

Anderson Dam Seismic Retrofit Project Frequently Asked Questions



General Questions

1 What is being done at Anderson Dam?

The Santa Clara Valley Water District (water district) is engaged in a major project to retrofit and strengthen Anderson Dam so it can safely withstand a strong earthquake. The effort is known as the Anderson Dam Seismic Retrofit Project.

2 Why are we doing this project?

The water district is undertaking the Anderson Dam Seismic Retrofit Project to ensure public safety and secure a reliable water supply today and for future generations. A large earthquake on the Calaveras Fault or the Coyote Creek Fault could result in significant damage, which could lead to dam failure and the uncontrolled release of water. To reduce this risk, since 2009, the water district has been operating Anderson Reservoir at a restricted water level of 68%. This restriction limits the reservoir's storage capacity to two thirds of its total volume. This reduction represents almost 20% of the total surface water storage capacity in the nine other reservoirs owned and operated by the water district, thus severely limiting the water district's ability to capture and store water.

New findings during the design phase of the project indicated that there is a potential of greater damage to the dam from a severe earthquake. The extent of the seismic retrofit work has expanded. In early January 2017, the water district decided to restrict the maximum water surface elevation in the reservoir by an additional 10 feet (to 58% of total reservoir capacity). To remove the restriction and ensure a safe and reliable facility, this retrofit project aims to fix the problems with Anderson Dam.

3 When did this project begin and how long will it take?

Project planning began in 2011 based on results of a seismic stability evaluation. During the design phase, which began in 2013, additional evaluations and explorations revealed previously unidentified seismic deficiencies, which will extend the length of time to complete the project.

Construction is currently scheduled to begin in spring of 2020 and is estimated to take five years to complete. However, this depends on a few factors. Currently, the engineering schedule is on track for 90% completion by winter 2018. A critical part of the schedule depends on the acquisition of environmental

Anderson Dam Existing Configuration



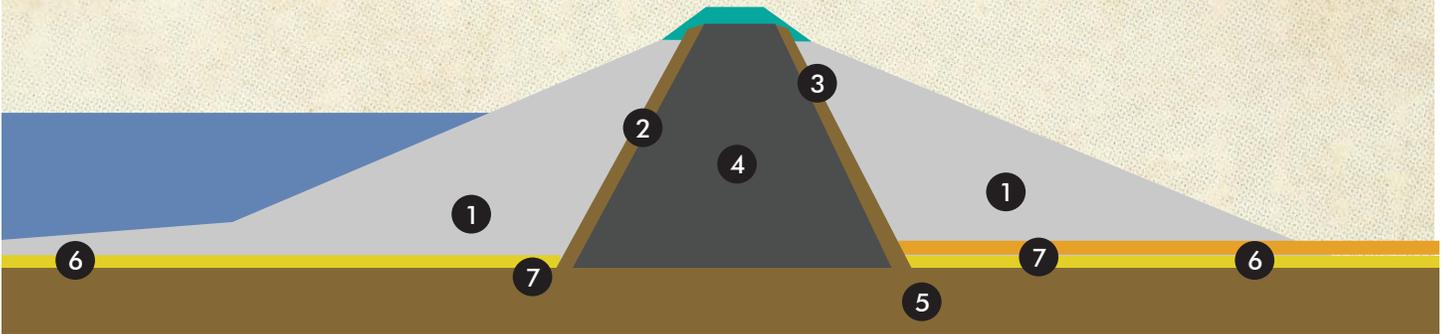
Spillway

Outlet pipe

Dam embankment

Crest of dam

Existing Anderson Dam



permits from state and federal agencies, such as National Marine Fisheries Service, U.S. Army Corp of Engineers, U.S. Fish and Wildlife Service, and California Department of Fish and Wildlife.

The construction duration is also a function of the large amount of earthwork that must be removed and later replaced at the site, and the limited length of the summer construction season. Wet winter weather generally prevents earthwork from being performed from October 15 through April 15; therefore, most of the earthwork and construction on the reservoir side of the dam must be completed in the dry summer months.

④ How much will the project cost?

We currently estimate that the project will cost \$550 million. Of that total cost, 15 to 20 percent will be spent on planning, design, and environmental studies and documentation, and the remaining will be spent for construction. These cost estimates may change as the project progresses.

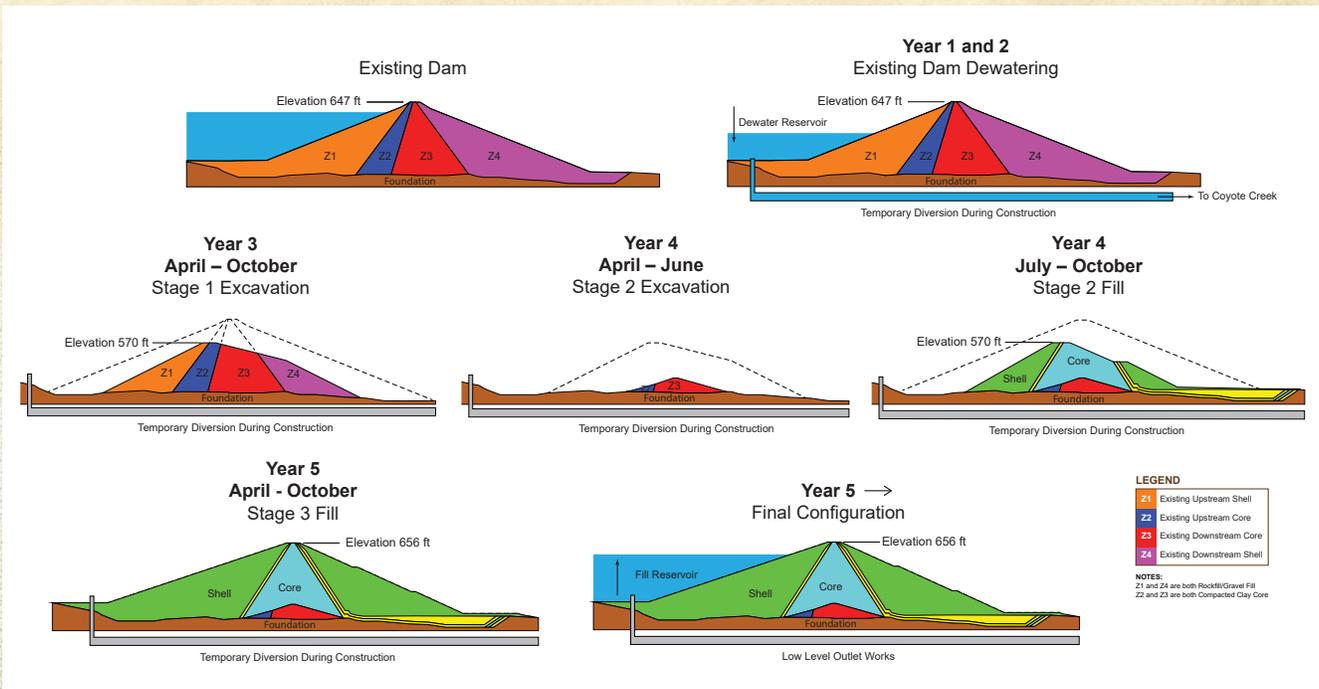
⑤ Who pays for this project?

The water district is the water “wholesaler” for Santa Clara County. The water district manages the county’s groundwater basin and operates three water treatment plants. When we set our wholesale rates, we calculate both our annual operating costs and the amount needed to build major capital projects.

Project Schedule



Embankment Construction Sequence



The Safe, Clean Water and Natural Flood Protection Program, which Santa Clara County voters approved in the November 2012 election, will fund about \$65 million of this project's cost.

The remaining project costs will be funded by water rates. Upon completion of the project, the North County Zone W-2 rate impact translates to approximately \$6.25 per month to the average household, and \$3.50 per month for the average household in South County Zone W-5. These estimates may change as the project progresses.

6 What is the status of the project and what is the proposed schedule?

The project is a complex undertaking and is currently in the design phase. Construction is anticipated to begin in spring of 2020 and will take approximately five years to complete (see project schedule on page 2).

7 How long will construction last?

The construction work will span five years, with the first two years used to construct the temporary diversion system. Embankment construction work cannot be performed during wet winter months, so this work will be limited to April to October during years three, four and five.

8 How can I get more information?

The project website has historic photographs of how Anderson Dam was built and features numerous fact sheets and other informational materials you can download. To access the webpage, please go to www.valleywater.org/project-updates/dam-reservoir-projects/anderson-dam-seismic-retrofit

"Access Valley Water," our customer information system, allows you to submit questions directly to us. Visit www.valleywater.org and click on the Access Valley Water "GO" button, then select "Projects planned for my neighborhood" to submit your questions. You can also call the Community Engagement office at (408) 755-0333.

Public Safety

9 What are the risks of dam failure before construction?

The water district has limited the amount of water that can be stored in the reservoir to reduce the likelihood of water overtopping the dam should damage occur during a large earthquake prior to construction of the retrofit project. The restricted reservoir level was

determined to ensure that even if the maximum credible earthquake (MCE) occurred near or at the dam, the predicted slumping and cracking damage would not result in an uncontrolled release of water from the reservoir.

The dam's two regulatory agencies, the Federal Energy Regulatory Commission (FERC) and the California Division of Safety of Dams (DSOD), have approved the restriction as a temporary and reasonable solution to protect the public.

10 What does the water district do when the water level exceeds the restriction? Isn't it at a higher risk of failure?

Since Anderson Dam was built in 1950, the reservoir has reached its capacity 11 times, including February 2017. The regulatory agencies that work with the water district to set the storage restriction understand that the reservoir water surface elevation cannot always be maintained at or below a restricted level. For example, they understand that storms produce rainfall runoff into reservoirs that will temporarily increase the amount of water stored, such as what occurred in early 2017. The water district makes every effort to restore the reservoir to its restricted level to stay in compliance with the regulatory requirements. Efforts include operating the reservoir at a lower level in advance of winter 2018 to reduce the chance of exceeding the seismic restriction.

When the reservoir exceeds the restricted level the dam is at greater risk of seismic deformations during a large seismic event. While earthquakes cannot be predicted with any precision, the chance of a large earthquake occurring and the epicenter being located at the nearest point to the dam during the limited time the reservoir is above the restricted level is extremely remote. Keep in mind that since its construction in 1950, this dam has performed well in numerous earthquakes, including the 1984 Morgan Hill Earthquake and the 1989 Loma Prieta Earthquake.

11 The retrofit project won't be completed until 2024 at the earliest. What are you doing to provide safety in the meantime?

The most important thing we've done is reduce the amount of water stored in the reservoir. This means that the top of the water in the reservoir is 55 feet below the crest of the dam. This lower water level means that even

if the dam were to slump during an earthquake, the top of the dam is still expected to be much higher than the water surface in the reservoir. We've also developed emergency preparedness plans and coordinated with local governments and agencies.

The water district recognizes the catastrophic nature of potential dam failure and operates a comprehensive dam safety program to protect the public. The Dam Safety Program includes four main components: periodic special engineering studies, surveillance and monitoring, routine inspections and maintenance activities, and maintaining emergency response and preparedness plans. The water district also works closely with state and federal regulators, and downstream emergency response partners to meet these goals.

12 Why not drain the reservoir now?

The water district manages Anderson Dam in accordance with existing operating procedures and requirements based on known and forecast information available at the time. The reservoir is a critical water supply source; thus maintaining a lower reservoir level than necessary could reduce the available drinking water supply for the county.

13 I'm concerned about what I've seen at Oroville. How is the water district ensuring that doesn't happen here?

Anderson Dam's spillway is inspected regularly by the water district's dam safety engineers and annually by state and federal regulators. Following Oroville, FERC and DSOD mandated a detailed condition assessment of the Anderson Dam spillway. The findings of the assessment indicate that while the spillway is structurally sound, and that it performed well during the February 2017 spill, the spillway does not meet today's design standards and has the potential for an Oroville-type failure. As such, the water district has elected to replace the spillway as part of the Anderson Dam Seismic Retrofit Project.

14 If the dam is going to be replaced, how will flood protection be provided for the period between dam removal and the new dam being built?

The seismic retrofit work will require substantial removal and rebuilding of the existing embankments. The work to remove the embankment will be staged to ensure

that removal will only occur during the summer dry season. To prevent water overtopping of the partially deconstructed dam during the wet winter season, a large diversion tunnel and temporary gated diversion system will also be constructed to minimize downstream impacts in Coyote Creek and protecting the partially deconstructed dam from overtopping.

The most critical period of construction will be the partial reconstruction of the embankments to about the mid-point of the new dam's full height prior to the next wet winter season.

15 Will the spillway improvements increase the risk of flooding for downstream properties?

The spillway modifications will not increase the amount of water that will spill. Instead, it will increase the volume of storm runoff that can be safely passed without overtopping the dam.

16 Coyote Dam is upstream of Anderson Dam. During wet years, if Coyote Dam failed would Anderson Dam fail? How will it be managed during construction of Anderson Dam?

An analysis of both dams shows that Anderson Reservoir would capture and pass water released by a Coyote Dam failure, even if Coyote Reservoir was full. Coyote Reservoir is currently operating at a storage restriction of 53% and will be managed during construction to provide additional storm detention for the system.

17 Why have we not received evacuation plans in the event of an earthquake?

The water district does not have the authority to conduct evacuations, as that is the responsibility of each city and county. The water district has been and will continue to be part of the development of any evacuation plan, providing technical information and other advisement on the plan.

For current evacuation information at Anderson Dam provided by the City of Morgan Hill, please visit: <https://www.morgan-hill.ca.gov/1614/Evacuation-Information>

Public Impacts

18 What public impacts are expected during construction?

The project will require a lot of heavy equipment and will generate associated traffic in multiple shifts to complete the seismic retrofit of Anderson Dam. Residents living near Anderson Dam should anticipate disturbances due to traffic, lighting, noise and dust. More specific impacts will be defined in the Environmental Impact Report and will be minimized as much as practical. The water district will work with the City of Morgan Hill, the County's Department of Parks & Recreation and local residents to develop a program to minimize these construction impacts.

All imported materials necessary for the reconstruction of Anderson Dam will be stockpiled at a site off of Burnett Avenue. Trucks hauling these imported materials will exit Highway 101 at Bailey Avenue and use a frontage road to access Burnett Avenue. Imported materials will not be transported to the dam site via Cochrane Road.

19 Can I use the reservoir during construction?

It is expected that the reservoir will be available for some recreational use until fall of 2020. We will then begin to lower the reservoir level in preparation for the start of construction. Once dewatering begins and the water level falls beneath a predetermined level the reservoir will be closed to recreation until construction of the project is completed, likely in 2025. The entire reservoir must be completely dewatered prior to and during construction. Once construction is complete, and with the help of Mother Nature, the reservoir can be refilled to its full capacity for recreational use.

20 Will the project impact my property values?

A real estate agent should be consulted for questions about specific properties. No changes to permanent structures or their use near Anderson Reservoir are planned; thus, the project should lead to no changes in permanent property values. In fact, completion of the new dam to modern design standards should grant residents greater confidence in the safety of the facility.

21 Will road closures be required during construction near the dam?

Cochrane Road will be closed to non-residents from Malaguerra Avenue to Coyote Road, while traffic will be detoured to Peet Road. During portions of the construction period Malaguerra Avenue will have a one-lane closure from Silverwings Court to Cochrane Road and traffic will be one way.

22 Will the roads that connect to East Dunne Avenue be open?

Yes. East Dunne Avenue and the roads that connect to East Dunne Avenue will not be impacted during construction.

23 Will this project require the realignment of Cochrane Road?

Realignment of Cochrane Road will not be necessary.

Water Supply

24 Why are we raising the dam crest? Are we trying to store more water?

The project will not increase the storage capacity of Anderson Reservoir. The capacity of the reservoir is determined by the height of the spillway, not the top, or crest, of the dam. The intent of raising the dam crest by seven feet is to prevent overtopping of the dam in the event of a Probable Maximum Flood (PMF), an extremely large storm event, but with a very low probability of occurrence. Both the Federal Energy Regulatory Commission and the California Division of Safety of Dams require that such an event be evaluated, and appropriate precautions incorporated, to avoid overtopping of the dam by the excessive runoff that such a storm would generate.

25 How will drinking water supplies be impacted when the reservoir is drained?

Water supply during the construction period, without Anderson Reservoir, will require operational changes and the water district will have less operational flexibility, but supply can still be met with other water sources.

26 When will the drawdown occur?

The drawdown is planned from fall of 2021 to the end of 2024. The reservoir will be dewatered for the

duration of construction to protect the work. However, the duration of the drawdown should remain the same. The reservoir will be dewatered for the duration of construction to protect the work and provide incidental flood protection downstream of Anderson Dam along Coyote Creek.

27 Will the drawdown periods also be used to remove sediments that have accumulated in the reservoir?

Sediment removal is not planned as sediment buildup is not a significant problem at Anderson Reservoir.

28 Does the spillway modification include raising the elevation of the spillway?

No, the elevation at which the spillway will begin releasing water from the reservoir will not be changed as part of the project.

29 When Anderson Dam is dewatered, do you have any ability to divert the drained water so it could be effectively reused or is it simply lost?

To the extent practical with our current infrastructure, the water district will convey the water to our drinking water treatment plants and groundwater recharge ponds. It is anticipated that treatment plant and groundwater recharge demands will not be high enough to utilize all of the water that needs to be drained; the remainder will be released via Coyote Creek, recharged and will flow to South San Francisco Bay.

30 What will happen downstream when there is no Anderson Dam to absorb the water during a storm?

When Anderson Dam is dewatered for construction, the dam and reservoir will be operated as a dry detention basin during each winter season. During the years of construction, stormwater runoff entering Anderson Reservoir will be released through a diversion tunnel that will be constructed before the dam is dewatered. This diversion system will be operated with valves that will allow the water district to control the flow rate into Coyote Creek. This system will be operated to minimize downstream impacts, but the primary objective will be to prevent the interim dam from overtopping.

31 The height of the dam during construction will be shorter than it is now. Will it be able to handle the water coming into Anderson Dam?

Yes. A diversion tunnel will be constructed prior to the complete dewatering of the dam. The tunnel has been sized with sufficient capacity to pass enough runoff that enters the reservoir to protect the interim dam heights.

Environmental concerns

32 Currently, Anderson Dam blocks the steelhead breeding migration. Will something be done to address this issue, such as fish ladders?

Consistent with adopted stewardship policies, the water district continues to seek and implement practicable strategies to restore salmonid fisheries by creating suitable and accessible spawning and rearing habitats. The feasibility of fish passage around Anderson Dam is being evaluated in coordination with natural resource agencies as project development moves forward. Feasibility of a conventional fish ladder around the dam will be assessed along with other technical concepts for both upstream and downstream passage.

33 When will environmental impact reports on the project be available?

Environmental studies are being conducted while project design work is underway. We will be preparing an Environmental Impact Report that complies with the State of California environmental review requirements. There will be community meetings to discuss the project's impacts on the environment. These meetings help identify significant environmental impacts and enable the development of measures to reduce or eliminate the impacts. At the present time, the Draft Environmental Impact Report is anticipated to be released for public review by September/October of 2018.

34 What will happen to the wildlife when construction on this project begins?

Impacts to wildlife will be thoroughly addressed in the Environmental Impact Report (EIR), which is anticipated to be available for public review by the September/October of 2018. Whenever feasible, construction activities will avoid and minimize impacts to wildlife. If impacts to special status species cannot be avoided,

mitigation measures will be developed with input from resource agencies.

Project Development

35 Why were these deficiencies not considered when the dam was built?

The field of earthquake engineering has matured significantly since 1950 when the dam was built. Methods of construction considered appropriate in 1950 are no longer best practices. Additionally, the understanding of the fault activity at the site has seen significant changes since 1950.

In addition to the nearby active Calaveras Fault, there are two other earthquake faults (the Coyote Creek Fault and the Range Front Fault) that run directly under the dam. These faults were first identified in 1949 but they were believed to be inactive. Our understanding of potential earthquakes has improved since 1950, when Anderson Dam was built, and newer studies have suggested that these faults could be active.

Additionally, the construction methods used to build Anderson Dam are a major contributor to its expected seismic performance. This is illustrated by layers of liquefiable material that were not removed beneath the dam during the original construction, and the inadequate compaction of the embankment materials, resulting in potential liquefaction. Modern dam design identifies these liquefiable sections as susceptible to a significant reduction in strength when subjected to severe shaking.

36 Why is such an extensive retrofit required? Is there another solution that could be accomplished instead?

We did consider other alternatives because substantial reconstruction of the dam is a significant undertaking. Because of the number of significant deficiencies identified at the dam, the best way to permanently fix the problems is to remove most of the embankment materials and properly use them to reconstruct the dam. Other alternatives to repair or rehabilitate the dam in place would, in the event of a large earthquake, still expose the water district and the community to extensive repairs and potential replacement of the dam at a future time. The water district is committed to fixing the problems at Anderson Dam in a comprehensive manner. This approach will also allow complete oversight and verification by our dam regulators, preventing future questions being raised about the effectiveness of a repair effort.

37 What is the probability that after you've rebuilt the dam to withstand an earthquake of 7.25 we experience an even bigger earthquake?

We are retrofitting the dam to withstand the Maximum Credible Earthquakes on the Calaveras Fault and the Coyote Creek Fault based on the latest understanding of these faults and their seismic potential. Larger earthquakes are possible on other faults such as the San Andreas Fault. However, our analyses showed that earthquake events along other faults would have less impact on the dam than the local faults evaluated.

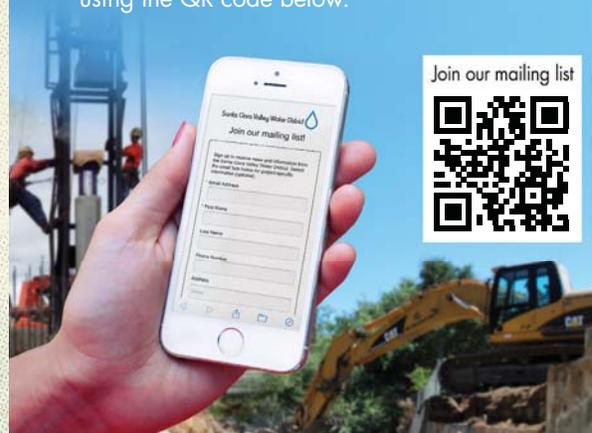
Using procedures issued by the California Division of Safety of Dams, the best science available states that the Calaveras Fault – which is one of the faults we're concerned about at Anderson Dam – is not capable of producing an earthquake higher than magnitude 7.25. The largest earthquake ever recorded on the Calaveras fault was 6.5 in 1911. The Maximum Credible Earthquake we are using for design purposes is very conservative, and builds in a sizeable margin of safety.

38 Will the water district be providing updates to neighbors during the construction period?

Yes. The water district will set up multiple mechanisms for communicating with neighbors about construction activities. From community meetings to neighborhood updates mailed or e-mailed to homeowners and businesses, to the Access Valley Water customer request system (see page 4 of project fact sheet), we will make every effort to keep the community well informed of progress updates before and during the construction phase. To ensure that you receive these notices, we strongly encourage you to sign up here to receive e-mails from us: <https://delivr.com/2npqb>. You can also download the new Access Valley Water App onto your iPhone or Android smart phone. The water district uses social media platforms including Nextdoor, Facebook and Twitter, and will also consider developing a project blog.

3 ways to get project updates

1. Visit www.valleywater.org/project-updates/dam-reservoir-projects/anderson-dam-seismic-retrofit
2. Use Access Valley Water (www.valleywater.org/avwapp/), the water district's customer request and information system, to request project information or to submit questions, complaints or compliments directly to a water district staff person.
3. Sign up to receive project updates via email using the QR code below.



We speak your language

Si habla español y tiene preguntas sobre el contenido de este mensaje por favor de comunicarse con José Villarreal al JVillarreal@valleywater.org o (408) 630-2879.

Nếu bạn nói tiếng Việt và có thắc mắc về nội dung của thông báo này, xin vui lòng liên hệ với Triet Trinh tại TTrinh@valleywater.org hoặc (408) 630-3211.

如果你說中文並對上述訊息有疑問，請聯繫 Jane Zhou，電郵 JZhou@valleywater.org，或者電話：(408) 630-2631。

CONTACT US

For more information, contact us at **(408) 630-2415** or by email at **EGross@valleywater.org**. Or use our **Access Valley Water** customer request and information system at valleywater.org to find out the latest information on district projects or to submit questions, complaints or compliments directly to a district staff person.



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