

AGUA FRIA AT GRAND AVENUE FCD GAGE ID# 14707 (5503)

STATION DESCRIPTION

LOCATION – The gage is located on the US 60 highway bridge crossing of the Agua Fria River near Sun City. The gage is located near the middle of the channel on the second pier from the right bank. The gage housing is located on the right bank of the channel between the highway and railroad bridges. Latitude N33° 36' 24"; Longitude W112° 18' 14". Located in the NW1/4 NW1/4 S18 T3N R1E in the El Mirage 7.5-minute quadrangle.

ESTABLISHMENT – The District established the ALERT gage on April 27, 1994. The USGS had maintained gages at the location for many years prior. The USGS established crest gages on December 5, 1962 and a water-stage recorder on October 1, 1980. The gage was removed for bridge construction from September 16, 1992 to November 10, 1993.

DRAINAGE AREA – 1,615 mi², of which 1,459 mi² is controlled by New Waddell Dam, and 247 mi² is controlled by McMicken Dam.

GAGE – A pressure transducer type instrument is installed at this site. Elevation of the transducer is 2.50 feet, levels of March 17, 2016.

There is one metal staff gage on the pier with the pressure transducer. This staff gage defines gage height, and therefore reads directly in gage height, levels of March 17, 2016.

A painted staff gage is located on the second railroad pier from the left bank, and is viewable from the east (left) bank. To convert painted staff gage readings into FCD gage height, add 1.50 feet, levels of March 17, 2016.

One crest stage gage is located at the gage site. The crest stage gage is located on the same pier as the transducer. The pin elevation is 3.27 feet gage height, levels of March 17, 2016.

ZERO GAGE HEIGHT - Zero is based on the zero of the old 0.02-foot USGS staff gages installed near the old orifice. Elevation is 1,104.711 feet NAVD88.

HISTORY – The USGS established crest gages in December 1962. The USGS established continuous data collection in October 1980. The District piggybacked to the USGS system beginning in April 1994. Gage datum was lowered 2.00 feet on November 19, 1993. The USGS ceased involvement with this gage on September 30, 1998. Survey of all gages and one USGS reference point on February 11, 2002 confirmed that the lower orifice elevation is at 1.84 feet gage height. Previously, in the NovaStar database, the

base value was at 1.80 feet. A correction was made to the most recent calibration in the database, (Sept. 1998.) Nitrogen / non-submersible transducer setup was replaced with a submersible transducer on August 21, 2006. Higher crest gage was found missing during the 2010 station visit. PT moved sometime around October 2012.

REFERENCE MARKS –

BM-50147 is an FCDMC brass cap located about 10 feet north of the station house on top of the right bank of the riverbed. It is at elevation 19.952 feet gage height and 1,124.663 feet NAVD88, levels of March 17, 2016.

BM-AFGRND is an FCD brass cap that was found rolled down the right bank and it is considered destroyed.

RM-5 – was established on September 15, 1992. It is the top of a 1/2-inch bolt anchored in the center of the downstream end of the tallest railroad pier, second pier from the left bank, about 5 feet above ground level. Elevation 8.716 feet gage height and 1,113.427 feet NAVD88, levels of March 17, 2016.

RM-6 – was established on November 19, 1993. It is the top of a nut on a 3/8-inch bolt anchored in the upstream end of the orifice pier (2nd pier from the right bank) about 3 feet above ground level. Elevation 6.170 feet gage height and 1,110.881 feet NAVD88, levels of March 17, 2016.

RM-7 – was established November 19, 1993. as the USGS gaging station brass cap mounted on the upstream side of the right bank highway bridge abutment in the horizontal surface of the enclosed area beneath the road surface, 11 feet streamward from the gage house near the orifice pipe. Elevation is 18.061 feet gage height and 1,122.772 feet NAVD88, levels of March 17, 2016.

CHANNEL AND CONTROL – Channel is straight for 800 feet upstream and 1200 feet downstream from the gage. Right bank upstream and downstream is edge of old landfill with shaped side slopes utilizing channel sand and gravel. Left bank upstream is a gradual slope from the old hauling roads for sand and gravel operations further upstream. The left bank upstream is nearly vertical and composed of a cemented conglomerate. The left bank downstream consists of old river sand, gravel, and boulders with some shaping by mechanical means. Vegetation is sparse on both banks. The streambed is composed of sand, gravel, cobbles, and some large boulders downstream of the bridge. There is a drainage ditch on the left bank just upstream of the railroad bridge that carries runoff from the community of Sun City. This runoff creates low flows in the low water channel near the orifice when no flow is coming down the main channel upstream.

The channel is the control for medium and high flows. The low water control is a cobble riffle about 100 feet downstream from the gage orifice. The section under the bridge is approximately 600 feet from left to right bank.

RATING – The current rating is rating #3. It was developed from a survey of numerous cross sections downstream from the Grand Avenue bridge. The survey data were used in an HEC-RAS model to develop a stage – discharge relationship. The new rating is valid for WY 2020 and forward. Previously, the final USGS rating was used since 1995.

DISCHARGE MEASUREMENTS – Low flow measurements could be made by wading near the gage. Higher flows may be impossible due to bridge and sidewalk configuration on the bridge. A suitable indirect reach is available upstream from the gage. However, access to the property is subject to the sand and gravel operator and property owner.

POINT OF ZERO FLOW – The PZF is approximately 1.5 feet gage height, levels of March 17, 2016.

FLOODS – A flood of 5,952 cfs and 6.5 ft gage height occurred on October 27, 2000. Before the ALERT station was established an event of approximately 58,400 cfs occurred on December 19, 1978.

REGULATION – New Waddell Dam regulates flows approximately 15 miles upstream. Trilby Wash, as regulated by McMicken Dam also contributes water to the Agua Fria River north of Bell Road.

DIVERSIONS – New Waddell Dam accepts and diverts water in the Central Arizona Project canal and the Beardsley Canal.

ACCURACY – Fair

JUSTIFICATION – Monitor flows in the Agua Fria River for record and for unbridged road crossing at Lower Buckeye Road, and as an early warning for the Camelback Ranch levees.

UPDATE - January 29, 2024
E.S. Thomas

