proterozoic Units East of the Squaw Peak Fault**

Xd	Diabase	Xqp	Quartzite-phyllite, undifferentiated
Xqs	Quartzite at Squaw Peak	Xqe	Cross-bedded quartzite
Xmr	Metarhyolite	Xrc	Crystal-rich metarhyolite
Xmrt	Metarhyolite tuff	Xrp	Crystal-poor metarhyolite
Xqm	Quartz-mica schist	Xra	Aphyric metarhyolite
Xs	Quartz-feldspar-biotite-hornblende schist	Xpv	Variable phyllite
Xad	Meta-andesite-diorite		

**Proterozoic Units at Shadow Mountain**

Xmgs	Metagraywacke	Xmsv	Metasedimentary and metavolcanic rocks, undifferentiated
Xrs	Metarhyolite	Xsq	Quartzite
Xvf	Metamorphosed volcanic fragmental		

**Symbols**

	Contact: dashed where approximately located		Bedding
	Fault, showing down-thrown side		Vertical bedding
	Fault, showing sense of displacement		Overtured bedding
	Thrust fault; teeth on upper block		Bedding, showing facing direction
	Marker unit or intra-unit contact		Cleavage
	Syncline		Vertical Cleavage
	Anticline		Cleavage parallel to bedding
	Overtured syncline		Quartz-kyanite locality
	Overtured anticline; approximate location		Line of cross section

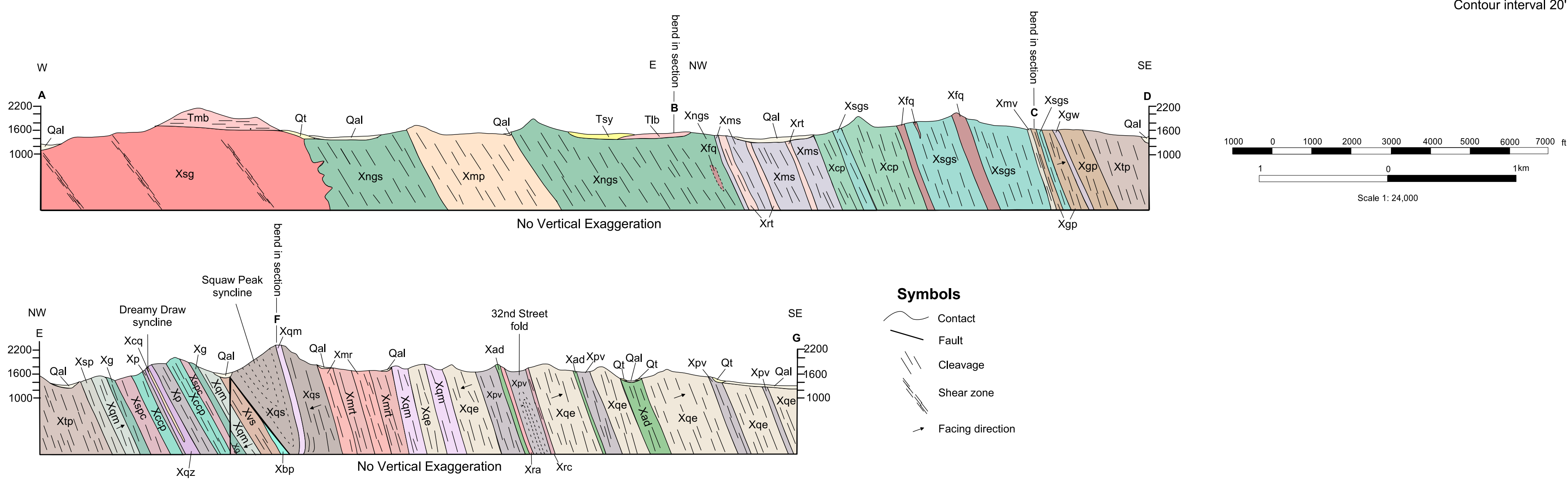
Geologic mapping by J.K. Johnson (1999-2002), S.J. Reynolds (1991-2002), and D.A. Jones (1995-1996). Some Quaternary contacts from Shank (1973). Base map from USGS Sunnyslope and Paradise Valley 7.5-minute quadrangles.

**Quaternary and Tertiary Units**

Qal	Alluvium	Tsl	Conglomerate at Lookout Mountain
Qt	Talus	Tmb	Moon Hill Basalt
Tsy	Conglomerate	Tlb	Lookout Mountain Basalt

**Proterozoic Units West of the Squaw Peak Fault**

Xsq	Shaw Butte Granodiorite	Xqw	Quartzite
Xcq	Conglomeratic quartzite	Xmv	Greenstone, gray phyllite, ferruginous quartzite, and metarhyolite, undifferentiated
Xqz	Quartzite and overlying greenschist	Xbp	Chlorite-feldspar-carbonate-biotite phyllite
Xp	Gray conglomeratic phyllite	Xsgs	Stoney Mountain Greenstone
Xccp	Carbonate-chlorite-feldspar-sericite phyllite	Xfq	Ferruginous quartzite
Xspc	Stretched-pebble conglomerate	Xcp	Chlorite-carbonate phyllite
Xg	Greenschist	Xmg	Metagraywacke
Xqm	Quartz metaconglomerate and greenschist	Xms	Metasiltstone
Xsp	Sericite phyllite	Xrt	Tuffaceous metarhyolite
Xvs	Variable schist	Xmp	Muscovite phyllite
Xtp	Tan phyllite	Xr	Metarhyolite at North Mountain
Xgp	Gray phyllite	Xngs	North Mountain Greenstone



# Geologic Map of the Phoenix Mountains, Central Arizona

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## Area Summaries

**Introduction:** The mapped area can be divided into 10 subareas (see Fig. 1 on accompanying sheet), based on physiography and geology. Each area is described briefly below, more or less from the northwest to the southeast.

**Moon Hill:** This small hill in the northwestern part of the range is composed entirely of flat-lying to gently northeast-tilted Tertiary basalt flows, flanked by talus.

**Lookout Mountain:** Lookout Mountain is the northernmost peak in the range. It consists of an older Tertiary basalt flow, successively overlain by Tertiary sediments and a younger Tertiary basalt flow and basalt breccia. The lower basalt has been estimated to be approximately 20 Ma (Leighty, 1997).

**Shaw Butte:** Shaw Butte, located in the northwestern end of the range, consists of Proterozoic granodiorite and tonalite (Shaw Butte Granodiorite) overlain by two basalt flows similar to those at Moon Hill. An older basalt has been dated at approximately 20 Ma, whereas the younger basalt caps the butte and is estimated to be 13 to 16 Ma (Leighty, 1997).

The east side of the Shaw Butte Granodiorite intrudes Proterozoic greenstone and has a complex suite of fine-grained to porphyritic granodiorite, interpreted to be a chilled border phase of the main pluton. If the pluton has been tilted along with the rest of the Proterozoic rocks in the range, then the fine-grained phase could represent the original top of the pluton. The granodiorite contains numerous shear zones and is locally well foliated.

**North Mountain and 7th Street Area:** Greenstone and felsic metavolcanics dominate North Mountain and the 7th Street area. The greenstones are intermediate to mafic in

composition and have both a finely crystalline and coarsely crystalline component, probably representing extrusive and intrusive protoliths. The coarser phase of the greenstone is to the west, in the lower, perhaps the originally deeper, parts of the sequence. At North Mountain, the cleavage bends from vertical at the base of the hill to moderately west-dipping at the crest. A belt of metamorphosed rhyolite tuff and felsic volcaniclastic rocks trends northward along both sides of 7th Street.

**Thunderbird Hills:** The low-relief hills near Thunderbird Road and 7th Street are composed of Tertiary sediments that unconformably overlie greenstone on the west and Tertiary basalt on the east. The sediments are weakly consolidated and contain clasts of basalt, crystalline rock, greenstone, fine-grained quartzite, ferruginous quartzite, and metarhyolite. Southeast of these Tertiary sediments is ferruginous quartzite overlain by a sequence of very fine-grained metasiltstone and metarhyolite.

**Shadow Mountain:** Rocks at Shadow Mountain cannot be correlated with rock units in the rest of the range. Most of Shadow Mountain is a sequence of metamorphosed volcanic, volcaniclastic, and sedimentary rocks interbedded with metamorphosed flow-banded rhyolite and tuff. Exposed at the tip of the northwest ridge is an unusual massive quartzite containing quartz-kyanite-andalusite rock.

**Stoney Mountain:** Stoney Mountain is mostly composed of an intermediate-composition greenstone intermixed with abundant ferruginous quartzite, graywacke, phyllite, and a few tuffaceous units, all of which contain carbonate in varying amounts. The greenstone varies from fine to medium grained, with the finer parts originally being intermediate to mafic

volcanics and the coarser parts probably being gabbroic to dioritic intrusions. The ferruginous quartzite has abundant chert clasts and numerous small, but well-developed, steeply plunging folds, especially in the southern Stoney Mountain area.

**Dreamy Draw Area:** The Dreamy Draw area straddles the Squaw Peak Parkway. It is composed mostly of gray and tan phyllite, but also includes a lens of orthoquartzite. This area represents the transition from a more oceanic setting down section to a more continental setting up section, as greenstones and ferruginous quartzite pass upward into continental quartzite. The section is repeated by the steep-plunging Dreamy Draw syncline.

**Squaw Peak:** Squaw Peak is the highest peak in the range, with an elevation of 782 m (2608 ft.). West of Squaw Peak is a northeast-trending reverse fault or shear zone, the Squaw Peak structure, across which units cannot be correlated. To the north and northwest are greenstone, greenschist, phyllite, and conglomeratic quartzite, whereas east of the structure are more continental units, including cross-bedded quartzite, metarhyolite, and metamorphosed tuff breccia. The large, northeast-plunging Squaw Peak syncline folds the quartzite and metarhyolite east of the structure near Squaw Peak.

**Quartzite Ridge:** Quartzite Ridge extends east of Squaw Peak to Tatum Boulevard. The most prevalent rock types are cross-bedded quartzite, phyllite, foliated and nonfoliated greenstone, and discontinuous metarhyolite, which are repeated by several large- and small-scale folds. The largest fold is a nearly isoclinal fold, probably a north-plunging anticline near 32nd Street, that separates opposite-facing sequences of quartzite, phyllite, and discontinuous metarhyolites.