



Annual Surveillance Report January 2025 to December 2025 for Sand Canyon Dam

DSOD Dam No. 1029-002

Irvine, California



Submitted to:
Irvine Ranch Water District
Dams & Storage
15600 Sand Canyon Avenue
Irvine, CA 92618



Prepared by:
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May 1, 2026
GEI Project No. 2305575

Consulting May 1, 2026
Engineers and GEI Project No. 2305575
Scientists

Mr. Jacob Moeder,
Engineering Manager – Dams & Storage
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

**Re: Sand Canyon Dam, DSOD Dam No. 1029-002,
Annual Surveillance Report from January 2025 to December 2025**

Dear Mr. Moeder:

GEI Consultants, Inc. (GEI) is pleased to submit this Annual Surveillance Report for Sand Canyon Dam covering January 2025 to December 2025. This report is part of the scope of work described under our Professional Service Agreement between Irvine Ranch Water District (District) and GEI Consultants Inc. (GEI) dated October 25, 2023.

We appreciate this opportunity to provide the District with our services. Please contact Nichole Tollefson at ntollefson@geiconsultants.com or Rich Sanchez at rsanchez@geiconsultants.com with any questions.

Sincerely,

GEI CONSULTANTS, INC.



Richard Sanchez, P.E.
Principal Engineer



Nichole Tollefson, P.M.P.
Senior Engineer

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Acronyms and Abbreviations

AC	asphalt concrete
AF	acre-feet
CCTV	closed-circuit television
CML&C	cement-mortar-lined and coated
CMP	corrugated Metal Pipe
District	Irvine Ranch Water District
DSOD	State of California, Department of Water Resources, Division of Safety of Dams
D/S	Downstream
El, EL, Elev	elevation
ft	feet
GEI	GEI Consultants, Inc.
gpm	gallons per minute
gal/min	gallons per minute
H:V	Horizontal to Vertical
ID	identification
in.	inches
liter/min	liters per min
mm	Millimeter
MW	monitoring well
NAVD 88	North American Vertical Datum of 1988
NGVD 29	National Geodetic Vertical Datum of 1929
No.	number
NOAA	National Oceanic and Atmospheric Administration
P.E.	Professional Engineer
P or Piez	piezometer
RCP	reinforced concrete pipe
RIDM	Risk Informed Decision Making

Res.	Reservoir
U/S	Upstream
VW, VWP, VB	vibrating wire piezometer
W.S.	water surface
YR	year

1.0 Introduction and Background

1.1 General

This report presents the results of the dam safety monitoring and surveillance for Sand Canyon Dam conducted by the Irvine Ranch Water District (District) and GEI Consultants, Inc. (GEI) covering the period between January 2025 through December 2025. It includes a review of previous surveillance reports, a compilation of field measurements, maintenance reports, observations, and conclusions related to the general condition and safety of the dam. In addition, recommendations are provided for continued operation, surveillance, and monitoring of the dam. This report is submitted as part of the jurisdictional requirements of the State of California, Department of Water Resources, Division of Safety of Dams (DSOD).

Table 5 provides details of piezometer water levels, reservoir water surface elevations, and seepage flow rates covered from 2007 to 2025 with representative plots in Figures 4 through 15. Tables 6 through 9 provide annual and cumulative horizontal movement, annual elevations, and cumulative vertical movement of survey monuments at Sand Canyon Dam. Annual (short term) and cumulative (long term) representations of the data help to identify any adverse trends or significant deviations in the data. Survey data tables and figures are presented to show the results of horizontal and vertical movement surveys from 1995 through 2025. Survey data tables also include limited data for years between 1968 and 1995. No surveys were conducted in calendar years 2017 and 2021. A survey was performed in October 2025 and is included in this report.

The vertical datum indicated on the as-built plans and project documents for Sand Canyon Dam is National Geodetic Vertical Datum of 1929 (NGVD 29). The reservoir water surface elevation, piezometer instrumentation data and vertical survey data are currently based on NGVD 29.

In July 2023, IRWD developed a Dam Safety Program (IRWD, 2023) that includes principles and guidelines for Risk Informed Decision Making (RIDM) for its portfolio of dams. This report has been updated to follow the guidelines in the Dam Safety Program.

1.2 Dam and Reservoir

Sand Canyon Dam is a 59-foot-high compacted embankment dam located on Sand Canyon Wash in Irvine, California. The dam was completed in 1943. The District took over operation of Sand Canyon Dam and Reservoir in 1967 from The Irvine Company.

The dam crest is at Elevation 202 feet (ft) (NGVD 29). There is a one-foot-high concrete parapet wall (Top of Wall at Elevation 203 ft) along the upstream edge of the crest of the dam (Figures 1 through 3). The watershed drainage area is 6.8 square miles, and the spillway crest is at Elevation 193.5 ft, providing 9.5 ft of freeboard. The reservoir area is 51

acres and the original construction reservoir capacity at the spillway crest elevation is 960 acre-feet. The maximum capacity has been reduced from 960 acre-feet to 740 acre-feet due to sedimentation in the reservoir (Draft Data Summary Report, Sand Canyon Dam, HDR 2021). The dam is 861 ft long with a 10-foot-wide crest. The crest is paved with Asphalt Concrete (AC).

The upstream face of the dam is lined with 3-inch-thick AC extending approximately 19 feet down from the crest of the dam and has a slope of approximately 2.5H:1V (Horizontal:Vertical). The downstream face of the dam is covered with grass and has a slope of approximately 2H:1V.

The dam is a zoned embankment with an upstream shell zone consisting of "selected impervious" material, a central core zone of "random" material, and a downstream shell zone of "unselected pervious" material. During construction of the dam, test results indicated that the embankment is homogeneous and consists, for the most part, of medium dense sandy clay and clayey sand (DSOD, 1984). The dam was founded on alluvium across the native broad stream channel, and on sandstone of the Santiago Formation at the abutments. A cutoff trench was constructed under portions of the upstream and central zones of embankment material (see Figure 2). The trench typically penetrates 2 to 4 ft into the sandstone bedrock but does not extend across the full width of the broad alluvial channel.

1.3 Spillway

The spillway is located about 250 ft to the East of the right abutment. The right abutment is a rock knob that separates the dam and the spillway. The spillway consists of an approach section, an ungated concrete ogee weir, and a rectangular channel. The channel has 18-foot-high reinforced concrete retaining walls on both sides. The bottom of the channel is mostly unlined and consists of sandstone bedrock with filled-in areas of dental concrete. The channel conveys the water to an energy-dissipating reinforced concrete structure that outlets to Sand Canyon Wash. The spillway crest is at Elevation 193.5 ft, which provides 9.5 ft of freeboard.

1.4 Outlet Works

The outlet works consist of a 36-inch-diameter corrugated metal pipe (CMP) with pipe water flow controlled by four upstream and three downstream gates. The upstream controls consist of three 24-inch-diameter inlet slide gates at Elevations 169.9, 177.1, and 185.0 ft, and one 20-inch-diameter main gate located near the upstream toe. The inlet gates are manually operated from the hand wheel controls located at the upstream edge of the crest of the dam.

The 36-inch CMP connects to a 20-inch steel outlet pipe under the dam, 260 ft in length, and transitions to a 24-inch-diameter distribution line near the downstream toe of the dam. The

24-inch-diameter distribution line splits into a 24-inch-diameter and 20-inch-diameter emergency outlet pipe, and a 12-inch-diameter main outlet pipe. At approximately 330 ft downstream of the toe of the dam, there are three emergency valves that control flow into Sand Canyon Wash (Figure 1). IRWD updated their non-potable system details during the 2024 review period and provided updated pipe layouts and valve sizes related to outlet flow from the dam. The updated details are provided in the appendix and have been incorporated in Figure 1. Based on the updated details, the emergency valve sizes are 24-inch-diameter (Valves 7 and 19) and 20-inch-diameter (Valve 20). Water is released through a 24-inch-diameter outfall located in the creek. A vault box was installed in 2023 near the emergency valves, and new concrete pads were installed for the valves in 2025.

The District provided a Dam Outlet Valve Exercising Log which states that: the 24-inch upstream control valves (gate valves #1, #2 and #3) were exercised on April 16, 2025 and on May 7, 2025 during the DSOD inspection; the two 24-inch and one 20-inch blow off valves were exercised on January 20, 2025; and the 24-inch emergency valve was exercised in January 2025. The 24-inch main valve was not exercised in 2025. Gate valve #2 was repaired in March 2025 after damage was noted during exercising in 2023. The valve exercise table is provided in the Appendix of this report.

1.5 Subdrains

There was no internal drainage system installed within the embankment during the construction of the dam. However, two seepage subdrains referred to as the Left Subdrain and Right Subdrain, were installed at the downstream toe near the left groin (Figure 1). The Left Subdrain consists of a 6-inch pipe with two 4-inch branches, while the Right Subdrain is a 6-inch pipe extending approximately 100 ft parallel to the toe (DSOD, 1984). The two subdrains discharge into a Drain Junction Vault located at the downstream toe of the dam near the left abutment. The flow from the two subdrains is measured at a small Drain Junction Vault by the District staff monthly.

As part of the District's 2-year maintenance program, a condition assessment of the Left, Right, and Vault subdrains was performed by V&A Consulting Engineers, Inc. (V&A) on June 4, 2024. The two subdrain pipes are made of PVC material. A push camera with a maximum length of 200 ft was advanced through the subdrains to record CCTV (closed-circuit television) footage. V&A encountered a root ball in the Left subdrain at approximately 83 ft. V&A encountered debris and three bends in the Right pipe. The push camera was not able to travel further than 59 ft due to a 90-degree bend. V&A also reported that the Right Subdrain pipe changed from PVC to metal at 56 ft and noticed perforation holes in the pipe at 59 feet. V&A reported that the Vault subdrain had rocks accumulating on the bottom of the pipe at approximately 53 feet. V&A concluded their assessment by saying the subdrains are in good condition. V&A recommended using a Vactor truck to remove any debris and root balls and to continue performing CCTV inspections every 2

years to maintain the integrity of the subdrain system. The next scheduled inspection is in 2026. A copy of the subdrain condition assessment report is provided in the appendix of this report.

2.0 Instrumentation Measurements

2.1 General

Instrumentation at Sand Canyon Dam includes 18 piezometers, two seepage subdrains, and six survey monuments. District staff measure the water levels in the reservoir, levels in the piezometers, and measure the seepage flow rates monthly and immediately following significant seismic events. The survey monuments are surveyed annually by a licensed surveyor under contract with the District. Precipitation is measured on-site. A crack gauge is also located along a joint on wall panels R1/R2 on the right side of the spillway chute.

A Site and Instrumentation Plan showing the layout of the dam and appurtenances, as well as the locations of the piezometers, seepage collection subdrains, and survey monuments is included in Figure 1. The left and right designations are viewed looking downstream.

IRWD contracted Genterra Consultants to establish thresholds and action levels for piezometer readings, seepage flows, and movement monitoring (Genterra, 2023). These thresholds and action levels are based on a review of historical performance data and previous reports, and a statistical analysis of piezometer readings in relation to reservoir water levels. Genterra developed four alarm levels based on an expected instrument reading range per instrument set by an upper and lower band for each alarm level. If an instrument reading falls outside its expected range, it moves into the next alarm level. Alarm Levels are designated as Alarm Level I (Green Alarm), II (Yellow Alarm), III (Orange Alarm), and IV (Red Alarm). The lower and upper bands for each alarm level and the required response for each alarm level are shown in Table 2 of Guideline No. 4 (Seepage & Piezometer Monitoring) and Table 2 of Guideline No. 6 (Movement Monitoring) in IRWD's Dam Safety Program (IRWD, 2023). The piezometers, seepages, and movement surveys were assessed using these alarm levels. Tables 1 through 4 summarize the readings for the 2025 review period.

Currently IRWD has contract GHD (previously Genterra Consultants) to update the thresholds and action levels based on historical data. This will be updated in the 2027 Dam Safety Program. Additionally, IRWD has contracted GEI to replace all existing vibrating wire piezometers, install vibrating wire piezometers in all open wells, install a new reservoir gauge, and to fully automate the system for remote reading of the piezometers and reservoir levels. The project is anticipated to begin construction in Fall 2026. As part of the project, all piezometers will be cleaned prior to installation of the vibrating wire piezometers. IRWD will coordinate with the instrumentation replacement project with DSOD.

Throughout this report, instrumentation measurements and readings remained within historical limits and followed historical trends will be classified as normal. Historical limit is

classified as the range between maximum and minimum water levels within the past ten years.

Based on the ten-year historical data from January 2015 through December 2025, the reservoir water surface elevation varied from a minimum Elevation of 163.6 ft to a maximum Elevation of 194.1 ft. During the 2025 review period, the reservoir water surface elevation varied from a minimum Elevation of 173.2 ft to a maximum Elevation of 186.1 ft, see Table 5. The reservoir water surface elevations during the 2025 review period remained within historical limits and considered normal. Rainfall data is included in Table 5 and Figures 4 through 15.th

2.2 Piezometers

Originally, the dam had 18 open-well piezometers. An open-well piezometer is a small-diameter well, used mainly to measure the pressure or depth to water. It is typically installed as a casing in a vertical borehole and has a discrete perforated zone near its bottom to enable monitoring of water levels within that zone. More than one piezometer can be installed within a single, larger-diameter outer well casing. These groups of piezometers are often referred to as multi-stage or nested piezometers. Piezometers 1 through 8 remain as open-well piezometers with A and B designations for nested piezometers (1A & 1B, 2A & 2B, and 8A & 8B). Both A & B are placed in the same hole but at different elevations.

In 2015, the District converted Piezometers 9 through 13 to vibrating wire piezometers (VWP). VWPs contain a high tensile steel wire attached at one end to a diaphragm. The frequency of vibration in the wire induces an alternating electrical current in a coil. The magnitude of the current is detected, and the reading is then converted to a pressure. The pressure fluctuates with changes in water levels in the immediate vicinity of the piezometer tip. All the VWPs were recording erroneous digital readings from February 2019 until December 2020 (Table 5). The erroneous readings are marked in red as shown in Table 5. The District reported they were having problems with the digital data logger. The District was able to fix the data logger unit with the help of the manufacturer (Geokon) and started providing readings in 2021. The readings appear to follow the historical trends seen before the data logger malfunction. The VWPs at the dam are designated with a V to identify them as such and with an A or B for nested piezometers (VBW9A & 9B and VBW/10A & 10B). Again, both A and B are placed in the same hole.

In October 2024, the District contracted Confluence Environmental to clean out the piezometers at the site. The District noted that since then, VBW12 has been providing erroneous data which they confirmed with a manual reading. The District has continued to read VBW12 manually for the 2025 review period.

The location of each piezometer is shown on Figure 1. Thirteen of the 18 piezometers are located either at or near the maximum section of the dam. Three of the remaining five piezometers are in the right portion of the dam and two are in the left portion.

Table 5 lists the reservoir water surface elevations and piezometer water levels from January 2007 through December 2025. Figures 4 through 8 are 2-year graphical plots (January 2024 through December 2025) of the piezometer data and reservoir water levels. Figures 9 through 13 are historical 10-year graphical plots (since 2015) of the piezometer data and reservoir water levels.

The following is a discussion of the piezometers including the water level measurements during the 2025 review period as well as comparisons with historical trends. As noted above, the vibrating wire piezometers were producing erroneous digital readings from February 2019 to December 2020 (Figures 10, 11, and 13). The District provided readings for the vibrating wire piezometers for the 2025 review period, and they follow historical trends.

Table 1 provides a summary of the piezometer level evaluations during the review period. Readings with isolated spikes or drops were not considered reliable and were not included in the maximum and minimum water level range.

Table 1. Piezometers – Maximum and Minimum Water Level Ranges

Piezometer	Tip Elevation (ft)	2015-2025 10-Year Range (ft)	2025 Range (ft)	2025 Maximum Alarm Level	Comment
P-1A	159.3	159.0 – 160.5	159.4 – 159.7	Level I	
P-1B	132.9	140.4 – 149.1	141.6 – 144.7	Level I	
P-2A	153.9	165.1 – 176.1	175.5 – 175.7	Level IV	Slight increasing trend since January 2023. Slow response to lowering of reservoir level. Continue to monitor changes. Perform Alarm Level IV response per Table 2 of Dam Safety Program Guideline No. 4 (Seepage & Piezometer Monitoring).
P-2B	123.8	137.3 – 143.6	138.4 – 140.8	Level I	
P-3	155.8	159.8 – 182.0	167.1 – 177.4	Level I	
P-4	129.1	136.2 – 150.7	136.9 – 139.6	Level I	
P-5	129.6	139.8 – 146.5	140.0 – 142.2	Level I	
P-6	127.7	140.1 – 147.8	141.0 – 143.9	Level IV	Has historically been at Alarm Level IV. Slight response to reservoir levels. Continue to monitor changes. Perform Alarm Level IV response per Table 2 of Dam Safety Program Guideline No. 4 (Seepage & Piezometer Monitoring).
P-7	152.7	154.7 – 166.9	161.6 – 165.0	Level I	
P-8A	164.3	162.4 – 173.8	166.2 – 168.2	Level I	
P-8B	144.5	152.5 – 164.5	155.8 – 159.7	Level I	
VBW9A	160.4	160.1 – 168.0	160.4 – 161.0	Level I	
VBW9B	151.7	154.2 – 159.1	154.6 – 155.4	Level I	
VBW/10A	148.0	157.6 – 164.3	159.1 – 160.5	Level I	
VBW/10B	136.1	136.1 – 143.2	136.1 – 138.2	Level I	
VBW/11	155.4	155.4 – 156.9	155.5 – 156.2	Level I	
VBW/12	151.5	151.0 – 156.7	151.7 – 153.5	Level I	
VBW/13	150.6	150.1 – 155.9	150.6 – 152.4	Level I	

Piezometers P-1A and P-1B are located on the crest of the dam, while Piezometer P-6 is near the downstream toe. The tip of Piezometer P- 1A (Elevation 159.3 ft) is located within the

embankment, while Piezometers P-1B and P-6 have tips within the foundation alluvium (Elevations 132.9 ft and 127.7 ft, respectively). Piezometer P-1A had minor changes during 2025 (Figure 4) and has historically shown slight to no response to the reservoir water level changes (Figure 9). Piezometers P-1B and P-6 tracked the reservoir level indicating groundwater levels within the alluvium foundation are responsive to reservoir water levels changes. The District stated to GEI that prior to the October 2024 cleaning they had been having issues with obtaining readings from piezometer P-1B due to debris build up within the standpipe. Currently, readings within piezometer P-1B have remained within historical levels and respond well to changes in reservoir levels. Based on the Alarm Levels developed, piezometer P-6 has historically been at Alarm Level IV and continues to follow historical trends. Although P-6 water levels have been within the 10-year historical range, IRWD should consider re-evaluating the alarm level thresholds for piezometer P-6 since it has been in alarm Level IV for the past two years.

Piezometers P-2A and P-2B are located on the crest of the dam. Both piezometers are near the maximum section A-A' (Figure 1) of the dam. The tip of P-2A is located within the dam embankment at Elevation 153.9 ft, and the tip of P-2B is within the foundation alluvium at Elevation 123.8. On July 7, 2023, the District informed GEI that piezometer P-2A was blocked with a stone. Despite cleaning efforts, the District has not been able to clear the blockage and was confirmed to still be blocked during the June 2025 GEI inspection. Piezometer P-2B tracked the reservoir levels slightly during the 2025 review period and remained within historical levels, see Figures 5 and 10.

Piezometers VBW/10A and VBW/10B are located at the downstream face of the dam near maximum section A-A' (Figure 1) of the dam. The tip of VBW/10A is located within the dam embankment at Elevation 148 ft, and the tip of VBW/10B is located within the foundation alluvium at Elevation 136.1 ft. The water level observed in VBW/10A reacts to the changes in reservoir level and increased rainfall. During the 2025 review period, VBW/10A remained within historical (Figures 5 and 10). Piezometer VBW/10B had slight fluctuations during the review 2025 review period and remained within historical levels (Figures 5 and 10).

Piezometer P-5 is located near the toe of the dam near the maximum section A-A' (Figure 1) of the dam. The tip of P-5 is located within the foundation alluvium at Elevation 129.6 ft. P-5 had slight fluctuations during the review period. The water levels observed in P-5 remained within historical levels during the review period (Figures 5 and 10).

Piezometers P-4, P-8A, P-8B, VBW9A, VBW9B and VBW/11 are located along another plane near the maximum cross section B-B' (Figure 1) of the dam. Piezometers P-8A & P-8B are located on the crest of the dam, Piezometer P-4 is located near the toe of the dam, and Piezometers VBW9A & VBW9B are located along the downstream face of the dam along with Piezometer VBW/11. Graphs of the water levels during the two-year period from

January 2024 through December 2025 are shown on Figure 6, and graphs for the historical period from January 2015 through December 2025 are shown on Figure 11. Piezometers P-8A, VBW9A, and VBW/11 are installed within the dam embankment. Piezometers P-8A continues to respond to reservoir water surface fluctuations. For the 2025 review period, VBW9A had a slight response to reservoir water surface fluctuations. The water level observed in the piezometers during the 2025 review period was consistent with historical levels (Figure 11). Piezometers P-4 and P-8B are installed in foundation bedrock, and VBW9B was installed in foundation alluvium. Piezometers P-8B and P-4 generally responded to reservoir water surface fluctuations. The phreatic surface in Piezometer P-4 increased and was near the top of the piezometer casing elevation during 2024 when the reservoir level was at its highest and consistently above Elevation 190 ft. Based on the last two years it appears that P-4 is sensitive to changes in reservoir water level and precipitation. The phreatic surface increase occurred during the peak rainy season and began trending downwards as the reservoir level decreased. During the review period, VBW9B and VBW/11 had minor fluctuations. The water levels observed in these piezometers during this 2025 review period were consistent with historical levels (Figures 6 and 11).

Piezometers P-3 and P-7 are located in the left portion of the dam. Piezometer P-3 is located on the crest of the dam, while Piezometer P-7 is on the downstream face near the left groin. Graphs of the water levels during the two-year period from January 2024 through December 2025 are shown on Figure 7, and those for the historical period from January 2015 through December 2025 are shown on Figure 12. The tips of these piezometers are set below the base of the embankment, and possibly into bedrock. During the 2024 review period and historically, both piezometers tracked the reservoir levels closely. The water levels observed in these piezometers during this 2025 review period were consistent with historical levels (Figures 7 and 12).

Vibrating wire piezometers VBW/12 and VBW/13 are located in the maximum section area of the dam at the downstream toe area. Graphs of the water levels during the two-year period from January 2024 through December 2025 are shown on Figure 8, and those for the historical period from January 2015 through December 2025 are shown on Figure 13. The tip elevation of these two piezometers is within the dam embankment. During the 2025 review period, both piezometers had slight responses to reservoir water surface fluctuations, see Figure 13.

Based on GEI's review of the piezometer data, there are no indications of any dam safety concerns at the dam embankment, abutments, right abutment stability berm, or foundation. It is also recommended that IRWD follows the appropriate response for alarm level changes per Table 2 of Dam Safety Program Guideline No. 4 (Seepage & Piezometer Monitoring). GEI will continue to assist the District and closely monitor the water levels in each piezometer.

2.3 Seepage Flows

There are no internal drains that were installed during construction of the dam but because of seepage appearing at the downstream toe soon after filling, the Left Subdrain was installed near the downstream toe at the left groin. In 1976, the Right Subdrain was added.

Figure 14 represents the seepage flow rates from the Left and Right Subdrains versus the reservoir water surface elevations for the two-year period from January 2024 through December 2025. Figure 15 covers the historical period from January 2015 through December 2025. Tabulated data for the seepage flow rates is presented in Table 2.

Table 2. Seepage Flows – Maximum and Minimum Water Flow Rates

Seepage Flow Point	2015-2025 10-Year Range (gpm)	2025 Range (gpm)	2025 Maximum Alarm Level	Comment
Left Subdrain	0.00 – 4.38	0.04 – 0.87	Level I	
Right Subdrain	0.00 – 0.04	0.00 – 0.00	N/A	Not included in reservoir alarm level analysis by GENTERRA.

During 2025, the Right Subdrain remained dry, while the Left Subdrain flow rate tracked the reservoir levels. Historically, the left subdrain seepage tracks the reservoir level (Figure 15).

Based on GEI's review of the seepage data, the flow rates continue to be consistent with historical flow rates and there are no indications of unusual conditions or trends. The flows should continue to be observed for clarity to check for the presence of any suspended solids that might indicate a potential piping condition.

Periodic seepage in the vicinity of the old abandoned weir on the lower left abutment area of the dam has been observed as noted in Figure 1. IRWD and GEI are currently designing a seepage collection system to monitor the seepage in the future.

2.4 Movement Surveys

There are six survey monuments (S-1 through S-6) located on the crest of Sand Canyon Dam spanning from the left abutment to the right abutment (Figure 1). Survey Monuments S-1 through S-5 were initially read on September 15, 1969, while S-6 was initially read on October 20, 1987. Starting in 1995, the monuments are normally surveyed annually by a licensed surveyor under contract with the District.

Table 6 presents the horizontal movement of the survey monuments compared to the baseline measurements, while Table 7 presents the cumulative horizontal displacement of the survey monuments since 1975. Table 8 presents the survey monument elevations from 1968 through 2025, while Table 9 presents the cumulative vertical movement of the survey monuments since 1969. Figures 16 and 17 are graphical presentations of the cumulative horizontal displacement

and cumulative vertical movement of the survey monuments since 1995, respectively. Table 3 provides the Cumulative Horizontal Displacement compared to the Alarm Level for each survey monument. Table 4 provides the Cumulative Vertical Displacement compared to the Alarm Level for each survey monument.

Table 3. Horizontal Movement Survey – Cumulative Horizontal Displacement

Monument ID	Historical Cumulative Horizontal Displacement Range (in)	2025 Cumulative Horizontal Displacement (in)	2025 Alarm Level	Comment
S-1	-0.30 to 0.54	0.28	Level I	
S-2	0.00 to 0.48	0.28	Level I	
S-3	0.54 to 0.96	0.77	Level I	
S-4	0.60 to 0.96	0.68	Level I	
S-5	0.12 to 0.60	0.18	Level I	
S-6	-0.54 to 0.00	-0.47	Level I	

Notes:

1. Negative displacements are in the upstream direction and positive displacements are in the downstream direction.
2. Historical range is based on surveys from 1995 to 2025.

Table 4. Vertical Movement Survey – Cumulative Vertical Displacement

Monument ID	Historical Cumulative Vertical Displacement Range (in)	2025 Cumulative Vertical Displacement (in)	2025 Alarm Level	Comment
S-1	-1.56 to -1.36	-1.42	Level I	
S-2	-1.37 to -1.10	-1.18	Level I	
S-3	-0.91 to -0.48	-0.59	Level I	
S-4	-3.24 to -2.76	-2.90	Level I	
S-5	-1.34 to -1.04	-1.06	Level I	
S-6	-0.96 to -0.05	-0.18	Level I	

Notes:

1. Historical range is based on surveys from 1995 to 2025.

No survey was performed in 2017 nor 2021. A survey was performed on October 3, 2025, and is provided in the Appendix of this report. The data for 2025 has been reviewed and found to be within historical limits and trends. The cumulative horizontal and vertical movements show relatively minor changes (Tables 6 through 9) during the review period and most likely related to temperature and reservoir level changes. Based on GEI’s review of the historical data, the horizontal and vertical movements are judged to be minimal with no unusual movements.

2.5 Crack Gauge

There is one crack gauge located on wall panels R1/R2 located on the right side of the spillway chute. Currently, the crack gauge is not included in the dam monitoring program. It is recommended IRWD take measurements of the crack gauge annually. During the 2025 annual inspection, GEI took a measurement of the crack gauge. The 3D measurements are included in Table 5 below. A diagram of the crack meter is also included below as Figure 18.

Table 5. 2025 3D Crack Gauge Measurements

Annual Surveillance Report
January 2025 to December 2025
Sand Canyon Dam, No. 1029-002

Direction	Displacement (mm)
DS (+) / US (-)	-1.55
Vertically Up (+) / Down (-)	1.55
Towards Centerline (+) / Away from Centerline (-)	0

3.0 Field Evaluations

3.1 Field Evaluation of June 17, 2025

A field evaluation and inspection were performed by Emerson Revolorio and Santiago Martinez-Granata of GEI, and Christian Wimenta, Anthony Zaragoza, Nick Pizanie, and Steve Habiger of the District on June 17, 2025. The reservoir level was reported to be at Elevation 181.4 ft. Weather conditions were sunny with temperature in the mid-80s. Photos taken by GEI are included in Appendix A of this report.

3.1.1 Dam

The crest of the dam was walked, and the asphalt concrete surface was observed to be in good condition with no signs of movement or significant cracking, see Photo 1. Minor temperature related AC cracking was observed near the left abutment, see Photo 1. The exposed upstream AC-lined slope face above the reservoir water level had some long-standing transverse and longitudinal shrinkage-expansion cracking with vegetation growing within the cracks, see Photo 2. The dam crest and upstream face looked similar to what was observed during the March 2024 inspection.

The downstream toe area, downstream embankment slope, and both groin areas were inspected (Photos 6 and 7). No signs of live seepage were seen on the downstream slope face. The downstream face was recently trimmed and had good grass cover. GEI noticed minor rodent activity at the downstream toe near the right abutment, see Photo 8. Currently, IRWD is utilizing carbon monoxide as an effective treatment for ground squirrel control. IRWD still has black feeder control stations for rats and mice near the dam caretaker houses and other IRWD facilities.

Overall, the condition of the dam remains largely unchanged from the conditions observed during the March 2024 inspection. Overall, the dam was well maintained with no signs of instability or distress.

3.1.2 Spillway

The reservoir was not spilling during the inspection, see Photo 9. IRWD has removed the vegetation and debris that had previously accumulated along the spillway channel, see Photos 9 and 10. The District has also removed the brush/tule growth that was previously observed at the end of the stilling basin, see Photos 11 and 12. The District is aware that the brush/tule growth has to be monitored continuously and cut as required. GEI observed cracking and concrete spalling at the two right baffle blocks in the stilling basin, see Photo 13. GEI was able to take measurements at the crack gauges and inspect the undermining at the concrete repair work on the spillway channel floor as part of the annual spillway inspection.

A spillway inspection was performed by Emerson Revolorio and Matt Corrado of GEI after the dam inspection. The entire spillway was walked, and each wall panel was inspected within the spillway. The inspection was supplemented by taking aerial images using a DJI Phantom 4 Pro V2 drone. An exhibit was prepared using Orthomosaic imagery created from the drone photos, and from the notes taken from the inspection. The inspection documented significant deficiencies with the spillway. Cracks, joint openings, and joint offsets greater than or equal to ¼-inch were classified as significant. The spillway inspection exhibit as requested by IRWD was created to document the inspection findings and is provided in the appendix of this report. A photo log of the inspection is also provided in the appendix of this report. As shown in the exhibit, there are various deficiencies, and a Spillway Condition Assessment along with any needed engineering analysis should be performed to determine a detailed condition of the spillway.

The crack meter located between wall panels R1 and R2 had the following measurements:

- 1.5 mm movement in the US direction
- 1.5 mm up vertically
- 0 mm in or away from the spillway centerline

Based on previous inspections, the crack meter readings have had little to no movement.

3.1.3 Outlet Works

The four upstream outlet gates and three downstream blowoff/control valves were not exercised during this inspection. In 2024, GEI observed that gate valve #2 stem was damaged from the last time it was exercised during the 2023 DSOD inspection. During the 2025 inspection, the District notified GEI that all three gate valves at the upstream face of the dam were replaced in March 2025. The stems and control wheels were in good condition, see Photo 14. The vegetation in Sand Canyon creek near the 24-inch outfall has started to grow, see Photo 15. Access to the emergency valves near the outfall was cleared of large diameter angular rocks and vegetation, and new concrete pads were installed recently, see Photo 16.

Based on the District's report, and observations of the control equipment, the outlet works for the dam appeared fully operational. Figure 1 shows the locations of the inlet gate structure which consists of three upstream 24-inch outlet gates (Nos. 1, 2, and 3), and one 20-inch diameter main lower outlet slide gate. Downstream of the dam adjacent to the Sand Canyon Creek, there are two 24-inch-diameter emergency valves (Valve 7 and 19), and a 20-inch-diameter emergency valve (Valve 20) for lowering the reservoir level in an emergency. The outfall is located within the creek area and not visible.

3.1.4 Seepage

Seepage flow rates continue to be monitored and measured monthly by District staff. A small seepage flow, estimated as 0.63 gpm, was observed in the Left Subdrain. The Right Subdrain

was dry during this inspection. The observed seepage conditions were within past levels based on past records and observations. Seepage water did not appear to have turbidity and appeared to be clear, see Photo 17.

GEI inspected the abandoned irrigation weir box which has previously shown signs of seepage, see Photos 3-5. GEI observed accumulated water within the box. The water in the weir box appears to be a combination of seepage and surface runoff from the surrounding area that has migrated through the cracks of the abandoned irrigation weir box. It is possible that the source of the seepage around the weir box, and inadvertently collected in the weir box, is from the reservoir. This possibility is further supported with observation that the seepage in the area is most noticeable during periods of elevated water levels in the reservoir. IRWD should continue monitoring this area throughout the year to observe any changes during drier seasons and lower reservoir water levels. GEI is currently working with IRWD on an improvement project to remove the existing weir box and design a seepage collection system to measure the seepage.

4.0 Conclusions and Recommendations

4.1 Conclusions

- 1) Based on the review of available instrumentation data and the field inspection, the dam did not have signs of structural deficiencies, seepage, or instability.
- 2) Based on GEI's review, the piezometer water levels remained normal and consistent with historical levels, except for piezometer P-2A.
- 3) On July 7, 2023, the District informed GEI that a stone was encountered inside piezometer P-2A. Despite cleaning efforts, the District has not been able to remove the stone. Piezometer P-2A may be providing erroneous data due to the presence of the stone. The piezometer will likely be cleaned out due to the upcoming instrumentation replacement project slated to begin construction in Fall 2026.
- 4) According to recently developed Alarm Levels, the readings at piezometer P-6 have historically been at Alarm Level IV. GEI does not consider this an issue since readings continue to follow historical trends and continue to respond to reservoir water level changes. However, IRWD should consider re-evaluating the alarm level thresholds for piezometer P-6 since it has been in alarm Level IV for the past two years.
- 5) GEI and IRWD inspected the abandoned irrigation weir box which has previously shown signs of seepage. Water seeping around the weir box and accumulated water within the box was observed. Minor seepage was also observed trickling from the crack in the weir box. The water in the weir box appears to be a combination of seepage and surface runoff from the surrounding area that has migrated through the cracks of the weir box. This possibility is further supported with observation that the seepage in the area is most noticeable during periods of elevated water levels in the reservoir. The District is moving forward with an improvement project to remove the existing irrigation weir box and design a collection system to monitor and measure the seepage and runoff in the area.
- 6) Seepage flow rates during this review period are within historical values and trends.
- 7) Horizontal and vertical movement are within historical values and trends. All survey monuments remained in Alarm Level I.
- 8) GEI saw minor rodent activity along the downstream slope of the dam near the left abutment. IRWD is continuing with rodent control measures. IRWD is currently utilizing carbon monoxide as an effective treatment for ground squirrel control. IRWD still has black feeder control stations for rats and mice near the dam caretaker houses and other IRWD facilities.

- 9) The long-standing transverse and longitudinal shrinkage-expansion cracking along the upstream face of the AC liner appeared similar to what was observed during the March 2024 inspection.
- 10) Desiccation cracks along the left downstream face near piezometer P-7 are still present.
- 11) The AC pavement on the dam crest has minor temperature expansion cracking.
- 12) Outlet works gate valve #2 stem had been repaired.
- 13) The District provided a Dam Outlet Valve Exercising Log which states that the valves were exercised on January 20, April 16, and May 7 other than the 24-inch main valve. Based on visual observations of exposed control equipment, the outlet facilities remain fully functional.
- 14) The area surrounding the 24-inch blowoff outfall has been cleared of overgrown vegetation. The 24-inch outfall has not been visually observed due to its depth of embedment of 4 feet below the water level.
- 15) Access to emergency valves 24 and 25 that were previously obstructed with large diameter angular rocks and vegetation have been cleared and concrete pads have been installed.
- 16) Vegetation and debris along the spillway channel have been removed.
- 17) Brush/tule growth was sprouting at the end of the spillway stilling basin but has been maintained by the District.
- 18) GEI conducted an inspection of the spillway and created an exhibit documenting the significant deficiencies with the spillway.
- 19) Two baffle blocks in the stilling basin are cracked. The District plans to replace the entire spillway in the next few years.

4.2 Recommendations

- 1) The District should continue collaborating with pest management companies to determine most effective treatment options in controlling rodent activity. In addition, the District should continue collapsing, backfilling, and compacting rodent holes with surrounding material as an ongoing maintenance item throughout the dam.
- 2) Piezometer P-2A should be cleaned out during the upcoming construction project in Fall 2026 to remove the possible debris build up/blockage. If cleaning proves to be inadequate during the project, P-2A should be marked for abandonment.
- 3) The District needs to prevent any water surface runoff from entering the casing in piezometer P-4 by sealing the casing cover with a rubber gasket. The District should continue to monitor the piezometer, and nearby area for any wet spots.
- 4) Continue to monitor trends at piezometer P-6. Report to Dam Safety Engineer if trends start to change. IRWD should consider re-evaluating the alarm level thresholds for

piezometer P-6 since it has been in alarm Level IV for the past two years.

- 5) GEI recommends continuously monitoring the desiccation cracks near piezometer P-7.
- 6) Continue to perform appropriate instrument alarm level response per Table 2 of Dam Safety Program Guideline No. 4 (Seepage & Piezometer Monitoring) and Table 2 Guideline No. 6 (Movement Monitoring).
- 7) IRWD should continue monitoring abandoned irrigation weir box throughout the year to observe any changes during drier seasons and lower reservoir water levels as the project to replace the box progresses.
- 8) Repair AC at localized crack areas on the upstream slope and crest of the dam. These cracks should be repaired with a Sika AC repair product. Vegetation and brush at the upstream slope need to be removed.
- 9) The outlet controls and the 24-inch blowoff outfall should continue to be fully exercised annually and IRWD should ensure the outfall at the creek is not clogged with mud and debris.
- 10) The District needs to continue monitoring brush/tule growth at the spillway stilling basin and cut when appropriate to avoid any damage to spillway concrete or impacts to spillway operability.
- 11) If significant delays to the spillway replacement project occur, the District should repair any existing cracking within the stilling basin concrete.
- 12) GEI recommends sealing the wall joint on the spillway left-wing wall with a Sika sealant. GEI also recommends installing a crack gauge at the wall joint to monitor future movement. The crack gauge should be measured annually and after each spilling event.
- 13) GEI recommends measuring the crack gauge at the R1/R2 wall panel joint annually and during other spillway inspections if conducted.
- 14) The District needs to remove vegetation and debris that accumulates in the spillway channel after a spilling event.
- 15) GEI recommends clearing the shrub and tree vegetation directly above the spillway channel walls.
- 16) GEI recommends performing a detailed Spillway Condition Assessment.
- 17) Continued careful monitoring by the District staff of the condition of the dam, appurtenances and instrumentation. Staff needs to be inspecting for signs of distress or movement, increased seepage, or any other unusual conditions including instrumentation readings. Any unusual observations need to be reported immediately to the Dam Safety Engineer.
- 18) GEI recommends continuing following IRWD's Dam Safety Program Guidelines after a peak ground acceleration of $>0.3g$ is observed at the site.

Sand Canyon Dam Action Item Summary

Item	Location	Maintenance	Measures
Rodent activity	Throughout dam	Active rodent holes and lack of poison in rodent control feeder boxes	The District should continue collaborating with pest management companies to determine most effective treatment options in controlling rodent activity. In addition, the District should continue collapsing, backfilling, and compacting rodent holes with surrounding material as an ongoing maintenance item throughout the dam.
Piezometer P-2A	Dam crest	Possible obstruction in piezometer	Clean out piezometer. Extend the top of standpipe to prevent water from entering. Resurvey top of piezometer.
Piezometer P-4	Dam crest	Increase piezometer water level readings	Prevent water surface runoff from entering piezometer. Continue monitoring piezometer, and nearby area for wet spots.
Piezometer P-6	Right toe of dam	Piezometer at Alarm Level IV	Continue to monitor trends at piezometer P-6. Report to Dam Safety Engineer if trends start to change.
AC pavement	Dam crest	Shrinkage-expansion temperature cracking	Repair AC pavement by filling in cracks and creating a smooth surface with a Sika AC repair product.
AC Liner	Upstream face	Shrinkage-expansion temperature cracking and vegetation growth in cracks	Repair areas with large cracks by filling in and creating a smooth surface with a Sika AC repair product. Remove vegetation.
AC Liner	Upstream face near water line	Overgrown brush within the reservoir near the water line	Remove brush.
Irrigation weir box	Downstream left groin	Seepage through and around structure	IRWD should continue monitoring abandoned irrigation weir box throughout the year to observe any changes during drier seasons and lower reservoir water levels as the project to replace the box progresses.
Wing wall joint	Spillway Left wing wall	Wall joint offset	Repair joint with a Sika sealant per manufactures instructions. Install crack gauge to measure joint movement. Monitor crack gauge annually and after each spilling event.
Spillway	Right Abutment	Assessment	Perform Spillway Condition Assessment.
Stilling basin	Spillway stilling basin	Brush/tule growth	Cut and maintain.
Stilling Basin	Spillway stilling basin	Cracked concrete	If significant delay to the replacement project is to occur, the District should repair the cracked concrete in the stilling basin.
Spillway channel wall	Right spillway concrete wall vertical joint with crack meter	Vertical wall joint with approximately a 1-mm offset between concrete wall sections	Continue to monitor and measure crack meter annually and after a spilling event. Report to Dam Safety Engineer if the wall continues to deflect.
Spillway channel walls	Spillway	Overgrown vegetation above spillway channel walls	Remove vegetation directly above the spillway channel walls.
Spillway channel	Spillway	Vegetation and debris throughout channel	Remove vegetation and debris that accumulated in the channel after every spilling event.
24-inch Blowoff Outfall	Creek Outfall	Potential blockage	Verify outfall is not blocked or clogged.

5.0 Limitations

This report was prepared exclusively for the use of Irvine Ranch Water District. The findings and conclusions, if any provided by GEI in this report, are based solely on the information reported to GEI as of the date of this report. Future investigations or additional information not provided to GEI at the time of this report may result in modification of this report. GEI's scope of work did not include verifying the completeness or accuracy of information provided by others. Accordingly, GEI shall not be liable for any damages, costs, or other consequences resulting from reliance on such information if it is later determined to be inaccurate or incomplete. GEI's professional services for this project have been performed in a manner consistent with that degree of skill and care ordinarily exercised by members of the same profession currently practicing in the same locality, performing similar services under similar conditions. GEI makes no other representations and no warranties, express or implied.

This report presents observations made, conclusions drawn, and opinions formed from (1) a visual inspection of the Sand Canyon Dam and its appurtenant structures, and (2) a review of instrumentation data, including piezometer levels and seepage, collected by the District and reported since 1975. The purpose of the inspection and review is to assess the safety of the structure for continuing operation. Reuse of this report for any other purposes, in part or in whole, is at the sole risk of the user.

In the context intended above, the term "safety" is interpreted to be restricted specifically to major structural and control features of the project in regard to their adequacy against possible catastrophic failure due to natural or operational events. No consideration is given herein to those public safety aspects related to voluntary occupancy or use of project features in such manner as to result in personal mishaps.

The undersigned who performed the inspection and reviewed the instrumentation data and prepared this report, desire that it be clearly understood that the conclusions regarding the condition and safety of the dam and related facilities are not guaranteed but do represent our best judgment. Inevitably, such judgment must be recognized to be affected to an uncertain degree by the practical limitations that affect all dam evaluations, relative principally to approximate knowledge of the existing properties of the structures and their foundations, the potential for storm or seismic damage, and the uncertainties that are known to exist in estimating margins of safety.

6.0 References

California Department of Water Resources, Division of Safety of Dams (DSOD), 1984, Sand Canyon Dam, 1029-2, Safety Review Report; safety Review Report; by DSOD; date April 1984.

California Department of Water Resources, DSOD, 2020, Inspection of Dam and Reservoir in Certified Status report; October 19, 2020.

Genterra, 2023, Technical Memorandum Identification of Instrumentation Thresholds and Action Levels at Sand Canyon, March 24, 2023.

HDR, 2021, Draft Data Summary Report, Sand Canyon Dam, July 2021

IRWD, 2023, Dam Safety Program Guidelines & Governance, July 2023.

Tables

**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			1A		1B		2A		2B	
Top of Well Elevation --->			201.9		201.8		201.9		202	
Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
1/31/2007	176.80		41.6	160.3	59.1	142.70	35.2	166.70	62.7	139.3
2/28/2007	177.60		42.5	159.4	59.2	142.60	35.5	166.40	62.6	139.4
3/29/2007	177.10		42.3	159.6	59.2	142.60	35.6	166.30	62.6	139.4
4/27/2007	176.60		42.3	159.6	59.3	142.50	35.3	166.60	62.8	139.2
5/24/2007	176.80		42.3	159.6	59.7	142.10	35.9	166.00	63.1	138.9
6/27/2007	179.90		42.5	159.4	59.6	142.20	35.3	166.60	63.4	138.6
7/27/2007	177.80		42.4	159.5	60.0	141.80	35.8	166.10	64.0	138.0
8/28/2007	177.20		42.4	159.5	60.1	141.70	35.5	166.40	64.1	137.9
9/26/2007	177.00		42.5	159.4	59.7	142.10	35.7	166.20	63.8	138.2
10/30/2007	175.50		42.5	159.4	59.6	142.20	36.0	165.90	63.9	138.1
11/27/2007	175.90		42.5	159.4	59.9	141.90	36.3	165.60	63.9	138.1
12/27/2007	178.20		42.6	159.3	59.5	142.30	36.4	165.50	63.0	139.0
1/30/2008	184.40		42.4	159.5	57.7	144.10	35.8	166.10	61.0	141.1
2/26/2008	186.10		42.4	159.5	57.0	144.80	34.9	167.00	60.7	141.3
3/26/2008	188.00		42.6	159.3	56.6	145.20	33.8	168.10	60.8	141.2
4/25/2008	191.00		42.4	159.5	56.5	145.30	32.7	169.20	61.0	141.0
5/28/2008	190.93		41.4	160.6	55.9	145.90	31.3	170.60	60.3	141.7
6/25/2008	189.50		42.3	159.6	56.1	145.70	30.7	171.20	60.5	141.5
7/29/2008	185.10		41.4	160.5	56.6	145.20	30.9	171.00	61.0	141.0
7/30/2008	185.10	0.00	41.5	160.4	56.5	145.30	30.7	171.20	60.9	141.1
8/27/2008	178.00	0.00	41.7	160.2	57.6	144.20	32.1	169.80	61.7	140.3
9/25/2008	176.80	0.00	42.5	159.4	58.4	143.40	33.1	168.80	62.4	139.6
10/28/2008	175.20	0.00	44.4	157.5	58.8	143.00	34.3	167.60	62.9	139.1
11/25/2008	175.80	1.82	42.4	159.5	58.9	142.90	35.2	166.70	63.0	139.0
12/30/2008	181.70	2.91	42.6	159.3	57.7	144.10	35.2	166.70	61.4	140.6
1/29/2009	182.20	0.39	42.4	159.5	57.5	144.30	34.8	167.10	61.3	140.7
2/25/2009	185.70	3.10	42.0	159.9	57.0	144.80	34.1	167.80	59.9	142.1
3/26/2009	188.40	0.10	42.4	159.5	56.9	144.90	33.2	168.70	61.0	141.0
4/28/2009	189.30	0.00	42.4	159.5	56.7	145.10	32.0	169.90	61.3	140.7
5/18/2009	188.50	0.00	41.3	160.6	56.6	145.20	31.4	170.50	61.0	141.0

Notes:

1. Readings in red are classified as erroneous
2. Elevation calculations between 2/27/2019 and 12/29/2020 were not included due to issues with data logger.
3. Piezometer data based on NGVD 29 datum.

TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			1A		1B		2A		2B	
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Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
5/27/2009	188.10	0.00	42.2	159.7	56.7	145.10	31.2	170.70	61.0	141.0
6/30/2009	188.60	0.10	42.4	159.5	56.7	145.10	31.2	170.70	61.3	140.7
7/30/2009	184.80	0.00	42.3	159.6	56.9	144.90	30.9	171.00	61.3	140.7
8/26/2009	176.60	0.00	41.5	160.4	57.8	144.00	31.6	170.30	61.8	140.2
9/30/2009	174.50	0.00	42.2	159.7	59.0	142.80	33.3	168.60	62.8	139.2
10/28/2009	175.30	0.29	42.6	159.3	59.2	142.60	34.2	167.70	63.0	139.0
12/1/2009	176.40	0.00	42.0	159.9	59.4	142.40	35.2	166.70	63.3	138.7
12/28/2009	178.80	2.75	42.5	159.5	58.6	143.30	35.5	166.50	62.2	139.8
1/26/2010	191.30	4.15	42.4	159.5	57.3	144.50	34.9	167.00	60.6	141.4
2/24/2010	193.60	2.29	42.4	159.5	55.4	146.40	32.5	169.40	59.8	142.2
3/29/2010	193.50	1.18	42.2	159.7	55.4	146.40	29.9	172.00	60.0	142.0
4/4/2010	193.50		41.5	160.4	55.5	146.30	25.5	176.40	60.0	142.0
4/27/2010	193.90	1.66	42.3	159.6	55.4	146.40	29.2	172.70	59.9	142.1
5/27/2010	192.90	0.03	41.4	160.5	55.4	146.40	28.7	173.20	59.9	142.1
6/29/2010	191.60	0.00	41.4	160.5	55.4	146.40	28.7	173.20	59.7	142.3
7/28/2010	187.50	0.00	42.3	159.6	55.9	145.90	29.1	172.80	60.4	141.6
8/31/2010	179.20	0.00	41.5	160.4	57.3	144.50	30.8	171.10	61.4	140.6
9/29/2010	175.60	0.00	41.2	160.7	58.5	143.30	31.7	170.20	62.0	140.0
10/26/2010	178.20	2.93	41.4	160.5	58.6	143.20	33.0	168.90	61.9	140.1
11/30/2010	178.80	1.14	42.6	159.3	58.8	143.00	34.4	167.50	62.4	139.6
12/30/2010	193.90	9.95	42.4	159.5	55.4	146.40	33.8	168.10	59.5	142.5
1/27/2011	194.00	0.86	41.5	160.4	55.4	146.40	30.4	171.50	60.0	142.0
2/23/2011	193.80	1.02	42.4	159.5	55.5	146.40	28.9	173.00	59.7	142.3
3/29/2011	193.90	2.38	41.3	160.6	54.9	146.90	28.1	173.80	59.5	142.5
4/27/2011	193.60	0.56	42.3	159.6	55.3	146.50	27.6	174.30	59.8	142.2
5/25/2011	193.10	0.51	41.4	160.5	55.2	146.60	27.9	174.00	59.8	142.2
6/28/2011	192.00	0.00	42.3	159.6	55.3	146.50	28.2	173.70	59.7	142.3
7/27/2011	186.75	0.00	41.5	160.5	55.8	146.00	28.9	173.10	60.0	142.0
8/25/2011	176.30	0.00	42.4	159.5	57.2	144.60	30.3	171.60	61.0	141.0
9/28/2011	176.00	0.06	42.4	159.5	58.6	143.30	32.5	169.50	62.1	139.9

Notes:

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TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			1A		1B		2A		2B	
Top of Well Elevation --->			201.9		201.8		201.9		202	
Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
10/25/2011	176.50	0.89	42.2	159.7	59.1	142.70	33.5	168.40	62.3	139.7
11/22/2011	177.20	1.31	42.4	159.5	58.9	143.00	34.4	167.50	62.2	139.8
12/22/2011	176.70	0.20	41.6	160.3	59.0	142.80	34.5	167.40	62.5	139.5
1/25/2012	178.60	0.84	41.4	160.5	58.6	143.20	35.0	166.90	61.9	140.1
2/28/2012	179.20	0.68	41.5	160.4	58.6	143.20	35.5	166.40	61.1	140.9
3/27/2012	180.60	1.73	41.5	160.4	58.4	143.50	35.1	166.80	61.6	140.4
6/27/2012	180.70	0.00	42.5	159.4	58.6	143.20	33.8	168.10	61.9	140.1
7/26/2012	179.20	0.10	42.3	159.6	58.7	143.10	34.3	167.60	62.1	139.9
8/8/2012	178.50	0.10	42.2	159.7	58.9	142.90	34.3	167.60	62.7	139.3
8/28/2012	177.10	0.00	42.4	159.5	59.3	142.50	34.6	167.30	62.9	139.1
8/29/2012	177.10	0.00	42.0	159.9	59.1	142.70	34.3	167.60	62.7	139.3
9/25/2012	175.30	0.00	42.3	159.6	59.8	142.00	35.0	166.90	63.5	138.5
10/30/2012	176.00	0.19	42.3	159.6	60.0	141.80	35.6	166.30	63.8	138.2
11/27/2012	175.80	0.69	42.4	159.5	59.7	142.10	35.8	166.20	63.4	138.6
12/12/2012	176.10	1.40	42.5	159.4	59.7	142.10	35.7	166.20	62.9	139.1
1/22/2013	177.20	1.20	42.4	159.5	58.8	143.00	36.0	165.90	62.1	139.9
2/27/2013	178.20	0.31	42.3	159.6	58.4	143.40	35.8	166.10	61.8	140.2
3/28/2013	178.20	0.71	42.4	159.5	58.4	143.40	35.8	166.10	61.7	140.3
4/25/2013	177.30	0.03	42.5	159.4	58.4	143.40	35.9	166.00	62.4	139.7
5/22/2013	177.60	0.00	42.5	159.4	59.0	142.80	35.9	166.00	62.3	139.7
6/25/2013	177.50	0.00	42.3	159.6	59.2	142.70	36.0	165.90	62.5	139.5
7/23/2013	175.70	0.00	42.5	159.4	59.6	142.20	36.0	165.90	63.1	138.9
8/21/2013	174.50	0.00	42.5	159.4	59.9	141.90	36.2	165.70	63.7	138.3
9/25/2013	175.70	0.00	42.6	159.3	60.2	141.60	36.3	165.60	63.8	138.2
10/29/2013	176.00	0.00	42.6	159.3	59.9	141.90	36.5	165.40	63.6	138.4
11/27/2013	176.50	0.44	42.3	159.6	59.5	142.30	36.4	165.50	63.3	138.7
12/19/2013	176.80	0.53	42.5	159.4	59.5	142.30	36.4	165.50	63.1	138.9
1/28/2014	176.80	0.00	42.5	159.4	59.1	142.70	36.5	165.40	62.7	139.3
2/25/2014	176.70	0.72	42.3	159.6	59.0	142.80	36.6	165.30	62.5	139.5
3/25/2014	178.50		42.5	159.4	58.5	143.30	36.5	165.40	62.0	140.0

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**TABLE 5
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PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			1A		1B		2A		2B	
Top of Well Elevation --->			201.9		201.8		201.9		202	
Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
3/29/2014	178.40	1.44	42.5	159.4	58.6	143.20	36.6	165.30	62.0	140.0
4/25/2014	177.40	0.74	42.4	159.5	58.8	143.00	36.3	165.60	62.2	139.8
5/28/2014	176.40	0.00	42.5	159.4	59.4	142.40	36.3	165.60	62.9	139.1
6/25/2014	176.10	0.00	42.5	159.4	60.0	141.80	36.5	165.40	63.6	138.4
7/30/2014	177.30	0.00	42.5	159.4	60.1	141.70	36.4	165.50	63.7	138.4
8/26/2014	176.10	0.03	42.5	159.4	60.2	141.60	36.3	165.60	63.8	138.2
9/23/2014	175.90	0.00	42.3	159.6	60.3	141.50	36.5	165.40	64.2	137.9
10/30/2014	176.30	0.00	42.2	159.7	60.1	141.70	36.6	165.30	64.0	138.0
11/21/2014	176.20	0.25	42.2	159.7	59.9	141.90	36.7	165.20	63.9	138.1
12/30/2014	178.90	3.37	42.3	159.6	58.8	143.00	36.7	165.20	62.5	139.5
1/27/2015	179.60	0.89	42.3	159.6	58.3	143.50	36.2	165.70	62.2	139.9
2/27/2015	180.00	0.46	42.3	159.6	58.3	143.50	35.8	166.10	62.0	140.0
3/26/2015	179.60	0.45	42.3	159.6	58.2	143.60	35.7	166.20	62.1	139.9
4/29/2015	178.20	0.24	42.2	159.7	58.7	143.10	35.5	166.40	62.7	139.3
5/27/2015	179.00	1.04	42.2	159.7	58.6	143.20	35.8	166.10	62.6	139.4
6/25/2015	179.60	0.00	42.2	159.7	58.5	143.30	35.6	166.30	62.3	139.7
7/29/2015	178.10	0.00	42.3	159.6	58.9	142.90	35.5	166.40	63.1	138.9
8/26/2015	176.20	0.00	42.2	159.7	59.2	142.60	35.4	166.50	63.3	138.7
9/22/2015	178.20	1.64	42.2	159.7	58.9	142.90	35.8	166.10	62.8	139.2
10/27/2015	176.90	0.10	42.3	159.6	59.0	142.80	35.8	166.10	63.0	139.0
11/24/2015	176.30	0.17	42.2	159.7	59.2	142.60	36.0	165.90	63.1	138.9
12/22/2015	177.60	0.72	42.3	159.7	58.9	143.00	36.1	165.80	62.9	139.1
1/27/2016	180.10	2.86	42.6	159.3	58.2	143.60	36.5	165.40	61.9	140.1
2/25/2016	181.60	0.20	42.2	159.7	57.8	144.00	35.6	166.30	61.8	140.2
3/24/2016	184.80		42.3	159.6	57.7	144.10	34.1	167.80	61.3	140.7
3/31/2016	184.50	1.51	42.2	159.7	57.7	144.10	35.0	166.90	61.8	140.2
4/28/2016	183.60	0.04	42.2	159.7	57.8	144.00	34.3	167.70	62.1	139.9
5/25/2016	182.50	0.13	42.2	159.7	58.0	143.80	34.2	167.70	62.2	139.8
6/28/2016	180.70	0.00	42.9	159.0	59.2	142.60	33.3	168.60	63.3	138.7
7/27/2016	178.40	0.00	42.4	159.5	59.1	142.70	34.2	167.70	63.1	138.9

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PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			1A		1B		2A		2B	
Top of Well Elevation --->			201.9		201.8		201.9		202	
Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
8/24/2016	176.40	0.00	42.3	159.6	59.6	142.30	34.8	167.10	63.5	138.5
9/27/2016	175.80	0.00	42.3	159.6	60.0	141.80	35.3	166.60	63.9	138.1
10/26/2016	178.60	0.64	42.3	159.6	59.8	142.00	35.6	166.30	63.7	138.3
11/22/2016	178.30	1.11	42.4	159.5	59.7	142.10	35.5	166.40	63.5	138.5
12/28/2016	184.80	4.01	42.3	159.6	59.0	142.80	35.6	166.30	62.6	139.4
1/25/2017	193.30	6.33	42.4	159.5	56.1	145.70	34.6	167.30	59.0	143.0
2/28/2017	193.90	3.27	42.3	159.6	54.5	147.30	31.2	170.70	58.8	143.2
3/29/2017	193.70	0.08	42.4	159.5	54.7	147.10	29.6	172.30	59.2	142.8
4/27/2017	192.90	0.04	42.2	159.7	54.7	147.10	28.8	173.10	59.5	142.5
5/23/2017	187.90	0.33	42.2	159.7	55.2	146.60	29.1	172.80	59.5	142.5
6/21/2017	182.50	0.00	42.2	159.7	56.1	145.70	29.9	172.00	60.1	141.9
7/26/2017	163.60	0.00	42.2	159.7	58.2	143.60	32.0	169.90	61.6	140.4
8/30/2017	163.60	0.00	42.2	159.7	59.7	142.10	34.1	167.80	62.9	139.1
9/28/2017	163.60	0.00	42.3	159.6	60.8	141.00	35.5	166.40	63.7	138.3
10/26/2017	171.80	0.00	42.1	159.8	61.4	140.40	36.2	165.70	64.2	137.8
11/29/2017	177.20	0.08	42.2	159.7	60.7	141.10	36.8	165.10	64.4	137.6
12/27/2017	176.70	0.00	42.3	159.6	60.9	140.90	36.4	165.50	64.5	137.5
1/24/2018	178.10	1.67	42.3	159.6	60.3	141.50	36.0	165.90	63.9	138.1
2/21/2018	177.80	0.27	42.2	159.7	60.2	141.60	35.9	166.00	63.9	138.1
3/28/2018	183.50	1.23	42.3	159.6	59.7	142.10	35.6	166.30	63.5	138.5
4/27/2018	184.30	0.05	42.2	159.7	59.5	142.30	35.0	166.90	63.5	138.5
5/30/2018	183.10	0.13	42.2	159.7	59.1	142.70	34.0	167.90	63.4	138.6
6/28/2018	181.70	0.00	42.4	159.5	59.3	142.50	33.8	168.10	63.6	138.4
7/26/2018	180.00	0.00	42.4	159.5	59.8	142.00	34.2	167.70	63.6	138.4
8/28/2018	177.30	0.00	42.3	159.6	60.2	141.60	34.3	167.60	64.2	137.8
9/27/2018	178.10	0.00	42.3	159.6	60.3	141.50	64.4	137.50	64.7	137.3
10/24/2018	178.00	0.66	42.4	159.5	60.3	141.50	64.4	137.50	64.3	137.7
11/29/2018	177.50	1.60	42.3	159.6	60.3	141.50	35.0	166.90	64.3	137.7
12/20/2018	181.40	2.39	42.2	159.7	59.1	142.70	35.0	166.90	62.9	139.1
1/30/2019	189.40	4.56	42.2	159.7	57.4	144.40	34.6	167.30	61.2	140.8

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**TABLE 5
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PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			1A		1B		2A		2B	
Top of Well Elevation --->			201.9		201.8		201.9		202	
Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
2/27/2019	194.10	7.48	42.3	159.6	54.8	147.00	30.9	171.00	59.4	142.6
3/27/2019	194.00	1.27	42.4	159.5	54.9	146.90	29.1	172.80	59.4	142.6
4/24/2019	193.60	0.07	42.30	159.6	55.00	146.80	28.20	173.70	59.55	142.5
5/30/2019	191.40	0.73	42.20	159.7	55.30	146.50	28.00	173.90	59.80	142.2
6/26/2019	190.80	0.02	42.40	159.5	55.40	146.40	28.10	173.80	59.80	142.2
7/5/2015	190.40	0.00	42.30	159.6	55.40	146.40	28.00	173.90	60.00	142.0
7/30/2019	188.95	0.00	42.30	159.6	55.70	146.10	28.30	173.60	60.30	141.7
8/27/2019	187.40	0.00	42.10	159.8	60.50	141.30	28.10	173.80	60.70	141.3
9/26/2019	186.20	0.00	42.30	159.6	60.40	141.40	28.00	173.90	59.90	142.1
10/22/2019	185.20	0.00	42.20	159.7	56.50	145.30	29.80	172.10	61.20	140.8
11/26/2019	183.50	2.66	42.20	159.7	56.90	144.90	30.80	171.10	61.30	140.7
12/18/2019	186.80	4.44	42.40	159.5	56.40	145.40	31.10	170.80	60.40	141.6
1/28/2020	192.00	0.24	42.20	159.7	55.00	146.80	28.30	173.60	59.50	142.5
2/25/2020	192.10	0.49	42.25	159.7	54.90	146.90	28.20	173.70	59.40	142.6
3/24/2020	194.00	3.89	42.20	159.7	54.80	147.00	28.00	173.90	59.10	142.9
4/29/2020	193.50	4.59	42.20	159.7	53.80	148.00	27.40	174.50	59.20	142.8
5/27/2020	193.10	0.03	42.20	159.7	54.00	147.80	27.40	174.50	59.50	142.5
6/24/2020	190.00	0.00	41.90	160.0	54.10	147.70	27.70	174.20	59.70	142.3
7/29/2020	188.90	0.00	42.20	159.7	54.50	147.30	28.50	173.40	59.60	142.4
8/27/2020	185.90	0.00	42.10	159.8	55.10	146.70	29.10	172.80	59.80	142.2
9/29/2020	183.10	0.00	42.30	159.6	55.70	146.10	30.25	171.65	60.00	142.0
10/29/2020	180.30	0.00	42.10	159.8	56.60	145.20	31.40	170.50	60.80	141.2
11/24/2020	179.00	0.65	42.20	159.7	57.40	144.40	32.10	169.80	61.20	140.8
12/29/2020	179.00	1.03	42.20	159.7	57.80	144.00	33.10	168.80	61.20	140.8
1/26/2021	180.50	2.39	42.20	159.7	57.60	144.20	33.50	168.40	60.90	141.1
2/25/2021	182.10	0.03	42.30	159.6	57.40	144.40	33.30	168.60	60.90	141.1
3/23/2021	182.90	1.15	41.40	160.5	57.30	144.50	33.50	168.40	61.30	140.7
4/27/2021	182.00	0.04	42.30	159.6	57.60	144.20	33.20	168.70	61.30	140.7
5/26/2021	181.00	0.11	42.20	159.7	57.80	144.00	33.40	168.50	61.60	140.4
6/30/2021	179.00	0.00	42.30	159.6	58.10	143.70	33.50	168.40	61.90	140.1

Notes:

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JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			1A		1B		2A		2B	
Top of Well Elevation --->			201.9		201.8		201.9		202	
Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
7/27/2021	177.10	0.08	42.30	159.6	58.50	143.30	34.00	167.90	62.30	139.7
8/24/2021	175.40	0.00	42.20	159.7	58.90	142.90	34.30	167.60	52.40	149.6
9/28/2021	175.20	0.06	42.20	159.7	59.10	142.70	35.00	166.90	52.80	149.2
10/27/2021	177.20	0.80	42.30	159.6	59.20	142.60	35.40	166.50	63.00	139.0
11/23/2021	177.80	0.00	42.30	159.6	59.10	142.70	35.20	166.70	63.10	138.9
12/21/2021	180.50	5.86	42.20	159.7	58.60	143.20	35.20	166.70	62.10	139.9
1/25/2022	187.00	0.08	42.20	159.7	54.20	147.60	29.30	172.60	59.70	142.3
2/22/2022	186.60	0.18	42.30	159.6	57.30	144.50	33.30	168.60	60.90	141.1
3/28/2022	186.60	1.38	42.30	159.6	56.70	145.10	30.90	171.00	60.10	141.9
4/26/2022	186.60	0.01	42.20	159.7	57.20	144.60	32.00	169.90	61.10	140.9
5/25/2022	185.30	0.05	42.30	159.6	57.70	144.10	31.90	170.00	61.30	140.7
6/28/2022	182.70	0.00	42.30	159.6	58.00	143.80	32.20	169.70	61.70	140.3
7/26/2022	179.70	0.00	42.30	159.6	58.50	143.30	32.60	169.30	62.30	139.7
8/30/2022	178.30	0.13	42.20	159.7	59.10	142.70	33.30	168.60	62.70	139.3
9/29/2022	175.80	0.24	42.20	159.7	59.40	142.40	34.10	167.80	52.70	149.3
10/26/2022	175.30	0.26	42.20	159.7	59.40	142.40	34.70	167.20	63.00	139.0
11/22/2022	179.40	1.46	42.30	159.6	59.10	142.70	35.10	166.80	62.60	139.4
12/29/2022	185.70	2.21	42.30	159.6	58.00	143.80	34.20	167.70	51.40	150.6
1/11/2023	191.70	3.90	42.20	159.70	57.30	144.50	33.90	168.00	50.20	151.8
1/25/2023	194.00	7.17	42.20	159.70	55.90	145.90	32.70	169.20	59.80	142.20
2/28/2023	194.00	3.98	42.30	159.60	55.30	146.50	29.70	172.20	58.90	143.10
3/29/2023	194.00	5.92	42.20	159.70	54.00	147.80	28.20	173.70	58.60	143.40
4/25/2023	194.00	0.19	42.20	159.70	55.10	146.70	27.70	174.20	59.60	142.40
5/24/2023	193.40	0.89	42.20	159.70	55.00	146.80	27.84	174.07	59.64	142.36
6/28/2023	192.70	0.07	42.30	159.60	55.30	146.50	27.40	174.50	59.80	142.20
7/26/2023	191.60	0.00	42.20	159.70	55.00	146.80	27.50	174.40	59.70	142.30
8/29/2023	190.50	1.84	42.18	159.72	54.90	146.90	27.60	174.30	59.60	142.40
9/26/2023	189.80	0.00	42.25	159.65	54.90	146.90	27.65	174.25	59.35	142.65
10/25/2023	189.70	0.19	42.20	159.70	54.90	146.90	27.70	174.20	60.10	141.90
11/30/2023	189.20	0.65	42.20	159.70	54.90	146.90	27.70	174.20	60.00	142.00

Notes:

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			1A		1B		2A		2B	
Top of Well Elevation --->			201.9		201.8		201.9		202	
Bottom of Well Elevation --->			159.3		132.9		153.9		123.8	
Depth of Well --->			42.6		68.9		48		78.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
12/27/2023	190.00	1.15	42.20	159.70	54.90	146.90	27.80	174.10	59.90	142.10
1/29/2024	191.90	2.00	42.20	159.70	54.00	147.80	29.10	172.80	59.60	142.40
2/27/2024	194.00	8.89	42.20	159.70	52.90	148.90	27.50	174.40	58.40	143.60
3/27/2024	193.80	2.51	42.20	159.70	53.10	148.70	27.35	174.55	58.75	143.25
4/23/2024	194.00	1.51	42.60	159.30	52.70	149.10	26.70	175.20	58.95	143.05
5/1/2024	193.90	0.00	42.20	159.70	53.20	148.60	26.80	175.10	59.00	143.00
5/23/2024	193.10	0.08	42.20	159.70	53.20	148.60	26.70	175.20	59.30	142.70
6/20/2024	191.50	0.00	42.20	159.70	53.30	148.50	25.90	176.00	59.40	142.60
7/25/2024	188.70	0.00	42.20	159.70	52.90	148.90	26.30	175.60	59.70	142.30
8/28/2024	185.90	0.00	42.30	159.60	53.40	148.40	26.20	175.70	60.10	141.90
9/18/2024	183.95	0.00	42.20	159.70	53.40	148.40	26.00	175.90	60.40	141.60
10/30/2024	182.00	0.00	42.20	159.70	56.90	144.90	25.80	176.10	60.70	141.30
11/26/2024	177.30	0.06	42.20	159.70	57.90	143.90	26.17	175.73	60.95	141.05
12/17/2024	175.70	0.04	42.30	159.60	58.30	143.50	25.90	176.00	61.40	140.60
1/29/2025	173.20	1.18	42.30	159.60	58.90	142.90	26.20	175.70	61.70	140.30
2/26/2025	178.50	2.65	42.30	159.60	58.60	143.20	26.20	175.70	61.40	140.60
3/25/2025	183.40	2.08	42.20	159.70	58.20	143.60	26.20	175.70	61.20	140.80
4/14/2025	183.10	#N/A	42.20	159.70	58.40	143.40	26.25	175.65	61.50	140.50
4/23/2025	183.10	0.37	42.30	159.60	58.50	143.30	26.30	175.60	61.80	140.20
5/22/2025	182.60	0.05	42.25	159.65	58.75	143.05	26.20	175.70	62.10	139.90
7/7/2025	179.65	0.28	42.30	159.60	59.20	142.60	26.20	175.70	62.60	139.40
7/24/2025	177.90	0.00	42.28	159.62	59.43	142.37	26.23	175.67	62.71	139.29
8/26/2025	175.00	0.00	42.30	159.60	59.90	141.90	26.30	175.60	63.30	138.70
9/25/2025	173.20	0.12	42.30	159.60	60.20	141.60	26.30	175.60	63.60	138.40
10/22/2025	178.30	1.38	42.20	159.70	59.60	142.20	26.30	175.60	63.20	138.80
11/20/2025	182.20	5.76	42.50	159.40	59.09	142.71	26.27	175.63	62.11	139.89
12/17/2025	186.10	2.26	42.30	159.60	57.10	144.70	26.40	175.50	61.40	140.60

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
1/31/2007	176.80		31.9	169.3	9.4	141.30	9.2	142.3	25.6	141.80
2/28/2007	177.60		31.7	169.5	9.6	141.10	9.3	142.2	25.4	142.00
3/29/2007	177.10		31.9	169.3	10.4	140.30	9.6	141.9	25.6	141.80
4/27/2007	176.60		32.1	169.1	10.5	140.20	9.5	142.0	25.7	141.70
5/24/2007	176.80		32.7	168.5	10.7	140.00	9.8	141.7	26.0	141.40
6/27/2007	179.90		30.0	171.2	11.0	139.70	9.6	141.9	26.0	141.40
7/27/2007	177.80		30.8	170.4	11.5	139.20	9.8	141.7	26.4	141.00
8/28/2007	177.20		31.5	169.7	11.8	138.90	10.2	141.3	26.4	141.00
9/26/2007	177.00		30.5	170.7	11.9	138.80	10.2	141.3	26.1	141.30
10/30/2007	175.50		31.9	169.3	12.3	138.40	10.3	141.2	26.0	141.40
11/27/2007	175.90		31.8	169.4	12.6	138.10	10.3	141.2	25.5	141.90
12/27/2007	178.20		30.3	170.9	12.6	138.10	10.6	140.9	25.4	142.00
1/30/2008	184.40		27.2	174	10.8	139.90	10.3	141.2	24.2	143.23
2/26/2008	186.10		25.6	175.6	9.7	141.00	9.2	142.3	23.6	143.80
3/26/2008	188.00		24.4	176.8	10.0	140.70	9.0	142.5	23.4	144.00
4/25/2008	191.00		22.2	179.0	10.2	140.50	8.9	142.6	23.1	144.30
5/28/2008	190.93		21.9	179.3	10.2	140.60	8.9	142.6	22.6	144.81
6/25/2008	189.50		22.2	179.0	10.2	140.50	8.9	142.6	22.8	144.60
7/29/2008	185.10		24.5	176.7	10.3	140.40	9.0	142.5	23.1	144.30
7/30/2008	185.10	0.00	24.4	176.8	10.3	140.40	8.9	142.6	23.0	144.40
8/27/2008	178.00	0.00	29.3	171.9	10.5	140.20	9.2	142.3	24.0	143.40
9/25/2008	176.80	0.00	30.3	170.9	10.7	140.00	8.9	142.6	24.6	142.80
10/28/2008	175.20	0.00	36.6	164.6	11.0	139.70	9.1	142.4	25.2	142.20
11/25/2008	175.80	1.82	31.5	169.7	11.3	139.40	9.2	142.3	25.3	142.10
12/30/2008	181.70	2.91	27.5	173.7	10.9	139.80	9.2	142.3	24.1	143.30
1/29/2009	182.20	0.39	27.1	174.1	10.9	139.80	9.1	142.4	24.0	143.40
2/25/2009	185.70	3.10	25.1	176.1	10.8	139.90	9.1	142.4	23.5	143.90
3/26/2009	188.40	0.10	23.3	177.9	10.8	139.90	9.2	142.3	23.4	144.00
4/28/2009	189.30	0.00	22.4	178.8	10.9	139.80	9.1	142.4	23.1	144.30
5/18/2009	188.50	0.00	22.8	178.4	10.9	139.80	9.2	142.3	23.2	144.20

Notes:

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SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
5/27/2009	188.10	0.00	23.0	178.2	10.9	139.80	9.2	142.3	23.2	144.20
6/30/2009	188.60	0.10	22.8	178.4	11.0	139.70	9.0	142.5	23.7	143.70
7/30/2009	184.80	0.00	24.7	176.5	11.0	139.70	9.1	142.4	23.4	144.00
8/26/2009	176.60	0.00	29.2	172.0	11.1	139.60	9.1	142.4	24.2	143.20
9/30/2009	174.50	0.00	32.1	169.1	11.3	139.40	9.2	142.3	25.3	142.10
10/28/2009	175.30	0.29	31.8	169.4	11.5	139.20	8.3	143.2	25.6	141.80
12/1/2009	176.40	0.00	31.5	169.7	11.9	138.80	9.5	142.0	25.7	141.70
12/28/2009	178.80	2.75	29.9	171.3	11.3	139.40	9.5	142.0	24.9	142.50
1/26/2010	191.30	4.15	22.8	178.4	9.9	140.80	9.2	142.3	23.8	143.60
2/24/2010	193.60	2.29	20.3	180.9	9.8	140.90	7.9	143.6	22.0	145.40
3/29/2010	193.50	1.18	19.7	181.5	8.5	142.20	8.2	143.3	22.0	145.40
4/4/2010	193.50		19.8	181.4	8.7	142.00	8.2	143.3	22.1	145.30
4/27/2010	193.90	1.66	19.5	181.7	8.9	141.80	7.8	143.7	22.0	145.40
5/27/2010	192.90	0.03	19.9	181.3	9.2	141.50	7.8	143.7	22.0	145.40
6/29/2010	191.60	0.00	20.6	180.6	9.5	141.20	7.7	143.8	22.0	145.40
7/28/2010	187.50	0.00	22.6	178.6	9.8	140.90	7.8	143.7	22.4	145.00
8/31/2010	179.20	0.00	27.9	173.3	10.2	140.50	8.0	143.5	23.6	143.80
9/29/2010	175.60	0.00	31.2	170.0	10.6	140.10	8.1	143.4	24.9	142.50
10/26/2010	178.20	2.93	30.5	170.7	10.8	139.90	9.7	141.8	24.9	142.50
11/30/2010	178.80	1.14	30.2	171.0	11.6	139.10	8.3	143.2	25.0	142.40
12/30/2010	193.90	9.95	20.4	180.8	8.6	142.10	5.9	145.6	22.0	145.40
1/27/2011	194.00	0.86	20.0	181.2	9.3	141.40	6.2	145.4	22.0	145.40
2/23/2011	193.80	1.02	20.0	181.3	9.5	141.20	5.9	145.6	22.0	145.39
3/29/2011	193.90	2.38	19.6	181.6	8.9	141.80	6.7	144.8	21.7	145.70
4/27/2011	193.60	0.56	19.7	181.5	9.0	141.70	7.0	144.5	22.0	145.40
5/25/2011	193.10	0.51	20.2	181.0	9.2	141.50	7.0	144.5	21.9	145.50
6/28/2011	192.00	0.00	20.7	180.5	9.3	141.40	7.2	144.3	22.0	145.40
7/27/2011	186.75	0.00	23.5	177.8	9.4	141.40	7.1	144.4	22.4	145.00
8/25/2011	176.30	0.00	29.7	171.5	9.7	141.00	7.2	144.3	23.6	143.80
9/28/2011	176.00	0.06	24.7	176.5	10.5	140.30	7.6	143.9	24.9	142.50

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JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
10/25/2011	176.50	0.89	31.7	169.5	11.0	139.70	8.1	143.4	25.2	142.20
11/22/2011	177.20	1.31	31.7	169.6	11.1	139.70	8.2	143.4	25.2	142.20
12/22/2011	176.70	0.20	31.7	169.5	11.5	139.20	8.2	143.3	25.4	142.00
1/25/2012	178.60	0.84	30.8	170.4	11.7	139.00	8.3	143.2	25.0	142.40
2/28/2012	179.20	0.68	30.5	170.7	11.7	139.00	8.5	143.0	25.0	142.40
3/27/2012	180.60	1.73	29.7	171.5	11.5	139.20	8.4	143.1	24.8	142.65
6/27/2012	180.70	0.00	28.0	173.2	10.3	140.40	8.8	142.7	24.9	142.50
7/26/2012	179.20	0.10	29.8	171.5	10.9	139.80	8.8	142.7	25.1	142.30
8/8/2012	178.50	0.10	30.1	171.1	10.8	139.90	8.6	142.9	25.3	142.10
8/28/2012	177.10	0.00	31.0	170.2	11.2	139.50	8.7	142.8	25.6	141.80
8/29/2012	177.10	0.00	30.8	170.4	11.0	139.70	8.5	143.0	25.5	141.90
9/25/2012	175.30	0.00	32.2	169.0	11.6	139.10	8.8	142.7	26.1	141.30
10/30/2012	176.00	0.19	32.0	169.2	12.1	138.60	8.9	142.6	26.3	141.10
11/27/2012	175.80	0.69	32.2	169.0	12.4	138.30	9.4	142.1	26.0	141.40
12/12/2012	176.10	1.40	31.9	169.3	12.5	138.20	9.5	142.0	25.8	141.60
1/22/2013	177.20	1.20	31.3	169.9	12.5	138.20	9.6	141.9	25.1	142.30
2/27/2013	178.20	0.31	30.7	170.5	12.2	138.50	9.3	142.2	24.7	142.70
3/28/2013	178.20	0.71	31.0	170.2	12.1	138.60	9.5	142.0	24.7	142.70
4/25/2013	177.30	0.03	31.6	169.6	12.2	138.60	9.6	141.9	25.1	142.30
5/22/2013	177.60	0.00	31.4	169.8	12.1	138.60	9.6	141.9	25.3	142.10
6/25/2013	177.50	0.00	31.4	169.9	12.2	138.60	9.6	141.9	25.5	141.95
7/23/2013	175.70	0.00	32.4	168.8	12.3	138.40	9.7	141.8	25.9	141.50
8/21/2013	174.50	0.00	32.8	168.4	12.5	138.20	9.7	141.8	26.3	141.10
9/25/2013	175.70	0.00	32.4	168.8	12.9	137.80	10.2	141.3	26.5	140.90
10/29/2013	176.00	0.00	32.2	169.0	13.0	137.70	10.2	141.3	26.3	141.15
11/27/2013	176.50	0.44	31.8	169.4	12.9	137.80	10.0	141.5	25.9	141.50
12/19/2013	176.80	0.53	31.7	169.5	13.1	137.60	10.2	141.3	25.8	141.60
1/28/2014	176.80	0.00	32.0	169.2	13.0	137.70	10.3	141.2	25.5	141.90
2/25/2014	176.70	0.72	32.2	169.0	12.8	137.90	10.3	141.2	25.4	142.05
3/25/2014	178.50		30.9	170.3	8.1	142.60	10.2	141.3	24.9	142.50

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JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
3/29/2014	178.40	1.44	31.1	170.1	8.2	142.50	10.3	141.2	24.9	142.50
4/25/2014	177.40	0.74	31.5	169.7	8.9	141.80	10.2	141.3	25.0	142.40
5/28/2014	176.40	0.00	32.4	168.8	9.7	141.00	10.3	141.3	25.7	141.70
6/25/2014	176.10	0.00	32.2	169.0	10.3	140.40	10.2	141.3	26.3	141.10
7/30/2014	177.30	0.00	31.6	169.6	10.7	140.10	10.2	141.3	26.4	141.00
8/26/2014	176.10	0.03	32.1	169.1	11.0	139.70	10.2	141.3	26.4	141.00
9/23/2014	175.90	0.00	32.0	169.2	11.4	139.30	10.3	141.2	26.7	140.75
10/30/2014	176.30	0.00	32.1	169.1	11.9	138.80	10.5	141.0	26.5	140.90
11/21/2014	176.20	0.25	31.8	169.4	12.1	138.60	10.5	141.0	26.2	141.20
12/30/2014	178.90	3.37	30.3	170.9	11.9	138.80	10.5	141.0	25.2	142.20
1/27/2015	179.60	0.89	29.9	171.3	11.9	138.80	10.5	141.1	24.8	142.60
2/27/2015	180.00	0.46	29.7	171.5	11.9	138.80	10.5	141.0	24.6	142.80
3/26/2015	179.60	0.45	30.0	171.2	11.9	138.80	10.4	141.1	24.5	142.90
4/29/2015	178.20	0.24	30.8	170.4	11.9	138.80	10.6	140.9	24.9	142.50
5/27/2015	179.00	1.04	30.8	170.4	12.0	138.70	10.4	141.1	24.9	142.50
6/25/2015	179.60	0.00	29.8	171.4	12.0	138.70	10.3	141.2	25.0	142.40
7/29/2015	178.10	0.00	30.8	170.4	12.3	138.40	10.4	141.1	25.3	142.10
8/26/2015	176.20	0.00	31.9	169.3	12.3	138.40	10.4	141.1	25.6	141.80
9/22/2015	178.20	1.64	31.0	170.2	9.3	141.40	10.5	141.0	25.3	142.10
10/27/2015	176.90	0.10	31.4	169.8	9.9	140.80	10.5	141.0	25.3	142.10
11/24/2015	176.30	0.17	32.5	168.7	10.4	140.30	10.6	140.9	25.7	141.70
12/22/2015	177.60	0.72	31.2	170.0	10.7	140.00	10.5	141.0	25.2	142.20
1/27/2016	180.10	2.86	30.2	171.0	10.2	140.50	10.5	141.0	24.5	142.90
2/25/2016	181.60	0.20	29.2	172.0	10.6	140.10	9.9	141.6	24.2	143.20
3/24/2016	184.80		27.6	173.6	10.1	140.60	9.8	141.7	24.0	143.40
3/31/2016	184.50	1.51	27.6	173.6	10.2	140.50	9.8	141.7	24.1	143.30
4/28/2016	183.60	0.04	27.8	173.4	10.4	140.30	9.8	141.7	24.3	143.10
5/25/2016	182.50	0.13	28.4	172.8	10.6	140.10	9.8	141.7	24.4	143.00
6/28/2016	180.70	0.00	29.3	171.9	11.0	139.70	9.9	141.6	24.9	142.50
7/27/2016	178.40	0.00	30.7	170.5	11.1	139.60	9.9	141.6	25.5	141.90

Notes:

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3. Piezometer data based on NGVD 29 datum.

**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
8/24/2016	176.40	0.00	32.1	169.2	11.4	139.30	10.0	141.5	25.6	141.80
9/27/2016	175.80	0.00	32.7	168.5	11.8	138.90	10.1	141.4	26.4	141.00
10/26/2016	178.60	0.64	31.0	170.2	11.2	139.50	10.2	141.3	25.4	142.00
11/22/2016	178.30	1.11	31.2	170.0	12.2	138.50	10.3	141.3	26.1	141.30
12/28/2016	184.80	4.01	29.3	172.0	12.3	138.40	10.3	141.2	25.5	141.95
1/25/2017	193.30	6.33	22.5	178.7	11.0	139.70	7.1	144.4	22.6	144.80
2/28/2017	193.90	3.27	21.4	179.8	9.3	141.40	6.7	144.8	21.1	146.30
3/29/2017	193.70	0.08	21.2	180.0	9.1	141.60	7.2	144.3	21.4	146.00
4/27/2017	192.90	0.04	21.5	179.7	9.0	141.70	7.2	144.3	21.4	146.00
5/23/2017	187.90	0.33	23.8	177.4	9.1	141.60	7.3	144.2	21.9	145.50
6/21/2017	182.50	0.00	27.0	174.2	9.3	141.40	7.3	144.2	22.6	144.80
7/26/2017	163.60	0.00	34.6	166.6	9.7	141.00	8.3	143.3	24.4	143.00
8/30/2017	163.60	0.00	37.8	163.4	10.5	140.20	7.2	144.3	25.9	141.50
9/28/2017	163.60	0.00	40.2	161.0	11.4	139.30	10.5	141.0	26.9	140.50
10/26/2017	171.80	0.00	41.4	159.8	11.7	139.00	10.6	140.9	27.3	140.10
11/29/2017	177.20	0.08	33.1	168.1	12.3	138.40	10.9	140.6	27.1	140.30
12/27/2017	176.70	0.00	32.6	168.6	12.7	138.00	11.1	140.4	27.1	140.30
1/24/2018	178.10	1.67	31.8	169.4	13.0	137.70	11.1	140.4	27.1	140.30
2/21/2018	177.80	0.27	31.8	169.4	13.2	137.50	11.1	140.4	26.6	140.80
3/28/2018	183.50	1.23	28.8	172.4	13.3	137.40	11.2	140.3	26.1	141.30
4/27/2018	184.30	0.05	27.9	173.3	13.4	137.30	11.3	140.2	25.9	141.50
5/30/2018	183.10	0.13	28.2	173.0	13.5	137.20	11.7	139.8	25.7	141.70
6/28/2018	181.70	0.00	29.2	172.0	13.4	137.30	11.2	140.3	25.7	141.70
7/26/2018	180.00	0.00	30.4	170.8	13.4	137.30	11.2	140.3	24.7	142.70
8/28/2018	177.30	0.00	31.8	169.4	13.7	137.00	11.2	140.3	26.6	140.80
9/27/2018	178.10	0.00	32.0	169.2	13.8	136.90	11.3	140.2	26.7	140.70
10/24/2018	178.00	0.66	31.7	169.5	14.0	136.70	11.3	140.2	26.6	140.80
11/29/2018	177.50	1.60	31.8	169.4	14.5	136.20	11.4	140.1	26.6	140.80
12/20/2018	181.40	2.39	29.3	171.9	13.7	137.00	11.4	140.1	25.5	141.90
1/30/2019	189.40	4.56	24.4	176.8	11.4	139.30	9.3	142.2	24.0	143.40

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SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
2/27/2019	194.10	7.48	21.5	179.7	10.3	140.40	7.0	144.5	21.4	146.00
3/27/2019	194.00	1.27	21.2	180.0	9.9	140.80	7.4	144.1	21.5	145.90
4/24/2019	193.60	0.07	21.05	180.2	9.80	140.90	7.50	144.0	21.70	145.70
5/30/2019	191.40	0.73	22.20	179.0	9.70	141.00	5.00	146.5	21.90	145.50
6/26/2019	190.80	0.02	22.30	178.9	9.70	141.00	7.60	143.9	22.00	145.40
7/5/2015	190.40	0.00	22.60	178.6	9.70	141.00	7.60	143.9	22.10	145.30
7/30/2019	188.95	0.00	22.90	178.3	9.90	140.80	7.60	143.9	22.40	145.00
8/27/2019	187.40	0.00	24.10	177.1	10.50	140.20	8.10	143.4	22.70	144.70
9/26/2019	186.20	0.00	23.80	177.4	10.10	140.60	7.30	144.2	21.90	145.50
10/22/2019	185.20	0.00	25.50	175.7	10.80	139.90	8.00	143.5	23.50	143.90
11/26/2019	183.50	2.66	26.20	175.0	10.80	139.90	8.15	143.4	23.50	143.90
12/18/2019	186.80	4.44	24.50	176.7	10.70	140.00	8.20	143.3	22.85	144.55
1/28/2020	192.00	0.24	20.10	181.1	9.90	140.80	7.70	143.8	21.70	145.70
2/25/2020	192.10	0.49	21.00	180.2	9.20	141.50	7.60	143.9	21.60	145.80
3/24/2020	194.00	3.89	20.70	180.5	9.80	140.90	7.40	144.1	21.20	146.20
4/29/2020	193.50	4.59	19.25	182.0	8.15	142.55	6.75	144.8	20.60	146.80
5/27/2020	193.10	0.03	19.80	181.4	8.50	142.20	7.00	144.5	20.70	146.70
6/24/2020	190.00	0.00	20.70	180.5	8.70	142.00	7.30	144.2	20.60	146.80
7/29/2020	188.90	0.00	22.30	178.9	9.10	141.60	7.20	144.3	21.30	146.10
8/27/2020	185.90	0.00	24.00	177.2	9.10	141.60	7.20	144.3	21.60	145.80
9/29/2020	183.10	0.00	26.10	175.1	9.35	141.35	7.30	144.2	22.25	145.15
10/29/2020	180.30	0.00	27.80	173.4	9.60	141.10	7.40	144.1	23.00	144.40
11/24/2020	179.00	0.65	27.00	174.2	9.80	140.90	7.60	143.9	23.70	143.70
12/29/2020	179.00	1.03	29.10	172.1	10.10	140.60	7.90	143.6	24.10	143.30
1/26/2021	180.50	2.39	28.60	172.6	10.30	140.40	8.00	143.5	24.00	143.40
2/25/2021	182.10	0.03	27.50	173.7	10.40	140.30	8.90	142.6	23.70	143.70
3/23/2021	182.90	1.15	27.20	174.0	10.50	140.20	8.10	143.4	23.60	143.80
4/27/2021	182.00	0.04	27.70	173.5	10.70	140.00	8.20	143.3	24.00	143.40
5/26/2021	181.00	0.11	28.20	173.0	10.80	139.90	8.30	143.2	24.10	143.30
6/30/2021	179.00	0.00	29.40	171.8	11.00	139.70	8.40	143.1	24.40	143.00

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
7/27/2021	177.10	0.08	30.50	170.7	11.20	139.50	8.70	142.8	24.80	142.60
8/24/2021	175.40	0.00	31.80	169.4	11.40	139.30	8.90	142.6	25.20	142.20
9/28/2021	175.20	0.06	32.40	168.8	11.70	139.00	9.50	142.0	25.30	142.10
10/27/2021	177.20	0.80	31.40	169.8	12.00	138.70	9.60	141.9	25.50	141.90
11/23/2021	177.80	0.00	30.40	170.8	12.20	138.50	9.60	141.9	25.40	142.00
12/21/2021	180.50	5.86	29.20	172.0	12.30	138.40	9.70	141.8	24.90	142.50
1/25/2022	187.00	0.08	22.50	178.7	9.70	141.00	7.20	144.3	21.60	145.80
2/22/2022	186.60	0.18	25.60	175.6	11.40	139.30	9.30	142.2	23.60	143.80
3/28/2022	186.60	1.38	23.90	177.3	10.70	140.00	8.20	143.3	22.40	145.00
4/26/2022	186.60	0.01	25.70	175.5	11.20	139.50	9.10	142.4	23.70	143.70
5/25/2022	185.30	0.05	26.20	175.0	11.10	139.60	9.10	142.4	23.90	143.50
6/28/2022	182.70	0.00	27.40	173.8	11.30	139.40	9.20	142.3	24.30	143.10
7/26/2022	179.70	0.00	29.20	172.0	11.40	139.30	9.30	142.2	24.80	142.60
8/30/2022	178.30	0.13	30.70	170.5	11.70	139.00	9.50	142.0	25.40	142.00
9/29/2022	175.80	0.24	31.60	169.6	12.10	138.60	9.70	141.8	25.70	141.70
10/26/2022	175.30	0.26	32.30	168.9	12.20	138.50	9.70	141.8	25.70	141.70
11/22/2022	179.40	1.46	30.20	171.0	12.30	138.40	9.90	141.6	25.40	142.00
12/29/2022	185.70	2.21	26.00	175.2	12.00	138.70	9.90	141.6	24.30	143.10
1/11/2023	191.70	3.90	23.60	177.60	9.10	141.60	9.40	142.10	23.70	143.70
1/25/2023	194.00	7.17	21.40	179.80	0.04	150.66	7.80	143.70	22.40	145.00
2/28/2023	194.00	3.98	21.10	180.10	0.00	150.70	7.00	144.50	21.80	145.60
3/29/2023	194.00	5.92	20.30	180.90	0.00	150.70	6.40	145.10	20.40	147.00
4/25/2023	194.00	0.19	21.20	180.00	0.90	149.80	7.50	144.00	21.60	145.80
5/24/2023	193.40	0.89	20.87	180.33	1.61	149.09	7.70	143.80	21.77	145.63
6/28/2023	192.70	0.07	21.40	179.80	2.40	148.30	7.70	143.80	21.90	145.50
7/26/2023	191.60	0.00	21.60	179.60	3.00	147.70	7.80	143.70	22.00	145.40
8/29/2023	190.50	1.84	22.20	179.00	3.64	147.06	7.76	143.74	21.94	145.46
9/26/2023	189.80	0.00	22.60	178.60	4.10	146.60	7.60	143.90	21.80	145.60
10/25/2023	189.70	0.19	23.20	178.00	4.60	146.10	7.70	143.80	22.10	145.30
11/30/2023	189.20	0.65	23.40	177.80	5.10	145.60	7.80	143.70	21.90	145.50

Notes:

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			3		4		5		6	
Top of Well Elevation --->			201.2		150.7		151.5		167.4	
Bottom of Well Elevation --->			155.8		129.1		129.6		127.7	
Depth of Well --->			45.4		21.6		21.9		39.7	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
12/27/2023	190.00	1.15	23.40	177.80	5.60	145.10	7.80	143.70	21.90	145.50
1/29/2024	191.90	2.00	22.40	178.80	6.40	144.30	7.90	143.60	21.90	145.50
2/27/2024	194.00	8.89	20.40	180.80	0.05	150.65	6.00	145.50	19.60	147.80
3/27/2024	193.80	2.51	20.75	180.45	0.50	150.20	6.80	144.70	20.40	147.00
4/23/2024	194.00	1.51	20.70	180.50	1.10	149.60	6.90	144.60	20.20	147.20
5/1/2024	193.90	0.00	20.65	180.55	1.30	149.40	6.95	144.55	20.35	147.05
5/23/2024	193.10	0.08	21.15	180.05	1.65	149.05	7.20	144.30	20.50	146.90
6/20/2024	191.50	0.00	22.10	179.10	2.10	148.60	7.30	144.20	20.80	146.60
7/25/2024	188.70	0.00	23.80	177.40	2.70	148.00	7.30	144.20	21.30	146.10
8/28/2024	185.90	0.00	24.30	176.90	3.30	147.40	7.60	143.90	22.00	145.40
9/18/2024	183.95	0.00	26.50	174.70	3.70	147.00	7.70	143.80	22.50	144.90
10/30/2024	182.00	0.00	27.50	173.70	10.70	140.00	8.80	142.70	23.30	144.10
11/26/2024	177.30	0.06	30.37	170.83	10.83	139.87	8.84	142.66	23.87	143.53
12/17/2024	175.70	0.04	31.30	169.90	11.30	139.40	9.60	141.90	24.60	142.80
1/29/2025	173.20	1.18	33.70	167.50	11.40	139.30	9.90	141.60	25.10	142.30
2/26/2025	178.50	2.65	31.40	169.80	11.30	139.40	9.60	141.90	24.80	142.60
3/25/2025	183.40	2.08	28.20	173.00	11.20	139.50	9.40	142.10	24.50	142.90
4/14/2025	183.10	#N/A	28.10	173.10	11.65	139.05	9.75	141.75	24.70	142.70
4/23/2025	183.10	0.37	28.20	173.00	11.80	138.90	9.90	141.60	24.80	142.60
5/22/2025	182.60	0.05	28.65	172.55	12.20	138.50	10.15	141.35	25.00	142.40
7/7/2025	179.65	0.28	30.30	170.90	12.80	137.90	10.60	140.90	25.50	141.90
7/24/2025	177.90	0.00	31.30	169.90	12.90	137.80	10.76	140.74	25.64	141.76
8/26/2025	175.00	0.00	33.00	168.20	13.50	137.20	11.20	140.30	26.20	141.20
9/25/2025	173.20	0.12	34.10	167.10	13.80	136.90	11.50	140.00	26.40	141.00
10/22/2025	178.30	1.38	31.20	170.00	13.00	137.70	11.20	140.30	25.90	141.50
11/20/2025	182.20	5.76	28.82	172.38	11.27	139.43	10.30	141.20	25.24	142.16
12/17/2025	186.10	2.26	23.80	177.40	11.10	139.60	9.30	142.20	23.50	143.90

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
1/31/2007	176.80		8.4	160.8	35.8	166.5	46.9	155.30	22.5	161.50
2/28/2007	177.60		8.1	161.1	36.3	166.0	47.0	155.20	23.1	160.90
3/29/2007	177.10		8.3	160.9	36.3	166.0	47.2	155.00	23.3	160.70
4/27/2007	176.60		8.7	160.5	36.2	166.1	47.0	155.20	23.2	160.80
5/24/2007	176.80		9.4	159.8	36.6	165.7	47.3	154.90	23.4	160.60
6/27/2007	179.90		8.2	161.0	36.0	166.3	46.1	156.10	23.2	160.80
7/27/2007	177.80		7.8	161.4	35.9	166.4	46.5	155.70	23.1	160.90
8/28/2007	177.20		8.6	160.6	36.0	166.3	46.7	155.50	23.0	161.00
9/26/2007	177.00		7.5	161.7	36.0	166.3	46.5	155.70	23.1	160.90
10/30/2007	175.50		8.0	161.2	36.3	166.0	47.2	155.00	23.3	160.70
11/27/2007	175.90		7.9	161.3	36.6	165.7	47.2	155.00	23.5	160.50
12/27/2007	178.20		7.4	161.8	36.4	165.9	46.6	155.60	23.4	160.60
1/30/2008	184.40		6.7	162.5	35.6	166.8	45.0	157.30	23.3	160.70
2/26/2008	186.10		5.8	163.4	34.5	167.8	44.1	158.10	22.7	161.30
3/26/2008	188.00		5.4	163.8	33.5	168.8	43.7	158.50	22.3	161.70
4/25/2008	191.00		4.5	164.7	32.2	170.1	42.6	159.60	21.7	162.30
5/28/2008	190.93		4.5	164.7	31.4	170.9	42.3	159.90	21.2	162.80
6/25/2008	189.50		5.0	164.2	31.9	170.4	42.6	159.60	20.8	163.20
7/29/2008	185.10		6.9	162.3	32.0	170.3	43.3	158.90	20.9	163.10
7/30/2008	185.10	0.00	4.9	164.3	31.9	170.4	43.3	158.90	20.8	163.20
8/27/2008	178.00	0.00	6.3	162.9	33.6	168.7	45.6	156.60	21.4	162.60
9/25/2008	176.80	0.00	6.9	162.3	34.8	167.5	46.0	156.20	22.1	161.90
10/28/2008	175.20	0.00	7.4	161.8	35.6	166.7	46.8	155.40	22.5	161.50
11/25/2008	175.80	1.82	7.7	161.5	36.1	166.2	47.0	155.20	22.8	161.20
12/30/2008	181.70	2.91	6.5	162.7	35.6	166.7	45.1	157.10	22.8	161.20
1/29/2009	182.20	0.39	6.0	163.2	34.9	167.4	44.7	157.50	22.7	161.30
2/25/2009	185.70	3.10	5.8	163.4	34.6	167.7	43.9	158.30	22.4	161.60
3/26/2009	188.40	0.10	5.0	164.2	33.0	169.3	43.1	159.10	21.9	162.10
4/28/2009	189.30	0.00	3.7	165.5	31.9	170.4	42.7	159.50	21.4	162.60
5/18/2009	188.50	0.00	4.5	164.7	31.9	170.4	42.7	159.50	21.0	163.00

Notes:

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TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
5/27/2009	188.10	0.00	4.6	164.6	31.9	170.4	42.9	159.30	21.0	163.00
6/30/2009	188.60	0.10	4.3	164.9	31.7	170.6	42.6	159.60	21.0	163.00
7/30/2009	184.80	0.00	4.5	164.7	32.0	170.3	43.2	159.00	20.9	163.10
8/26/2009	176.60	0.00	5.8	163.4	33.3	169.0	45.1	157.10	21.4	162.60
9/30/2009	174.50	0.00	7.7	161.5	35.1	167.2	46.6	155.60	22.2	161.80
10/28/2009	175.30	0.29	7.8	161.4	35.6	166.7	46.7	155.50	22.5	161.50
12/1/2009	176.40	0.00	7.7	161.5	36.1	166.2	46.9	155.30	22.8	161.20
12/28/2009	178.80	2.75	6.8	162.4	36.0	166.3	46.0	156.20	23.0	161.10
1/26/2010	191.30	4.15	5.5	163.7	35.4	166.9	43.2	159.00	22.9	161.10
2/24/2010	193.60	2.29	3.2	166.0	31.8	170.5	41.5	160.70	21.6	162.40
3/29/2010	193.50	1.18	3.4	165.8	31.3	171.0	41.2	161.00	20.2	163.80
4/4/2010	193.50		3.6	165.6	30.2	172.1	41.1	161.10	20.3	163.70
4/27/2010	193.90	1.66	3.4	165.8	29.8	172.5	41.0	161.20	19.5	164.50
5/27/2010	192.90	0.03	3.4	165.8	29.8	172.5	41.0	161.20	19.4	164.60
6/29/2010	191.60	0.00	3.1	166.1	29.9	172.4	41.2	161.00	19.4	164.60
7/28/2010	187.50	0.00	3.3	165.9	30.6	171.7	42.6	159.60	19.8	164.20
8/31/2010	179.20	0.00	4.6	164.6	32.6	169.7	44.4	157.80	21.0	163.00
9/29/2010	175.60	0.00	6.3	162.9	34.2	168.1	45.8	156.40	21.5	162.50
10/26/2010	178.20	2.93	6.8	162.4	35.2	167.1	45.8	156.40	22.3	161.70
11/30/2010	178.80	1.14	6.4	162.8	35.7	166.6	45.8	156.40	22.8	161.20
12/30/2010	193.90	9.95	4.1	165.1	33.8	168.5	41.3	160.90	19.6	164.40
1/27/2011	194.00	0.86	2.9	166.3	30.3	172.0	41.0	161.20	19.2	164.80
2/23/2011	193.80	1.02	2.8	166.4	29.5	172.9	40.7	161.50	18.7	165.40
3/29/2011	193.90	2.38	2.7	166.5	28.8	173.5	40.4	161.80	16.3	167.70
4/27/2011	193.60	0.56	2.8	166.5	29.0	173.3	40.5	161.70	18.2	165.90
5/25/2011	193.10	0.51	2.5	166.7	29.4	172.9	40.6	161.60	18.8	165.20
6/28/2011	192.00	0.00	2.5	166.7	29.6	172.7	40.9	161.30	19.2	164.80
7/27/2011	186.75	0.00	2.9	166.3	30.7	171.6	42.1	160.10	19.7	164.30
8/25/2011	176.30	0.00	4.7	164.5	32.7	169.6	44.8	157.40	20.9	163.10
9/28/2011	176.00	0.06	6.6	162.6	34.9	167.4	46.0	156.20	22.1	161.90

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
10/25/2011	176.50	0.89	6.7	162.5	35.8	166.5	46.1	156.10	22.5	161.50
11/22/2011	177.20	1.31	6.7	162.6	36.0	166.4	46.2	156.00	22.8	161.20
12/22/2011	176.70	0.20	6.3	162.9	35.9	166.4	45.9	156.30	22.9	161.10
1/25/2012	178.60	0.84	6.5	162.7	35.7	166.6	45.5	156.70	22.8	161.20
2/28/2012	179.20	0.68	6.4	162.8	35.9	166.4	45.6	156.60	22.8	161.20
3/27/2012	180.60	1.73	6.3	162.9	35.6	166.7	45.0	157.20	23.0	161.10
6/27/2012	180.70	0.00	5.9	163.3	34.4	167.9	44.6	157.60	22.4	161.60
7/26/2012	179.20	0.10	6.3	162.9	35.0	167.3	45.1	157.10	22.5	161.50
8/8/2012	178.50	0.10	6.2	163.0	34.8	167.5	45.2	157.00	22.4	161.60
8/28/2012	177.10	0.00	6.5	162.7	35.3	167.0	45.6	156.60	22.6	161.40
8/29/2012	177.10	0.00	6.4	162.8	35.0	167.3	45.5	156.70	22.3	161.70
9/25/2012	175.30	0.00	7.0	162.2	35.7	166.6	46.3	155.90	22.8	161.20
10/30/2012	176.00	0.19	7.0	162.2	36.3	166.0	46.4	155.80	23.2	160.80
11/27/2012	175.80	0.69	7.0	162.2	36.4	165.9	46.5	155.70	23.3	160.70
12/12/2012	176.10	1.40	6.9	162.3	36.3	166.0	46.3	155.90	23.1	160.90
1/22/2013	177.20	1.20	6.4	162.8	36.4	165.9	45.8	156.40	23.3	160.70
2/27/2013	178.20	0.31	6.1	163.1	36.0	166.3	45.4	156.80	23.1	160.90
3/28/2013	178.20	0.71	6.4	162.8	36.0	166.3	45.5	156.70	23.3	160.70
4/25/2013	177.30	0.03	6.6	162.6	36.1	166.2	45.8	156.40	23.3	160.80
5/22/2013	177.60	0.00	6.6	162.6	36.1	166.2	45.7	156.50	23.2	160.80
6/25/2013	177.50	0.00	6.5	162.7	36.2	166.1	45.7	156.50	23.3	160.70
7/23/2013	175.70	0.00	6.8	162.4	36.3	166.0	46.3	156.00	23.3	160.70
8/21/2013	174.50	0.00	7.0	162.2	38.0	164.3	46.5	155.70	23.3	160.70
9/25/2013	175.70	0.00	6.8	162.4	36.2	166.1	46.3	155.90	23.4	160.60
10/29/2013	176.00	0.00	6.5	162.7	36.6	165.7	46.2	156.00	23.5	160.60
11/27/2013	176.50	0.44	6.1	163.1	36.4	165.9	45.9	156.30	23.3	160.70
12/19/2013	176.80	0.53	6.2	163.0	36.3	166.0	45.8	156.40	23.2	160.80
1/28/2014	176.80	0.00	6.2	163.0	36.5	165.8	45.9	156.30	23.5	160.50
2/25/2014	176.70	0.72	6.3	163.0	36.5	165.8	45.9	156.30	23.5	160.50
3/25/2014	178.50		6.0	163.3	36.2	166.1	45.4	156.90	23.4	160.60

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
3/29/2014	178.40	1.44	5.9	163.3	36.4	165.9	45.5	156.70	23.5	160.50
4/25/2014	177.40	0.74	6.1	163.1	36.1	166.2	45.5	156.70	23.3	160.70
5/28/2014	176.40	0.00	6.6	162.6	36.3	166.0	46.0	156.20	23.3	160.70
6/25/2014	176.10	0.00	6.4	162.8	36.4	165.9	44.9	157.30	23.3	160.70
7/30/2014	177.30	0.00	6.2	163.0	36.3	166.0	45.6	156.70	23.2	160.90
8/26/2014	176.10	0.03	6.1	163.1	36.2	166.1	45.6	156.60	23.6	160.40
9/23/2014	175.90	0.00	6.0	163.2	36.4	166.0	45.7	156.50	23.3	160.80
10/30/2014	176.30	0.00	5.9	163.3	36.3	166.0	45.8	156.40	23.3	160.70
11/21/2014	176.20	0.25	5.8	163.4	36.3	166.0	45.5	156.70	23.2	160.80
12/30/2014	178.90	3.37	5.3	163.9	36.0	166.3	44.9	157.30	23.1	160.90
1/27/2015	179.60	0.89	5.2	164.0	35.8	166.5	44.6	157.60	23.2	160.90
2/27/2015	180.00	0.46	5.2	164.0	35.2	167.1	44.3	157.90	22.8	161.20
3/26/2015	179.60	0.45	5.3	163.9	35.3	167.0	44.4	157.80	22.8	161.20
4/29/2015	178.20	0.24	5.6	163.6	35.3	167.0	44.8	157.40	22.6	161.40
5/27/2015	179.00	1.04	5.8	163.4	35.7	166.6	45.0	157.20	22.9	161.10
6/25/2015	179.60	0.00	5.2	164.0	35.2	167.1	44.5	157.70	23.0	161.00
7/29/2015	178.10	0.00	5.4	163.8	35.3	167.0	44.8	157.40	22.6	161.40
8/26/2015	176.20	0.00	5.6	163.6	35.6	166.7	45.2	157.00	22.7	161.30
9/22/2015	178.20	1.64	5.6	163.6	35.8	166.5	44.9	157.30	22.9	161.10
10/27/2015	176.90	0.10	5.4	163.8	35.8	166.5	45.0	157.20	22.5	161.50
11/24/2015	176.30	0.17	5.6	163.6	35.8	166.5	45.3	156.90	23.2	160.80
12/22/2015	177.60	0.72	5.5	163.7	35.8	166.5	44.9	157.30	22.9	161.10
1/27/2016	180.10	2.86	5.3	163.9	36.0	166.3	44.7	157.50	23.5	160.50
2/25/2016	181.60	0.20	5.0	164.2	34.9	167.4	43.8	158.40	23.5	160.50
3/24/2016	184.80		4.8	164.4	34.5	167.8	43.3	158.90	23.4	160.60
3/31/2016	184.50	1.51	4.7	164.5	34.4	167.9	43.1	159.10	23.3	160.70
4/28/2016	183.60	0.04	4.8	164.4	33.8	168.5	43.2	159.00	23.2	160.80
5/25/2016	182.50	0.13	4.7	164.5	34.1	168.2	43.6	158.60	22.9	161.10
6/28/2016	180.70	0.00	4.8	164.4	34.3	168.0	43.9	158.30	23.1	160.90
7/27/2016	178.40	0.00	5.1	164.1	34.6	167.7	44.6	157.60	23.2	160.80

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TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
8/24/2016	176.40	0.00	5.7	163.5	35.3	167.0	45.1	157.10	23.4	160.60
9/27/2016	175.80	0.00	6.1	163.1	35.8	166.5	45.5	156.70	23.5	160.50
10/26/2016	178.60	0.64	5.3	163.9	35.8	166.5	44.8	157.40	23.6	160.40
11/22/2016	178.30	1.11	5.6	163.7	35.7	166.6	44.8	157.40		
12/28/2016	184.80	4.01	5.2	164.0	35.5	166.8	44.0	158.20	23.4	160.60
1/25/2017	193.30	6.33	3.9	165.3	33.9	168.4	41.1	161.10	22.3	161.70
2/28/2017	193.90	3.27	3.2	166.0	30.7	171.6	40.5	161.70	21.2	162.80
3/29/2017	193.70	0.08	3.0	166.2	30.0	172.3	40.3	161.90	20.5	163.50
4/27/2017	192.90	0.04	2.7	166.5	29.7	172.6	40.0	162.20	20.4	163.60
5/23/2017	187.90	0.33	3.0	166.2	30.5	171.8	41.2	161.00	23.4	160.60
6/21/2017	182.50	0.00	3.5	165.7	31.9	170.4	42.6	159.60	21.3	162.70
7/26/2017	163.60	0.00	5.8	163.4	34.5	167.8	46.7	155.50	22.8	161.30
8/30/2017	163.60	0.00	8.7	160.5	36.4	165.9	48.6	153.60	23.5	160.50
9/28/2017	163.60	0.00	12.6	156.6	37.5	164.8	49.7	152.50	23.6	160.40
10/26/2017	171.80	0.00	14.5	154.7	37.7	164.6	48.8	153.40	23.6	160.40
11/29/2017	177.20	0.08	9.7	159.5	37.2	165.1	46.3	155.90	23.6	160.40
12/27/2017	176.70	0.00	7.6	161.6	36.7	165.6	46.1	156.10	23.6	160.40
1/24/2018	178.10	1.67	7.7	161.5	36.3	166.0	45.4	156.80	23.6	160.40
2/21/2018	177.80	0.27	6.8	162.4	36.1	166.2	45.3	156.90	23.6	160.40
3/28/2018	183.50	1.23	5.9	163.3	35.6	166.7	44.0	158.20	23.3	160.74
4/27/2018	184.30	0.05	5.2	164.0	34.8	167.5	43.5	158.70	23.6	160.40
5/30/2018	183.10	0.13	5.3	163.9	34.2	168.1	43.6	158.60	23.3	160.75
6/28/2018	181.70	0.00	5.7	163.5	34.2	168.1	44.0	158.20	23.3	160.70
7/26/2018	180.00	0.00	6.0	163.2	34.5	167.8	44.4	157.80	23.9	160.10
8/28/2018	177.30	0.00	6.7	162.5	35.2	167.2	45.3	156.90	23.4	160.60
9/27/2018	178.10	0.00	7.0	162.2	35.5	166.8	45.5	156.70	23.6	160.40
10/24/2018	178.00	0.66	6.2	163.0	35.6	166.7	45.3	156.90	23.6	160.40
11/29/2018	177.50	1.60	6.9	162.3	35.5	166.8	45.5	156.70	23.6	160.40
12/20/2018	181.40	2.39	6.6	162.6	35.3	167.0	44.4	157.80	23.6	160.40
1/30/2019	189.40	4.56	5.0	164.2	33.6	168.7	41.8	160.40	23.4	160.60

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JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
2/27/2019	194.10	7.48	3.5	165.7	30.8	171.5	39.7	162.50	20.1	
3/27/2019	194.00	1.27	3.9	165.3	29.6	172.7	34.3	167.90	20.9	
4/24/2019	193.60	0.07	4.25	165.0	29.40	172.9	39.30	162.90	20.10	
5/30/2019	191.40	0.73	4.60	164.6	29.90	172.4	39.90	162.30	20.50	
6/26/2019	190.80	0.02	4.50	164.7	30.30	172.0	40.20	162.00	20.70	
7/5/2015	190.40	0.00	4.40	164.8	30.50	171.8	40.30	161.90	20.80	
7/30/2019	188.95	0.00	4.70	164.5	30.70	171.6	40.50	161.70	21.00	
8/27/2019	187.40	0.00	4.70	164.5	31.10	171.2	41.20	161.00	2.31	
9/26/2019	186.20	0.00	4.70	164.5	31.50	170.8	41.20	161.00	21.70	
10/22/2019	185.20	0.00	5.00	164.2	32.40	169.9	42.00	160.20	22.00	
11/26/2019	183.50	2.66	5.10	164.1	32.70	169.6	42.50	159.70	8804.00	
12/18/2019	186.80	4.44	4.80	164.4	32.60	169.7	41.65	160.55	8803.00	
1/28/2020	192.00	0.24	4.00	165.2	30.50	171.8	39.40	162.80	23.30	
2/25/2020	192.10	0.49	4.00	165.2	30.30	172.00	39.10	163.10	87.67	
3/24/2020	194.00	3.89	4.00	165.2	3.20	199.10	39.10	163.10	8760.00	
4/29/2020	193.50	4.59	3.30	165.9	28.70	173.6	37.90	164.30	8719.457	
5/27/2020	193.10	0.03	3.00	166.2	29.00	173.3	38.10	164.10	8736.785	
6/24/2020	190.00	0.00	2.80	166.4	29.70	172.6	38.40	163.80	8749.643	
7/29/2020	188.90	0.00	2.90	166.3	30.30	172.0	39.40	162.80	8763.9	
8/27/2020	185.90	0.00	3.30	165.9	31.10	171.2	40.30	161.90	8779.345	
9/29/2020	183.10	0.00	4.20	165.0	32.40	169.9	41.55	160.65	8796.117	
10/29/2020	180.30	0.00	5.00	164.2	33.40	168.9	42.60	159.60	8808.922	
11/24/2020	179.00	0.65	5.70	163.5	34.00	168.3	43.30	158.90	8817.643	
12/29/2020	179.00	1.03	5.90	163.3	34.50	167.8	43.30	158.90	8824.287	
1/26/2021	180.50	2.39	4.80	164.4	34.70	167.6	43.00	159.20	23.3	160.70
2/25/2021	182.10	0.03	5.60	163.6	34.10	168.2	41.90	160.30	23.10	160.90
3/23/2021	182.90	1.15	5.40	163.8	33.80	168.5	41.40	160.80	23.20	160.80
4/27/2021	182.00	0.04	5.60	163.6	34.00	168.3	42.10	160.10	23.20	160.80
5/26/2021	181.00	0.11	5.70	163.5	34.20	168.1	42.40	159.80	23.60	160.40
6/30/2021	179.00	0.00	6.00	163.2	34.60	167.7	43.20	159.00	23.40	160.60

Notes:

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3. Piezometer data based on NGVD 29 datum.

**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
7/27/2021	177.10	0.08	6.50	162.7	35.00	167.3	43.90	158.30	23.50	160.50
8/24/2021	175.40	0.00	6.80	162.4	35.40	166.9	44.60	157.60	23.50	160.50
9/28/2021	175.20	0.06	6.90	162.3	35.90	166.4	45.10	157.10	23.60	160.40
10/27/2021	177.20	0.80	6.60	162.6	36.10	166.2	44.80	157.40	23.60	160.40
11/23/2021	177.80	0.00	6.20	163.0	35.70	166.6	44.20	158.00	23.60	160.40
12/21/2021	180.50	5.86	5.90	163.3	35.60	166.7	43.50	158.70	23.60	160.40
1/25/2022	187.00	0.08	3.20	166.0	39.90	162.4	39.60	162.60	23.60	160.40
2/22/2022	186.60	0.18	4.70	164.5	33.00	169.3	40.50	161.70	23.10	160.90
3/28/2022	186.60	1.38	4.60	164.6	32.30	170.0	41.50	160.70	22.80	161.20
4/26/2022	186.60	0.01	4.50	164.7	33.20	169.1	40.50	161.70	22.73	161.27
5/25/2022	185.30	0.05	4.60	164.6	32.60	169.7	41.00	161.20	22.70	161.30
6/28/2022	182.70	0.00	5.00	164.2	33.20	169.1	41.90	160.30	22.80	161.20
7/26/2022	179.70	0.00	5.40	163.8	33.90	168.4	43.00	159.20	23.00	161.00
8/30/2022	178.30	0.13	6.10	163.1	34.60	167.7	43.90	158.30	23.40	160.60
9/29/2022	175.80	0.24	6.40	162.8	35.30	167.0	44.70	157.50	23.70	160.30
10/26/2022	175.30	0.26	6.60	162.6	35.80	166.5	45.20	157.00	23.60	160.40
11/22/2022	179.40	1.46	6.00	163.2	35.90	166.4	44.30	157.90	23.60	160.40
12/29/2022	185.70	2.21	45.00	124.2	34.00	168.3	41.90	160.30	23.60	160.40
1/11/2023	191.70	3.90	4.20	165.00	33.50	168.80	40.60	161.60	23.10	160.90
1/25/2023	194.00	7.17	3.40	165.80	31.90	170.40	38.80	163.40	22.50	161.50
2/28/2023	194.00	3.98	3.40	165.80	30.10	172.20	38.10	164.10	20.50	163.50
3/29/2023	194.00	5.92	3.20	166.00	28.50	173.80	37.70	164.50	17.00	167.00
4/25/2023	194.00	0.19	3.60	165.60	28.80	173.50	37.90	164.30	19.30	164.70
5/24/2023	193.40	0.89	3.79	165.41	28.83	173.48	38.55	163.65	19.80	164.20
6/28/2023	192.70	0.07	3.00	166.20	29.40	172.90	38.80	163.40	20.08	163.92
7/26/2023	191.60	0.00	2.80	166.40	29.70	172.60	38.80	163.40	20.45	163.55
8/29/2023	190.50	1.84	2.60	166.60	30.19	172.11	39.15	163.05	20.77	163.23
9/26/2023	189.80	0.00	2.50	166.70	30.55	171.75	39.60	162.60	20.90	163.10
10/25/2023	189.70	0.19	2.70	166.50	30.80	171.50	39.80	162.40	21.20	162.80
11/30/2023	189.20	0.65	3.00	166.20	30.80	171.50	39.80	162.40	21.40	162.60

Notes:

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			7		8A		8B		VBW9A	
Top of Well Elevation --->			169.2		202.3		202.2		184	
Bottom of Well Elevation --->			152.7		164.3		144.5		160.4	
Depth of Well --->			16.5		38		57.7		23.6	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
12/27/2023	190.00	1.15	3.20	166.00	31.20	171.10	39.80	162.40	21.50	162.50
1/29/2024	191.90	2.00	3.50	165.70	30.50	171.80	39.00	163.20	21.29	162.71
2/27/2024	194.00	8.89	2.60	166.60	28.50	173.80	38.00	164.20	16.01	167.99
3/27/2024	193.80	2.51	2.60	166.60	28.90	173.40	38.10	164.10	18.78	165.22
4/23/2024	194.00	1.51	2.50	166.70	28.80	173.50	37.90	164.30	18.98	165.02
5/1/2024	193.90	0.00	3.10	166.10	28.60	173.70	37.90	164.30	19.02	164.98
5/23/2024	193.10	0.08	2.30	166.90	29.05	173.25	38.40	163.80	18.97	165.03
6/20/2024	191.50	0.00	2.60	166.60	29.60	172.70	38.90	163.30	20.30	163.70
7/25/2024	188.70	0.00	3.30	165.90	30.70	171.60	39.90	162.30	21.14	162.86
8/28/2024	185.90	0.00	3.80	165.40	31.60	170.70	40.75	161.45	21.72	162.28
9/18/2024	183.95	0.00	4.10	165.10	32.20	170.10	41.40	160.80	18.97	165.03
10/30/2024	182.00	0.00	4.50	164.70	33.20	169.10	43.40	158.80	22.68	161.32
11/26/2024	177.30	0.06	5.20	164.00	33.94	168.36	44.48	157.72	22.92	161.08
12/17/2024	175.70	0.04	6.20	163.00	34.80	167.50	45.20	157.00	23.17	160.83
1/29/2025	173.20	1.18	7.60	161.60	36.10	166.20	46.40	155.80	23.26	160.74
2/26/2025	178.50	2.65	6.70	162.50	36.10	166.20	45.00	157.20	23.60	160.40
3/25/2025	183.40	2.08	5.20	164.00	35.30	167.00	43.40	158.80	23.60	160.40
4/14/2025	183.10	#N/A	4.95	164.25	34.55	167.75	43.35	158.85	23.60	160.40
4/23/2025	183.10	0.37	5.00	164.20	34.40	167.90	43.40	158.80	23.47	160.53
5/22/2025	182.60	0.05	5.50	163.70	34.10	168.20	43.55	158.65	23.40	160.60
7/7/2025	179.65	0.28	5.40	163.80	34.40	167.90	44.30	157.90	23.43	160.57
7/24/2025	177.90	0.00	6.68	162.52	34.73	167.57	44.80	157.40	23.48	160.52
8/26/2025	175.00	0.00	6.50	162.70	35.50	166.80	45.60	156.60	23.60	160.40
9/25/2025	173.20	0.12	7.10	162.10	36.10	166.20	46.30	155.90	23.60	160.40
10/22/2025	178.30	1.38	6.30	162.90	36.10	166.20	45.10	157.10	23.00	161.00
11/20/2025	182.20	5.76	5.54	163.66	35.59	166.71	44.07	158.13	23.60	160.40
12/17/2025	186.10	2.26	4.20	165.00	34.10	168.20	42.50	159.70	23.51	160.49

Notes:

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3. Piezometer data based on NGVD 29 datum.

TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
1/31/2007	176.80		28.9	155.3	19.4	164.0	45.0	138.7	8.4	157.2
2/28/2007	177.60		28.5	155.7	19.3	164.1	45.2	138.5	9.2	156.4
3/29/2007	177.10		28.6	155.6	19.3	164.1	45.6	138.1	8.4	157.2
4/27/2007	176.60		28.5	155.7	19.3	164.1	45.4	138.3	9.3	156.3
5/24/2007	176.80		28.6	155.6	19.3	164.1	45.9	137.8	9.2	156.4
6/27/2007	179.90		28.4	155.8	19.2	164.2	45.4	138.3	8.2	157.4
7/27/2007	177.80		28.5	155.7	19.3	164.1	46.5	137.2	9.2	156.4
8/28/2007	177.20		28.3	155.9	19.4	164.0	46.4	137.3	8.0	157.6
9/26/2007	177.00		28.4	155.8	19.4	164.0	46.5	137.2	9.3	156.3
10/30/2007	175.50		28.7	155.5	19.4	164.0	46.6	137.1	9.3	156.3
11/27/2007	175.90		28.8	155.4	19.5	163.9	46.6	137.1	9.3	156.3
12/27/2007	178.20		28.9	155.3	19.5	163.9	45.5	138.2	9.5	156.1
1/30/2008	184.40		28.6	155.6	19.4	164.1	43.6	140.3	9.4	156.2
2/26/2008	186.10		28.2	156.0	19.4	164.0	43.2	140.6	9.3	156.3
3/26/2008	188.00		27.7	156.5	19.3	164.1	43.4	140.4	9.1	156.5
4/25/2008	191.00		27.1	157.1	19.5	163.9	42.8	141.0	8.9	156.7
5/28/2008	190.93		26.7	157.5	19.6	163.8	42.9	141.0	8.3	157.3
6/25/2008	189.50		26.5	157.7	19.8	163.6	42.8	141.0	8.3	157.3
7/29/2008	185.10		26.5	157.7	19.2	164.2	42.8	141.0	8.2	157.4
7/30/2008	185.10	0.00	26.5	157.7	19.3	164.1	42.7	141.1	7.8	157.8
8/27/2008	178.00	0.00	26.9	157.3	19.4	164.0	44.2	139.6	8.3	157.3
9/25/2008	176.80	0.00	27.6	156.6	19.3	164.1	45.0	138.8	8.1	157.5
10/28/2008	175.20	0.00	28.1	156.1	21.0	162.4	45.3	138.5	8.0	157.6
11/25/2008	175.80	1.82	28.4	155.8	21.4	162.0	45.4	138.4	9.0	156.6
12/30/2008	181.70	2.91	28.2	156.0	21.7	161.7	43.9	139.9	9.0	156.6
1/29/2009	182.20	0.39	28.2	156.0	21.5	161.9	43.9	139.9	9.1	156.5
2/25/2009	185.70	3.10	28.0	156.2	21.4	162.0	43.0	140.8	8.9	156.7
3/26/2009	188.40	0.10	27.5	156.7	20.9	162.5	43.6	140.2	8.8	156.8
4/28/2009	189.30	0.00	27.1	157.1	20.2	163.2	43.7	140.1	8.5	157.1
5/18/2009	188.50	0.00	26.8	157.4	19.6	163.8	43.4	140.4	8.4	157.2

Notes:

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
5/27/2009	188.10	0.00	26.8	157.4	19.4	164.0	43.6	140.2	8.4	157.2
6/30/2009	188.60	0.10	26.7	157.5	19.2	164.2	43.7	140.1	8.4	157.2
7/30/2009	184.80	0.00	26.7	157.5	19.2	164.2	43.9	139.9	8.3	157.3
8/26/2009	176.60	0.00	27.0	157.2	19.5	163.9	44.1	139.7	8.3	157.3
9/30/2009	174.50	0.00	27.7	156.5	20.4	163.0	45.1	138.7	8.7	156.9
10/28/2009	175.30	0.29	28.0	156.2	20.8	162.6	44.4	139.4	8.9	156.7
12/1/2009	176.40	0.00	28.4	155.8	21.0	162.4	45.0	138.8	9.0	156.6
12/28/2009	178.80	2.75	28.5	155.8	21.8	161.6	44.5	139.3	9.2	156.5
1/26/2010	191.30	4.15	28.3	155.9	21.5	161.9	43.0	140.8	8.1	157.5
2/24/2010	193.60	2.29	27.2	157.0	20.5	162.9	42.4	141.4	8.3	157.3
3/29/2010	193.50	1.18	26.1	158.1	19.1	164.3	42.4	141.4	8.1	157.5
4/4/2010	193.50		26.0	158.2	18.7	164.7	42.6	141.2	8.2	157.4
4/27/2010	193.90	1.66	25.8	158.4	18.4	165.0	42.5	141.3	8.0	157.6
5/27/2010	192.90	0.03	25.7	158.5	18.2	165.2	42.4	141.4	7.8	157.8
6/29/2010	191.60	0.00	25.8	158.4	18.1	165.3	42.2	141.6	7.9	157.7
7/28/2010	187.50	0.00	26.1	158.1	18.3	165.1	42.9	140.9	8.0	157.6
8/31/2010	179.20	0.00	26.8	157.4	18.9	164.5	42.9	140.9	7.9	157.7
9/29/2010	175.60	0.00	27.2	157.0	19.3	164.1	44.0	139.8	8.0	157.6
10/26/2010	178.20	2.93	27.8	156.4	20.3	163.1	44.3	139.5	8.6	157.0
11/30/2010	178.80	1.14	28.4	155.8	21.3	162.1	44.6	139.2	8.9	156.7
12/30/2010	193.90	9.95	27.0	157.2	19.5	163.9	42.1	141.7	7.5	158.1
1/27/2011	194.00	0.86	26.0	158.2	18.8	164.6	42.7	141.2	7.8	157.8
2/23/2011	193.80	1.02	25.6	158.7	18.2	165.2	42.4	141.4	7.9	157.8
3/29/2011	193.90	2.38	24.6	159.6	16.8	166.6	41.9	141.9	7.6	158.0
4/27/2011	193.60	0.56	25.0	159.2	17.0	166.4	42.4	141.4	7.8	157.8
5/25/2011	193.10	0.51	25.5	158.7	17.6	165.8	42.3	141.5	7.9	157.7
6/28/2011	192.00	0.00	25.8	158.4	18.3	165.1	42.4	141.4	8.0	157.6
7/27/2011	186.75	0.00	26.1	158.1	18.4	165.1	42.6	141.2	8.2	157.4
8/25/2011	176.30	0.00	26.9	157.3	18.5	164.9	43.4	140.4	8.5	157.1
9/28/2011	176.00	0.06	27.7	156.5	20.0	163.5	44.5	139.3	8.7	156.9

Notes:

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TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
10/25/2011	176.50	0.89	28.1	156.1	20.6	162.8	44.8	139.0	8.9	156.7
11/22/2011	177.20	1.31	28.4	155.8	21.2	162.2	44.7	139.1	9.0	156.6
12/22/2011	176.70	0.20	28.5	155.7	21.6	161.8	45.2	138.6	8.9	156.7
1/25/2012	178.60	0.84	28.3	155.9	21.4	162.0	44.2	139.6	9.2	156.4
2/28/2012	179.20	0.68	28.6	155.6	21.7	161.7	44.2	139.6	9.4	156.2
3/27/2012	180.60	1.73	28.4	155.8	21.8	161.7	43.8	140.0	9.2	156.4
6/27/2012	180.70	0.00	27.9	156.3	20.2	163.2	44.1	139.7	9.6	156.0
7/26/2012	179.20	0.10	28.2	156.0	21.5	161.9	44.4	139.4	9.2	156.4
8/8/2012	178.50	0.10	28.0	156.2	21.1	162.3	44.9	138.9	9.0	156.6
8/28/2012	177.10	0.00	28.2	156.0	21.3	162.1	45.3	138.5	9.1	156.5
8/29/2012	177.10	0.00	27.8	156.4	20.9	162.5	45.7	138.1	8.9	156.7
9/25/2012	175.30	0.00	28.3	155.9	21.4	162.0	46.2	137.6	9.1	156.5
10/30/2012	176.00	0.19	28.6	155.6	21.8	161.6	46.3	137.5	9.2	156.4
11/27/2012	175.80	0.69	28.8	155.4	22.1	161.3	46.1	137.7	9.3	156.3
12/12/2012	176.10	1.40	28.6	155.6	22.0	161.5	45.6	138.2	9.3	156.3
1/22/2013	177.20	1.20	28.8	155.4	22.3	161.1	44.6	139.2	9.2	156.4
2/27/2013	178.20	0.31	28.6	155.6	22.2	161.2	44.4	139.4	9.4	156.2
3/28/2013	178.20	0.71	28.7	155.5	22.3	161.1	44.1	139.7	9.5	156.1
4/25/2013	177.30	0.03	28.7	155.5	22.3	161.1	45.0	138.8	9.5	156.1
5/22/2013	177.60	0.00	28.5	155.7	22.3	161.1	44.9	138.9	9.5	156.1
6/25/2013	177.50	0.00	28.7	155.5	22.4	161.1	45.0	138.8	9.6	156.1
7/23/2013	175.70	0.00	28.7	155.5	22.3	161.1	45.7	138.1	9.5	156.2
8/21/2013	174.50	0.00	28.6	155.6	22.3	161.1	46.1	137.7	9.4	156.2
9/25/2013	175.70	0.00	28.7	155.5	22.0	161.4	46.4	137.4	9.4	156.2
10/29/2013	176.00	0.00	28.8	155.4	22.5	160.9	42.3	141.6	9.4	156.2
11/27/2013	176.50	0.44	28.6	155.6	22.5	160.9	46.2	137.6	9.3	156.3
12/19/2013	176.80	0.53	28.6	155.6	22.5	160.9	45.6	138.2	9.5	156.1
1/28/2014	176.80	0.00	28.9	155.3	22.9	160.5	45.4	138.4	9.6	156.0
2/25/2014	176.70	0.72	28.9	155.3	22.9	160.5	45.2	138.6	9.6	156.0
3/25/2014	178.50		28.8	155.5	22.9	160.6	44.6	139.2	9.6	156.0

Notes:

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TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
3/29/2014	178.40	1.44	28.9	155.3	22.9	160.5	44.7	139.1	9.3	156.3
4/25/2014	177.40	0.74	28.7	155.5	22.7	160.7	44.8	139.0	9.5	156.1
5/28/2014	176.40	0.00	28.8	155.4	22.7	160.7	43.3	140.5	9.6	156.0
6/25/2014	176.10	0.00	28.8	155.4	22.7	160.7	46.3	137.5	8.9	156.7
7/30/2014	177.30	0.00	28.6	155.7	22.6	160.9	46.9	136.9	9.3	156.3
8/26/2014	176.10	0.03	32.5	151.7	22.5	160.9	42.5	141.3	9.5	156.1
9/23/2014	175.90	0.00	28.7	155.5	22.7	160.7	46.6	137.3	9.4	156.3
10/30/2014	176.30	0.00	28.7	155.5	22.7	160.7	46.6	137.2	9.3	156.3
11/21/2014	176.20	0.25	28.6	155.6	22.7	160.7	45.0	138.8	9.1	156.5
12/30/2014	178.90	3.37	28.5	155.7	22.8	160.6	45.1	138.7	9.4	156.2
1/27/2015	179.60	0.89	28.6	155.6	22.8	160.6	44.8	139.0	9.3	156.3
2/27/2015	180.00	0.46	28.2	156.0	22.4	161.0	44.3	139.5	9.1	156.5
3/26/2015	179.60	0.45	28.2	156.0	22.3	161.1	42.5	141.3	9.1	156.5
4/29/2015	178.20	0.24	28.1	156.1	22.1	161.3	42.4	141.4	9.0	156.6
5/27/2015	179.00	1.04	28.5	155.7	22.2	161.2	44.0	139.8	9.3	156.3
6/25/2015	179.60	0.00	28.3	155.9	22.1	161.3	46.9	136.9	9.0	156.6
7/29/2015	178.10	0.00	28.0	156.2	22.0	161.4	45.0	138.8	8.9	156.7
8/26/2015	176.20	0.00	28.0	156.2	21.2	162.2	40.6	143.2	8.9	156.7
9/22/2015	178.20	1.64	28.2	156.0	22.1	161.3	45.4	138.4	9.0	156.6
10/27/2015	176.90	0.10	28.3	155.9	22.2	161.2	45.8	138.0	9.2	156.4
11/24/2015	176.30	0.17	28.5	155.7	22.3	161.1	42.7	141.1	9.3	156.3
12/22/2015	177.60	0.72	28.7	155.5	22.7	160.7	45.7	138.1	9.3	156.3
1/27/2016	180.10	2.86	29.4	154.8	24.7	158.7	45.7	138.1	10.1	155.5
2/25/2016	181.60	0.20	29.3	154.9	24.6	158.9	46.5	137.3	10.1	155.5
3/24/2016	184.80		29.1	155.1	24.3	159.1	46.3	137.5	10.1	155.5
3/31/2016	184.50	1.51	29.1	155.1	24.3	159.1	46.5	137.3	10.1	155.5
4/28/2016	183.60	0.04	28.9	155.3	24.0	159.4	46.9	136.9	10.2	155.4
5/25/2016	182.50	0.13	28.8	155.4	23.7	159.7	46.8	137.0	9.8	155.8
6/28/2016	180.70	0.00	28.9	155.3	23.6	159.8	47.1	136.7	9.9	155.7
7/27/2016	178.40	0.00	29.0	155.2	23.6	159.8	47.5	136.3	9.9	155.7

Notes:

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
8/24/2016	176.40	0.00	29.1	155.1	23.6	159.8	47.6	136.2	9.8	155.8
9/27/2016	175.80	0.00	29.4	154.8	23.9	159.5	47.6	136.2	10.0	155.6
10/26/2016	178.60	0.64	29.5	154.7	24.1	159.3	47.6	136.2	10.0	155.6
11/22/2016	178.30	1.11								
12/28/2016	184.80	4.01	29.3	154.9	24.2	159.2	45.5	138.4	10.1	155.5
1/25/2017	193.30	6.33	28.2	156.0	23.0	160.4	42.9	140.9	9.5	156.1
2/28/2017	193.90	3.27	27.4	156.8	21.3	162.1	43.1	140.7	9.0	156.6
3/29/2017	193.70	0.08	27.0	157.2	20.5	162.9	43.7	140.1	9.0	156.6
4/27/2017	192.90	0.04	27.0	157.2	20.6	162.8	43.9	139.9	9.2	156.4
5/23/2017	187.90	0.33	27.3	156.9	23.0	160.4	44.0	139.8	9.7	155.9
6/21/2017	182.50	0.00	27.7	156.5	21.1	162.3	44.8	139.0	9.3	156.3
7/26/2017	163.60	0.00	28.6	155.6	22.0	161.4	46.6	137.2	9.5	156.1
8/30/2017	163.60	0.00	29.4	154.8	23.1	160.3	47.6	136.2	9.8	155.8
9/28/2017	163.60	0.00	29.8	154.4	23.8	159.6	47.6	136.2	9.9	155.7
10/26/2017	171.80	0.00	29.9	154.3	24.3	159.1	47.6	136.2	37.3	155.7
11/29/2017	177.20	0.08	30.0	154.2	24.7	158.7	47.6	136.2	10.2	155.7
12/27/2017	176.70	0.00	29.8	154.4	24.7	158.7	47.6	136.2	10.2	155.7
1/24/2018	178.10	1.67	29.8	154.4	24.7	158.7	47.6	136.1	10.2	155.7
2/21/2018	177.80	0.27	29.8	154.4	24.7	158.7	47.6	136.1	10.2	155.7
3/28/2018	183.50	1.23	29.7	154.5	24.6	158.8	47.6	136.1	10.2	155.7
4/27/2018	184.30	0.05	29.4	154.8	24.4	159.0	47.6	136.1	10.2	155.7
5/30/2018	183.10	0.13	29.2	155.0	24.4	159.0	47.6	136.1	10.2	155.7
6/28/2018	181.70	0.00	29.0	155.2	23.6	159.8	47.6	136.1	28.2	155.7
7/26/2018	180.00	0.00	29.1	155.1	23.5	159.9	47.6	136.1	10.0	155.6
8/28/2018	177.30	0.00	29.2	155.0	23.5	159.9	47.6	136.1	9.9	155.7
9/27/2018	178.10	0.00	29.4	154.8	23.7	159.7	47.6	136.1	10.0	155.6
10/24/2018	178.00	0.66	29.4	154.8	23.9	159.5	47.6	136.1	10.1	155.5
11/29/2018	177.50	1.60	29.6	154.6	24.2	159.2	47.6	136.1	10.2	155.4
12/20/2018	181.40	2.39	29.5	154.7	24.1	159.3	46.8	136.9	10.1	155.5
1/30/2019	189.40	4.56	28.9	155.3	25.8	157.6	45.6	138.1	9.9	155.7

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
2/27/2019	194.10	7.48	17.8		33.9		41.8		6.1	
3/27/2019	194.00	1.27	26		20.5		43.7		9.1	
4/24/2019	193.60	0.07	29.40		20.30		43.80		9.20	
5/30/2019	191.40	0.73	26.90		20.50		44.10		9.30	
6/26/2019	190.80	0.02	27.00		20.60		44.00		9.40	
7/5/2015	190.40	0.00	27.10		20.60		44.20		10.20	
7/30/2019	188.95	0.00	17.80		34.90		42.40		7.30	
8/27/2019	187.40	0.00	18.03		35.11		42.62		7.73	
9/26/2019	186.20	0.00	18.20		34.90		42.80		8.06	
10/22/2019	185.20	0.00	27.90		21.30		45.80		9.70	
11/26/2019	183.50	2.66	8743.00		8514.00		8702.00		8316.00	
12/18/2019	186.80	4.44	8741.00		8511.00		8665.00		8308.00	
1/28/2020	192.00	0.24	29.14		23.80		45.60		9.80	
2/25/2020	192.10	0.49	87.16		8488.50		8635.60		8296.30	
3/24/2020	194.00	3.89	8712.80		8481.00		8636.60		8300.80	
4/29/2020	193.50	4.59	8678.46		8455.261		8641.121		8286.36	
5/27/2020	193.10	0.03	8695.179		8468.494		8646.494		8295.486	
6/24/2020	190.00	0.00	8704.683		8475.23		8651.577		8304.142	
7/29/2020	188.90	0.00	8718.148		8484.906		8654.388		8309.247	
8/27/2020	185.90	0.00	8726.589		8495.277		8663.389		8316.309	
9/29/2020	183.10	0.00	8737.937		8507.042		8659.805		8314.927	
10/29/2020	180.30	0.00	8747.634		8518.862		8682.145		8317.247	
11/24/2020	179.00	0.65	8753.042		8531.034		8686.862		8318.992	
12/29/2020	179.00	1.03	8757.986		8545.635		8683.545		8319.8	
1/26/2021	180.50	2.39	29.10	155.1	23.20	160.2	45.50	138.20	10.10	155.50
2/25/2021	182.10	0.03	28.90	155.3	23.30	160.1	45.30	138.40	9.80	155.80
3/23/2021	182.90	1.15	28.90	155.3	23.30	160.1	45.40	138.30	10.00	155.60
4/27/2021	182.00	0.04	28.90	155.3	23.20	160.2	45.80	137.90	10.00	155.60
5/26/2021	181.00	0.11	28.90	155.3	23.28	160.1	46.58	137.12	9.90	155.70
6/30/2021	179.00	0.00	29.10	155.1	23.40	160.0	46.80	136.90	10.00	155.60

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TABLE 5
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PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
7/27/2021	177.10	0.08	29.20	155.0	23.50	159.9	46.80	136.90	9.90	155.70
8/24/2021	175.40	0.00	29.20	155.0	23.50	159.9	46.80	136.90	9.90	155.70
9/28/2021	175.20	0.06	29.50	154.7	23.80	159.6	47.40	136.30	10.08	155.52
10/27/2021	177.20	0.80	29.50	154.7	24.00	159.4	47.40	136.30	10.10	155.50
11/23/2021	177.80	0.00	29.60	154.6	24.30	159.1	47.60	136.10	10.20	155.40
12/21/2021	180.50	5.86	29.40	154.8	24.30	159.1	46.80	136.90	10.10	155.50
1/25/2022	187.00	0.08	28.80	155.4	23.60	159.8	45.40	138.30	10.10	155.50
2/22/2022	186.60	0.18	28.80	155.4	23.60	159.8	45.40	138.30	10.10	155.50
3/28/2022	186.60	1.38	28.50	155.7	22.70	160.7	45.70	138.00	10.20	155.40
4/26/2022	186.60	0.01	28.40	155.8	22.70	160.7	45.50	138.20	9.80	155.80
5/25/2022	185.30	0.05	28.40	155.8	22.50	160.9	46.10	137.60	9.80	155.80
6/28/2022	182.70	0.00	28.60	155.6	22.60	160.8	46.50	137.20	9.60	156.00
7/26/2022	179.70	0.00	28.80	155.4	22.70	160.7	46.80	136.90	9.60	156.00
8/30/2022	178.30	0.13	29.10	155.1	23.20	160.2	47.10	136.60	9.80	155.80
9/29/2022	175.80	0.24	29.30	154.9	23.60	159.8	47.50	136.20	9.90	155.70
10/26/2022	175.30	0.26	29.40	154.8	23.80	159.6	47.60	136.10	9.90	155.70
11/22/2022	179.40	1.46	29.50	154.7	24.09	159.3	46.95	136.75	10.03	155.57
12/29/2022	185.70	2.21	29.30	154.9	24.10	159.3	45.80	137.90	9.90	155.70
1/11/2023	191.70	3.90	28.80	155.40	23.60	159.80	44.40	139.30	9.70	155.90
1/25/2023	194.00	7.17	28.10	156.10	22.80	160.60	44.00	139.70	8.80	156.80
2/28/2023	194.00	3.98	27.30	156.90	21.20	162.20	43.20	140.50	8.70	156.90
3/29/2023	194.00	5.92	25.10	159.10	19.10	164.30	43.40	140.30	8.70	156.90
4/25/2023	194.00	0.19	26.10	158.10	19.80	163.60	44.20	139.50	8.90	156.70
5/24/2023	193.40	0.89	26.50	157.70	19.90	163.50	44.30	139.40	8.90	156.70
6/28/2023	192.70	0.07	26.75	157.45	20.23	163.17	44.44	139.26	9.05	156.55
7/26/2023	191.60	0.00	27.10	157.10	20.60	162.80	44.20	139.50	9.00	156.60
8/29/2023	190.50	1.84	27.31	156.89	20.83	162.57	44.47	139.23	9.15	156.45
9/26/2023	189.80	0.00	27.40	156.80	21.00	162.40	43.90	139.80	8.90	156.70
10/25/2023	189.70	0.19	27.60	156.60	21.20	162.20	44.70	139.00	9.00	156.60
11/30/2023	189.20	0.65	27.70	156.50	21.30	162.10	44.60	139.10	9.10	156.50

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SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW9B		VBW/10A		VBW/10B		VBW/11	
Top of Well Elevation --->			184.2		183.4		183.7		165.6	
Bottom of Well Elevation --->			151.7		148.0		136.1		155.4	
Depth of Well --->			32.5		35.4		47.6		10.2	
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Reading	Elev.	Reading	Elev.
	Reservoir Elevation	Rainfall (in)								
12/27/2023	190.00	1.15	27.70	156.50	21.40	162.00	44.30	139.40	9.00	156.60
1/29/2024	191.90	2.00	27.53	156.67	21.20	162.20	44.10	139.60	9.08	156.52
2/27/2024	194.00	8.89	25.64	158.56	19.41	163.99	42.26	141.44	8.82	156.78
3/27/2024	193.80	2.51	26.14	158.06	19.70	163.70	43.23	140.47	8.71	156.89
4/23/2024	194.00	1.51	26.40	157.80	19.60	163.80	43.80	139.90	9.03	156.57
5/1/2024	193.90	0.00	26.34	157.86	19.63	163.77	43.89	139.81	9.08	156.52
5/23/2024	193.10	0.08	26.26	157.94	19.60	163.80	43.80	139.90	9.03	156.57
6/20/2024	191.50	0.00	27.20	157.00	20.60	162.80	44.40	139.30	9.40	156.20
7/25/2024	188.70	0.00	27.58	156.62	20.16	163.24	44.44	139.26	9.23	156.37
8/28/2024	185.90	0.00	27.87	156.33	21.46	161.94	44.91	138.79	9.22	156.38
9/18/2024	183.95	0.00	26.26	157.94	19.58	163.82	43.78	139.92	9.03	156.57
10/30/2024	182.00	0.00	28.26	155.94	22.19	161.21	44.99	138.71	9.30	156.30
11/26/2024	177.30	0.06	28.47	155.73	22.55	160.85	45.24	138.46	9.32	156.28
12/17/2024	175.70	0.04	28.77	155.43	22.83	160.57	45.71	137.99	9.44	156.16
1/29/2025	173.20	1.18	28.81	155.39	22.87	160.53	45.72	137.98	9.45	156.15
2/26/2025	178.50	2.65	29.45	154.75	23.94	159.46	45.97	137.73	10.01	155.59
3/25/2025	183.40	2.08	29.34	154.86	24.10	159.30	45.71	137.99	10.03	155.57
4/14/2025	183.10	#N/A	29.15	155.05	23.93	159.47	46.52	137.18	10.06	155.54
4/23/2025	183.10	0.37	29.01	155.19	23.75	159.65	46.69	137.01	10.06	155.54
5/22/2025	182.60	0.05	28.96	155.24	23.55	159.85	46.83	136.87	10.00	155.60
7/7/2025	179.65	0.28	28.99	155.21	23.46	159.94	47.12	136.58	9.82	155.78
7/24/2025	177.90	0.00	29.01	155.19	23.52	159.88	47.36	136.34	9.73	155.87
8/26/2025	175.00	0.00	29.28	154.92	23.67	159.73	47.60	136.10	9.68	155.92
9/25/2025	173.20	0.12	29.56	154.64	24.06	159.34	47.60	136.10	9.92	155.68
10/22/2025	178.30	1.38	29.62	154.58	24.30	159.10	47.56	136.14	10.09	155.51
11/20/2025	182.20	5.76	29.44	154.76	24.26	159.14	45.44	138.26	9.56	156.04
12/17/2025	186.10	2.26	28.98	155.22	23.93	159.47	45.58	138.12	9.97	155.63

Notes:

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**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW/12		VBW/13		Seepage Flow Point	
Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
1/31/2007	176.80		8.2	152.3	8.6	151.50	0.00	0.0
2/28/2007	177.60		8.4	152.1	5.7	154.40	0.00	0.0
3/29/2007	177.10		8.7	151.8	9.2	150.90	0.00	0.0
4/27/2007	176.60		8.8	151.7	8.9	151.20	0.00	0.0
5/24/2007	176.80		8.9	151.6	9.3	150.80	0.00	0.0
6/27/2007	179.90		8.7	151.8	9.1	151.00	0.00	0.0
7/27/2007	177.80		8.8	151.7	9.4	150.70	0.00	0.0
8/28/2007	177.20		8.9	151.6	9.2	150.90	0.00	0.0
9/26/2007	177.00		8.9	151.6	9.2	150.92	0.00	0.0
10/30/2007	175.50		8.9	151.6	9.2	150.90	0.00	0.0
11/27/2007	175.90		9.0	151.5	9.3	150.80	0.00	0.0
12/27/2007	178.20		9.0	151.5	9.4	150.70	0.00	0.0
1/30/2008	184.40		6.5	154.0	6.3	153.80	0.16	0.0
2/26/2008	186.10		7.6	152.9	7.7	152.40	0.36	0.0
3/26/2008	188.00		8.0	152.5	8.6	151.50	0.84	0.0
4/25/2008	191.00		8.9	151.6	9.0	151.10	1.59	0.0
5/28/2008	190.93		8.6	151.9	9.0	151.10	1.98	0.0
6/25/2008	189.50		8.3	152.2	8.7	151.40	1.59	0.0
7/29/2008	185.10		7.9	152.6	8.4	151.70	1.74	0.0
7/30/2008	185.10	0.00	7.6	152.9	8.6	151.50	2.06	0.0
8/27/2008	178.00	0.00	8.2	152.3	8.3	151.80	0.79	0.0
9/25/2008	176.80	0.00	8.2	152.3	8.1	152.00	0.29	0.0
10/28/2008	175.20	0.00	8.4	152.1	8.6	151.50	0.03	0.0
11/25/2008	175.80	1.82	8.6	151.9	8.7	151.40	0.04	0.0
12/30/2008	181.70	2.91	8.0	152.5	7.8	152.30	0.63	0.0
1/29/2009	182.20	0.39	8.6	151.9	8.5	151.60	0.68	0.0
2/25/2009	185.70	3.10	7.7	152.8	7.5	152.60	1.06	0.0
3/26/2009	188.40	0.10	8.5	152.0	8.5	151.60	1.59	0.0
4/28/2009	189.30	0.00	8.6	151.9	8.9	151.20	2.26	0.0
5/18/2009	188.50	0.00	7.8	152.7	9.0	151.10	2.18	0.0

Notes:

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**TABLE 5
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JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW/12		VBW/13		Seepage Flow Point	
Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
5/27/2009	188.10	0.00	8.7	151.8	9.1	151.00	1.98	0.0
6/30/2009	188.60	0.10	7.8	152.7	8.6	151.50	2.98	0.0
7/30/2009	184.80	0.00	8.1	152.4	8.4	151.70	2.26	0.0
8/26/2009	176.60	0.00	8.0	152.5	8.1	152.00	0.63	0.0
9/30/2009	174.50	0.00	7.9	152.6	8.4	151.70	0.01	0.0
10/28/2009	175.30	0.29	8.0	152.5	8.5	151.60	0.00	0.0
12/1/2009	176.40	0.00	8.0	152.5	8.7	151.40	0.00	0.0
12/28/2009	178.80	2.75	8.2	152.3	8.6	151.50	0.21	0.0
1/26/2010	191.30	4.15	5.6	154.9	4.9	155.20	1.06	0.0
2/24/2010	193.60	2.29	7.1	153.4	6.7	153.40	2.88	0.0
3/29/2010	193.50	1.18	7.3	153.2	6.8	153.30	1.82	0.0
4/4/2010	193.50		7.5	153.0	7.0	153.10	2.54	0.0
4/27/2010	193.90	1.66	7.3	153.2	6.8	153.30	0.75	0.0
5/27/2010	192.90	0.03	7.4	153.1	7.5	152.60	3.17	0.0
6/29/2010	191.60	0.00	7.7	152.8	8.6	151.50	2.38	0.0
7/28/2010	187.50	0.00	7.5	153.0	7.1	153.00	1.59	0.0
8/31/2010	179.20	0.00	7.4	153.1	7.7	152.40	0.98	0.0
9/29/2010	175.60	0.00	7.3	153.2	7.3	152.80	0.13	0.0
10/26/2010	178.20	2.93	7.5	153.0	7.6	152.50	0.20	0.0
11/30/2010	178.80	1.14	8.0	152.5	8.6	151.50	0.32	0.0
12/30/2010	193.90	9.95	4.6	155.9	3.7	156.40	2.51	0.0
1/27/2011	194.00	0.86	6.4	154.2	5.9	154.20	2.25	0.0
2/23/2011	193.80	1.02	6.5	154.0	6.1	154.00	1.46	0.0
3/29/2011	193.90	2.38	4.8	155.7	3.8	156.30	0.87	0.0
4/27/2011	193.60	0.56	6.0	154.6	5.2	154.90	0.79	0.0
5/25/2011	193.10	0.51	6.8	153.7	6.2	153.90	0.79	0.0
6/28/2011	192.00	0.00	7.8	152.7	7.3	152.80	1.59	0.0
7/27/2011	186.75	0.00	7.7	152.9	7.0	153.10	0.98	0.0
8/25/2011	176.30	0.00	7.7	152.8	7.8	152.30	0.69	0.0
9/28/2011	176.00	0.06	7.8	152.7	7.9	152.30	0.13	0.0

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Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
10/25/2011	176.50	0.89	7.9	152.6	8.3	151.80	0.26	0.0
11/22/2011	177.20	1.31	8.4	152.1	8.4	151.80	0.24	0.0
12/22/2011	176.70	0.20	8.7	151.8	8.5	151.60	0.30	0.0
1/25/2012	178.60	0.84	7.8	152.7	8.6	151.50	0.32	0.0
2/28/2012	179.20	0.68	8.0	152.5	8.6	151.50	0.40	0.0
3/27/2012	180.60	1.73	7.9	152.6	8.6	151.50	0.43	0.0
6/27/2012	180.70	0.00	8.9	151.6	9.4	150.70	0.13	0.0
7/26/2012	179.20	0.10	8.8	151.7	9.5	150.60	0.12	0.0
8/8/2012	178.50	0.10	8.9	151.6	8.6	151.50	0.32	0.0
8/28/2012	177.10	0.00	8.9	151.6	9.4	150.70	0.24	0.0
8/29/2012	177.10	0.00	9.2	151.3	8.6	151.50	0.18	0.0
9/25/2012	175.30	0.00	8.9	151.6	9.4	150.70	0.07	0.0
10/30/2012	176.00	0.19	8.9	151.6	9.3	150.80	0.12	0.0
11/27/2012	175.80	0.69	9.0	151.5	9.2	150.90	0.13	0.0
12/12/2012	176.10	1.40	9.0	151.6	9.0	151.10	0.13	0.0
1/22/2013	177.20	1.20	9.0	151.5	9.3	150.80	0.24	0.0
2/27/2013	178.20	0.31	8.9	151.6	9.2	150.90	0.14	0.0
3/28/2013	178.20	0.71	9.0	151.5	9.4	150.70	0.32	0.0
4/25/2013	177.30	0.03	9.0	151.5	9.4	150.70	0.34	0.0
5/22/2013	177.60	0.00	9.0	151.5	9.4	150.70	0.16	0.0
6/25/2013	177.50	0.00	8.9	151.6	9.2	150.90	0.23	0.0
7/23/2013	175.70	0.00	8.9	151.6	9.3	150.80	0.12	0.0
8/21/2013	174.50	0.00	9.0	151.5	9.5	150.60	0.10	0.0
9/25/2013	175.70	0.00	9.0	151.5	9.4	150.70	0.16	0.0
10/29/2013	176.00	0.00	9.0	151.5	9.4	150.70	0.22	0.0
11/27/2013	176.50	0.44	8.9	151.6	9.2	150.90	0.25	0.0
12/19/2013	176.80	0.53	9.0	151.5	9.4	150.70	0.40	0.0
1/28/2014	176.80	0.00	9.0	151.5	9.4	150.70	0.37	0.0
2/25/2014	176.70	0.72	9.0	151.5	9.4	150.70	0.22	0.0
3/25/2014	178.50		9.0	151.5	9.4	150.70	0.25	0.0

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JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW/12		VBW/13		Seepage Flow Point	
Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
3/29/2014	178.40	1.44	9.0	151.5	9.4	150.70	0.47	0.0
4/25/2014	177.40	0.74	9.0	151.5	9.5	150.60	0.32	0.0
5/28/2014	176.40	0.00	9.0	151.5	9.3	150.80	0.04	0.0
6/25/2014	176.10	0.00	9.0	151.5	9.5	150.60	0.21	0.0
7/30/2014	177.30	0.00	9.0	151.5	9.4	150.70	0.28	0.0
8/26/2014	176.10	0.03	9.0	151.5	9.4	150.70	0.29	0.0
9/23/2014	175.90	0.00	8.9	151.7	9.2	150.90	0.26	0.0
10/30/2014	176.30	0.00	8.0	152.5	8.5	151.60	0.29	0.0
11/21/2014	176.20	0.25	8.9	151.6	9.2	150.90	0.32	0.0
12/30/2014	178.90	3.37	8.8	151.7	9.2	150.90	0.42	0.0
1/27/2015	179.60	0.89	8.9	151.6	9.1	151.00	0.40	0.0
2/27/2015	180.00	0.46	8.9	151.6	9.1	151.00	0.52	0.0
3/26/2015	179.60	0.45	9.0	151.5	8.9	151.20	0.61	0.0
4/29/2015	178.20	0.24	8.9	151.6	9.2	150.90	0.55	0.0
5/27/2015	179.00	1.04	8.9	151.6	9.3	150.80	0.48	0.0
6/25/2015	179.60	0.00	8.9	151.6	9.3	150.80	0.44	0.0
7/29/2015	178.10	0.00	8.9	151.6	9.3	150.80	0.55	0.0
8/26/2015	176.20	0.00	8.9	151.6	9.3	150.80	0.13	0.0
9/22/2015	178.20	1.64	8.9	151.6	9.3	150.80	0.61	0.0
10/27/2015	176.90	0.10	8.9	151.6	9.3	150.80	0.42	0.0
11/24/2015	176.30	0.17	9.0	151.5	9.3	150.80	0.40	0.0
12/22/2015	177.60	0.72	9.0	151.5	8.4	151.70	0.41	0.0
1/27/2016	180.10	2.86	8.9	151.6	9.4	150.70	0.37	0.0
2/25/2016	181.60	0.20	9.0	151.5	9.5	150.60	0.57	0.0
3/24/2016	184.80		8.9	151.6	9.5	150.60	0.60	0.0
3/31/2016	184.50	1.51	8.9	151.6	9.5	150.60	2.03	0.0
4/28/2016	183.60	0.04	9.0	151.5	9.5	150.60	1.76	0.0
5/25/2016	182.50	0.13	9.0	151.5	9.5	150.60	1.61	0.0
6/28/2016	180.70	0.00	9.0	151.5	9.5	150.60	1.11	0.0
7/27/2016	178.40	0.00	9.0	151.5	9.5	150.60	1.02	0.0

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JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW/12		VBW/13		Seepage Flow Point	
Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
8/24/2016	176.40	0.00	9.0	151.5	9.5	150.60	0.61	0.0
9/27/2016	175.80	0.00	9.0	151.5	9.5	150.60	0.40	0.0
10/26/2016	178.60	0.64	9.0	151.5	9.5	150.60	0.88	0.0
11/22/2016	178.30	1.11					0.92	0.0
12/28/2016	184.80	4.01	9.0	151.5	9.5	150.60	1.36	0.0
1/25/2017	193.30	6.33	4.7	155.8	7.7	152.40	2.01	0.0
2/28/2017	193.90	3.27	3.8	156.7	6.5	153.60	1.72	0.0
3/29/2017	193.70	0.08	4.9	155.6	7.7	152.40	1.66	0.0
4/27/2017	192.90	0.04	5.5	155.0	8.2	151.90	2.77	0.0
5/23/2017	187.90	0.33	9.0	151.5	9.0	151.10	3.29	0.0
6/21/2017	182.50	0.00	8.9	151.6	8.6	151.50	2.06	0.0
7/26/2017	163.60	0.00	8.8	151.7	8.5	151.60	0.26	0.0
8/30/2017	163.60	0.00	8.4	152.1	9.2	150.90	0.00	0.0
9/28/2017	163.60	0.00	9.0	151.5	9.5	150.60	0.00	0.0
10/26/2017	171.80	0.00	9.0	151.5	9.5	150.60	0.00	0.0
11/29/2017	177.20	0.08	9.0	151.5	9.5	150.60	0.00	0.0
12/27/2017	176.70	0.00	9.0	151.5	9.5	150.60	0.00	0.0
1/24/2018	178.10	1.67	9.0	151.5	9.5	150.60	0.02	0.0
2/21/2018	177.80	0.27	9.0	151.5	9.5	150.60	0.00	0.0
3/28/2018	183.50	1.23	9.0	151.5	9.5	150.60	0.14	0.0
4/27/2018	184.30	0.05	9.0	151.5	9.5	150.60	0.29	0.0
5/30/2018	183.10	0.13	9.0	151.5	9.5	150.60	0.22	0.0
6/28/2018	181.70	0.00	9.0	151.5	9.5	150.60	0.15	0.0
7/26/2018	180.00	0.00	9.0	151.5	9.5	150.60	0.03	0.0
8/28/2018	177.30	0.00	9.0	151.5	9.5	150.60	0.00	0.0
9/27/2018	178.10	0.00	9.0	151.5	9.5	150.60	0.00	0.0
10/24/2018	178.00	0.66	9.0	151.5	9.5	150.60	0.00	0.0
11/29/2018	177.50	1.60	9.0	151.5	9.5	150.60	0.00	0.0
12/20/2018	181.40	2.39	9.0	151.5	9.5	150.60	0.08	0.0
1/30/2019	189.40	4.56	8.4	152.1	8.4	151.70	0.76	0.0

Notes:

1. Readings in red are classified as erroneous
2. Elevation calculations between 2/27/2019 and 12/29/2020 were not included due to issues with data logger.
3. Piezometer data based on NGVD 29 datum.

**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW/12		VBW/13		Seepage Flow Point	
Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
2/27/2019	194.10	7.48	6.5		5.8		1.82	0.0
3/27/2019	194.00	1.27	7.1		7		1.66	0.0
4/24/2019	193.60	0.07	7.60		7.60		1.66	0.0
5/30/2019	191.40	0.73	8.40		8.20		1.35	0.0
6/26/2019	190.80	0.02	7.90		7.90		1.53	0.0
7/5/2015	190.40	0.00	9.00		9.50		1.59	0.0
7/30/2019	188.95	0.00	9.00		9.50		1.37	0.0
8/27/2019	187.40	0.00	9.00		0.00		1.06	0.0
9/26/2019	186.20	0.00	9.00		9.50		1.03	0.0
10/22/2019	185.20	0.00	9.00		9.50		1.05	0.0
11/26/2019	183.50	2.66	8081.00		8358.00		1.13	0.0
12/18/2019	186.80	4.44	8070.00		8344.00		1.65	0.0
1/28/2020	192.00	0.24	8.39		8.40		2.06	0.0
2/25/2020	192.10	0.49	8052.60		8325.60		2.57	0.0
3/24/2020	194.00	3.89	8014.40		8288.70		2.44	0.0
4/29/2020	193.50	4.59	8005.488		8269.357		3.70	0.0
5/27/2020	193.10	0.03	8038.796		8312.104		4.12	0.0
6/24/2020	190.00	0.00	8073.167		8344.973		4.23	0.0
7/29/2020	188.90	0.00	8066.977		8341.389		3.54	0.0
8/27/2020	185.90	0.00	8080.359		8356.421		3.49	0.0
9/29/2020	183.10	0.00	8077.749		8356.66		2.43	0.0
10/29/2020	180.30	0.00	8084.328		8366.622		1.51	0.0
11/24/2020	179.00	0.65	8089.965		8379.636		1.05	0.0
12/29/2020	179.00	1.03	8086.061		8380.184		0.89	0.0
1/26/2021	180.50	2.39	9.00	151.50	9.50	150.60	0.98	0.00
2/25/2021	182.10	0.03	9.00	151.50	9.50	150.60	1.00	0.00
3/23/2021	182.90	1.15	9.00	151.50	9.50	150.60	1.36	0.00
4/27/2021	182.00	0.04	9.00	151.50	9.50	150.60	1.17	0.00
5/26/2021	181.00	0.11	9.00	151.50	9.50	150.60	0.87	0.00
6/30/2021	179.00	0.00	9.00	151.50	9.50	150.60	0.69	0.00

Notes:

1. Readings in red are classified as erroneous
2. Elevation calculations between 2/27/2019 and 12/29/2020 were not included due to issues with data logger.
3. Piezometer data based on NGVD 29 datum.

**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW/12		VBW/13		Seepage Flow Point	
Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
7/27/2021	177.10	0.08	9.00	151.50	9.50	150.60	0.43	0.00
8/24/2021	175.40	0.00	9.00	151.50	9.50	150.60	0.24	0.00
9/28/2021	175.20	0.06	8.79	151.71	9.50	150.60	0.19	0.00
10/27/2021	177.20	0.80	9.00	151.50	9.50	150.60	0.32	0.00
11/23/2021	177.80	0.00	9.00	151.50	9.50	150.60	0.51	0.00
12/21/2021	180.50	5.86	9.00	151.50	9.50	150.60	0.63	0.00
1/25/2022	187.00	0.08	9.00	151.50	9.50	150.60	1.59	0.00
2/22/2022	186.60	0.18	9.00	151.50	9.50	150.60	1.59	0.00
3/28/2022	186.60	1.38	9.00	151.50	9.50	150.60	1.33	0.00
4/26/2022	186.60	0.01	9.00	151.50	9.50	150.60	1.35	0.00
5/25/2022	185.30	0.05	9.20	151.30	9.90	150.20	1.30	0.00
6/28/2022	182.70	0.00	9.00	151.50	9.50	150.60	1.19	0.00
7/26/2022	179.70	0.00	9.00	151.50	9.50	150.60	0.76	0.00
8/30/2022	178.30	0.13	9.00	151.50	9.50	150.60	0.57	0.00
9/29/2022	175.80	0.24	9.50	151.00	10.00	150.10	0.32	0.00
10/26/2022	175.30	0.26	9.00	151.50	9.50	150.60	0.27	0.00
11/22/2022	179.40	1.46	9.00	151.50	9.50	150.60	0.49	0.00
12/29/2022	185.70	2.21	8.90	151.60	9.80	150.30	1.37	0.00
1/11/2023	191.70	3.90	6.70	153.80	6.10	154.00	1.97	0.00
1/25/2023	194.00	7.17	7.20	153.30	7.30	152.80	2.12	0.00
2/28/2023	194.00	3.98	6.50	154.00	5.90	154.20	2.69	0.00
3/29/2023	194.00	5.92	5.90	154.60	4.60	155.50	3.17	0.04
4/25/2023	194.00	0.19	6.70	153.80	6.30	153.80	3.04	0.00
5/24/2023	193.40	0.89	7.00	153.50	6.80	153.30	2.64	0.00
6/28/2023	192.70	0.07	7.60	152.90	7.40	152.70	3.17	0.00
7/26/2023	191.60	0.00	8.10	152.40	7.90	152.20	3.59	0.00
8/29/2023	190.50	1.84	8.24	152.26	8.06	152.04	3.43	0.00
9/26/2023	189.80	0.00	8.50	152.00	8.30	151.80	4.04	0.00
10/25/2023	189.70	0.19	8.40	152.10	8.40	151.70	3.70	0.00
11/30/2023	189.20	0.65	8.40	152.10	8.40	151.70	2.43	0.00

Notes:

1. Readings in red are classified as erroneous
2. Elevation calculations between 2/27/2019 and 12/29/2020 were not included due to issues with data logger.
3. Piezometer data based on NGVD 29 datum.

**TABLE 5
SAND CANYON DAM
PIEZOMETER AND SUBDRAIN MEASUREMENTS
JANUARY 2007 THROUGH DECEMBER 2025**

Monitoring Well --->			VBW/12		VBW/13		Seepage Flow Point	
Top of Well Elevation --->			160.5		160.1		Drain ID	
Bottom of Well Elevation --->			151.5		150.6			
Depth of Well --->			9		9.5			
Date	Spillway 378'		Reading	Elev.	Reading	Elev.	Seepage Flow Point (Gal / Min)	
	Reservoir Elevation	Rainfall (in)					Left Subdrain	Right Subdrain
12/27/2023	190.00	1.15	8.30	152.20	8.30	151.80	3.80	0.00
1/29/2024	191.90	2.00	7.99	152.51	8.14	151.96	3.71	0.00
2/27/2024	194.00	8.89	5.71	154.79	4.20	155.90	3.17	0.01
3/27/2024	193.80	2.51	6.78	153.72	6.41	153.69	4.36	0.00
4/23/2024	194.00	1.51	6.97	153.53	6.82	153.28	4.02	0.00
5/1/2024	193.90	0.00	7.31	153.19	7.00	153.10	4.28	0.00
5/23/2024	193.10	0.08	7.00	153.50	6.80	153.30	4.38	0.00
6/20/2024	191.50	0.00	8.40	152.10	8.50	151.60	3.33	0.00
7/25/2024	188.70	0.00	8.75	151.75	8.85	151.25	4.28	0.00
8/28/2024	185.90	0.00	8.73	151.77	8.96	151.14	3.01	0.00
9/18/2024	183.95	0.00	6.96	153.54	6.81	153.29	3.17	0.00
10/30/2024	182.00	0.00	7.60	152.90	9.25	150.85	1.85	0.00
11/26/2024	177.30	0.06	7.80	152.70	9.48	150.62	1.59	0.00
12/17/2024	175.70	0.04	#N/A		9.50	150.60	0.52	0.00
1/29/2025	173.20	1.18	8.84	151.66	9.50	150.60	0.11	0.00
2/26/2025	178.50	2.65	8.00	152.50	9.50	150.60	0.38	0.00
3/25/2025	183.40	2.08	8.20	152.30	9.50	150.60	0.87	0.00
4/14/2025	183.10	#N/A	8.00	152.50	9.50	150.60	0.77	0.00
4/23/2025	183.10	0.37	8.50	152.00	9.50	150.60	0.69	0.00
5/22/2025	182.60	0.05	8.35	152.15	9.50	150.60	0.82	0.00
7/7/2025	179.65	0.28	8.30	152.20	9.50	150.60	0.57	0.00
7/24/2025	177.90	0.00	8.20	152.30	9.50	150.60	0.44	0.00
8/26/2025	175.00	0.00	8.30	152.20	9.50	150.60	0.30	0.00
9/25/2025	173.20	0.12	8.30	152.20	9.50	150.60	0.04	0.00
10/22/2025	178.30	1.38	8.30	152.20	9.05	151.05	0.32	0.00
11/20/2025	182.20	5.76	7.04	153.46	7.72	152.38	0.57	0.00
12/17/2025	186.10	2.26	8.00	152.50	9.50	150.60	0.25	0.00

Notes:

1. Readings in red are classified as erroneous
2. Elevation calculations between 2/27/2019 and 12/29/2020 were not included due to issues with data logger.
3. Piezometer data based on NGVD 29 datum.

**TABLE 6
SAND CANYON DAM
HORIZONTAL MOVEMENT OF SURVEY MONUMENTS
1975 THROUGH 2025**

Monument ID		Reservoir Elevation (feet)	Temperature (°C)	S-1		S-2		S-3		S-4		S-5		S-6	
Approx.	Station			8+00.234		6+00.212		4+00.125		2+00.191		0+00.079		0+61.430	
Year	Date			(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)
1968															
1969															
1975	9/15/1975			0.050	0.600	0.060	0.720	0.050	0.600	0.040	0.480	0.000	0.000		
1976															
1977															
1978															
1979															
1980															
1981	12/15/1981			0.070	0.840	0.080	0.960	0.080	0.960	0.040	0.480	0.100	1.200		
1982	6/15/1982			0.030	0.360	0.070	0.840	0.100	1.200	0.080	0.960	0.050	0.600		
1983															
1984															
1985	10/20/1985			0.070	0.840	0.090	1.080	0.120	1.440	0.130	1.560	0.060	0.720		
1986															
1987	10/20/1987			0.080	0.960	0.120	1.440	0.110	1.320	0.110	1.320	0.060	0.720	0.150	1.800
1988															
1989															
1990															
1991															
1992															
1993															
1994															
1995	5/8/1995			0.060	0.720	0.080	0.960	0.130	1.560	0.120	1.440	0.040	0.480	0.120	1.440
1996	5/1/1996			0.080	0.960	0.100	1.200	0.120	1.440	0.120	1.440	0.050	0.600	0.150	1.800
1997	5/28/1997			0.070	0.840	0.080	0.960	0.100	1.200	0.100	1.200	0.005	0.600	0.130	1.560
1998	5/11/1998			0.070	0.840	0.080	0.960	0.100	1.200	0.100	1.200	0.010	0.120	0.120	1.440
1999	4/26/1999			0.070	0.840	0.090	1.080	0.100	1.200	0.095	1.140	0.015	0.180	0.115	1.380
2000	6/29/2000			0.075	0.900	0.090	1.080	0.105	1.260	0.095	1.140	0.015	0.180	0.120	1.440
2001	5/2/2001			0.075	0.900	0.090	1.080	0.100	1.200	0.095	1.140	0.020	0.240	0.110	1.320
2002	5/21/2002			0.070	0.840	0.090	1.080	0.120	1.440	0.100	1.200	0.020	0.240	0.105	1.260
2003	5/21/2003			0.075	0.900	0.095	1.140	0.115	1.380	0.100	1.200	0.015	0.180	0.110	1.320
2004	5/18/2004			0.070	0.840	0.100	1.200	0.120	1.440	0.100	1.200	0.020	0.240	0.115	0.138
2005	5/31/2005			0.070	0.840	0.100	1.200	0.105	1.260	0.100	1.200	0.020	0.240	0.115	1.380
2006	5/31/2006			0.070	0.840	0.095	1.140	0.110	1.320	0.100	1.200	0.010	0.120	0.115	1.380
2007	5/15/2007	176.8		0.080	0.960	0.085	1.020	0.105	1.260	0.090	1.080	0.020	0.240	0.105	1.260
2008	5/27/2008	190.9		0.080	0.960	0.085	1.020	0.105	1.260	0.100	1.200	0.020	0.240	0.120	1.440
2009	6/9/2009	188.1		0.065	0.780	0.085	1.020	0.095	1.140	0.100	1.200	0.020	0.240	0.120	1.440
2010	5/24/2010	190.9		0.060	0.720	0.080	0.960	0.110	1.320	0.090	1.080	0.020	0.240	0.105	1.260
2011	5/18/2011	193.1		0.065	0.780	0.080	0.960	0.110	1.320	0.110	1.320	0.020	0.240	0.120	1.440
2012	5/18/2012	180.7		0.065	0.780	0.085	1.020	0.110	1.320	0.105	1.260	0.020	0.240	0.120	1.440
2013	6/6/2013	177.6		0.065	0.780	0.105	1.260	0.100	1.200	0.100	1.200	0.015	0.180	0.115	1.380
2014	4/25/2014	177.4		0.095	1.140	0.100	1.200	0.130	1.560	0.100	1.200	0.015	0.180	0.120	1.440
2015	6/4/2015	179.0		0.080	0.960	0.080	0.960	0.115	1.380	0.105	1.260	0.020	0.240	0.115	1.380
2016	7/25/2016	178.4		0.080	0.960	0.085	1.020	0.115	1.380	0.110	1.320	0.015	0.180	0.125	1.500
2017	6/15/2017	182.5													
2018	5/31/2018	183.1		0.080	0.960	0.090	1.080	0.115	1.380	0.105	1.260	0.025	0.300	0.125	1.500
2019	6/13/2019	190.8		0.080	0.960	0.095	1.140	0.120	1.440	0.115	1.380	0.020	0.240	0.125	1.500
2020	10/16/2020	180.3		0.060	0.720	0.060	0.720	0.110	1.320	0.110	1.320	0.035	0.420	0.130	1.560
2021															
2022	4/26/2022	186.2		0.060	0.720	0.070	0.840	0.110	1.320	0.110	1.320	0.025	0.300	0.120	1.440
2022	10/27/2022	175.3	27.2	0.070	0.840	0.095	1.140	0.115	1.380	0.095	1.140	0.020	0.240	0.115	1.380
2023	12/6/2023	189.3	12.8	0.070	0.840	0.085	1.020	0.120	1.440	0.100	1.200	0.020	0.240	0.120	1.440
2024	6/5/2024	192.1	16.7	0.025	0.300	0.075	0.900	0.113	1.356	0.103	1.236	0.024	0.288	0.123	1.476
2025	10/3/2025	175.9	18.3	0.073	0.876	0.083	0.996	0.114	1.368	0.097	1.164	0.015	0.180	0.111	1.332

Note:
1. Vertical data is referenced in NGVD 29 datum.

**TABLE 7
SAND CANYON DAM
CUMULATIVE HORIZONTAL DISPLACEMENT OF SURVEY MONUMENTS
1975 THROUGH 2025**

Monument ID		Reservoir Elevation (feet)	Temperature (°C)	S-1		S-2		S-3		S-4		S-5		S-6	
Approx.	Station			8+00.234		6+00.212		4+00.125		2+00.191		0+00.079		0+61.430	
Year	Date			(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)
1968															
1969															
1975	9/15/1975			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
1976															
1977															
1978															
1979															
1980															
1981	12/15/1981			0.020	0.240	0.020	0.240	0.030	0.360	0.000	0.000	0.100	1.200		
1982	6/15/1982			-0.020	-0.240	0.010	0.120	0.050	0.600	0.040	0.480	0.050	0.600		
1983															
1984															
1985	10/20/1985			0.020	0.240	0.030	0.360	0.070	0.840	0.090	1.080	0.006	0.720		
1986															
1987	10/20/1987			0.030	0.360	0.060	0.720	0.060	0.720	0.070	0.840	0.060	0.720	0.000	0.000
1988															
1989															
1990															
1991															
1992															
1993															
1994															
1995	5/8/1995			0.010	0.120	0.020	0.240	0.080	0.960	0.080	0.960	0.040	0.480	-0.030	-0.360
1996	5/1/1996			0.030	0.360	0.040	0.480	0.070	0.840	0.080	0.960	0.050	0.600	0.000	0.000
1997	5/28/1997			0.020	0.240	0.020	0.240	0.050	0.600	0.060	0.720	0.050	0.600	-0.020	-0.240
1998	5/11/1998			0.020	0.240	0.020	0.240	0.050	0.600	0.060	0.720	0.010	0.120	-0.030	-0.360
1999	4/26/1999			0.020	0.240	0.030	0.360	0.050	0.600	0.055	0.660	0.015	0.180	-0.035	-0.420
2000	6/29/2000			0.025	0.300	0.030	0.360	0.055	0.660	0.055	0.660	0.015	0.180	-0.030	-0.360
2001	5/2/2001			0.025	0.300	0.030	0.360	0.050	0.600	0.055	0.660	0.020	0.240	-0.040	-0.480
2002	5/21/2002			0.020	0.240	0.030	0.360	0.070	0.840	0.060	0.720	0.020	0.240	-0.045	-0.540
2003	5/21/2003			0.025	0.300	0.035	0.420	0.065	0.780	0.060	0.720	0.015	0.180	-0.040	-0.480
2004	5/18/2004			0.020	0.240	0.040	0.480	0.070	0.840	0.060	0.720	0.020	0.240	-0.035	-0.420
2005	5/31/2005			0.020	0.240	0.040	0.480	0.055	0.660	0.060	0.720	0.020	0.240	-0.035	-0.420
2006	5/31/2006			0.020	0.240	0.035	0.420	0.060	0.720	0.060	0.720	0.010	0.120	-0.035	-0.420
2007	5/15/2007	176.8		0.030	0.360	0.025	0.300	0.055	0.660	0.050	0.600	0.020	0.240	-0.045	-0.540
2008	5/27/2008	190.9		0.030	0.360	0.025	0.300	0.055	0.660	0.060	0.720	0.020	0.240	-0.030	-0.360
2009	6/9/2009	188.1		0.015	0.180	0.025	0.300	0.045	0.540	0.060	0.720	0.020	0.240	-0.030	-0.360
2010	5/24/2010	190.9		0.010	0.120	0.020	0.240	0.060	0.720	0.050	0.600	0.020	0.240	-0.045	-0.540
2011	5/18/2011	193.1		0.015	0.180	0.020	0.240	0.060	0.720	0.070	0.840	0.020	0.240	-0.030	-0.360
2012	5/18/2012	180.7		0.015	0.180	0.025	0.300	0.060	0.720	0.065	0.780	0.020	0.240	-0.030	-0.360
2013	6/6/2013	177.6		0.015	0.180	0.015	0.180	0.055	0.660	0.060	0.720	0.015	0.180	-0.035	-0.420
2014	4/25/2014	177.4		0.045	0.540	0.040	0.480	0.080	0.960	0.060	0.720	0.015	0.180	-0.030	-0.360
2015	6/4/2015	179.0		0.030	0.360	0.020	0.240	0.065	0.780	0.065	0.780	0.020	0.240	-0.035	-0.420
2016	7/25/2016	178.4		0.030	0.360	0.025	0.300	0.065	0.780	0.070	0.840	0.015	0.180	-0.025	-0.300
2017	6/15/2017	182.5													
2018	5/31/2018	183.1		0.030	0.360	0.030	0.360	0.065	0.780	0.065	0.780	0.025	0.300	-0.025	-0.300
2019	6/13/2019	190.8		0.030	0.360	0.035	0.420	0.070	0.840	0.075	0.900	0.020	0.240	-0.025	-0.300
2020	10/16/2020	180.3		0.010	0.120	0.000	0.000	0.060	0.720	0.070	0.840	0.035	0.420	-0.020	-0.240
2021															-0.150
2022	4/26/2022	186.2		0.010	0.120	0.010	0.120	0.060	0.720	0.070	0.840	0.025	0.300	-0.030	-0.360
2022	10/27/2022	175.3	27.2	0.020	0.240	0.035	0.420	0.065	0.780	0.055	0.660	0.020	0.240	-0.035	-0.420
2023	12/6/2023	189.3	12.8	0.020	0.240	0.025	0.300	0.070	0.840	0.060	0.720	0.020	0.240	-0.030	-0.360
2024	6/5/2024	192.1	16.7	-0.025	-0.300	0.015	0.180	0.063	0.756	0.063	0.756	0.024	0.288	-0.027	-0.324
2025	10/3/2025	175.9	18.3	0.023	0.276	0.023	0.276	0.064	0.768	0.057	0.684	0.015	0.180	-0.039	-0.468

Note:
1. Vertical data is referenced in NGVD 29 datum.

**TABLE 8
SAND CANYON DAM
ELEVATIONS OF SURVEY MONUMENTS
1968 THROUGH 2025**

Monument ID		Reservoir Elevation (feet)	Temperature (°C)	S-1	S-2	S-3	S-4	S-5	S-6
Approx. Station				8+00.234	6+00.212	4+00.125	2+00.191	0+00.079	0+61.430
Year	Date		(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)
1968			200.75	200.33	200.4	200.57			
1969			200.6	200.24	200.29	200.41			
1975	9/15/1975		200.727	200.956	200.534	200.430	200.570		
1976									
1977									
1978									
1979									
1980									
1981	12/15/1981		200.750	201.970	200.540	200.630	200.570		
1982	6/15/1982		200.800	201.010	200.570	200.660	200.610		
1983									
1984									
1985	10/20/1985		200.740	200.960	200.540	200.600	200.550		
1986									
1987	10/20/1987		200.790		200.550	200.630	200.550	200.760	
1988									
1989									
1990									
1991									
1992									
1993									
1994									
1995	5/8/1995		200.840	201.060	200.610	200.680	200.660	200.830	
1996	5/1/1996		200.840	201.060	200.610	200.690	200.670	200.840	
1997	5/28/1997		200.850	201.070	200.610	200.700	200.680	200.810	
1998	5/11/1998		200.850	201.060	200.600	200.680	200.660	200.780	
1999	4/26/1999		200.847	201.057	200.592	200.677	200.657	200.772	
2000	6/29/2000		200.847	201.057	200.597	200.682	200.667	200.777	
2001	5/2/2001		200.847	201.057	200.602	200.692	200.672	200.787	
2002	5/21/2002		200.852	201.057	200.597	200.682	200.672	200.782	
2003	5/21/2003		200.852	201.062	200.602	200.687	200.677	200.787	
2004	5/18/2004		200.852	201.062	200.602	200.687	200.677	200.787	
2005	5/31/2005		200.852	201.062	200.602	200.682	200.672	200.782	
2006	5/31/2006		200.857	201.062	200.597	200.682	200.672	200.782	
2007	5/15/2007	176.8	200.847	201.060	200.597	200.680	200.671	200.778	
2008	5/27/2008	190.9	200.850	201.054	200.591	200.673	200.668	200.774	
2009	6/9/2009	188.1	200.847	201.067	200.607	200.687	200.682	200.787	
2010	5/24/2010	190.9	200.847	201.052	200.587	200.672	200.667	200.772	
2011	5/18/2011	193.1	200.847	201.052	200.592	200.677	200.672	200.777	
2012	5/18/2012	180.7	200.847	201.057	200.592	200.677	200.672	200.777	
2013	6/6/2013	177.6	200.847	201.057	200.587	200.672	200.672	200.777	
2014	4/25/2014	177.4	200.847	201.062	200.597	200.682	200.682	200.787	
2015	6/4/2015	179.0	200.847	201.057	200.587	200.677	200.672	200.777	
2016	7/25/2016	178.4	200.842	201.047	200.582	200.672	200.667	200.772	
2017	6/15/2017	182.5							
2018	5/31/2018	183.1	200.842	201.057	200.592	200.682	200.682	200.787	
2019	6/13/2019	190.8	200.852	201.052	200.582	200.667	200.662	200.767	
2020	10/16/2020	180.3	200.843	201.052	200.574	200.660	200.658	200.764	
2021									
2022	4/26/2022	186.2	200.845	201.054	200.581	200.668	200.667	200.771	
2022	10/27/2022	175.3	200.842	201.057	200.581	200.669	200.665	200.767	
2023	12/6/2023	189.3	200.845	201.048	200.578	200.665	200.663	200.769	
2024	6/5/2024	192.1	200.849	201.052	200.583	200.671	200.670	200.776	
2025	10/3/2025	175.9	200.845	201.054	200.583	200.672	200.658	200.775	

Note:

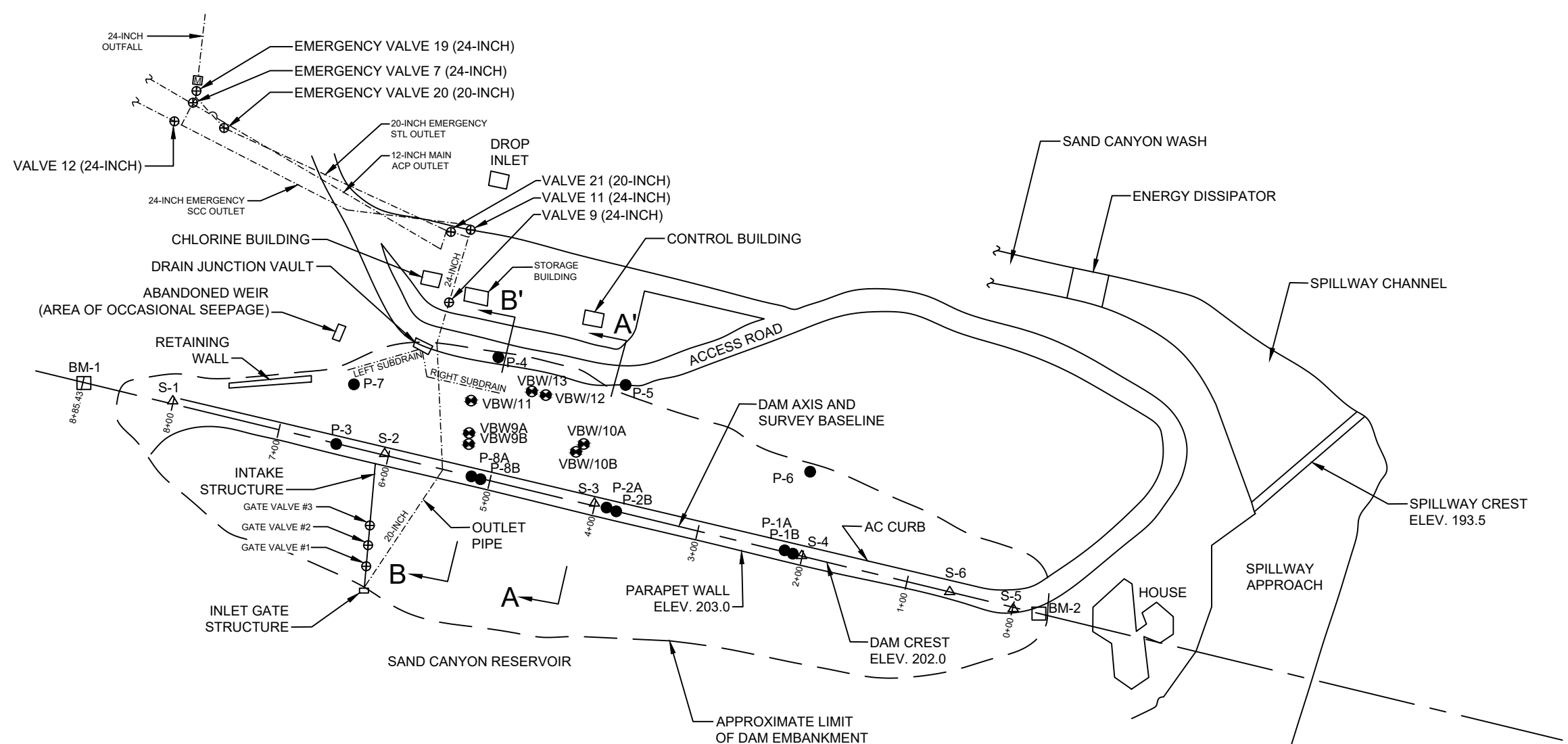
1. Vertical data is referenced in NGVD 29 datum.

**TABLE 9
SAND CANYON DAM
CUMULATIVE VERTICAL MOVEMENT OF SURVEY MONUMENTS
1969 THROUGH 2025**

Monument ID		Reservoir Elevation (feet)	Temperature (°C)	S-1		S-2		S-3		S-4		S-5		S-6	
Approx.	Station			8+00.234		6+00.212		4+00.125		2+00.191		0+00.079		0+61.430	
Year	Date			(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)
1968															
1969				-0.15	-1.800	-0.09	-1.080	-0.11	-1.32	-0.16	-1.92				
1975	9/15/1975			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
1976															
1977															
1978															
1979															
1980															
1981	12/15/1981			-0.023	-0.276	-1.014	-12.168	-0.006	-0.072	-0.200	-2.400	0.000	0.000		
1982	6/15/1982			-0.073	-0.876	-0.054	-0.648	-0.036	-0.432	-0.230	-2.760	-0.040	-0.480		
1983															
1984															
1985	10/20/1985			-0.013	-0.156	-0.004	-0.048	-0.006	-0.072	-0.170	-2.040	0.020	0.240		
1986															
1987	10/20/1987			-0.063	-0.756		0.000	-0.016	-0.192	-0.200	-2.400	0.020	0.240	0.000	0.000
1988															
1989															
1990															
1991															
1992															
1993															
1994															
1995	5/8/1995			-0.113	-1.356	-0.104	-1.248	-0.076	-0.912	-0.250	-3.000	-0.090	-1.080	-0.070	-0.840
1996	5/1/1996			-0.113	-1.356	-0.104	-1.248	-0.076	-0.912	-0.260	-3.120	-0.100	-1.200	-0.080	-0.960
1997	5/28/1997			-0.123	-1.476	-0.114	-1.368	-0.076	-0.912	-0.270	-3.240	-0.110	-1.320	-0.050	-0.600
1998	5/11/1998			-0.123	-1.476	-0.104	-1.248	-0.066	-0.792	-0.250	-3.000	-0.090	-1.080	-0.020	-0.240
1999	4/26/1999			-0.120	-1.440	-0.101	-1.212	-0.058	-0.696	-0.247	-2.964	-0.087	-1.044	-0.012	-0.144
2000	6/29/2000			-0.120	-1.440	-0.101	-1.212	-0.063	-0.756	-0.252	-3.024	-0.097	-1.164	-0.017	-0.204
2001	5/2/2001			-0.120	-1.440	-0.101	-1.212	-0.068	-0.816	-0.262	-3.144	-0.102	-1.224	-0.027	-0.324
2002	5/21/2002			-0.125	-1.500	-0.101	-1.212	-0.063	-0.756	-0.252	-3.024	-0.102	-1.224	-0.022	-0.264
2003	5/21/2003			-0.125	-1.500	-0.106	-1.272	-0.068	-0.816	-0.257	-3.084	-0.107	-1.284	-0.027	-0.324
2004	5/18/2004			-0.125	-1.500	-0.106	-1.272	-0.068	-0.816	-0.257	-3.084	-0.107	-1.284	-0.027	-0.324
2005	5/31/2005			-0.125	-1.500	-0.106	-1.272	-0.068	-0.816	-0.252	-3.024	-0.102	-1.224	-0.022	-0.264
2006	5/31/2006			-0.130	-1.560	-0.106	-1.272	-0.063	-0.756	-0.252	-3.024	-0.102	-1.224	-0.022	-0.264
2007	5/15/2007	176.8		-0.120	-1.440	-0.104	-1.248	-0.063	-0.756	-0.250	-3.000	-0.101	-1.212	-0.018	-0.216
2008	5/27/2008	190.9		-0.123	-1.476	-0.098	-1.176	-0.057	-0.684	-0.243	-2.916	-0.098	-1.176	-0.014	-0.168
2009	6/9/2009	188.1		-0.120	-1.440	-0.111	-1.332	-0.073	-0.876	-0.257	-3.084	-0.112	-1.344	-0.027	-0.324
2010	5/24/2010	190.9		-0.120	-1.440	-0.096	-1.152	-0.053	-0.636	-0.242	-2.904	-0.097	-1.164	-0.012	-0.144
2011	5/18/2011	193.1		-0.120	-1.440	-0.096	-1.152	-0.058	-0.696	-0.247	-2.964	-0.102	-1.224	-0.017	-0.204
2012	5/18/2012	180.7		-0.120	-1.440	-0.101	-1.212	-0.058	-0.696	-0.247	-2.964	-0.102	-1.224	-0.017	-0.204
2013	6/6/2013	177.6		-0.120	-1.440	-0.101	-1.212	-0.053	-0.636	-0.242	-2.904	-0.102	-1.224	-0.017	-0.204
2014	4/25/2014	177.4		-0.120	-1.440	-0.106	-1.272	-0.063	-0.756	-0.252	-3.024	-0.112	-1.344	-0.027	-0.324
2015	6/4/2015	179.0		-0.120	-1.440	-0.101	-1.212	-0.053	-0.636	-0.247	-2.964	-0.102	-1.224	-0.017	-0.204
2016	7/25/2016	178.4		-0.115	-1.380	-0.091	-1.092	-0.048	-0.576	-0.242	-2.904	-0.097	-1.164	-0.012	-0.144
2017	6/15/2017	182.5													
2018	5/31/2018	183.1		-0.115	-1.380	-0.101	-1.212	-0.058	-0.696	-0.252	-3.024	-0.112	-1.344	-0.027	-0.324
2019	6/13/2019	190.8		-0.125	-1.500	-0.096	-1.152	-0.048	-0.576	-0.237	-2.844	-0.092	-1.104	-0.007	-0.084
2020	10/16/2020	180.3		-0.116	-1.392	-0.096	-1.152	-0.040	-0.480	-0.230	-2.760	-0.088	-1.056	-0.004	-0.048
2021															
2022	4/26/2022	186.2		-0.118	-1.416	-0.098	-1.176	-0.047	-0.564	-0.238	-2.856	-0.097	-1.164	-0.011	-0.132
2022	10/27/2022	175.3	27.2	-0.115	-1.38	-0.101	-1.212	-0.047	-0.564	-0.239	-2.868	-0.095	-1.140	-0.007	-0.084
2023	12/6/2023	189.3	12.8	-0.118	-1.416	-0.092	-1.104	-0.044	-0.528	-0.235	-2.82	-0.093	-1.116	-0.009	-0.108
2024	6/5/2024	192.1	16.7	-0.122	-1.464	-0.096	-1.152	-0.049	-0.588	-0.241	-2.892	-0.100	-1.200	-0.016	-0.192
2025	10/3/2025	175.9	18.3	-0.118	-1.416	-0.098	-1.176	-0.049	-0.588	-0.242	-2.904	-0.088	-1.056	-0.015	-0.180

Note:
1. Vertical data is referenced in NGVD 29 datum.

Figures




LEGEND

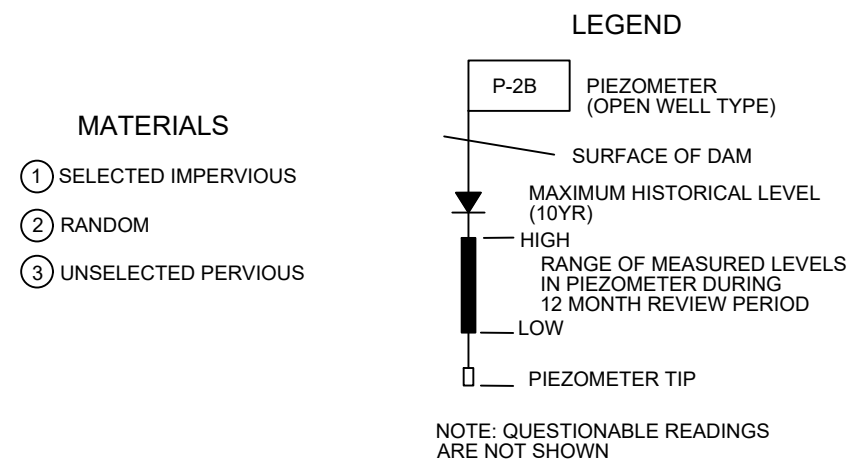
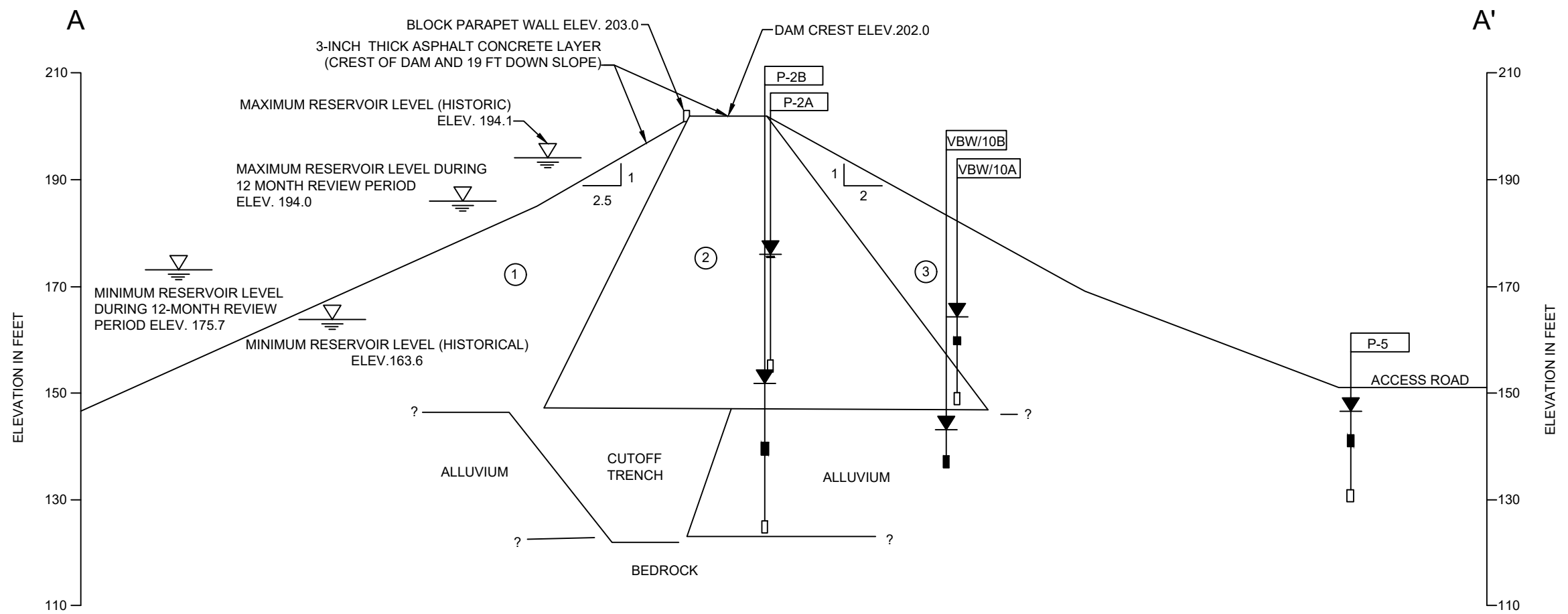
- VBW/13 VIBRATING WIRE PIEZOMETER
- P-2A OPEN WELL PIEZOMETER
- △ S-3 SURVEY MONUMENT
- BM-1 BENCH MARK
- Ⓜ METER
- A — A' LINE OF SECTION
- OUTLET PIPE
- - - SEEPAGE SUBDRAIN
- +— STATION NUMBER

NOTES:

- (1) SECTION A-A' IS SHOWN ON FIGURE 2
- (2) SECTION B-B' IS SHOWN ON FIGURE 3
- (3) ELEVATIONS ARE IN FEET RELATIVE TO NGVD29 DATUM
- (4) LOCATIONS OF OUTLET PIPES AND VALVES ARE ESTIMATED
- (5) ONLY DSOD JURISDICTIONAL VALVES ARE SHOWN

NOT TO SCALE

Annual Surveillance Report from Jan. 2025 to Dec. 2025 Sand Canyon Dam Irvine, CA	 GEI Consultants	SITE AND INSTRUMENTATION PLAN
		Irvine Ranch Water District Irvine, CA




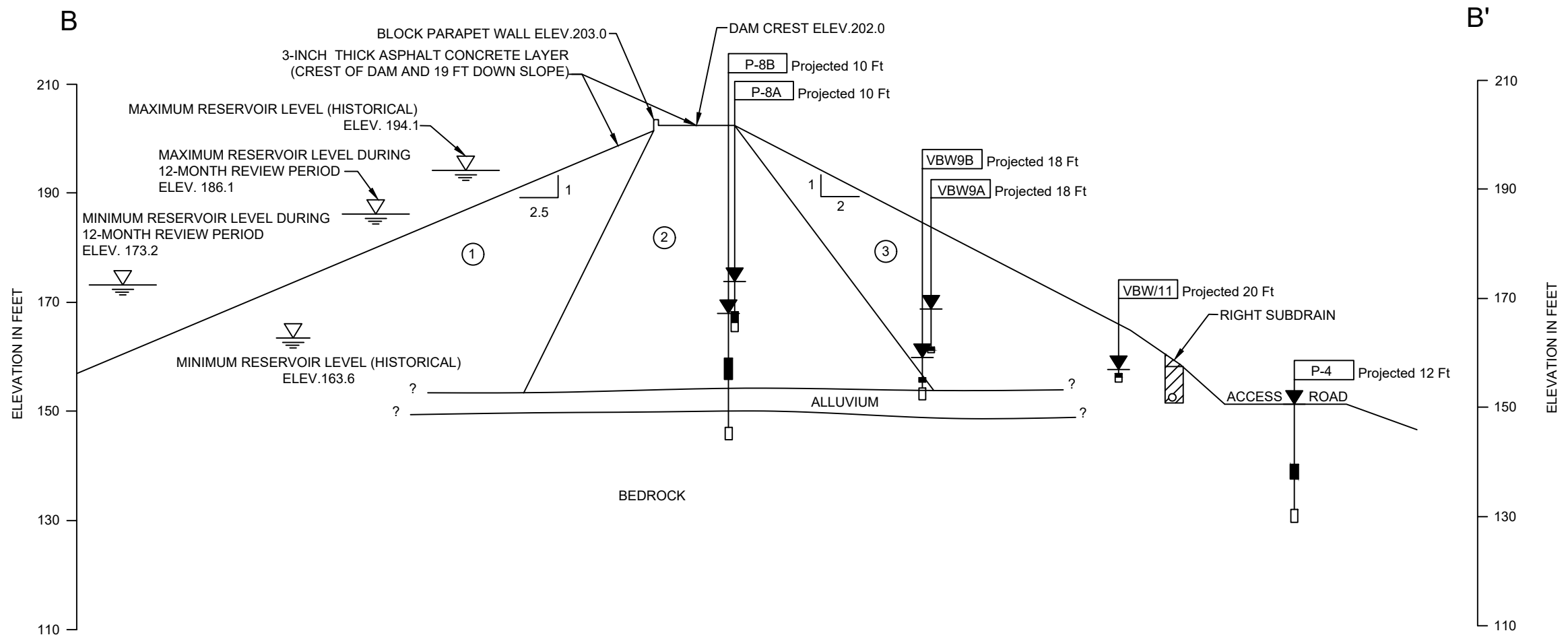
NOTES:

(1) SEE FIGURE 1 FOR LOCATION OF SECTION

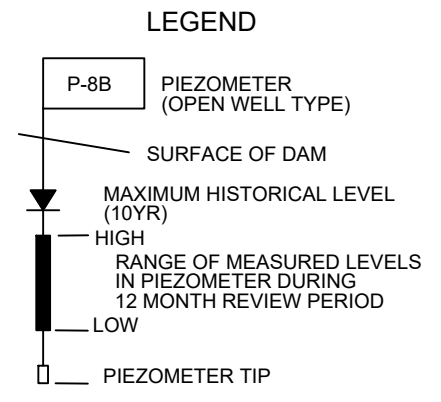
(2) ELEVATIONS ARE IN FEET RELATIVE TO NGVD29

NOT TO SCALE

Annual Surveillance Report from Jan. 2025 to Dec. 2025 Sand Canyon Dam Irvine, CA		SECTION A-A'	
Irvine Ranch Water District Irvine, CA		Project 2305575	May 2026



- MATERIALS**
- ① SELECTED IMPERVIOUS
 - ② RANDOM
 - ③ UNSELECTED PERVIOUS



NOTE: QUESTIONABLE READINGS ARE NOT SHOWN

- NOTES:**
- (1) SEE FIGURE 1 FOR LOCATION OF SECTION
 - (2) ELEVATIONS ARE IN FEET RELATIVE TO NGVD29

NOT TO SCALE


Annual Surveillance Report from Jan. 2025 to Dec. 2025 Sand Canyon Dam Irvine, CA		SECTION B-B'	
Irvine Ranch Water District Irvine, CA		Project 2305575	May 2026

Figure 4
SAND CANYON DAM
2-YR OPEN WELL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
OPEN WELL PIEZOMETERS P-1A, P-1B, AND P-6
JANUARY 2024 THROUGH DECEMBER 2025

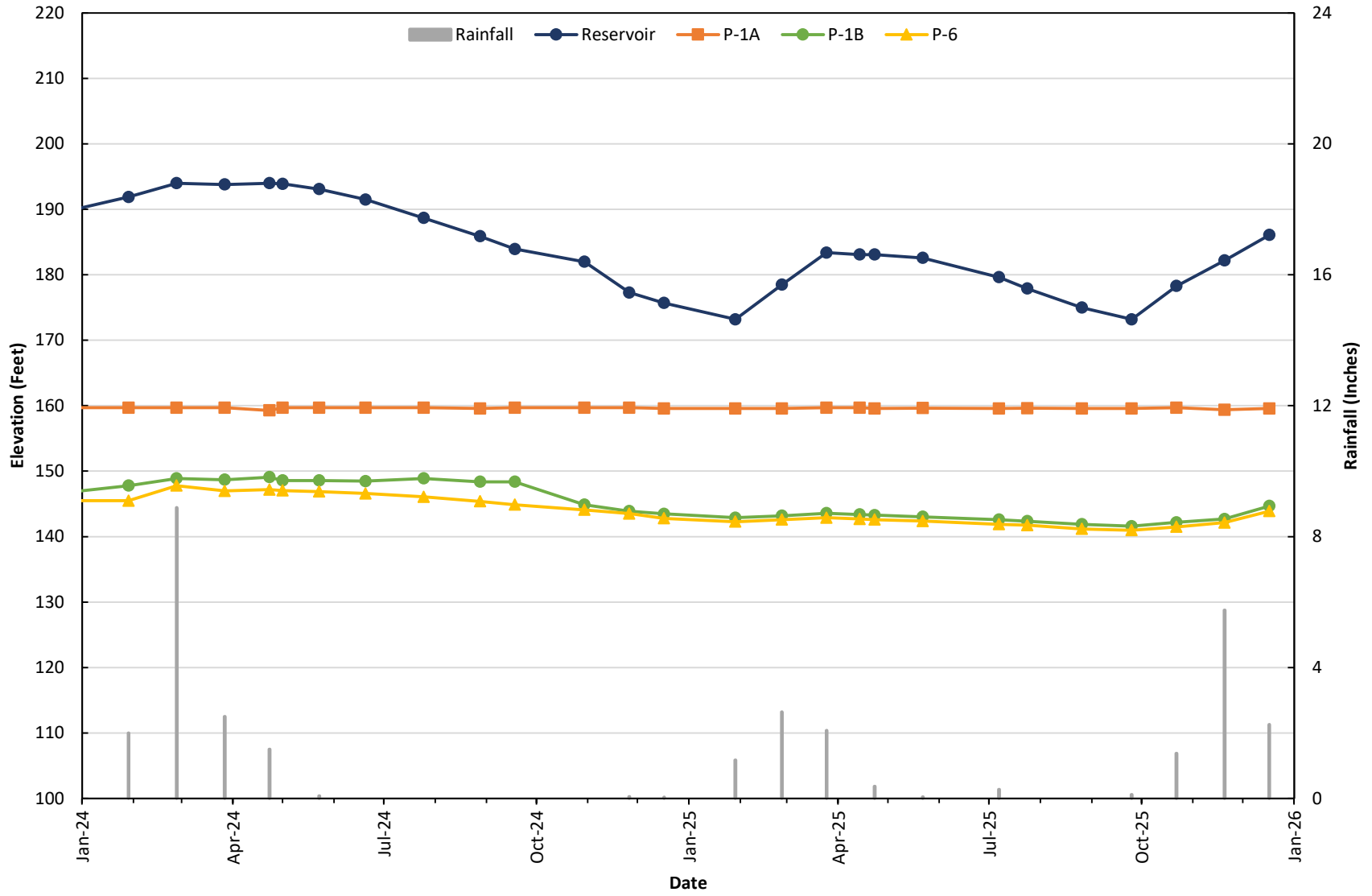


Figure 5
SAND CANYON DAM
2-YR PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-2A, P-2B, P-5, VBW/10A, AND VBW/10B
JANUARY 2024 THROUGH DECEMBER 2025

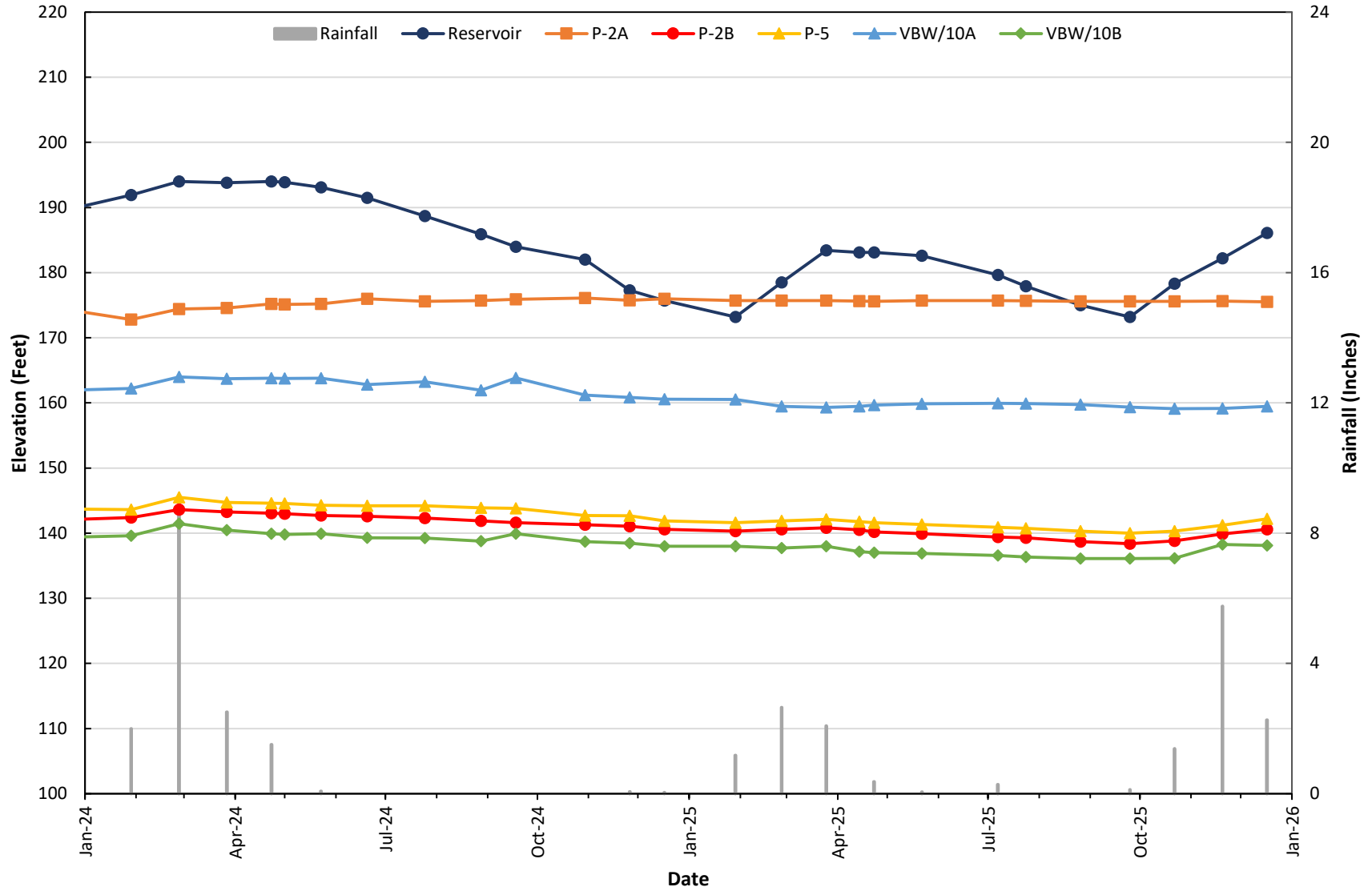


Figure 6
SAND CANYON DAM
2-YR PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-4, P-8A, P-8B, VBW9A, VBW9B, AND VBW/11
JANUARY 2024 THROUGH DECEMBER 2025

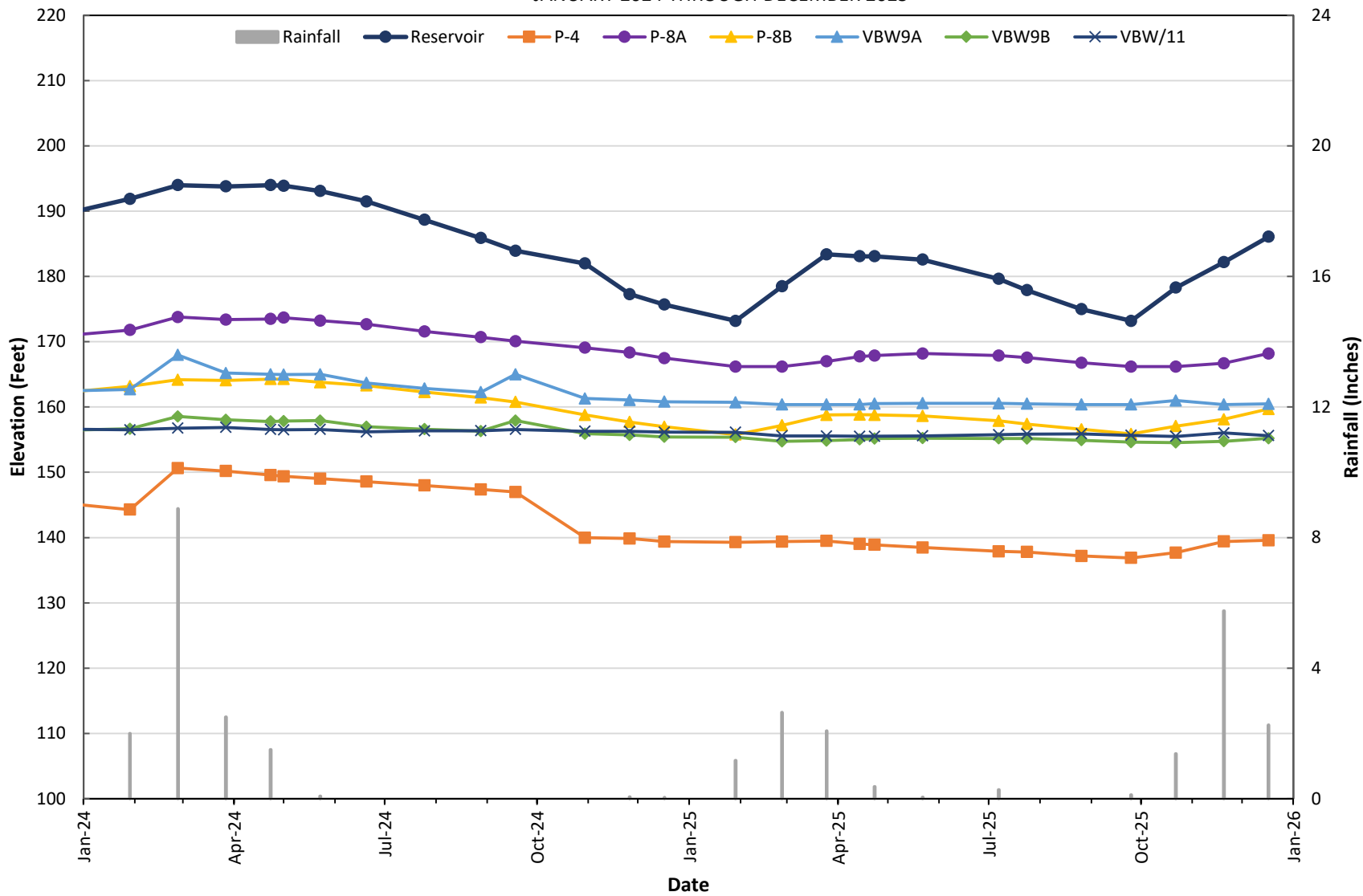


Figure 7
SAND CANYON DAM
2-YR OPEN WELL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
OPEN WELL PIEZOMETERS P-3 AND P-7
JANUARY 2024 THROUGH DECEMBER 2025

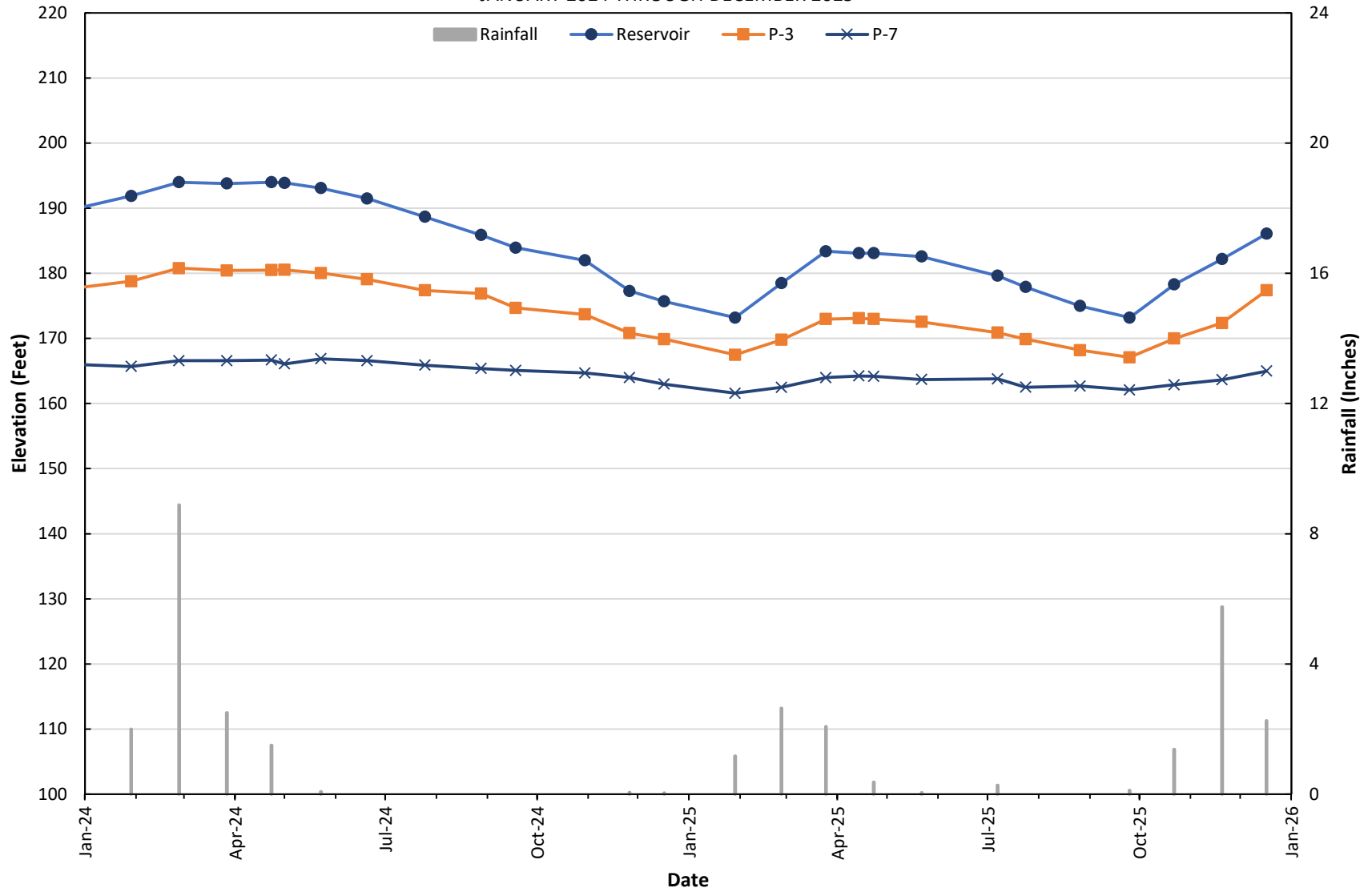


Figure 8
SAND CANYON DAM
2-YR VIBRATING WIRE PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
VIBRATING WIRE PIEZOMETERS VBW/12 AND VBW/13
JANUARY 2024 THROUGH DECEMBER 2025

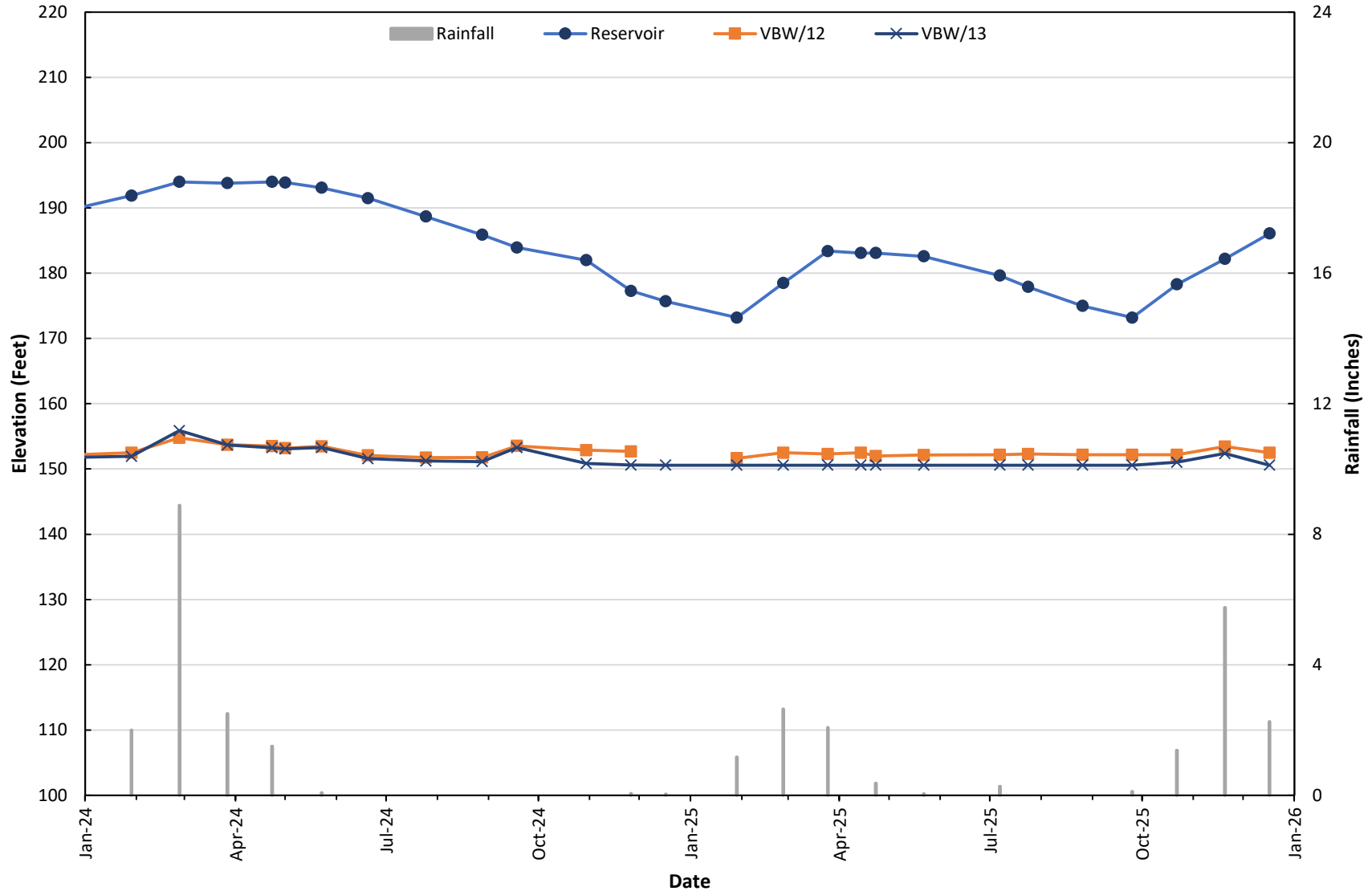


Figure 9
SAND CANYON DAM
HISTORICAL OPEN WELL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
OPEN WELL PIEZOMETERS P-1A, P-1B, AND P-6
JANUARY 2015 THROUGH DECEMBER 2025

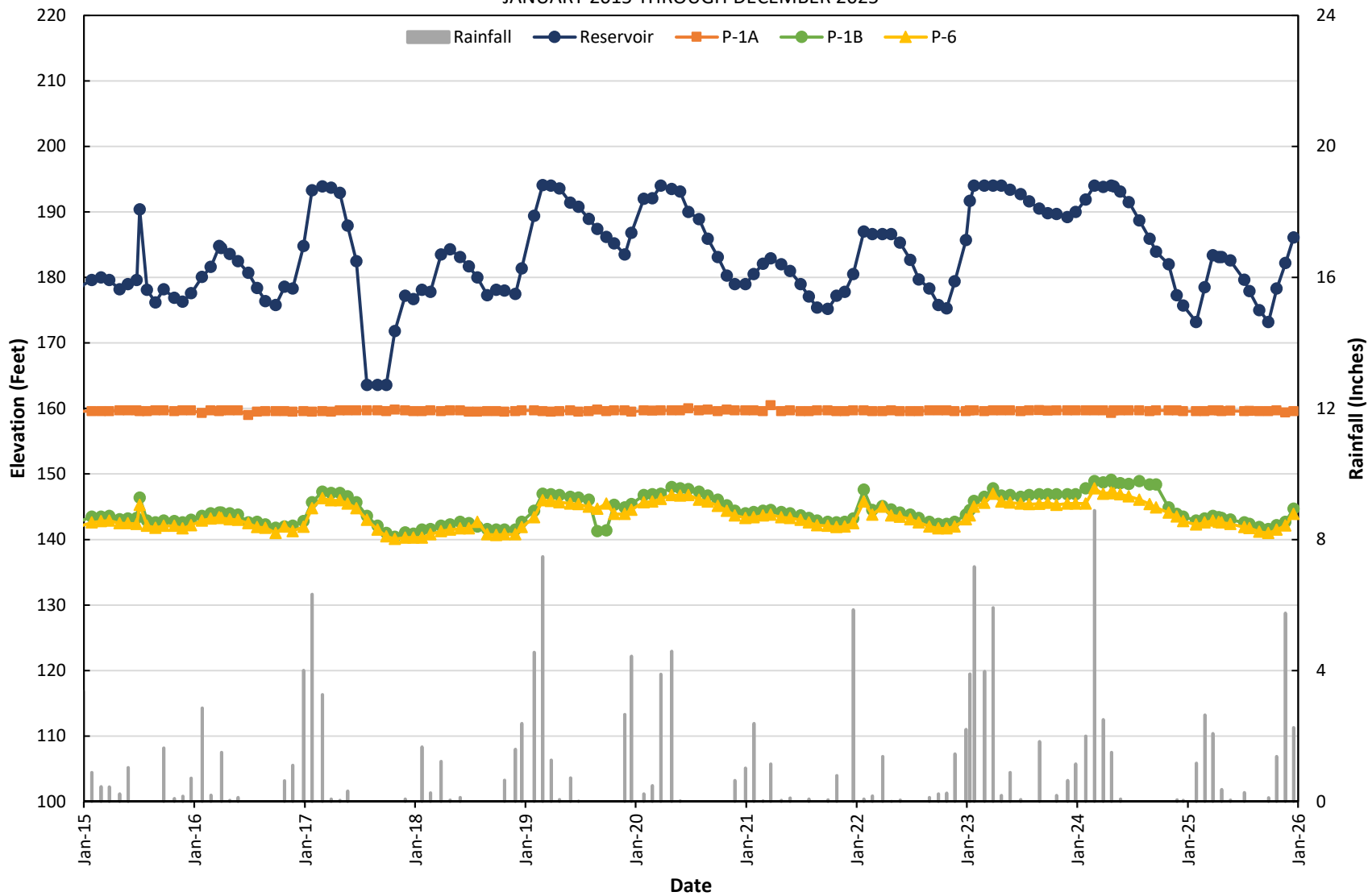


Figure 10
SAND CANYON DAM
HISTORICAL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-2A, P-2B, P-5, VBW/10A, AND VBW/10B
JANUARY 2015 THROUGH DECEMBER 2020

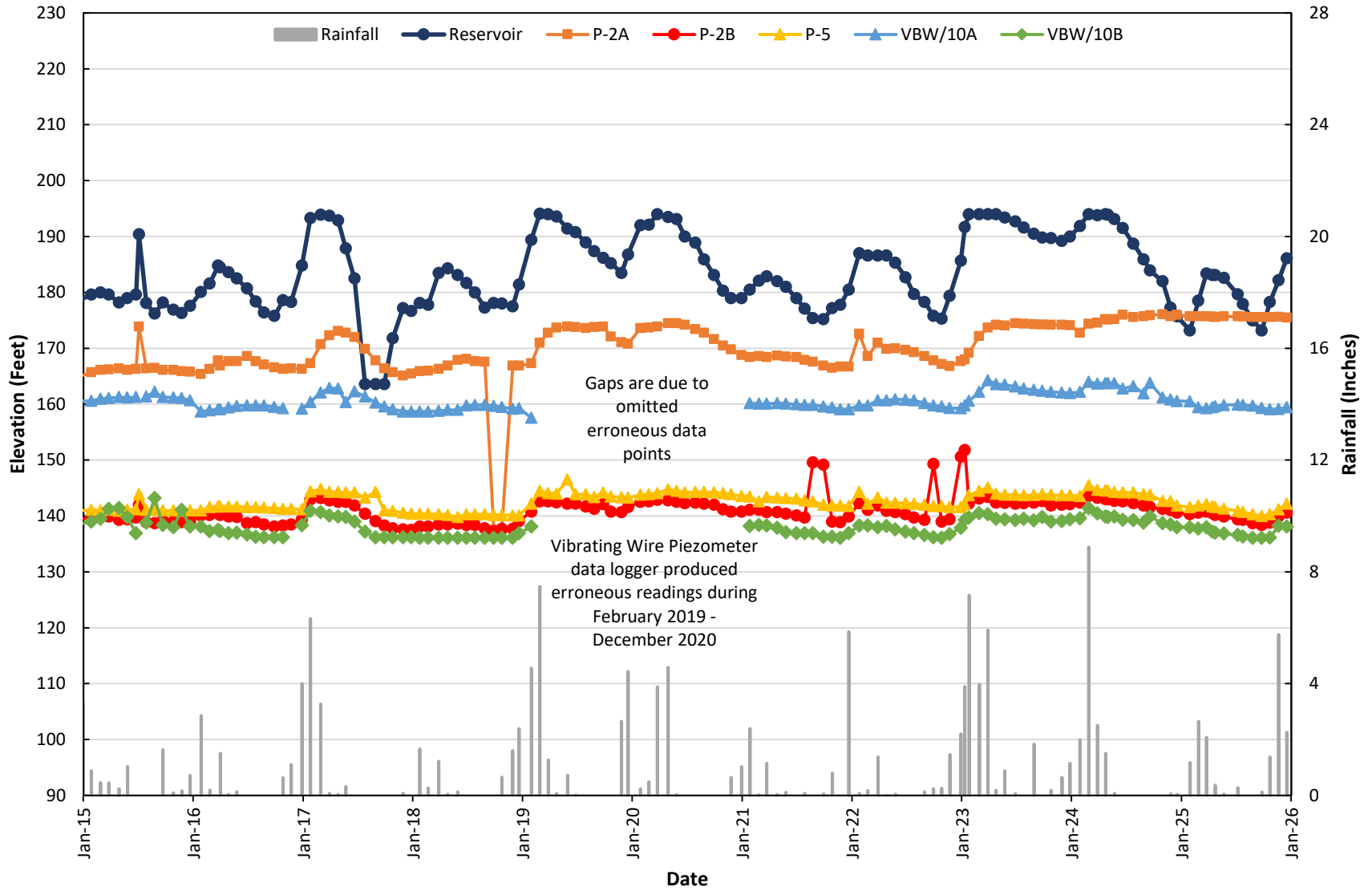


Figure 11
SAND CANYON DAM
HISTORICAL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-4, P-8A, P-8B, VBW9A, VBW9B, AND VBW/11
JANUARY 2015 THROUGH DECEMBER 2025

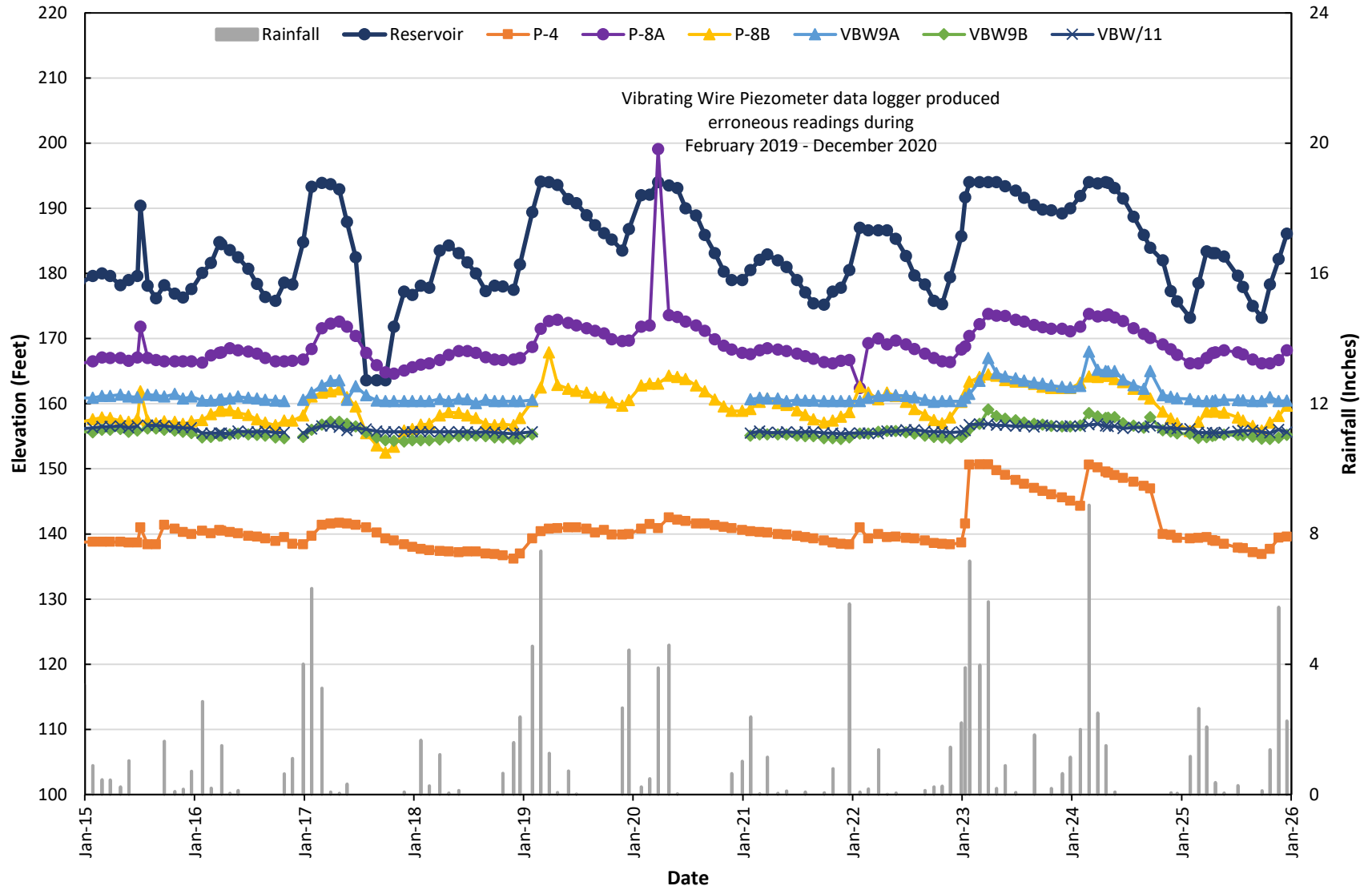


Figure 12
 SAND CANYON DAM
 HISTORICAL OPEN WELL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
 OPEN WELL PIEZOMETERS P-3 AND P-7
 JANUARY 2015 THROUGH DECEMBER 2025

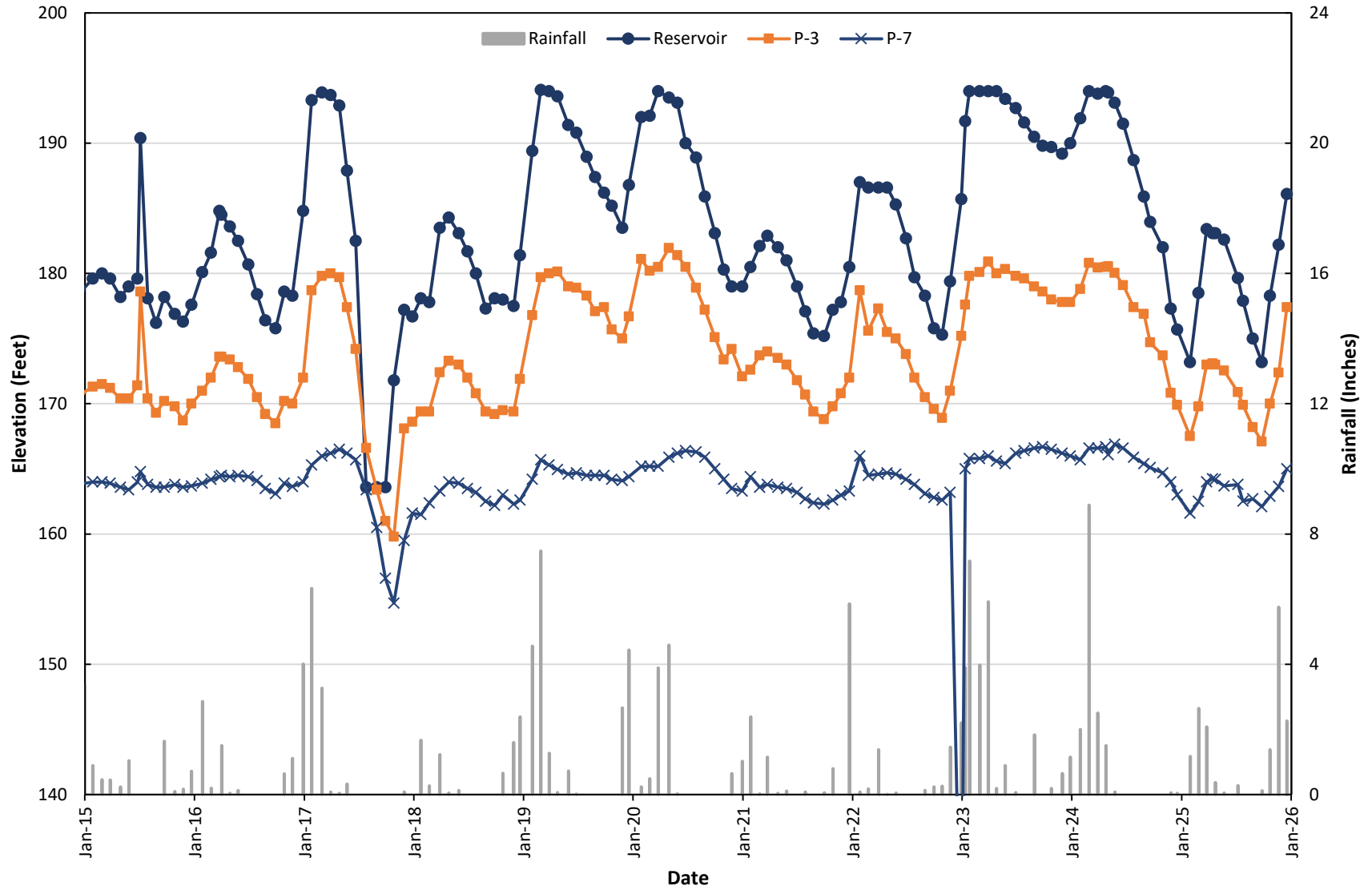


Figure 13
SAND CANYON DAM
HISTORICAL VIBRATING WIRE PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
VIBRATING WIRE PIEZOMETERS VBW/12 AND VBW/13
JANUARY 2015 THROUGH DECEMBER 2025

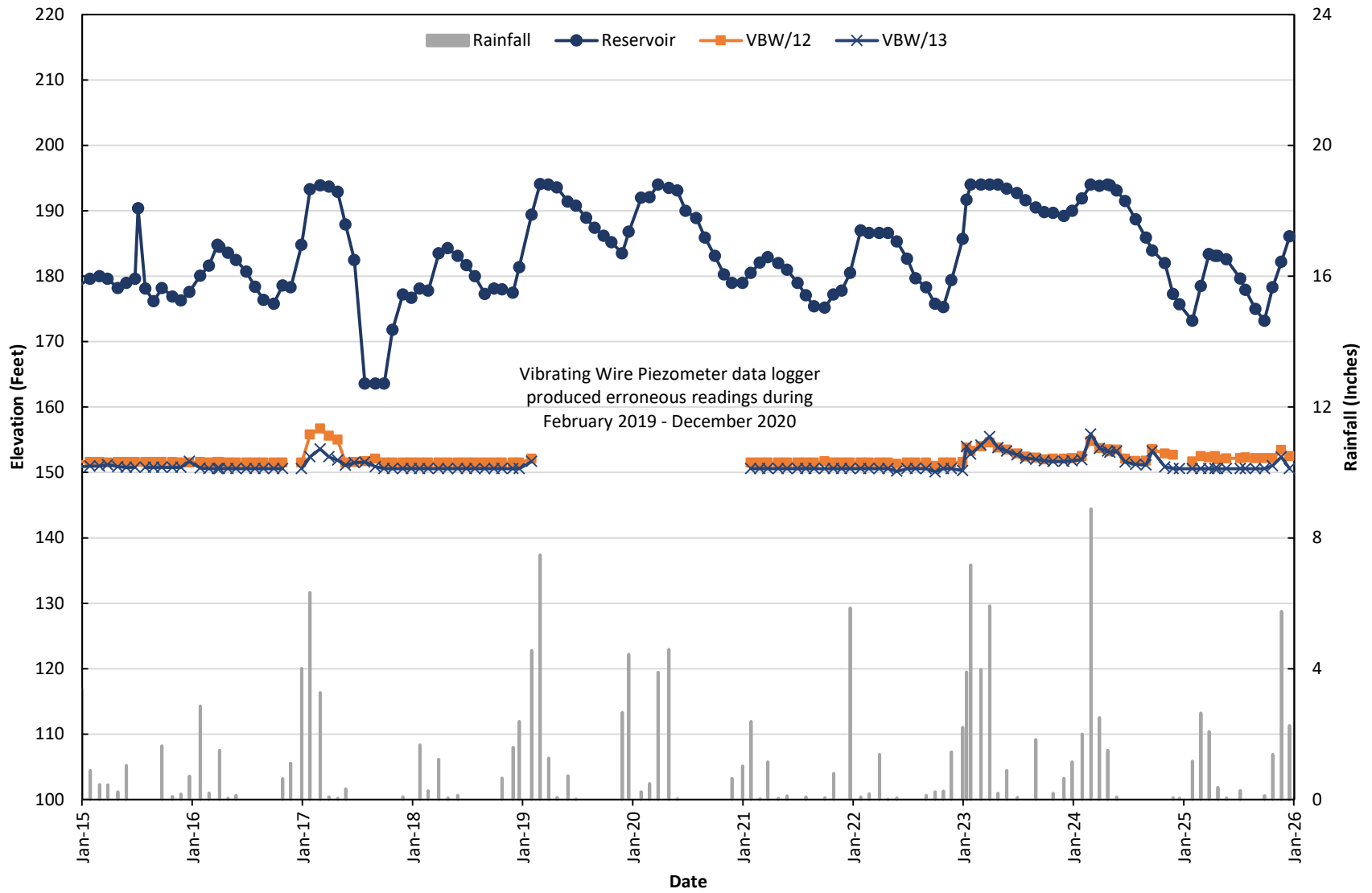


Figure 14
SAND CANYON DAM
2-YR SEEPAGE, RESERVOIR WATER SURFACE ELEVATIONS AND RAINFALL
JANUARY 2024 THROUGH DECEMBER 2025

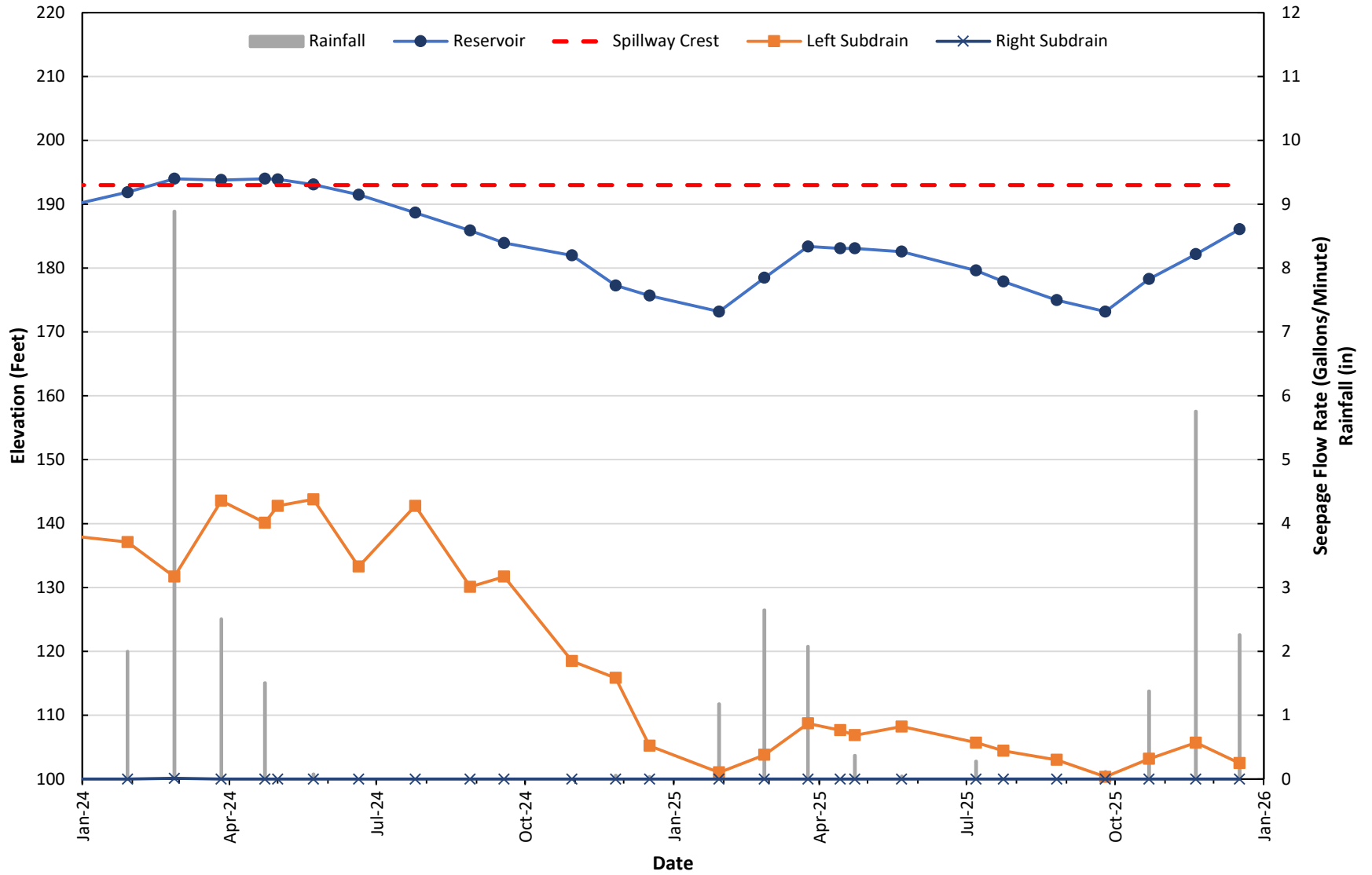


Figure 15
SAND CANYON DAM
HISTORICAL SEEPAGE FLOW RATES AND RESERVOIR WATER SURFACE ELEVATIONS
JANUARY 2015 THROUGH DECEMBER 2025

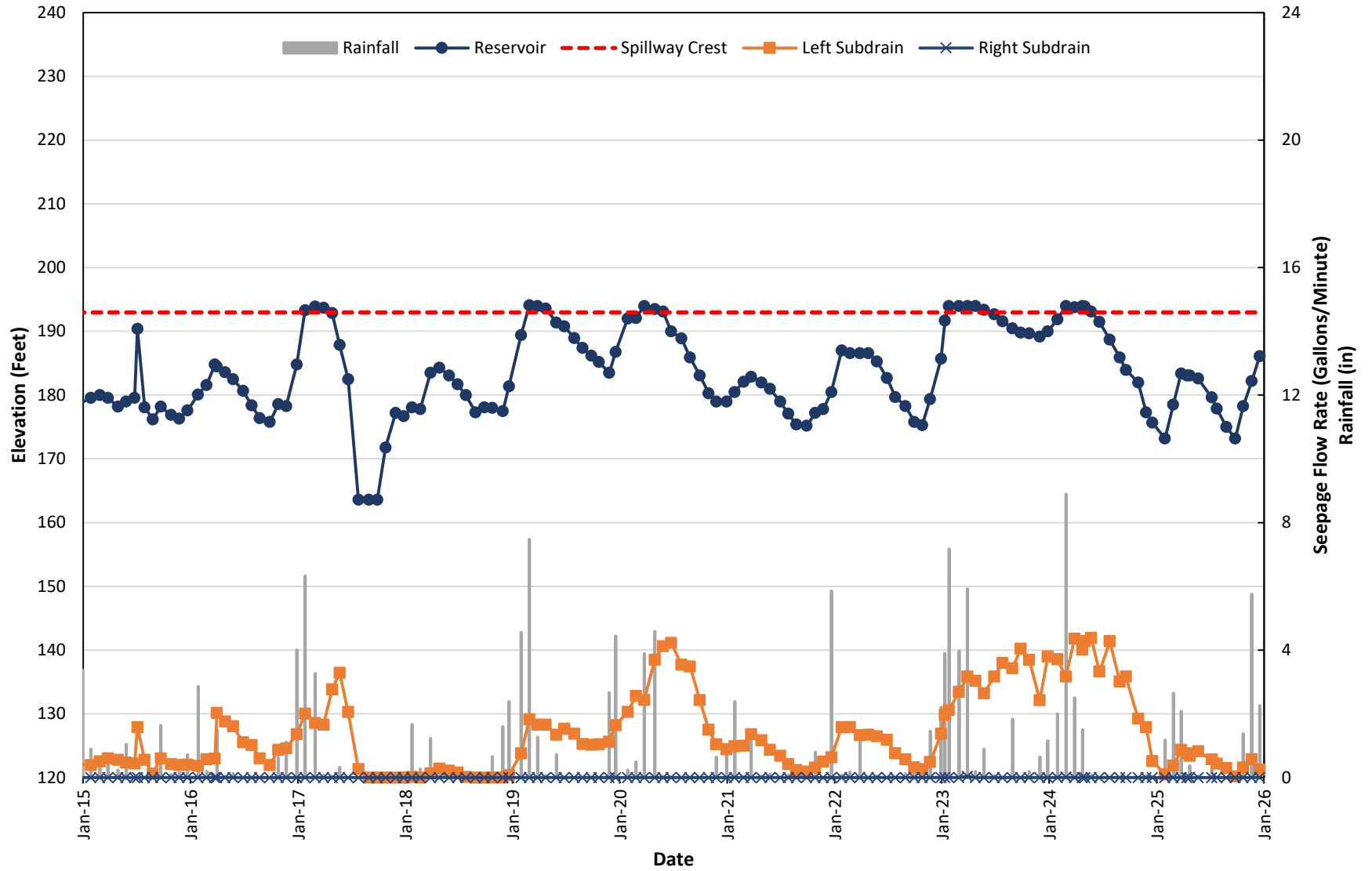


Figure 16
SAND CANYON DAM
HISTORICAL CUMULATIVE HORIZONTAL DISPLACEMENT
SURVEY MONUMENTS S-1, S-2, S-3, S-4, S-5, AND S-6
JANUARY 1995 THROUGH DECEMBER 2025

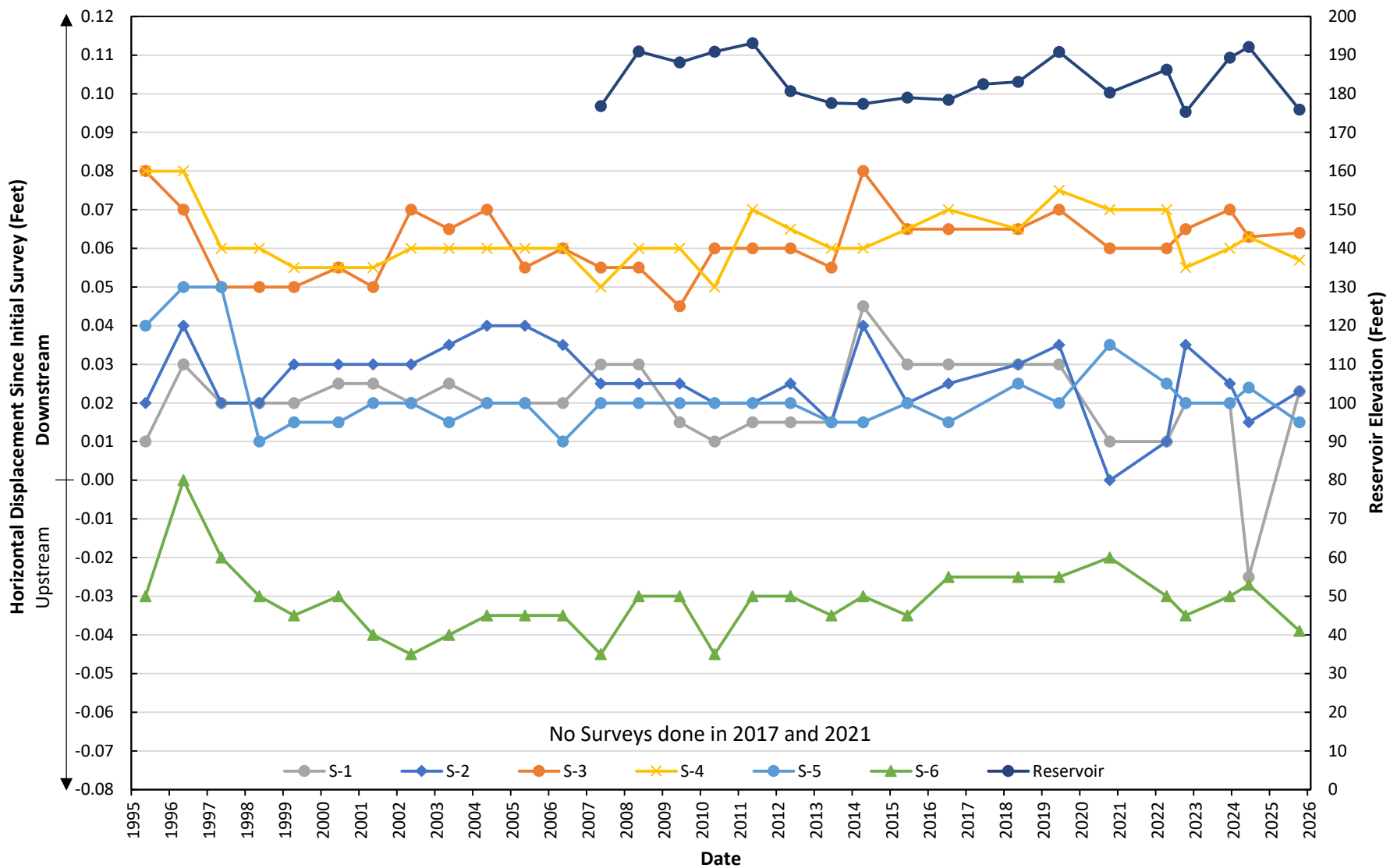
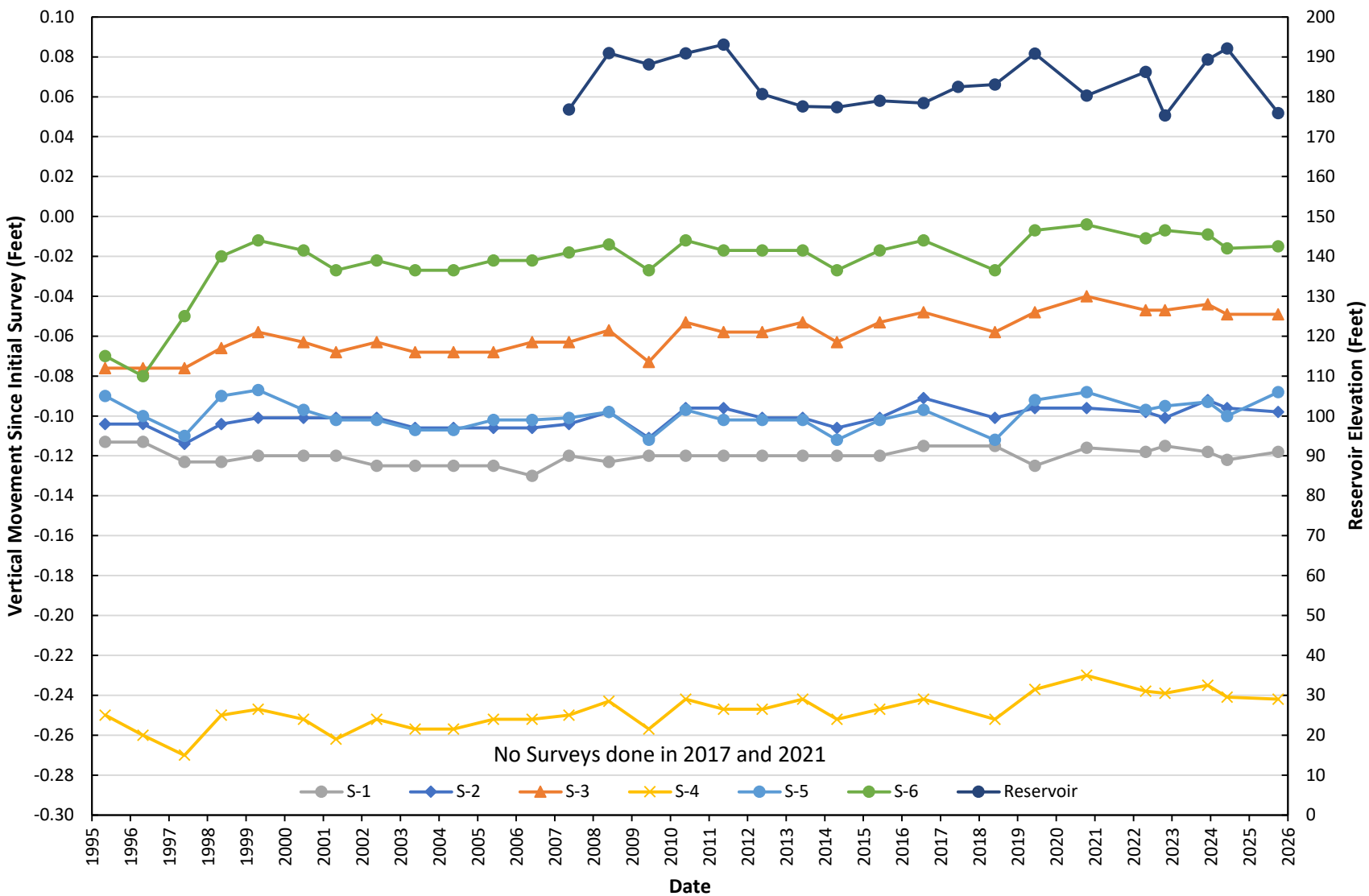
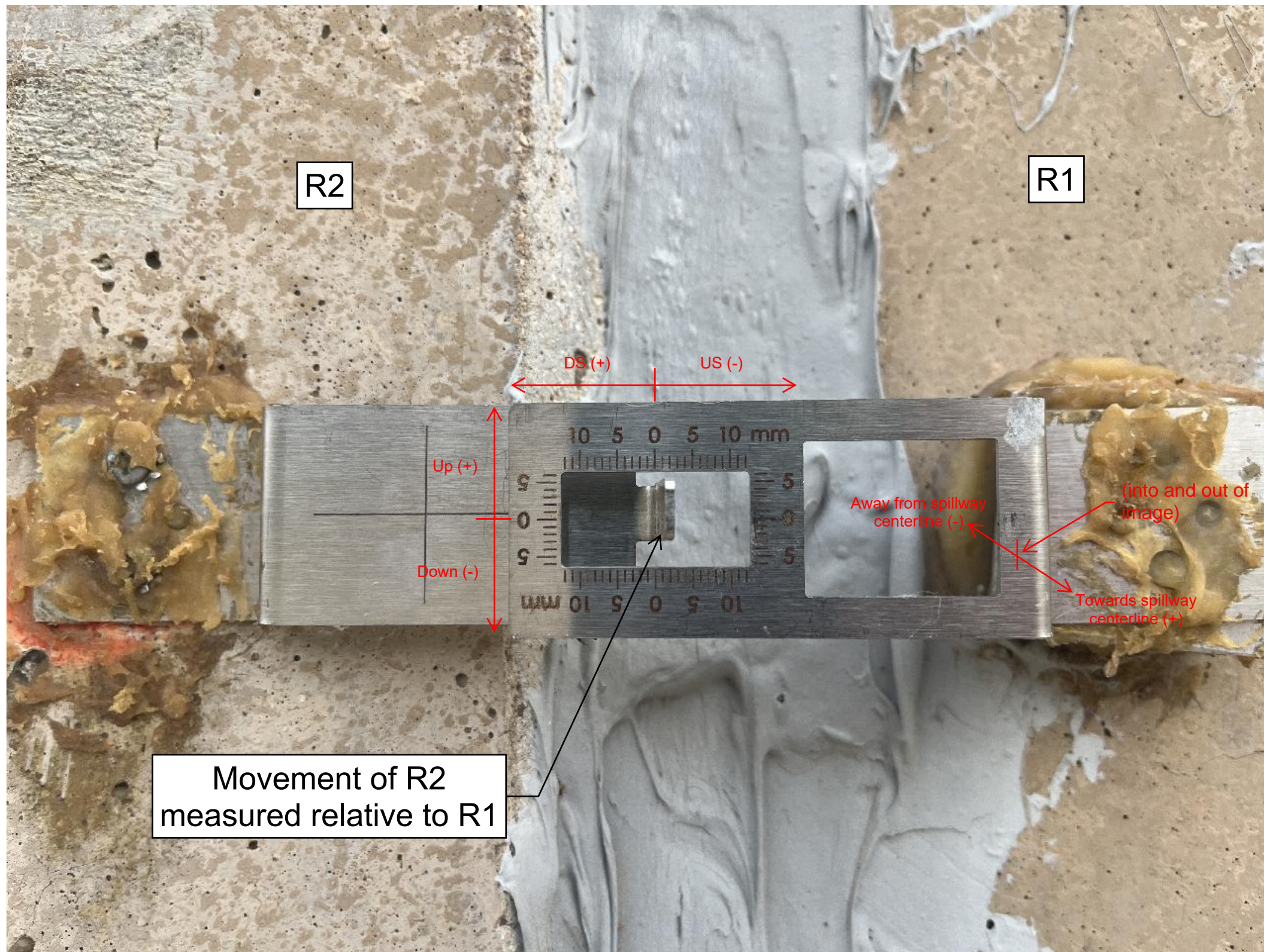


Figure 17
SAND CANYON DAM
HISTORICAL CUMULATIVE VERTICAL MOVEMENT
SURVEY MONUMENTS S-1, S-2, S-3, S-4, S-5, AND S-6
JANUARY 1995 THROUGH DECEMBER 2025





Appendix A

Inspection Photographs of Sand Canyon Dam – June 17, 2025

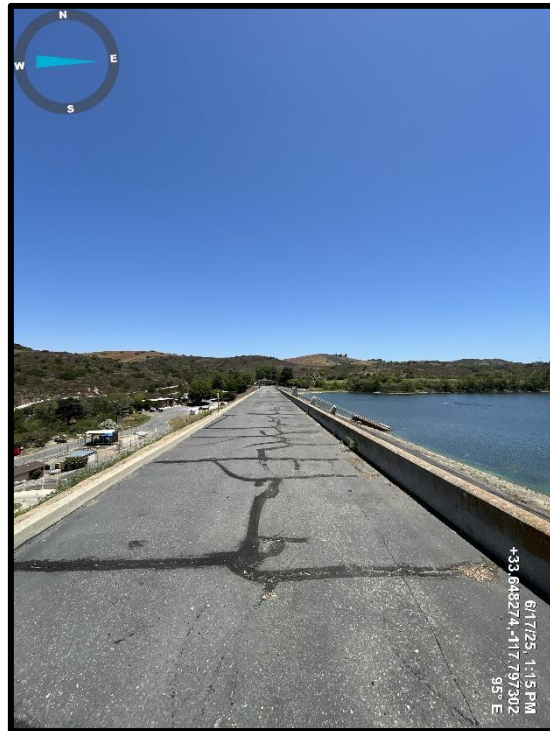


Photo 1) AC paved crest looking towards the right abutment, including 1-foot-high parapet wall.



Photo 2) AC-lined upstream face looking towards right abutment. Note cracks along face.



Photo 3) Abandoned irrigation weir box. Note seepage surrounding the box.



Photo 4) Abandoned irrigation weir box. Note pooled water.



Photo 5) Downstream face of dam near left abutment. Note abandoned irrigation weir box.



Photo 6) Downstream face of dam. Looking towards right abutment.



Photo 7) Downstream face of dam. Looking towards left abutment.



Photo 8) Minor rodent activity on the downstream toe near the right abutment.



Photo 9) Spillway control ogee section and approach.



Photo 10) Spillway channel looking downstream. Note vegetation.



Photo 11) Close up view of spillway stilling basin. Note brush/tule growth downstream and two spalling baffle blocks on the right.



Photo 12) Close up view of spillway stilling basin. Note brush/tule growth downstream.



Photo 13) View of the gate valve system.



Photo 14) View of the gate valve system.



Photo 15) Sand Canyon creek. Note minor vegetation growth and outlet outfall.



Photo 16) Close up of new concrete pads and access to emergency valves.



Photo 17) Seepage at left subdrain. Right subdrain was dry.



Photo 18) Close up view of Piezometer P-4.

Appendix B

IRWD Dam Outlet Valve Exercising Log



IRWD DAM OUTLET VALVE EXERCISING LOG


SAND CANYON DAM VALVE EXERCISING													
DATE	INITIALS	24" TOP # OF TURNS(50) 185'	24" MIDDLE # OF TURNS(48) 177'	24" BOTTOM # OF TURNS(50) 170'	24" MAIN # OF TURNS	24" BLOW-OFF VALVE #2	24" BLOW-OFF VALVE #1	20" BLOW-OFF VALVE #3	24" EMERGENCY VALVE FLOW (CFS)	TIME (MIN)	TOTAL GALLONS	REASON	COMMENT
5/6/2013		58	21	48	102		Not Turned				0		
4/22/2014		58	21	48	102		Not Turned				0		
4/20/2015		58	21	48	102/50%		Not Turned				0	DSOD	
5/26/2016		58	21	48	30%		Not Turned				0	DSOD	
7/20/2016		58	21	48	30%	Installed 2016	100%	Replaced 2016			0		
4/5/2017		58	21	48	30%	100%	100%	100%			0	DSOD	
Reservoir empty from 7/24/2017 to 10/19/2017 for outlet stucture and main valve repairs.													
5/2/2018		58	21	48	102	100%	100%	100%			0	DSOD	
3/28/2019		58	21	48	102	100%	100%	100%			0	DSOD	
1/14/2020		58	21	48	102	100%	100%	100%			0	DSOD	
4/27/2021		58	21	48	102	100%	100%	100%			0		
4/14/2022		58	21	48	102	100%	100%	100%			0		
10/18/2022						100%	100%				0		
04/18-19/23		58	21	N/A*	102	100%	100%	100%			0	DSOD	*Valve broken
11/12-12/3/24	SH, NK, JV					15%	100%	100%	3.34		0	Discharge	Emergency
12/16-31/2024	SH, AZ, JV					15%	100%	100%	3.5		0	Discharge	Emergency
1/20/2025	SH, NK					100%	100%	100%	0		0	Repair	Emergency
4/16/2025	MJ, SH	50	48	50	N/A	N/A	N/A	N/A			0	Upgrade	New valves
5/7/2025	SH,AL,NP	50	48	50	Not Turned	Not Turned	Not Turned	Not Turned			0	DSOD	
											0		
											0		
											0		
											0		
											0		


Appendix C

GUIDA Survey Report


RESERVOIR MONITORING LAND SURVEYING NOTES

NAME	STATION	OFFSET	HOLD FOR LINE
BM-1	8+85.336		BM1- BRASS DISC WITH PUNCH MARK IN WELL AT WEST SIDE OF VAULT.

S-1	8+00.23	0.073'	
-----	---------	--------	-----------------------------------------------------------------------------------

S-2	6+00.21	0.083'	
-----	---------	--------	-----------------------------------------------------------------------------------

NOTES:
 S-1 THRU S-6 ARE "+" ON BRASS DISC IN WELL


S-3	4+00.11	0.114'	
-----	---------	--------	-------------------------------------------------------------------------------------

 INSTRUMENT SETUP




N.T.S.


WEATHER CONDITIONS:
 TEMP 65°
 OVERCAST SKIES
 HUMIDITY 87%
 BAROMETRIC PRESSURE (INHG) 29.90
 RESERVOIR WATER ELEVATION=175.9 +/-

S-4	2+00.18	0.097'	
-----	---------	--------	-------------------------------------------------------------------------------------




S-6	0+61.42	0.111'	
-----	---------	--------	-------------------------------------------------------------------------------------

JOSHUA R. GROEN PLS 9753

S-5	0+00.06	0.015'	
-----	---------	--------	-------------------------------------------------------------------------------------

BM-2	-0+15.38		HOLD STATION
------	----------	-------------------------------------------------------------------------------------	--------------

BM2- BRASS DISC WITH PUNCH MARK IN WELL MONUMENT AT EDGE OF CONCRETE WALK.

 HOLD FOR LINE

GUIDA JOB

CREW: J. GROEN/ R.GUIDA

NUMBER: 0123-02577

PROJECT NAME: IRWD ANNUAL DAM MONITORING

CLIENT

NAME: IRWD

PROJECT LOCATION: SAND CANYON RESERVOIR

INSTRUMENT S/N: _____

WEATHER

OVERCAST

PRESSURE

29.90

TEMP

65° F

STATION	BS	HI	FS	ELEV	ADJUSTED ELEVATION	DESCRIPTION/NOTES
BM1					204.167	BRASS DISK IN WELL
	3.438	207.514				
S-1			6.759	200.845	200.845	BRASS DISK IN WELL
	6.233	207.078				
S-2			6.024	201.054	201.054	BRASS DISK IN WELL
	6.564	207.618				
S-3			7.035	200.583	200.583	BRASS DISK IN WELL
	7.005	207.587				
S-4			6.916	200.672	200.672	BRASS DISK IN WELL
	6.773	207.445				
S-6			6.670	200.775	200.775	BRASS DISK IN WELL
	6.562	207.336				
S-5			6.678	200.658	200.658	BRASS DISK IN WELL
	5.785	206.444				
BM2			4.747	201.696	201.696	BRASS DISK IN WELL
	5.563	207.259				
E-1			4.038	203.222	203.222	NAIL AND SQUARE WASHER IN TOP OF WALL
	4.425	207.646				
E-2			4.388	203.258	203.258	NAIL AND SQUARE WASHER IN TOP OF WALL
	4.446	207.704				
E-3			4.314	203.389	203.389	NAIL AND SQUARE WASHER IN TOP OF WALL
	3.722	207.111				
E-4			3.599	203.512	203.512	NAIL AND SQUARE WASHER IN TOP OF WALL
	3.865	207.377				
BM1			3.214	204.164	204.164	BRASS DISK IN WELL

Appendix D

Valves Exhibit for Emergency Release



LEGEND

- Emergency Outlet
- Main Outlet
- Main Inlet
- ⊗ Emergency Valve, Normally Closed
- ⊗ Valve Normally Open
- ⊗ Valve Normally Closed
- #* DSOD Valve

NOTES

① 20" STL LINE PREVIOUSLY ABANDONED. REVIVED BY CONSTRUCTION SERVICES AND CONNECTED TO 30" EMERGENCY DUMP IN APPROX. 2008 (REF. BILL WESSON, 2023)

NO.	DATE	REVISIONS	APPROVED
2	4/11/2024	VALVE SIZES REVISED, METER BOX ADDED	DD

DSOD Valves: 7*, 9*, 11*, 12*, 19*, 20*, 21*

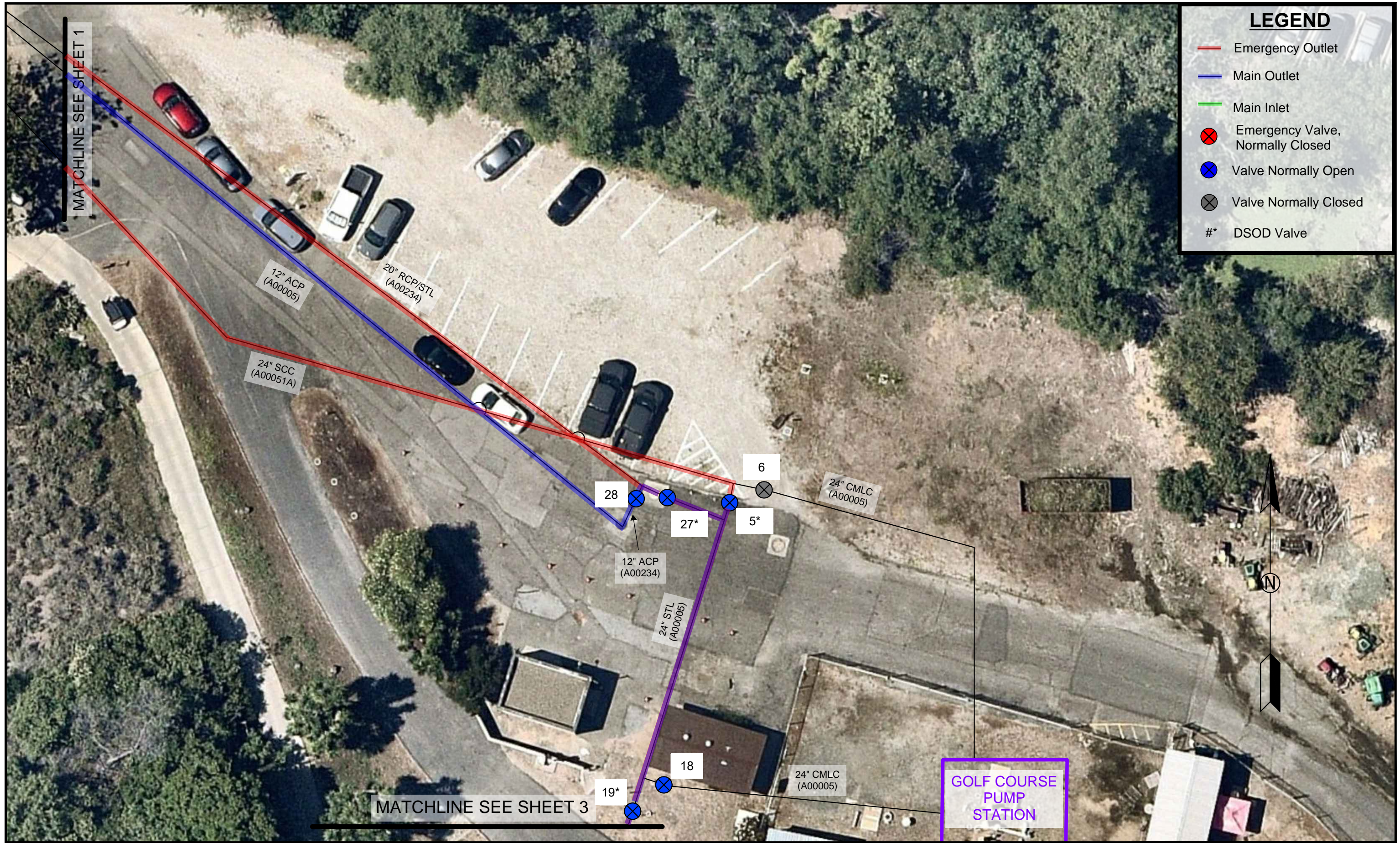
BILL WESSON NAME	WATER OPERATIONS SUPERVISOR	DATE
DANIELLE DRAKE NAME	ASSISTANT ENGINEER	DATE
JACOB MOEDER NAME	IRWD ENGINEERING MANAGER	DATE



DEVELOPED BY ENGINEERING INTERNS:
TINH NGUYEN
RYAN TRAN

SAND CANYON DAM
PIPELINE SCHEMATIC

SHEET
01
01 of 05
SHEETS



LEGEND

- Emergency Outlet
- Main Outlet
- Main Inlet
- ⊗ Emergency Valve, Normally Closed
- ⊗ Valve Normally Open
- ⊗ Valve Normally Closed
- #* DSOD Valve

NO.	DATE	REVISIONS	APPROVED

DSOD Valves: 7*, 9*, 11*, 12*, 19*, 20*, 21*

BILL WESSON NAME	WATER OPERATIONS SUPERVISOR	DATE
DANIELLE DRAKE NAME	ASSISTANT ENGINEER	DATE
JACOB MOEDER NAME	IRWD ENGINEERING MANAGER	DATE



DEVELOPED BY ENGINEERING INTERNS:
TINH NGUYEN
RYAN TRAN

SAND CANYON DAM
PIPELINE SCHEMATIC

SHEET
02
02 of 05
SHEETS



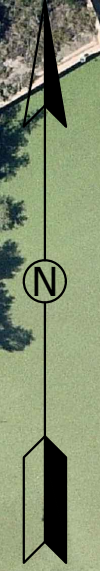
LEGEND

- Vibrating Wire Piezometer (VBW)
- Open-Well Piezometer (P)
- ⊗ Outlet Gate Valves

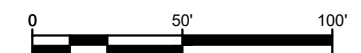
Bend in outlet not shown

MATCHLINE SEE SHEET 2

24" STL
(A00005)



NO.	DATE	REVISIONS	APPROVED



BILL WESSON NAME	WATER OPERATIONS SUPERVISOR	DATE
DANIELLE DRAKE NAME	ASSISTANT ENGINEER	DATE
JACOB MOEDER NAME	IRWD ENGINEERING MANAGER	DATE



DEVELOPED BY ENGINEERING INTERNS:
TINH NGUYEN
RYAN TRAN

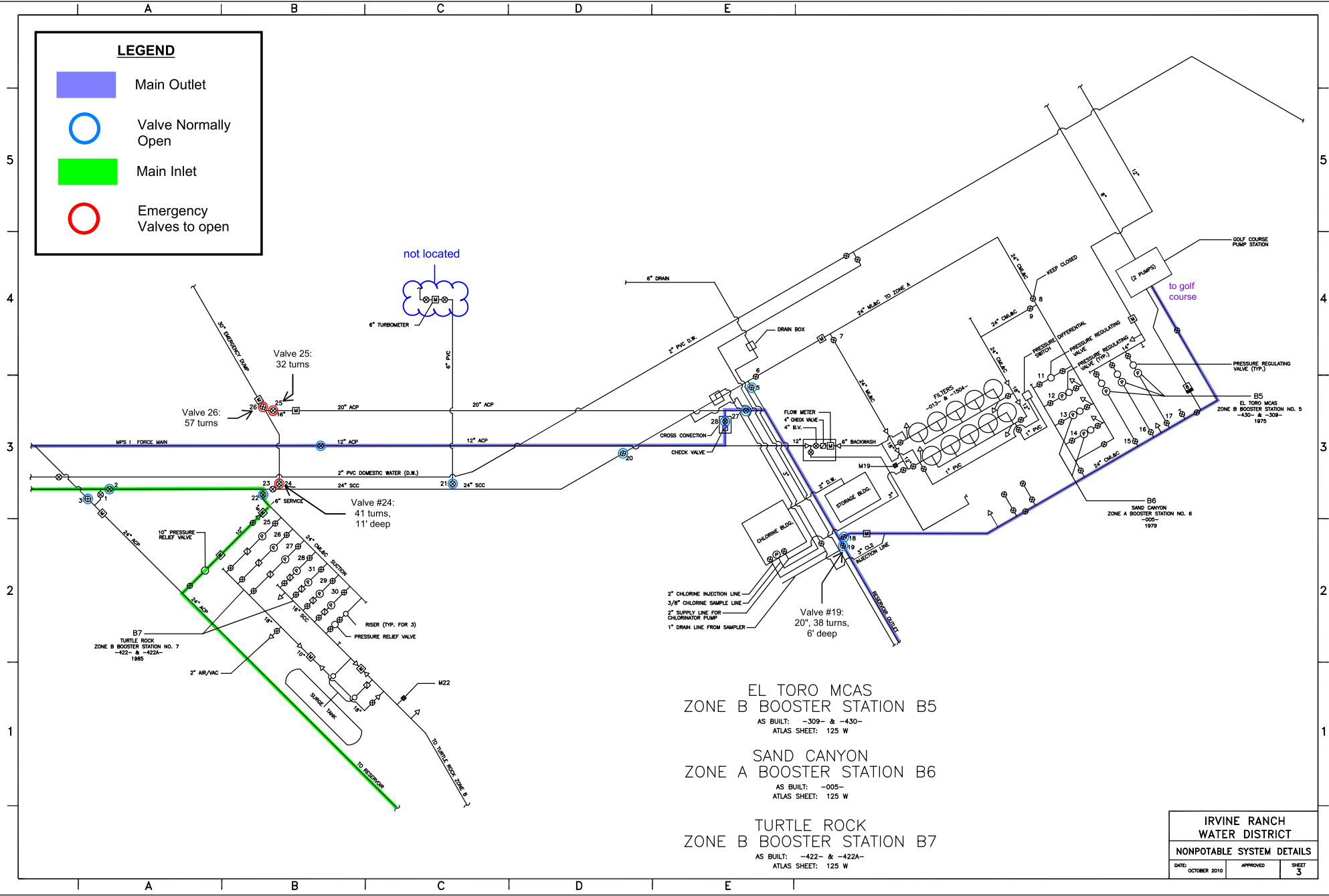
SAND CANYON DAM
PIPELINE SCHEMATIC

SHEET
03
03 of 05
SHEETS

AUGUST 2023

LEGEND

- Main Outlet
- Valve Normally Open
- Main Inlet
- Emergency Valves to open



EL TORO MCAS
 ZONE B BOOSTER STATION B5
 AS BUILT: -309- & -430-
 ATLAS SHEET: 125 W

SAND CANYON
 ZONE A BOOSTER STATION B6
 AS BUILT: -005-
 ATLAS SHEET: 125 W

TURTLE ROCK
 ZONE B BOOSTER STATION B7
 AS BUILT: -422- & -422A-
 ATLAS SHEET: 125 W

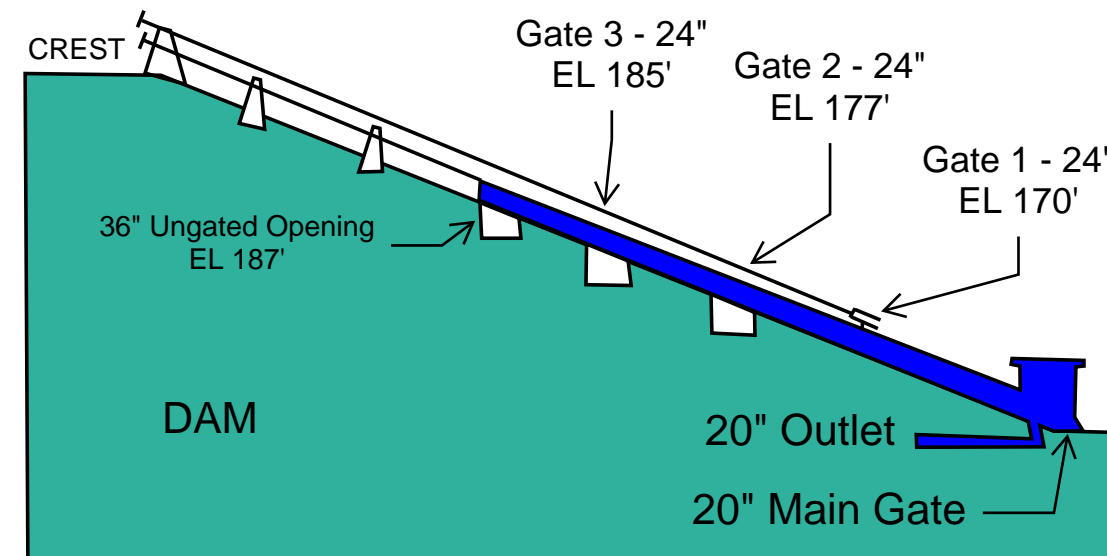
IRVINE RANCH WATER DISTRICT		
NONPOTABLE SYSTEM DETAILS		
DATE:	APPROVED:	SHEET
OCTOBER 2010	[Signature]	3

Sand Canyon Dam Valve Summary

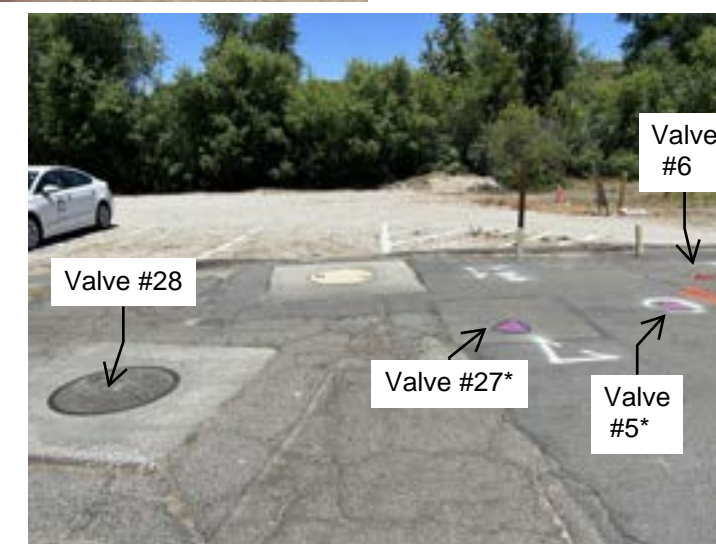
Valve Number	Size	Turns	Normally:	Emergency Valve
2	24"		Open	
1	24"		Closed	
3	24"		Open	
22	24"		Open	
24*	24"	41	Closed	Yes
18	24"		Open	
19*	24"	38	Open	
6	24"	45	Closed	
5*	24"	42	Open	
23	24"		Closed	
17	12"	37	Open	
26*	24"	57	Closed	Yes
25*	20"	32	Closed	Yes
27*	20"		Open	
28	12"		Open	

Sand Canyon Dam Gate Valve Summary

Valve	Turns	Size	Elevation
Main	102	20"	-
Gate 1	48	24"	170'
Gate 2	21	24"	177'
Gate 3	58	24"	185'



1 SAND CANYON DAM SECTION OF MULTILEVEL OUTLET



NOTE: EDITED BY GEI BASED ON DATA RECEIVED FROM IRWD DURING 2026 ANNUAL INSPECTION

NO.	DATE	REVISIONS	APPROVED
2	4/11/2024	VALVE SIZES REVISED	DD

DSOD Valves: 5*, 19*, 24*, 25*, 26* 27*

BILL WESSON NAME	WATER OPERATIONS SUPERVISOR	DATE
DANIELLE DRAKE NAME	ASSISTANT ENGINEER	DATE
JACOB MOEDER NAME	IRWD ENGINEERING MANAGER	DATE



DEVELOPED BY ENGINEERING INTERNS:
TINH NGUYEN
RYAN TRAN

SAND CANYON DAM
PIPELINE SCHEMATIC

SHEET
05
05 of 05
SHEETS

AUGUST 2023

Appendix E

Subdrain Condition Assessment

V&A Project No. 24-0164

July 11, 2024

Brandon Joseph
Assistant Engineer
Irvine Ranch Water District
3512 Michelson Drive
Irvine, CA 92612

Subject: Irvine Ranch Sand Canyon Subdrain Condition Assessment – Vector Cleaning and CCTV

Dear Brandon Joseph:

Irvine Ranch Water District (IRWD) owns and operates the Sand Canyon Reservoir in Irvine, California. IRWD requested a condition assessment of the subdrain system to start a two-year maintenance program. The condition assessment included three (3) separate subdrain pipes:

1. 6-inch Left drain
2. 6-inch Right drain
3. 6-inch Vault drain

The three (3) subdrain pipes are 6-inch in diameter and are made of PVC material. It was found that the right drain is connected to a metal pipe. IRWD contracted V&A Consulting Engineers, Inc. (V&A) to perform a condition assessment of the subdrain pipes by obtaining and evaluating closed-circuit television (CCTV) video. Based on the review of site conditions, V&A prepared to perform a condition assessment of the subdrains, which involved interior video documentation using a push camera with CCTV recording capability. IRWD was responsible for preparing the access points for entry, which included removing the vault lid.

On June 4, 2024, V&A arrived on site, accompanied by IRWD and Performance Pipeline Technologies Inc., who were subcontracted by V&A to assist in capturing CCTV video. The pipes were assessed with a push camera. During the assessment, the left and right drains were staked with flags to locate the pipes underground.

Figure 1 presents the pipe alignments for this condition assessment report.



Figure 1 – Irvine Ranch Water District Sand Canyon Left, Right, and Vault Drains.

Assessment

Three (3) sections of drains were assessed, which included the following:

1. 6-inch left drain
 - a. Vault box to the end of the push camera's capabilities
2. 6-inch right drain
 - a. Vault box to the end of the push camera's capabilities
3. 6-inch vault drain
 - a. Vault box to the end of the push camera's capabilities

The push camera can reach a maximum length of 200 feet but cannot safely navigate obstructions like tight turns. Based on site conditions, the left and right drains were assessed upstream and surveyed to the end of the push camera's capabilities. The vault drain was assessed in the downstream direction.

A summary of observations from V&A's review of the CCTV footage is provided in the following sections below.

Left Drain

The 6-inch left drain was assessed from the vault box to 83.5 feet when the push camera could not travel further because of a root ball in the pipe. Significant water flow throughout the pipe made it difficult to consistently capture clear footage. The following is a summary of the observations:

- STA 00+07 – Pipe is in good condition with 75% staining on its walls
- STA 00+43 – Possible blockage in the pipe—due to the water level, there was no clear footage or picture, but the push camera operator felt a blockage
- STA 00+83 – Root ball in the pipe and end of the survey

Refer to Photo 1 through Photo 4 below for general observations.



Photo 1 – STA 00+07: Pipe is in good condition with 75% staining on its walls (typical).

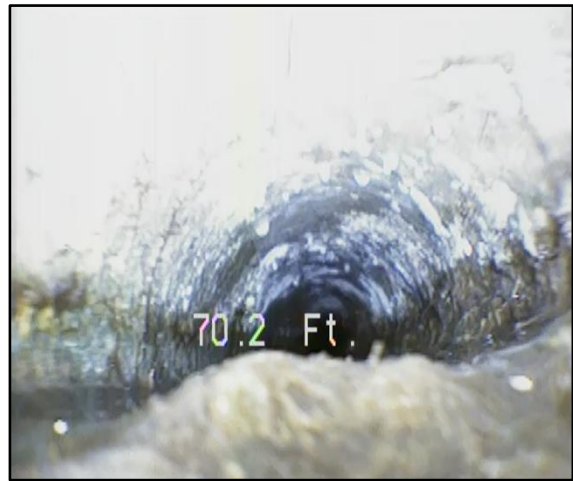


Photo 2 – STA 00+70: Pipe is in good condition.



Photo 3 – STA 00+82: Root ball inside pipe.



Photo 4 – STA 00+82: Root ball inside pipe.

Right Drain

The 6-inch right drain was assessed from the vault box to 112.2 feet, after which the push camera could not travel further because of a 90° bend in the pipe. The pipe material changed at 56.2 feet to what appeared to be perforated metal. The following is a summary of the observations:

- STA 00+04 – Debris in the pipe
- STA 00+09 – Bend in the pipe
- STA 00+11 – Bend in the pipe with debris buildup
- STA 00+55 – 90° bend in the pipe
- STA 00+56 – Change in pipe material to metal
- STA 00+59 – Possible perforation hole in the metal pipe

Refer to Photo 5 through Photo 10 below for general observations.

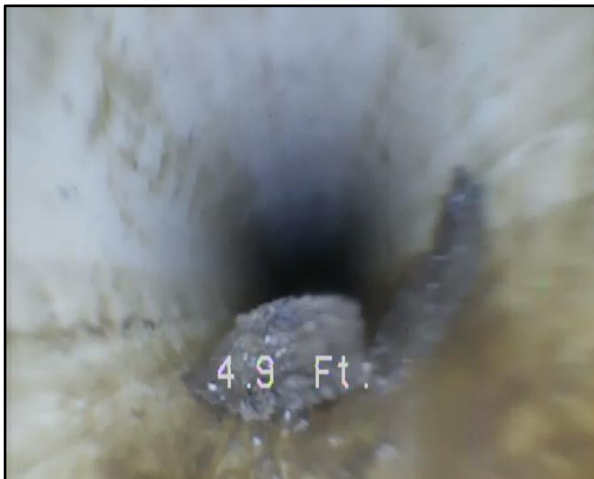


Photo 5 – STA 00+04: Debris in the pipe.

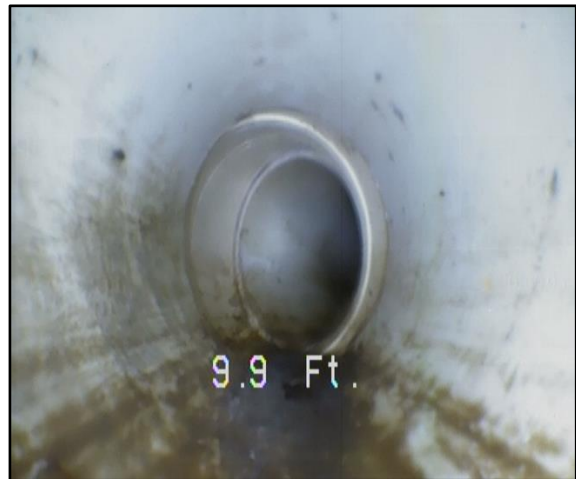


Photo 6 – STA 00+09: Bend in the pipe.

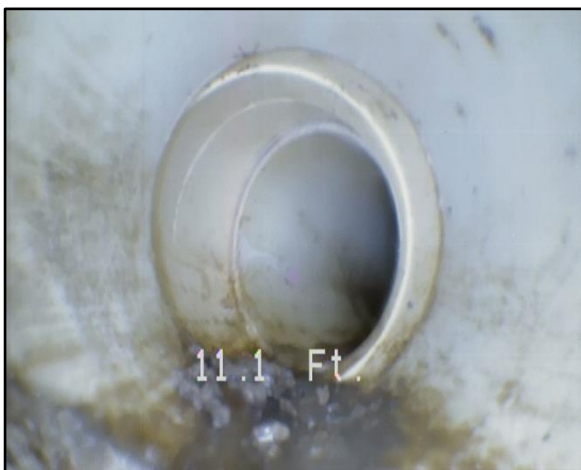


Photo 7 – STA 00+11: Bend in the pipe with debris buildup.

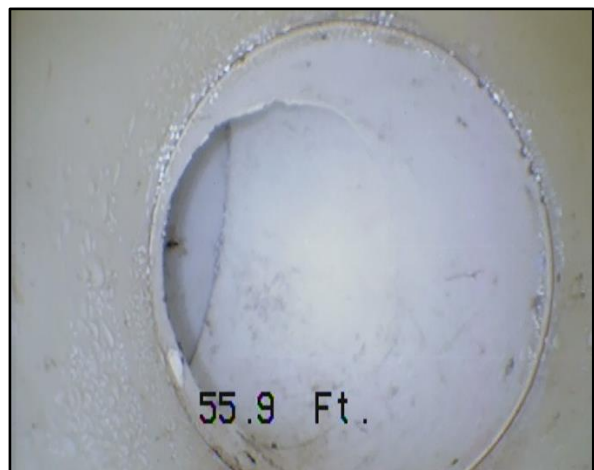


Photo 8 – STA 00+55: 90° bend in the pipe.

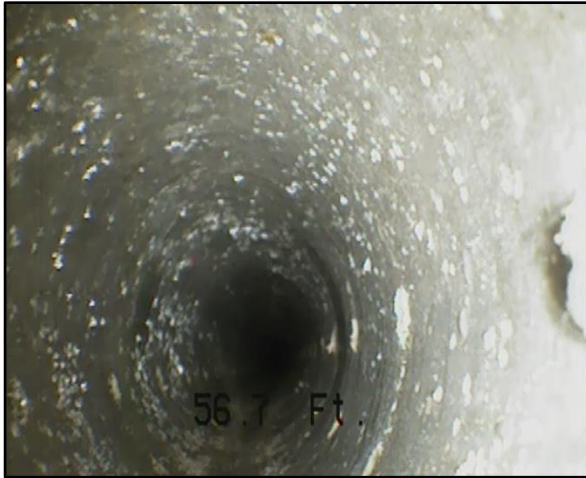


Photo 9 – STA 00+56: Change in pipe material to metal.

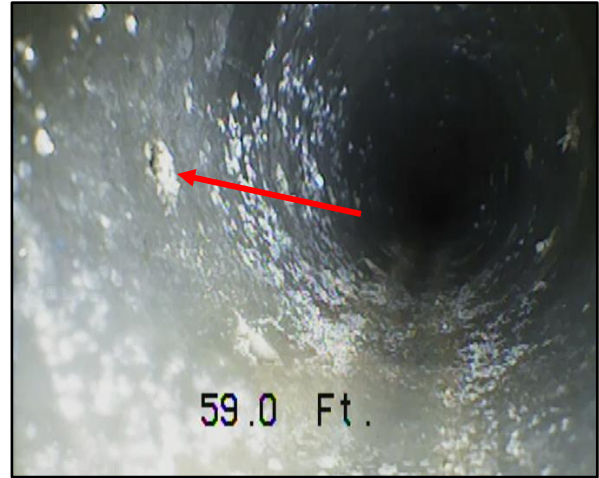


Photo 10 – STA 00+59: Possible perforation hole in the metal pipe.

Vault Drain

The 6-inch vault drain was assessed in the downstream direction to 112.2 feet, after which a change in pipe diameter prevented the push camera from traveling any further. The following is a summary of the observations:

- STA 00+02 – Pipe is in good condition with 100% staining on its walls
- STA 00+39 – Lateral tap connection at 9 o'clock
- STA 00+52 – 50% water level
- STA 00+53 – Rocks on the bottom of the pipe
- STA 00+56 – Change in pipe diameter
- STA 01+12 – End of survey

Refer to Photo 11 through Photo 17 below for general observations.



Photo 11 – STA 00+02: Pipe is in good condition with 100% staining on pipe walls.

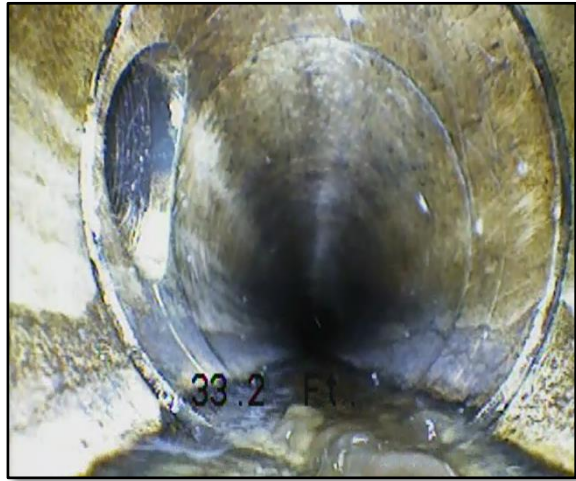


Photo 12 – STA 00+39: Lateral tap connection at 9 o'clock.

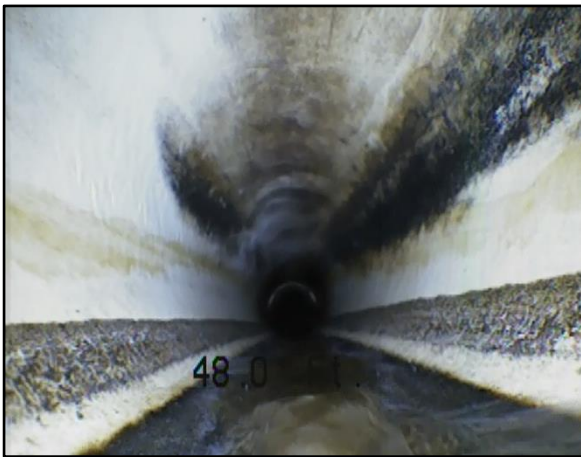


Photo 13 – STA 00+48: Pipe is in good condition with 65% staining on pipe walls.

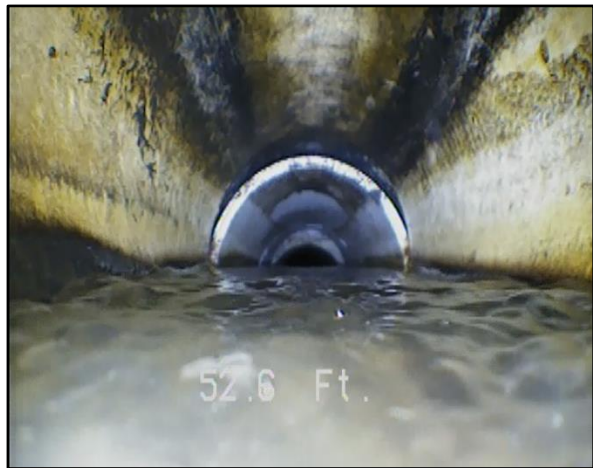


Photo 14 – STA 00+52: 50% water level and change in pipe diameter.

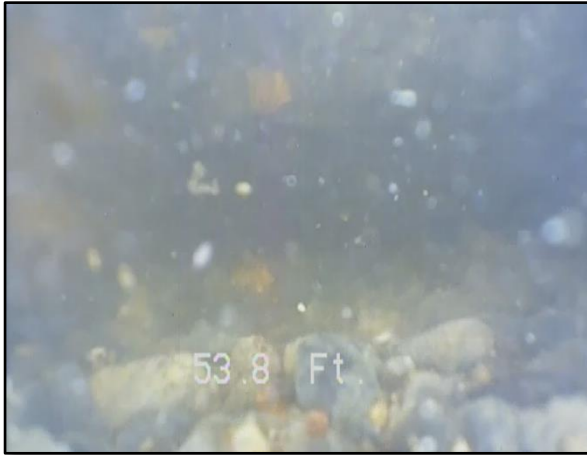


Photo 15 – STA 00+53: Rocks on the bottom of the pipe.



Photo 16 – STA 00+56: Change in the pipe diameter.

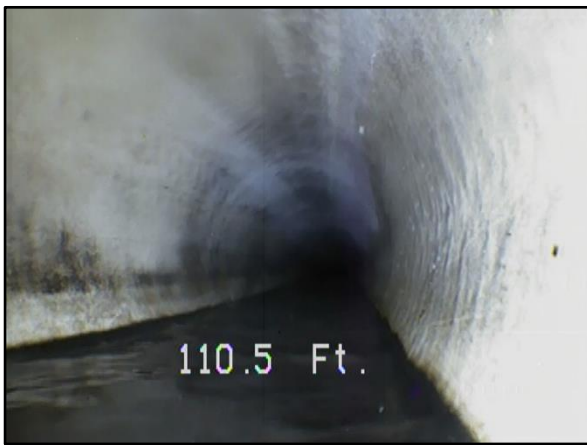


Photo 17 – STA 01+10: Pipe is in good condition.

Only left drain had a root ball

Conclusions and Recommendations

The left, right, and vault drains at the Sand Canyon reservoir are in good condition, and no major defects were found. The left and right drains had root ball obstructions, and the vault drain had rocks accumulating on the bottom of the pipe, where the pipe changed diameters.

Based on the review of the CCTV footage, V&A finds it feasible to keep the subdrains in operation for the foreseeable future. V&A provided the following recommendations to be considered for the subdrains:

1. Vactor clean the pipelines to ensure debris and root balls are removed.
2. Perform CCTV every two years to ensure the integrity of the subdrain system.

On behalf of our staff and myself, I would like to thank you for the opportunity to be of service to you and the Irvine Ranch Water District.

Sincerely,
V&A Consulting Engineers, Inc.

A handwritten signature in blue ink that reads "Brian Briones". The signature is written in a cursive, flowing style.

Brian Briones, P.E.
Southwest Regional Manager

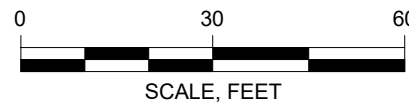
Appendix F

Spillway Inspection Exhibit



NOTES:

1. ALIGNMENT BEGINS AT BOTTOM OF OGEE CREST.
2. ORTHOMOSAIC COMPILED FROM IMAGERY CAPTURED ON 6/17/2025 AT APPROXIMATELY 1:00 PM TO 3:00 PM.



SPILLWAY INSPECTION
SAND CANYON DAM
IRVINE, CALIFORNIA

IRVINE RANCH WATER DISTRICT
IRVINE, CALIFORNIA

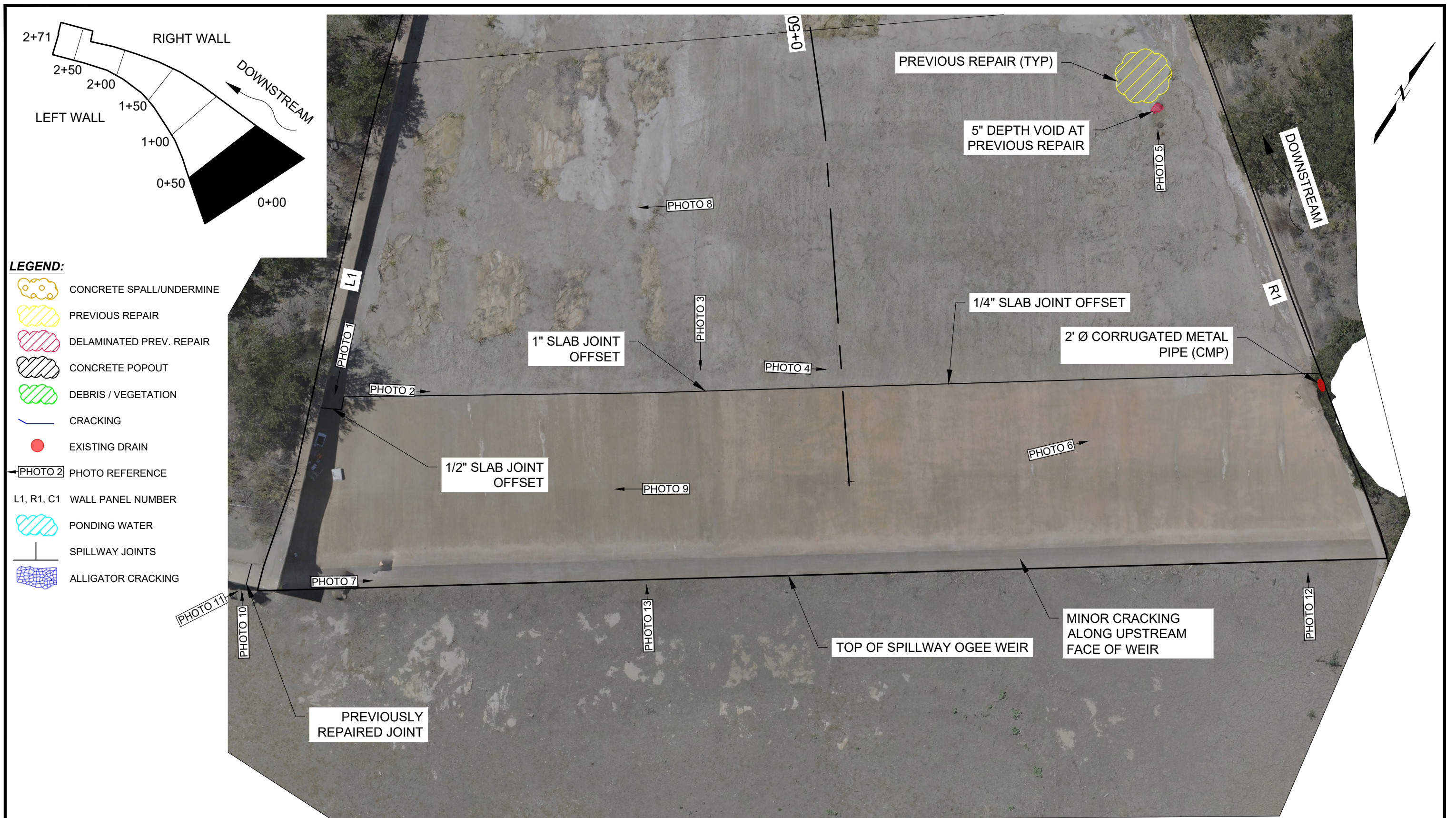
GEI 
Consultants

Project 2305575












PLAN OVERVIEW

June 2025

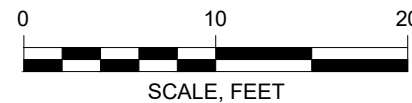
Fig. 1



LEGEND:

-  CONCRETE SPALL/UNDERMINE
-  PREVIOUS REPAIR
-  DELAMINATED PREV. REPAIR
-  CONCRETE POPOUT
-  DEBRIS / VEGETATION
-  CRACKING
-  EXISTING DRAIN
-  PHOTO REFERENCE
- L1, R1, C1** WALL PANEL NUMBER
-  PONDING WATER
-  SPILLWAY JOINTS
-  ALLIGATOR CRACKING

- NOTES:**
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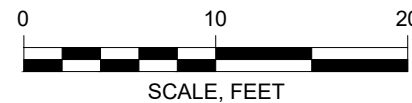
SPILLWAY FLOOR
STA 0+00 TO STA 0+50

June 2025

Fig. 2



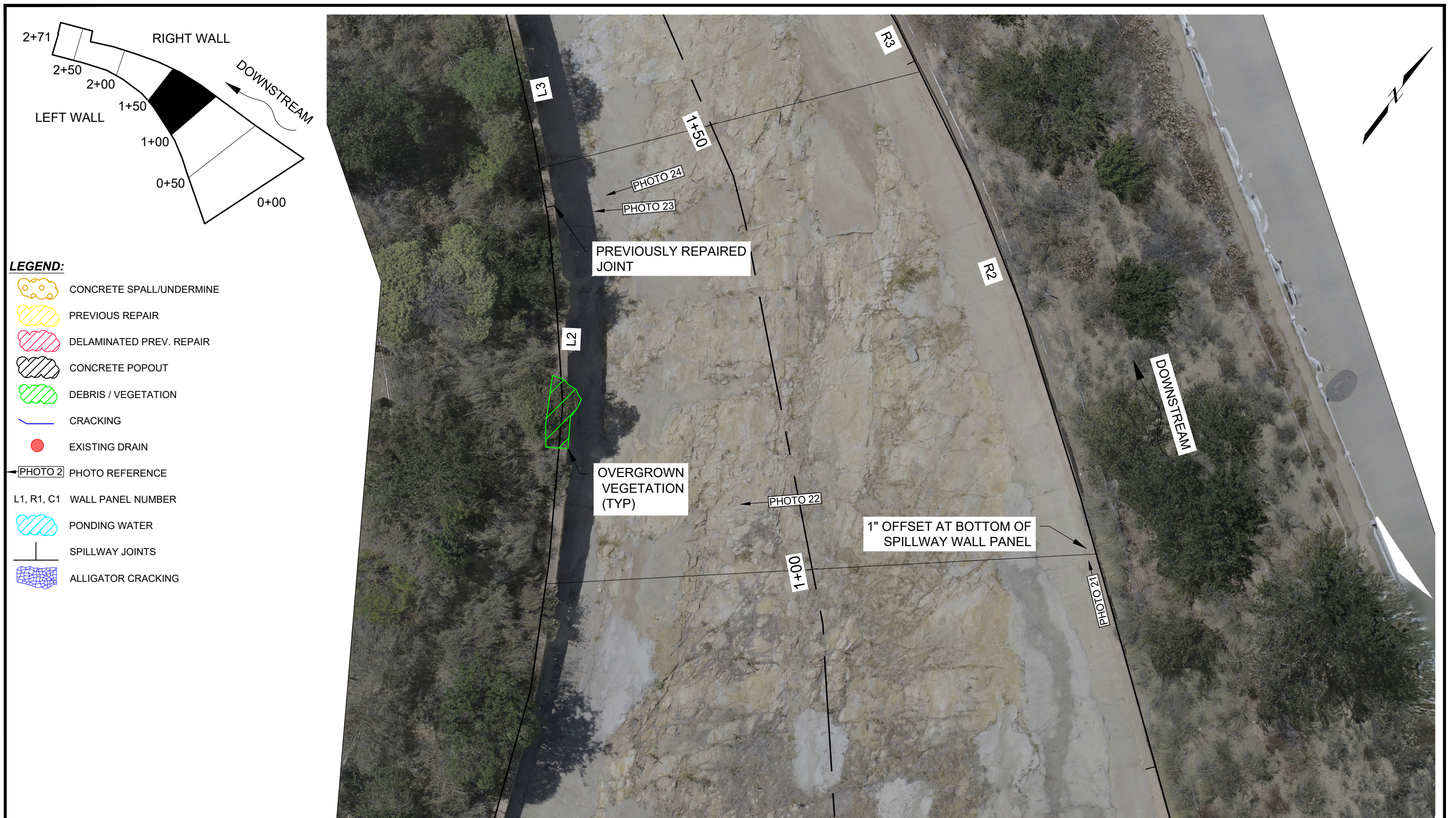
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SPILLWAY INSPECTION
 SAND CANYON DAM
 IRVINE, CALIFORNIA
 IRVINE RANCH WATER DISTRICT
 IRVINE, CALIFORNIA

GEI Consultants
 Project 2305575

SPILLWAY FLOOR
 STA 0+50 TO STA 1+00
 June 2025
 Fig. 3



- LEGEND:**
- CONCRETE SPALL/UNDERMINE
 - PREVIOUS REPAIR
 - DELAMINATED PREV. REPAIR
 - CONCRETE POPOUT
 - DEBRIS / VEGETATION
 - CRACKING
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SPILLWAY INSPECTION
 SAND CANYON DAM
 IRVINE, CALIFORNIA
 IRVINE RANCH WATER DISTRICT
 IRVINE, CALIFORNIA



SPILLWAY FLOOR
 STA 1+00 TO STA 1+50
 June 2025
 Fig. 4



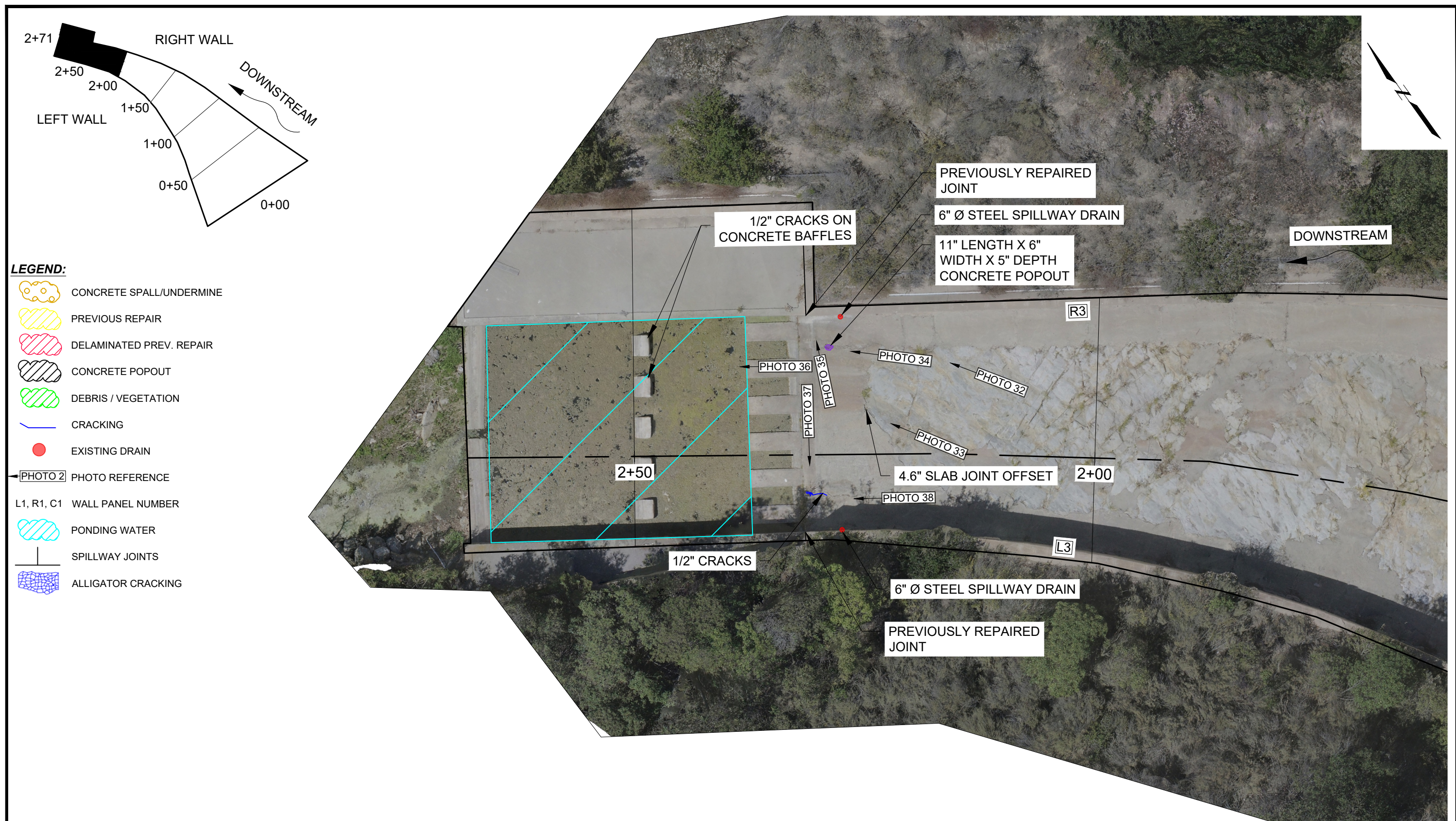
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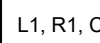





SPILLWAY INSPECTION
 SAND CANYON DAM
 IRVINE, CALIFORNIA
 IRVINE RANCH WATER DISTRICT
 IRVINE, CALIFORNIA




SPILLWAY FLOOR
 STA 1+50 TO STA 2+00
 June 2025
 Fig. 5



- LEGEND:**
-  CONCRETE SPALL/UNDERMINE
 -  PREVIOUS REPAIR
 -  DELAMINATED PREV. REPAIR
 -  CONCRETE POPOUT
 -  DEBRIS / VEGETATION
 -  CRACKING
 -  EXISTING DRAIN
 -  PHOTO REFERENCE
 - L1, R1, C1** WALL PANEL NUMBER
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SPILLWAY INSPECTION SAND CANYON DAM IRVINE, CALIFORNIA		SPILLWAY FLOOR STA 2+00 TO STA 2+71
IRVINE RANCH WATER DISTRICT IRVINE, CALIFORNIA		Project 2305575 June 2025 Fig. 6

Appendix G

Spillway Inspection Photographs – June 17, 2025

06/17/2025: Spillway Inspection



Photo 1) ½” slab joint offset near toe of spillway ogee weir.



Photo 2) View of spillway ogee weir and unlined spillway channel transition looking northeast.



Photo 3) 1" slab joint offset at spillway ogee weir and unlined spillway channel transition.



Photo 4) View of spillway ogee weir and unlined spillway channel transition looking northeast. Note 2' diameter corrugated metal pipe.



Photo 5) 5” depth void at previous spillway repair.



Photo 6) View of spillway wall panel R1.



Photo 7) View of spillway ogee weir looking northeast.



Photo 8) View of spillway wall panel L1.



Photo 9) View of spillway wall panel L1.



Photo 10) Recently repaired joint.



Photo 11) Recently repaired joint.



Photo 12) Minor cracking along upstream face of weir.



Photo 13) Minor cracking along upstream face of weir.



Photo 14) View of spillway wall panel R1 and R2. Note previous repair of joint.



Photo 15) Previously repaired joint.



Photo 16) 1/8" crack and 2" x 3/4" concrete popout wall panel R1.

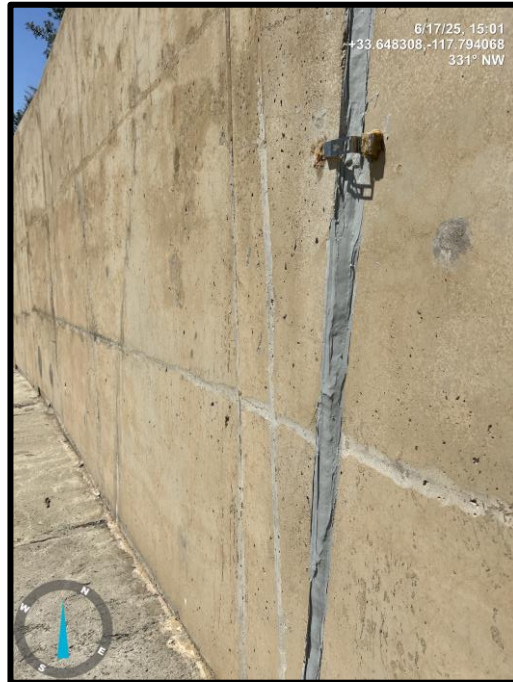


Photo 17) Crack gauge at wall panels R1 and R2 joint. Crack gauge measured joint opening 1.5mm and joint offset 1.5mm. Note previously repaired joint.



Photo 18) 6" Height x 8" Depth spillway floor undermining.



Photo 19) View of spillway wall panels L1 and L2. Note previously repair of joint.



Photo 20) View of spillway wall panels L1 and L2. Note previous repair of joint.



Photo 21) 1” offset at bottom of spillway wall panel R2.



Photo 22) View of spillway wall panel L2.



Photo 23) View of spillway wall panels L2 and L3. Note recent repair of joint.



Photo 24) Vertical wall joint open 1/2" max between wall panels L2 and L3. Note recent repair of joint.



Photo 25) View of spillway wall panels R2 and R3. Note previous repair of bottom half of joint.



Photo 26) Vertical wall joint open ½" max between wall panels R2 and R3. Note previous repair of bottom half of joint.



Photo 27) View of spillway wall panel L3.



Photo 28) View of spillway wall panel L3.



Photo 29) 12" max height x 12" max depth spillway floor undermining.



Photo 30) View of spillway wall panel R3 looking upstream.



Photo 31) View of spillway wall panel R3.



Photo 32) View of spillway wall panel R3 looking downstream. Note spillway drain.

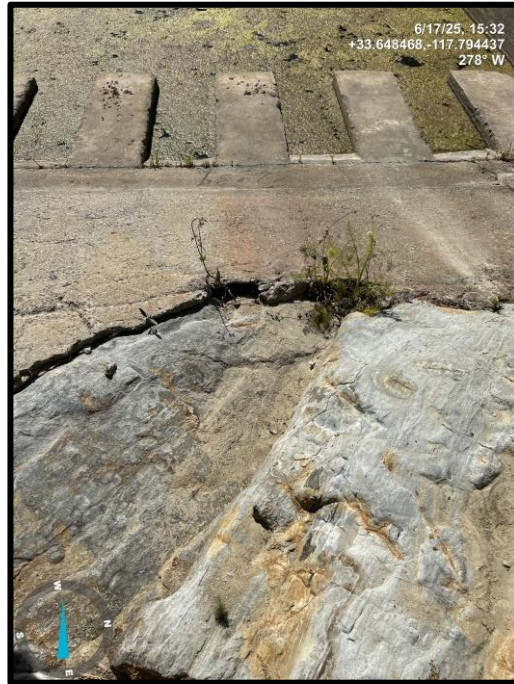


Photo 33) 4.6” slab joint offset at unlined spillway channel and stilling basin transition. Note vegetation.

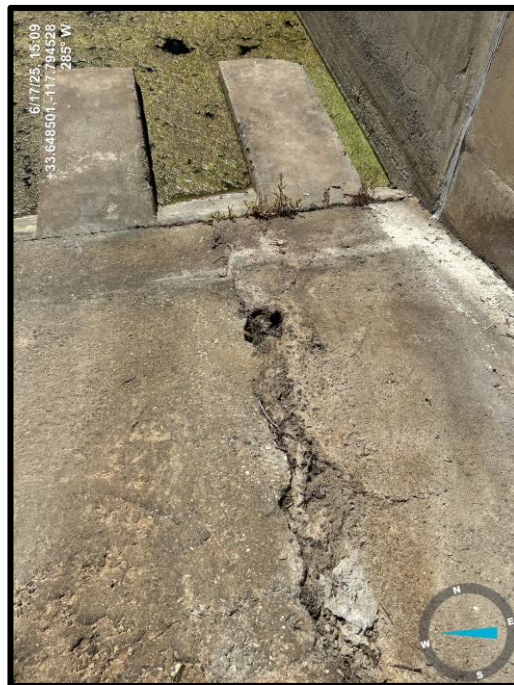


Photo 34) 11” Length x 6” Width x 5” Depth concrete popout at unlined spillway channel and stilling basin transition.



Photo 35) Previously repaired spillway vertical wall joint.



Photo 36) Spillway stilling basin. Note 1/2" cracks on right two concrete baffles.



Photo 37) Previously repaired spillway vertical wall joint. Note spillway drain and vegetation..

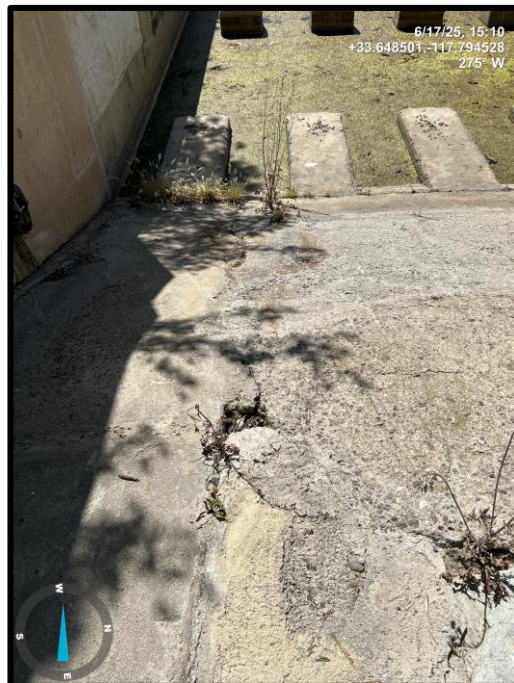


Photo 38) 1/2" cracks along spillway floor. Note vegetation.