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DRAFT

2020 Water Shortage Contingency Plan

Palmdale Water District

PALMDALE WATER DISTRICT

A CENTURY OF SERVICE

Kennedy Jenks

Kennedy Jenks

2775 North Ventura Road, Suite 202
Oxnard, California 93036
805-973-5700

PUBLIC REVIEW DRAFT

Water Shortage Contingency Plan

14 May 2021

Prepared for

Palmdale Water District
2029 E. Ave Q.
Palmdale, CA 93550

KJ Project No. 2044225*00

Table of Contents

Table of Contents (cont'd)

List of Tables

Table of Contents (cont'd)

List of Figures

List of Appendices

List of Acronyms

District	Palmdale Water District
DWR	California Department of Water Resources
ERP	Emergency Response Plan
PWD	Palmdale Water District
SWP	State Water Project
UWMP	Urban Water Management Plan
WSCP	Water Shortage Contingency Plan

DWR Checklist Table for WSCP

Water Code Section	Summary as Applies to UWMP	2020 WSCP Location
Subject: Water Shortage Contingency Planning | 2020 UWMP Guidebook Location: Chapter 8		
10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Full Document
10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Section 2
10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Section 2
10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Section 3.1
10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Section 3.1
10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Section 3.2.1
10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Section 3.2.3
10632(a)(4)(C)	Specify locally appropriate operational changes.	Section 3.2.2
10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state- mandated prohibitions are appropriate to local conditions.	Section 3.3.3.1
10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Table 3-4 and 3-7
10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Section 4.1.1
10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Section 4.1.1
10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Section 2.6
10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Section 3
10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Section 2.6
10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Section 7.1.1
10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Section 7.1.2
10632(a)(8)(C)	Describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought.	Table 7-1
10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Section 5.2
10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Section 1.3

10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Section 3.2.3

Section 1: Introduction

1.1 Overview

Water supplies may be interrupted or reduced significantly in a number of ways, such as a drought that limits supplies, an earthquake that damages water delivery or storage facilities, a regional power outage or a toxic spill that affects water quality. This Plan addresses the requirements in the California Water Code Section 10632, which requires that every urban water supplier shall prepare and adopt a Water Shortage Contingency Plan (WSCP) as part of its Urban Water Management Plan (UWMP). This WSCP serves as a guide for the intended actions by Palmdale Water District (PWD, the District) during water shortage conditions to improve preparedness for droughts and other impacts on water supplies by describing the process used to address varying degrees of water shortages.

Since the 1991 drought, PWD has approved and adopted numerous conservation resolutions from establishing a voluntary water conservation program, to implementing a water waste policy, declaring water shortage emergency conditions, identifying stages of action and response requirements, and establishing emergency water conservation regulations. Moreover, due to recent drought conditions and the Governor's emergency declarations that required a reduction in overall potable urban water use statewide, PWD developed ordinances and other planning documents to incentivize individual customer conservation and reduce overall water demands. Budget-based tiered water rates were introduced in May 2009 and updated in October 2019.

This WSCP describes the actions PWD will take to identify and respond to water shortage.

1.2 Plan Preparation, Adoption, Submittal and Availability

PWD began preparation of this WSCP in January 2021. The public hearing for the WSCP Plan was noticed in local newspapers (*TBD*), as prescribed in Government Code 6066, which included the time and place of the hearing (*Date and Place TBD*), as well as the location where the plan was available for public inspection. Interested parties, including other local agencies, were notified of the public hearing.

The final draft of the Plan was adopted by the PWD Board of Directors by Resolution No. 21-0XX (provided in Appendix C) and was submitted to the Department of Water Resources (DWR) within 30 days of approval. Additionally, the plan was made available for public review per the requirements of the Water Code.

1.3 Water Shortage Contingency Plan Refinement Procedures

PWD will convene the following departmental staff as needed to re-evaluate and improve procedures for systematically monitoring and evaluating the functionality of the WSCP to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed:

- Water Use Efficiency Staff
- Administrative Staff
- Operational Staff

The WSCP will be reviewed, revised, and refined as appropriate and needed following significant changes to PWD supply portfolio, but no less than every 5 years.

1.4 Relationship to the Urban Water Management Plan

Water Code Section 10632(a) requires that every urban water supplier prepare and adopt a water shortage contingency plan as part of its urban water management plan. While the water shortage contingency plan is a stand-alone document it is updated and adopted in concert with the UWMP. Content of the water shortage are informed by the analysis of water supply reliability conducted pursuant to Water Code Section 10635 (contained in the UWMP). The reliability analysis of the UWMP considers “normal”, “single-dry”, and “5-year drought”.

The reliability of PWD supply is highly dependent on the local groundwater sources, imported water availability, and local surface water availability. As shown in Table 1-1 (from Draft UWMP, subject to revision), in the near term (2021 to 2025) the total supplies are greater than demand in years 2022, 2024, and 2025. However, anticipated supplies are less than anticipated water demands in years 2021 and 2023. The WSCP identifies shortage reduction actions to reduce the shortage gap and actions to augment supplies.

Table 1-1 Near Term Water Supply Reliability Assuming 5-Year Drought

Parameter	2021	2022	2023	2024	2025
Gross Water Use	19,410	19,505	19,620	19,715	20,220
Total Supplies	16,450	26,155	17,475	19,980	24,680
Surplus/Shortfall w/o WSCP Action	***-2,960***	***6,650***	***-2,145***	***265***	***4,460***
WSCP - supply augmentation benefit	N/A	N/A	N/A	N/A	N/A
WSCP - use reduction savings benefit	4,270	N/A	4,316	N/A	N/A
Revised Surplus/(shortfall)	1,310	N/A	2,171	N/A	N/A
Resulting % Use Reduction from WSCP action	22%	N/A	22%	N/A	N/A

Note: Reformatted from UWMP Guidebook, Table 7-5 Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)

Section 2: Procedures for the Annual Water Supply and Demand Assessment

The California Water Code Division 1, Section 350, states:

"The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection."

New provisions in Water Code Section 10632.1. require that an urban water supplier such as PWD conduct an annual water supply and demand assessment ("Annual Assessment"), on or before July 1 of each year, to be submitted to DWR. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its Annual Assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later. The requirement to perform the Annual Assessment begins in July 2022. The procedures for performing the Annual Assessment are to be detailed in an urban suppliers' Water Shortage Contingency Plan.

This section of the WSCP provides the written procedure for PWD's Annual Assessment.

2.1.1 Timeline for Conducting the Annual Assessment

Table 2-1 provides targets for performing the Annual Assessment and outlines actions for a normal year and one year of drought. By starting to plan in July, PWD will get a snapshot of conditions and can begin to prepare to mitigate supply and start outreach to customers to manage demand. Major actions are proposed in January 2022, when an initial estimate of supply is made and compared to demand. A final annual assessment is proposed in April 2022.

Table 2-1. Timeline for Decision Making Process to Perform Annual Assessment

Target Date	Action
Jul-Dec	• Monitor supply sources • Monitor demand trends
Jan	• Confirm anticipated weather (e.g., National Weather Service Climate Prediction Center, La Niña, US Drought Seasonal Outlook) • Confirm State Water Project (SWP initial allocation) • Confirm available groundwater • Confirm groundwater production capacity • Evaluate storage in Littlerock Dam Reservoir available to PWD • Prepare initial assessment of Supplies *(Supply Table 1)*
Feb	• Prepare informational item to the Board of Directors
Mar	• Make initial assessment of unconstrained demand (*Demand Tables 1, 2, 3*) • Make initial estimate of shortage • If shortage anticipated, form Water Shortage Task Force • Confirm current SWP allocation • Confirm groundwater production capacity • Estimate supply/storage in Littlerock Dam Reservoir available to PWD
April	• Start public outreach • Complete Draft Annual Assessment and present to Board of Directors • If necessary, prepare notices of public hearing on water shortage
May-July	• Continue public outreach • Update Annual Water Assessment, present to Board of Directors • Finalize Annual Water Assessment and submit to DWR • If necessary, declare water shortage and implement supply mitigations and demand reduction actions • Monitor customer response to water shortage messaging and other actions

2.2 Factors Affecting Demand and Supply

2.2.1 Weather Outlook

Weather affects PWD supplies in many ways. For many of the supplies, the effects of weather are seen over the long-term and are reflected in reservoir levels and groundwater levels. There are some resources and phenomena that can be considered when looking at the sources of supply:

- Potential for La Niña. ENSO (El Niño Southern Oscillation) is the warming and cooling of the ocean water along the Equator in the Eastern Pacific Ocean near South America. The warm phase is called El Niño and the cold phase is called La Niña. When the Eastern Pacific Ocean is 0.5 degrees Celsius above normal for 5 consecutive 3-month average periods, an El Niño is declared. When the Eastern Pacific Ocean is 0.5 degrees Celsius below normal for 5 consecutive 3-month average periods, a La Niña is declared. The El Niño and La Niña are declared as Weak, Moderate, or Strong depending on how far from normal the water temperature gets. When the temperature is above 1.5 degrees Celsius, it is declared as strong. When the temperature is above 1.0 degrees Celsius, it is declared as Moderate. When the temperature is above 0.5 degrees Celsius, it is declared as Weak. With El Niños, the High Desert tends experience increased precipitation, and decreased precipitation with La Niñas. The National Weather Service Climate Prediction Center provides information on potential for La Niña conditions.

- US Drought Information Seasonal Outlook. The National Weather Service Climate Prediction Center provides information geographically on drought conditions and categorizes geographies as “Drought Persists”, “Drought Remains but Improves”, “Drought Removal Likely”, and “Drought Development Likely”.

2.3 Current Year Unconstrained Demand

DWR guidance for the Annual Assessment is to consider the expected water use in the upcoming year, based on recent water use, and before any projected response actions a Supplier may trigger under its Water Shortage Contingency Plan.

2.3.1 Land Use

To evaluate water demand, PWD is required examine current and projected land uses. PWD incorporates City of Palmdale’s information on land use in its Master Plan Updates and is part of the City’s Development Advisory Board (DAB). The DAB participation will assist with relatively short-term forecasting of upcoming land use development. Using the known built and pending connections, a summarized total of the existing land use within the service area and potential future land use can used to assess total land use development.

2.3.2 Current Demand

PWD will create a table that will summarize the total water consumption (potable, recycled, and untreated) for each consumption category within the water service area for the most recent 5-year average, by month (*Demand Table 1*). Based on anticipated weather, *Demand Table 1*

may be adjusted to assume an increase in current demands. *Demand Table 1* will estimate existing demand in the current calendar year and demand in the subsequent calendar year. For the purposes of the analysis the subsequent year will be assumed to be a drought year.

2.3.3 Potential Demand

PWD will create a table showing anticipated demands from "Under Construction and Approved Projects" (*Demand Table 2*) derived from the Water Service Availability Letters issuance and conditions. In *Demand Table 2* anticipated water use will be forecasted by month. The calculations in *Demand Table 2* will develop or use any recently developed demand factors inclusive of water loss and including a contingency to account for annual demand variations that are likely to occur.

Demand Table 2 will reflect anticipated demands in the current calendar year and demand in the subsequent calendar year. For the purposes of the analysis the subsequent year will be assumed to be a drought year.

2.3.4 Total Near-Term Demands

Near-term water demands (*Demand Table 3*) will be the sum of the demands reflected in *Demand Table 1* plus *Demand Table 2*.

2.4 Assessing Supply in Current Year and One Dry Year

PWD will evaluate the total water sources available, including imported water, local groundwater, local surface water, recycled water, and other sources as they are put into service. Table 2-2 summarizes the factors to be considered.

Using Table 2-2 as a guide, PWD will develop a summary of each water source available in the upcoming year assuming the current and subsequent year will be dry years. *Supply Table 1* will also be developed, in which a quantified summary of each anticipated supply source is provided for the upcoming year assuming the current and subsequent year are dry years. Anticipated water supply will be forecasted by month using past supply patterns.

2.5 Assessing Water Supply Reliability

PWD will compare *Supply Table 1* and *Demand Table 3* and determine if a supply shortage is anticipated, the level of shortage, and prepare if necessary, to implement its water shortage contingency plan.

2.6 Steps Following the Annual Assessment

The District has the power and authority to implement and enforce its shortage response actions including mandatory water conservation measures within its boundaries per Division 11 of the California Water Code as previously exercised by Resolution No. 09-04, which was adopted in March 2009. Shortage response actions are described in Section 3. PWD will declare the appropriate stage of a water shortage emergency in accordance with Chapter 3, commencing with Section 350, of Division 1 of the California Water Code. Should a water shortage be declared, PWD may coordinate with the City of Palmdale and the County of Los Angeles for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

Table 2-2. Annual Assessment of Supply

Source	Factors to be Evaluated in Current Year	Establishing Supply in Assumed Subsequent Dry Year
Local Groundwater	Regulatory limitations	Regulatory limitations
	Groundwater level	Groundwater level
	Any constraints on supply due to infrastructure or water quality	Any constraints on supply due to infrastructure or water quality
	Consider if supply would be managed differently if it is known subsequent year will be dry year	
Local Surface Water	Regulatory limitations	Regulatory limitations
	Any constraints on supply due to infrastructure or water quality	Any constraints on supply due to infrastructure or water quality
Imported Water (SWP)	Water supply available under contract with DWR and any existing transfers and exchanges	Water supply available under contract with DWR and any existing transfers and exchanges
	Any constraints on supply due to infrastructure or water quality	Any constraints on supply due to infrastructure or water quality
	Consider if supply would be managed differently if it is known subsequent year will be dry year	
Recycled Water	What is current annual recycled water production capability	What is current annual recycled water production capability
	What is current annual demand + new (12 months) demand	What is current annual demand + new (24 months) demand

Section 3: Six Standard Water Shortage Levels

3.1 Stages of Action to Respond to Water Shortages

As required by California Water Code Section 10632(a)(3)(A), this WSCP is framed around six standard water shortage stages, which correspond to progressive ranges of percent supply reductions from zero to more than fifty percent. Table 3-1 presents a description of the six water supply shortage stages, defined as stages I to VI.

Each stage may be triggered by a declaration from federal or state authorities, or PWD to address events that result in a water shortage. The stages and applicable water supply conditions are summarized in Table 3-1 and Table 3-2.

Table 3-1: Rationing and Reduction Goals

Deficiency or State Mandated Reduction	Stage	Demand Reduction Goal	Type of Program	Water Shortage Condition
1-10%	1	10% reduction	Voluntary	Minor Shortage
11-20%	2	20% reduction	Mandatory	Moderate Shortage
21-30%	3	30% reduction	Mandatory	Severe Shortage
31-40%	4	40% reduction	Mandatory	Critical Shortage
41-50%	5	50% reduction	Mandatory	Emergency Shortage
>50%	6	>50% reduction	Mandatory	Catastrophic Failure

DWR Table 8-1

Table 3-2. Stages of PWD Water Shortage Contingency Plan

Stage	Percent Supply Reduction	Triggers
I	Up to 10%	• Results of the Annual Assessment • Federal, state or local disaster declaration that may impact water supplies • State declaration due to drought or system maintenance • Unplanned PWD water system maintenance
II	Up to 20%	• Results of the Annual Assessment • Federal, state or local disaster declaration that may impact water supplies • State declaration due to drought or system maintenance • Unplanned PWD water system maintenance requiring more time to repair

Stage	Percent Supply Reduction	Triggers
III	Up to 30%	• Results of the Annual Assessment • Federal, state or local disaster declaration that may impact water supplies • State determination due to drought or significant system failure; and/or • Unplanned PWD water system failure or emergency
IV	Up to 40%	• Federal, state or local disaster declaration that may impact water supplies • State determination due to drought or significant system failure; and/or • Unplanned PWD water system failure or emergency
V	Up to 50%	• Results of the Annual Assessment • Federal, state or local disaster declaration that may impact water supplies • State determination due to drought or significant system failure; and/or • Advanced PWD water system failure or emergency
Stage VI	50% or higher	• Results of the Annual Assessment • Federal, state or local disaster declaration that may impact water supplies • State determination due to drought or significant system failure • Natural or human-caused catastrophe disrupting delivery of water to, or within the service area • Severe PWD water system failure

3.1.1 Procedures for Water Shortage Level Determination

The results of the Annual Assessment will be used to determine the water shortage level. In case of emergencies, a special meeting may be called by a majority of the Board on less than twenty-four-hour notice and without an agenda to deal with the disruption of service. If an emergency arises which would ordinarily be brought to the attention of the Board, but insufficient time exists, the General Manager has administrative authority to take action as deemed appropriate and reasonable.

3.2 Water Shortage Response Actions

Once a shortage stage is declared, PWD may implement shortage response actions required by the customer and through operational changes, as listed in Table 3-3. These actions will be supported by communication protocols (discussed in Section 4.1.1), enforcement actions (discussed in Section 3.3.2) and monitoring and reporting efforts (discussed in Section 5.2) activities appropriate at each shortage stage level.

Table 3-3: Customer and PWD Water Shortage Actions

Stage	District Actions	Customer Actions
Stage I	• Initiate public information campaign • Increase awareness of conservation measures and water use efficiency programs • Conduct focused outreach to large water users • Consider coordination of public outreach with the cities and County • Publish Water Shortage Event Contingency Plan stages and actions per stage • Consider implementation of drought factor for customer bill calculation • Consider enforcement of conservation measures	• Comply with PWD Water Waste Policy (see Table 3-3 and Appendix B) • Voluntary water conservation • Adhere to conservation measures • Consider conversion to more efficient irrigation methods • Consider turf removal and conversion to Water Wise Landscape • Patronize local carwashes that recycle their water • Consider PWD Water Use Efficiency Rebate Programs
Stage II	• Continue previous action • Expand public information campaign • Commence enforcement of conservation measures • Implement of drought factor for customer bill • Suspend issuance of potable construction meters.	• Comply with PWD Water Waste Policy (see Table 3-3and Appendix B) • Comply with mandatory conservation regulations • Continue previous actions
Stage III	• Continue previous actions • Intensify public information campaign • Expand enforcement of conservation measures • Provide regular media public briefings • Activate emergency connections with mutual aid agencies • Evaluate size of monetary fines for water waste • Begin water waste patrols	• Comply with PWD Water Waste Policy (see Table 3-3and Appendix B) • Continue previous actions • Limit washing of sidewalks, driveways, walkways, parking lots, or any other hard-surfaced area by hose or flooding unless otherwise necessary • Comply with prohibited outdoor irrigation of ornamental landscape or turf with potable water through an irrigation system between 9:00 am and 6:00 pm and limit system use to two days a week
Stage IV	• Continue previous actions	• Comply with PWD Water Waste Policy (see Table 3-3and Appendix B) • Continue previous actions • Obligation to fix leaks, breaks, or malfunctions within 48 hours
Stage V	• Continue previous actions • Enforce mandatory water consumption goals and allocations for all customers and users	• Comply with PWD Water Waste Policy (see Table 3-3and Appendix B) • Continue previous actions
Stage VI	• Continue previous actions • Implement crisis communication plan • Activate Emergency Operations Center	• Continue previous actions • Terminate outdoor water use for irrigation, pools and

Stage	District Actions	Customer Actions
	• Coordinate actions with regulatory agencies • Coordinate actions with public safety agencies to address enforcement and fire protection issues • Recall all temporary meters and activate water fill stations • Suspend issuance of new development approvals and new water connections other than those required to be processed by state law	fountains • Water may only be used outdoors for public health and safety purposes • Be on alert for Boil Water Orders if they become necessary

3.2.1 Supply Augmentation

Any water shortage event should trigger a review of potential sources for supplemental water supply. Potential sources for supplemental water include increasing allocation of State Water Project water (infrastructure not currently available) or utilizing water from the Palmdale GRRP. Any supplemental water supply project or improvements to existing facilities to allow for entitled flows should be a priority for consideration in immediate capital projects if shortage (e.g., demands exceeding supplies) greater than ten percent is anticipated or when a Stage 3 Water Shortage Event continues for more than 18 months. Additional supply sources for consideration include replacement or rehabilitated wells increased use of reclaimed water, and other alternatives based on the actual circumstances at that time. Supply augmentation in near term is presented in Table 3-4 below.

Table 3-4. Supply Augmentation Actions

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier *(based on DWR's WUE database categories)*	How much is this going to reduce the shortage gap?	Additional Explanation or Reference
3	Groundwater	2,000 AF	Pump Additional Groundwater
4	Groundwater	1,000 AF	Pump Additional Groundwater
5	Groundwater	1,000 AF	Pump Additional Groundwater
6	Groundwater	500 AF	Pump Additional Groundwater

Note: (DWR Table 8-3)

3.2.2 Operational Changes

PWD shall comply with the restrictions similar to those implemented for the public to the extent possible. Hydrant flushing shall be limited except as deemed necessary by the General Manager to enhance water quality or to conduct fire flow and large meter tests. Other actions include efficient water use practices identified in Table 3-5, such as minimizing waste of water in construction, following a modified outdoor landscape watering schedule for PWD facilities depending on shortage stage, and fixing any identified leaks in the distribution system or other related water infrastructure components.

3.2.3 Demand Reduction Actions

PWD permanently implements general water conservation measures and irrigation practices aimed at increasing everyday water use efficiency. Those measures, plus those to be enacted in the various stages, are presented in Table 3-5 and are also indicated in the District's Water Waste Policy.

Table 3-5. Prohibitions During Different Shortage Stages

Stage	Prohibition/Requirement
In Effect at All Times	Water waste is prohibited at all times. Water waste includes but is not limited to: • Application of potable water to outdoor landscapes in a manner that causes runoff. • Water leaks shall be repaired in a timely manner and sprinklers shall be adjusted to eliminate over-spray. • Hosing of hardscape surfaces, except where health and safety needs dictate, is prohibited. • No watering of outdoor landscapes within 48 hours of measurable rainfall. • Car washing and outside cleaning activities prohibited except when performed with buckets and automatic hose shutoff devices. • The serving of drinking water other than upon request in eating or drinking establishments is prohibited. • Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guestroom. Other • Water for construction purposes, including but not limited to de-brushing of vacant land, compaction of fills and pads, trench backfill, and other construction uses shall be in an efficient manner.
Stage I	• Same as In Effect At All Times
Stage II	• All restrictions/prohibitions/initiatives from Stage I are in effect • Landscape watering between the hours of 1000 and 1800 hours is prohibited • Outdoor watering is limited to 3 days per week. • Irrigation with potable water outside of newly constructed homes and buildings not delivered by drip or microspray is prohibited. • Suspend issuance of potable water construction meters.

Stage	Prohibition/Requirement
Stage III	• All restrictions/prohibitions/initiatives from Stage I and Stage II are in effect and are mandatory. • Irrigation with potable water of ornamental turf on public street medians is prohibited. • Outdoor watering is limited to 2 days per week. • Potable water cannot be used to maintain fountains, reflection ponds and decorative water bodies for aesthetic or scenic purposes, except where necessary to support aquatic life.
Stage IV	• All restrictions/prohibitions/initiatives from Stage I, Stage II, and Stage III are in effect and are mandatory. • Outdoor watering is limited to 1 day per week. • Filling of new swimming pools, spas, hot tubs, or the draining and refilling of existing pools, etc is prohibited. Topping off is allowed to the extent that the designated water allocation is not exceeded. • Meters will only be installed for new accounts where the building permit was issued prior to the declaration of the water shortage.
Stage V	• Filling of new swimming pools, spas, hot tubs, or the draining and refilling of existing pools, etc is prohibited. Topping off is allowed to the extent that the designated water allocation is not exceeded. • Meters will only be installed for new accounts where the building permit was issued prior to the declaration of the water shortage
Stage VI	• All restrictions/prohibitions/initiatives from previous Shortage Stages are in effect and are mandatory. • No meters will be installed for new accounts. • Outdoor irrigation is prohibited, with the exception of drip or hand watering to preserve established trees.

As described in the table above, prohibitions and restrictions on water features that are artificially supplied with water, such as ornamental lakes, ponds and decorative fountains are treated differently from swimming pools and spas, as defined in Section 115921 of the California Health and Safety Code.

3.2.3.1 Emergency Response Plan

In order to prepare for catastrophic events, the PWD has prepared an Emergency Response Plan (ERP) in accordance with other state and federal regulations. The purpose of the ERP is to design actions necessary to minimize the impacts of supply interruptions due to catastrophic events.

The ERP includes PWD's standardized response and recovery procedures to prevent, minimize, and mitigate injury and damage resulting from emergencies or disasters. The ERP includes, or is planned to include incident response procedures for the following incidents:

- Evacuation
- Earthquake
- Fire
- Wildfire
- Flood
- Power Outage
- Drought
- HazMat Release
- Security Incidents
- Bomb Threat
- Single-Employee Security Incident
- Personnel Injury
- Contamination
- Transmission/Main Break
- Distribution Line Break
- Pandemic

The plan considers the various aspects of the potential for malevolent threats or actual terrorism. The information contained in the ERP is intended to guide staff and inform other emergency responding agencies and includes plans, procedures, lists, and identification of equipment, emergency contacts, etc.

3.2.3.2 Seismic Risk Assessment and Mitigation Plan

PWD owns and operates water storage and distribution, treatment, and groundwater pumping facilities. The water distribution system is comprised of two separate systems – one for potable water and the other for recycled water. In 2021 PWD performed the following to understand, plan, for and mitigate seismic risk:

- Evaluated seismic risk zone for the PWD service area
- Identified critical water facilities and seismic and building deficiencies
- Identified mitigation measures to reduce seismic risk at facilities.

This section summarizes the 2020 seismic risk assessment and provides an update of the seismic vulnerability of the drinking water supply, treatment, storage, and distribution facilities and mitigation plan for the water system (Kennedy Jenks 2021). The Seismic Evaluation is included in Appendix C.

3.2.3.2.1 Seismic Evaluation and Mitigation for Steel Tanks

Geotechnical work was conducted for PWD's above-ground potable water reservoirs located on 19 sites in the Palmdale area, to classify sites for repair and retrofit needs. Design level earthquake values were identified for each tank evaluation, corresponding to the appropriate American Society of Civil Engineers design level earthquake.

A seismic evaluation was performed to identify seismic deficiencies and recommend strengthening measures for each of the welded carbon steel tanks. Work included a written description for each tank summarizing the results of the interior and exterior inspections and condition assessments; and the findings of the desktop evaluation.

Several tanks were found to have deficiencies, due to one or more of the following:

- age of the tank
- code which was applicable at the time the tank was designed,
- dimensions of the tank diameter to height ratio,
- lack of anchorage to foundations

The tank structural and seismic evaluation investigated several mitigation concepts in order to bring the tanks within code compliance. These mitigation concepts included arranging for a civil or structural engineer to inspect PWD facilities, consulting with a geotechnical engineering firm to perform site investigations and provide a more detailed analysis, increasing freeboard height to accommodate wave action, and combinations of these.

PWD will prioritize tanks for repairs and replacement based on the likelihood and consequences of various types of damage associated with code compliance issues identified.

3.2.3.2.2 Seismic Evaluation and Mitigation for Pump Stations, Pressure Reducing Valves, Wells or Well Pump Stations

Seismic assessments were performed for the booster pump stations, wells, and booster pump buildings. Work included documentation of facility descriptions, seismic deficiencies, and seismic mitigation measures. Many of these facilities had identified deficiencies associated with anchorage to foundations and walls, inadequate load path to transfer later loads, and thin slabs. Similar to the tank evaluation, additional analysis is recommended.

3.3 Benefit of Shortage Response Actions

As discussed above, supply actions and actions within PWD operations will help reduce water shortage. Closing the "gap" between supplies and demands through customer actions, will include:

- Public Information
- Enforcement
- Restrictions on Non-Essential Water Uses
- Pricing

The water shortage response actions and their anticipated effect are summarized in Table 3-7.

3.3.1 Public Information

Without exception, experience has shown that a well-informed public is generally more willing to heed requests to voluntarily conserve or alter water use patterns and will be more likely to comply if mandatory water use restrictions become necessary. DWR (2008) estimates that public information campaigns have alone reduced demand in the range of **5 to 20** percent, depending on the time, money, and effort spent. Public information supports voluntary and mandatory measures by educating and convincing the public that a critical water shortage exists and provides information on how water is used and how they can help. The DWR Drought Guidebook highlights that when the public perceives a drought to be severe, they change behaviors (such as flushing the toilet less often).

The information provided to the public should include a description of the conditions that will trigger implementation of shortage stages as well as a description of what the plan entails (restrictions, enforcement provisions, etc.). It is also advisable to provide practical "consumer" information that will help water users comply with the plan. For example, information about restrictions on lawn watering might be accompanied with information about proper lawn watering practices.

Based on past experience, with minimal public outreach, a water savings of 5 percent is assumed, with extensive public outreach a water savings of 7 percent is assumed, public information combined with enforcement (see section 3.3.2) is assumed to achieve a savings of up to 22 percent.

3.3.2 Enforcement

A study examining the effectiveness of drought management programs in reducing residential water-use (Virginia Polytechnic Institute 2006) showed considerable variation in the effectiveness of drought management programs and highlighted the importance of public information and enforcement. Results, shown in Table 3-6, indicate that overall reductions in residential water-use ranged from 0-7 percent for voluntary restrictions and from 0-22 percent for mandatory restrictions. The observed differences were statistically attributed to information efforts for voluntary restrictions and both information and enforcement efforts for mandatory restrictions.

Table 3-6. Drought Program Management Variables Effect on Residential Water-Use

Classification	Estimated Change in Water-Use	Statistically Different than No Effect?
Voluntary Restrictions		
Little or no information disseminated	-2%	No
Moderate level of information	-2%	No
Aggressive information dissemination	-7%	Yes
Mandatory Restrictions		
Low information and low enforcement	-5%	No
Moderate information and low enforcement	-6%	Yes
Aggressive information and low enforcement	-12%	Yes
Low information and moderate enforcement	-4%	No
Moderate information and enforcement	-9%	Yes
Aggressive information and moderate enforcement	-15%	Yes
Moderate information and aggressive enforcement	-20%	Yes
Aggressive information and enforcement	-22%	Yes

Source: Virginia Polytechnic Institute 2006

The analysis highlights the key role that public outreach and information plays in the success of drought response actions. Voluntary restriction programs with little to moderate levels of information dissemination had no appreciable effect on water-use. Voluntary restriction programs with active promotional efforts, however, reduced water-use by an estimated 7 percent from what would have otherwise occurred without any restriction program. Thus, for voluntary restrictions, only the most intense programs had even a moderate level of success in reducing water-use.

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Mandatory restriction programs without a significant enforcement component broadly mirrored the outcomes achieved by the voluntary programs. Programs with mandatory restrictions that invested minimal effort in information dissemination did not appreciably reduce residential water-use. Programs with no active enforcement efforts but with moderate to high levels of informational dissemination achieved 6 and 12 percent reductions in water-use, respectively. These estimated reductions are similar to those achieved by voluntary programs with aggressive informational campaigns.

The experience the City of Santa Cruz had implementing its Drought Contingency Plan and successfully reaching its reduction goals supports the importance of a strong public information program. Analysis of the implementation program identified the key ingredient to its success was "the public's understanding, awareness, and belief that the City was confronted with a true water shortage problem. Media coverage of water problems across California reinforced the situation. Without that sense of a real and imminent problem, it's likely the level of cooperation and willingness demonstrated by the community in making changes they did might have been considerably reduced." (Santa Cruz 2010)

Delivering accurate and timely information to water users, news media and local governments with updates on conditions, restrictions, and helpful contact information is key.

With aggressive information dissemination and enforcement its assumed PWD could achieve a 22 percent water savings.

3.3.3 Restrictions on Non-Essential Water Uses

PWD's water waste policy focuses on curtailing water waste and non-essential water use. Outdoor water use, including washing sidewalks and watering ornamental landscapes is targeted. These uses are typically considered to be discretionary or nonessential, are highly visible, and therefore relatively easy to monitor, and often are a substantial component of water demand, particularly during the summer months when drought conditions are likely most severe.

Given the significance and visibility of lawn watering as the predominant component of seasonal use, best management practices in drought contingency plans typically prescribe time-of-use and other restrictions on lawn watering. This often involves placing water users on a schedule which allows for staggered lawn watering days, as well as restrictions on the times during the day when lawns can be watered. Additionally, this may include the suspension of potable water construction meters.

The American Waterworks Association estimates that voluntary outdoor water use limits can result in a water savings of **up to 10 percent** and mandatory outdoor water limits can achieve **up to a 56** percent reduction in outdoor water use (AWWA 2008, AWWA 2011). Specifically, case studies found that:

- Restricting water use to every third day reduced water use by 22 percent

- Restricting water use to twice a week reduced water use by 33 percent
- Restricting water use to once a week saved 56 percent

PWD performed a detailed review of water use as part of its 2019 Financial Planning Study (PWD 2019). This analysis estimated that for residential customers, approximately 52% of water use was outdoors. Residential water demand makes up approximately 77% of PWD's overall demands Therefore:

- Voluntary outdoor water limits that saved 10% of outdoor residential demands would reduce overall water demand by 4% (0.1*0.52*0.77).
- Restricting water use to twice a week could reduce outdoor water use by 33%, reducing overall water demand by 13% (0.33*0.52*0.77).
- Restricting water use to once a week could reduce outdoor water use by 56%, reducing overall water demand by 22% (0.56*0.52*0.77).

3.3.3.1 Additional Mandatory Restrictions

The State, through the State Water Board, adopted drought emergency conservation regulations in July 2014. The Board expanded, updated, extended, and readopted the emergency regulations several times and in the prohibitions on wasteful water use practices were in place until November 25th, 2017.

As directed by Executive Order B-40-17, the State Water Board is conducting a rulemaking to put in place permanent prohibitions on wasteful water use practices. This rulemaking is part of the broader legislation, *Making Water Conservation a California Way of Life*.

The specific outcome of the permanent prohibitions cannot be known at this time. The emergency conservation regulations in effect through November 2017 included the following prohibitions:

- Application of potable water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures;
- The use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use
- The application of potable water to driveways and sidewalks
- The use of potable water in a fountain or other decorative water feature except where the water is part of a recirculating system
- The application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall
- The serving of drinking water other than upon request in eating or drinking establishments
- Irrigation with potable water of ornamental turf on public street medians.

The emergency conservation regulations further required that:

- The irrigation with potable water of landscapes outside of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development

- Commercial, industrial, and institutional properties shall limit outdoor irrigation of ornamental landscapes or turf with potable water to no more than two days per week

PWD's water use restrictions are consistent with the State's prohibitions to prevent water waste. However, dependent on the declared drought stage, PWD may have restrictions and requirements in addition to those of the State such as:

- Limiting outdoor irrigation of ornamental landscape or turf with potable water to certain hours and to certain days of the week (all customer types, not just Commercial, Industrial, or Institutional properties)
- Prohibiting all outdoor irrigation with potable water
- Prohibiting filling of swimming pools, spas, and wading pools

3.3.4 Drought Surcharge Rates

PWD has a drought rate structure to recover costs related to increased effort during drought. While not a specifically meant to reduce water demand, drought surcharge rates are expected to decrease water demands.

Past studies reveal that water use decreases when utilities install water meters and impose commodity charges. AWWA estimates that water use decreases between 15 to 40 percent when customers are charged a commodity rate rather than a flat rate (AWWA 2008). This indicates that customers are price sensitive and will adjust habits to reduce their cost of water. The actual extent that increasing rates during a drought can result in decreased water use is uncertain.

AWWA studies indicate that the effectiveness of pricing to reduce water use is very dependent on the affluence of the water utility customer base. As a rule of thumb, AWWA estimates that marginal price increases in water (up to 10 percent) reduce water use by 1.5 to 7 percent; price increases greater than 10 percent are necessary to achieve water use reductions greater than 10 percent (AWWA 2008).

Based on AWWA data its assumed that water use reductions of 10 to 15 percent will be achieved with drought rates.

Table 3-7. Effectiveness Demand Reduction and Other Actions

Shortage Level	Demand Reduction Actions	Reduction in Shortage Gap	Explanation	Penalty, Charge, or Other Enforcement?
1	Expand Public Information Campaign	7%	Based on AWWA 2008 assumes savings of 7%	No
2	Expand Public Information Campaign	22%	Based on AWWA 2008 assumes savings of 22% with enforcement	Yes
2	Implement or Modify Drought Rate Structure or Surcharge	10%	Based on AWWA 2011 assumes savings of 10%	Yes
3	Expand Public Information Campaign	22%	Based on AWWA 2008 assumes savings of 22% with enforcement	Yes
3	Implement or Modify Drought Rate Structure or Surcharge	10%	Based on AWWA 2011 assumes savings of 10%	Yes
3	Landscape - Other landscape restriction or prohibition	4%	Outdoor water limited to 3 days a week. Based on AWWA 2011.	Yes
4	Expand Public Information Campaign	22%	Based on AWWA 2008 assumes savings of 22% with enforcement	Yes
4	Implement or Modify Drought Rate Structure or Surcharge	15%	Based on AWWA 2011 assumes savings of 15%	Yes
4	Landscape - Other landscape restriction or prohibition	13%	Outdoor water limited to 2 days a week. Based on AWWA 2011.	Yes
5	Expand Public Information Campaign	22%	Based on AWWA 2008 assumes savings of 22% with enforcement	Yes
5	Implement or Modify Drought Rate Structure or Surcharge	15%	Based on AWWA 2011 assumes savings of 15%	Yes
5	Landscape - Other landscape restriction or prohibition	22%	Outdoor water limited to 1 day a week. Based on AWWA 2011.	Yes

Table 3-7. cont.

Shortage Level	Demand Reduction Actions	Reduction in Shortage Gap	Explanation	Penalty, Charge, or Other Enforcement?
6	Expand Public Information Campaign	22%	Based on AWWA 2008 assumes savings of 22% with enforcement	Yes
6	Implement or Modify Drought Rate Structure or Surcharge	15%	Based on AWWA 2011 assumes savings of 15%	Yes
6	Landscape - Other landscape restriction or prohibition	52%	Outdoor water use prohibited	Yes

DWR Table 8-2

Section 4: Communications Protocols

4.1.1 Communications Protocols and Customer Outreach

Customer participation is a key element in responding to a supply shortage, while general media coverage of a drought is likely to increase awareness. Multiple communication channels will continue to be used by PWD staff to communicate water shortage conditions and necessary actions to the PWD Board of Directors, customers, residential homeowners associations, business chambers, inter-governmental bodies, essential facilities (schools, hospitals, fire and police department), and other stakeholders. Communication methods include the following:

- Public water conservation forums hosted at PWD headquarters, off- site locations, or through virtual platforms.
- Attendance and agenda presentation at local city council meetings.
- Attendance and agenda presentations at home-owners association and business chamber meetings.
- Direct mailings and bill inserts to customers and account holders.
- Press releases.
- PWD publications, e.g., “The Pipeline”.
- Updated posting of issues and information on PWD website.
- Advertisements in local publications and cable channels.
- Cards, table tents, door hangers and other leave-behind reminders.
- Social media updates and postings

Table 4-1 describes communication protocols and procedures to be used by PWD for outreach to customers to reduce demand during each defined shortage stage. The shortage stages are further defined in Section 3.1.

Table 4-1. Communication Protocols and Procedures to Support Shortage Response Actions

Shortage Stage	Percent Supply Reduction	Communication Protocols and Procedures *(Outreach to customers when each Stage is declared)*
I	Up to 10%	- Declaration and notification of water supply shortage I by resolution, and adoption at a public meeting in accordance with state law. - Notification of supply shortage in Public Newspaper
II	Up to 20%	- Declaration and notification of water supply shortage II by resolution, and adoption at a public meeting in accordance with state law. - Notification of supply shortage in Public Newspaper - Advertisement in Local Public Newspaper - Commence social media updates - Notify top 5 water users in each customer class, e.g. residential, and CII
III	Up to 30%	- Declaration and notification of water supply shortage III by resolution, and adoption at a public meeting in accordance with state law. - Notification of supply shortage in Public Newspaper - Advertisement in Local Public Newspaper and local cable channel - Schedule regular media, city council and County briefings - Continue social media updates - Targeted Messaging to customers - Notify top 10 water users in each customer class, e.g. residential, and CII
IV	Up to 40%	- Declaration and notification of water supply shortage IV by resolution, and adoption at a public meeting in accordance with state law. - Notification of supply shortage in Public Newspaper - Advertisement in Local Public Newspaper and local cable channel -Continue regular media, city council and County briefings - Continue social media updates - Targeted Messaging to customers - Notify top 15 water users in each customer class, e.g. residential, and CII
V	Up to 50%	- Declaration and notification of water supply shortage V by resolution, and adoption at a public meeting in accordance with state law. - Notification of supply shortage in Public Newspaper - Advertisement in Local Public Newspaper and local cable channel - Continue regular media, city council and County briefings - Continue social media updates - Targeted Messaging to customers - Notify top 20 water users in each customer class, e.g. residential, and CII
VI	50% of More	- Declaration and notification of water supply shortage VI by resolution, and adoption at a public meeting in accordance with state law. - Notification of supply shortage in Public Newspaper - Advertisement in Local Public Newspaper and local cable channel - Continue regular media, city council and County briefings - Continue social media updates - Targeted Messaging to customers - Notify top 25 water users in each customer class, e.g. residential, and CII

Section 5: Monitoring and Reporting

Monitoring is essential to ensure that the response actions are achieving their intended water use reduction purposes, or if improvements or new actions need to be considered.

5.1 Mechanism to Determine Reductions in Water Use and to Meet State Reporting Requirements

The PWD has meters on all residential, commercial and landscape service connections in the service area and requires meters on all new connections. These meters record the amount of water consumption at each location. These meters in combination with billing information will be used to monitor actual reductions in water use.

5.2 Monitoring and Reporting

Certain aspects of water conservation can be readily monitored and evaluated, such as metered water use and production quantities. Other aspects such as public education are more difficult to measure in terms of effectiveness. Additionally, weather patterns make it more difficult to compare one year's water demand and conservation results with another year's usage.

When severe shortages occur and some degree of mandatory reduction is required, a program's effectiveness can be judged directly by water billings. In these cases, targeted results must be met, and even reluctant customers will, on the whole, meet the goals. Specific methods to evaluate effectiveness of water conservation programs to be employed by PWD are:

1. Monitoring of Metered Water Usage – This will determine how much has been used. Compiling statistics to track usage of customer groups to determine trends is currently being done through the water billing computer system. Meter readings/billings can be compared and analyzed to determine the effectiveness of conservation for all customer classes.

2. Monitoring Production Quantities – In normal water supply conditions, production figures are recorded daily by the District's automated system. The Water Production Supervisor and the Production Lead monitor the accuracy of the monthly production totals. The totals are incorporated into the monthly water supply report to the State by the Water Treatment Supervisor.

To verify that conservation reduction goals are being met, production and metered usage reports will be provided to General Manager during each stage of the conservation period. Water production figures will be compared to previous year production figures for the same time period to ascertain if conservation goals are being reached. Results will be posted on the Palmdale Water website, as appropriate.

Additional actions available to PWD include:

1. Transition of remaining customer water meters to "smart meters" and investment in automated system to improve customer interface to allow more timely monitoring by customer of water use patterns.

2. Provide incentives to property owners to install individual meters or sub-meters in multi-family structures to for resident/property owners to track water usage.

Table 5-1 lists specific monitoring and reporting methods for each shortage stage that can be used to measure the effectiveness of reducing the shortage gap. As the stages progress into a greater percent supply reduction needed, the monitoring and reporting will increase in frequency, intensity, and resources.

Table 5-1: Monitoring and Reporting to Support Shortage Response Actions

Shortage Stage (% supply reduction)	Monitoring and Reporting Methods (How to measure effectiveness of reducing the shortage gap)
I (Up to 10%)	- Water-Use Monitoring Mechanisms - Prepare and review monthly water use reports
II (Up to 20%)	All Previous Monitoring and Reporting Methods AND: - Run and review monthly water use reports
III (Up to 30%)	All Previous Monitoring and Reporting Methods AND: - Run and review monthly water use reports
IV (Up to 40%)	All Previous Monitoring and Reporting Methods AND: - Run and review monthly water use reports
V (Up to 50%)	All Previous Monitoring and Reporting Methods AND: - Run and review monthly water use reports
VI (Up 50% of More)	All Previous Monitoring and Reporting Methods - Run and review monthly water use reports

Section 6: Enforcement

The District has the power and authority to implement and enforce its shortage response actions including mandatory water conservation measures within its boundaries per Resolution No. 09-04, which was adopted in March 2009.

Enforcement actions for violations of water conservation measures are summarized in Table 6-1. PWD customers are encouraged to report water conservation violations through use of the PWD hotline.

Table 6-1. Penalties for Customer Violations

Violation Level	Penalties or Charges
1st Violation	The customer shall be notified in writing. The notice shall include a warning that further violations could result in stricter penalties.
2nd Violation	A 2nd violation is punishable by a fine of up to $50.
3rd Violation	A 3rd violation is punishable by a fine of up to $250.
4th Violation	A 4th violation is punishable by a fine of up to $500.
5th Violation	A 5th violation may result in termination of service and a $1,000 reconnection fee
Violation Assessment Period	Any violations occurring within twelve months of each other will be considered consecutive and result in escalating penalties. The period for assessing. consecutive penalties may be extended beyond 12 months by resolution of the Board.

In accordance with the PWD Water Waste policy, a receipt of notice regarding a claim of water waste or misuse, the Customer shall have five days to file a request for reconsideration with the General Manager, and fifteen days after the General Manager's decision to file a written appeal with the Board. A hearing on the appeal will be conducted in the next Board meeting following the appeal, with the Board's decision from the hearing designated as final and conclusive.

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Section 7: Financial Consequences of Actions during Shortages

Water providers face significant financial challenges during droughts. During periods of reduced consumption, revenue from water sales decline while expenses remain relatively constant. A reduction in construction activities can also reduce water service connection fees collected. At the same time, as consumption decreases, some expenditures are expected to increase, including staff costs for community education, enforcement of ordinances, monitoring and evaluation of water use, and drought planning. Operations and maintenance costs may also increase because of the need to identify and quickly repair all water losses.

PWD recognizes the financial impacts of reduced customer deliveries and connections during droughts. The following sections describe potential revenue reductions, expense increases, mitigation actions and the cost of compliance with reducing residential water use during drought.

7.1.1 Revenue Impacts of Reduced Sales and Increased Costs

Currently, about 55 percent of PWD'S O&M costs are covered by fixed revenues. As a result, water conservation efforts can significantly impact revenues and the ability to cover fixed, non-variable costs.

Reductions in potable water use could result in an operating shortfall for the Potable Water Enterprise. While operating expenses are reduced with lower sales, fixed costs cannot be fully recovered when there are significant reductions in sales, thereby resulting in a net operating loss. PWD has planned for this shortfall by creating a reserve fund.

In the case of future water use reductions resulting from the implementation of the PWD WSCP, PWD would likely experience impacts to operating revenue and would draw as necessary and as possible from reserves. In addition, one of the objectives of the budget-based tiered rate structure implemented on January 1, 2020 is to improve revenue stability. Therefore, while revenue would inevitably fluctuate with water use reductions, PWD has established appropriate means to manage these impacts with use of drought surcharge, as indicated in the 2019 Financial Planning report. Future or continued reductions in consumption would ultimately cause a rate structure adjustment that would generate enough revenue to fund operations without drawing from reserves. Table 7-1 presents an amended summary of findings from the 2019 Financial Planning Report with respect to revenue impacts from demand reduction, based on data from 2020.

Table 7-1. Revenue Impacts of Reduced Water Demand

Demand Reduction	Annual Revenue Reduction ($ million)	State Water Purchase Offset ($ million)	Ancillary Costs ($ million)[1]	Net Cost of Compliance ($ million)[4]
10%	-$0.71	+$0.38	$0.23	-$0.10
20%	-$1.42	+$0.76	$0.25	-$0.41
30%	-$2.14	+$1.13	$0.28	-$0.73
40%	-$2.85	+$1.51	$0.27	-$1.07
50%	- $3.56	+$1.88	$0.26	-$1.42

1. Estimated as a percent of Operations and Maintenance expenses to reflect increased costs for expanded public outreach campaigns, increased meter reading, operational and administrative support during each drought stage to implement demand reduction actions.
2. Calculated sum of annual revenue reduction plus reduced imported water purchased plus ancillary costs.

7.1.2 Mitigation Actions to Address Revenue Reductions

A reduction in water revenue could be mitigated by use of the established reserve fund, deferral, or avoidance of capital fund expenditures, use of less costly water supplies (if possible), and implementation of drought surcharge rates. This would meet short-term cash flow needs, although it should only be considered on a short-term basis.

A summary of measures to overcome revenue and expenditure impacts is provided in Table 7-2.

Table 7-2. Measures to Overcome Revenue Impacts During Shortage

Measure	Summary of Effects
Use of Reserve Funds	Use of reserves may provide short-term rate stabilization but would require delays in capital expenditures and rebuilding of reserves after the water shortage.
Re-evaluate Capital Expenditure Plans	Delay major construction projects for facilities as well as upgrades and replacements.
Shift Water Sources to Less Costly Supplies if Possible	Reduce costs associated with purchase, treatment, and distribution of water.
Drought Surcharge Rates	Increase revenue.

Drought surcharges are recommended based on the Board Resolution No 09-04 and are summarized in the table below.

Table 7-3. Proposed Drought Surcharges

Drought Mandate	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024
20% Surcharge	$ 0.35	$ 0.38	$ 0.40	$ 0.42	$ 0.45
30% Surcharge	$ 0.54	$ 0.58	$ 0.61	$ 0.65	$ 0.69
40% Surcharge	$ 0.79	$ 0.84	$ 0.89	$ 0.94	$ 1.00

Source: PWD Financial Planning, Revenue Requirements, Cost of Service, and Rate Setting Analysis, 2019

7.1.3 Financial Consequences of Limiting Excessive Water Use

Per the California Water Code Section 365 et al., retail water suppliers are required to prohibit or discourage excessive water use. Reporting this is not a required part of the UWMP; however, Water Code Section 10632(a)(8)(C) requires the financial consequences of these actions be reported as part of the UWMP.

Water Code Section 367 states that there are three types of drought emergencies:

- Declared statewide drought emergency
- When a supplier implements its mandatory reductions per their WSCP
- A declared local drought emergency

Water Code Section 366 states that a retail water supplier must prohibit excessive use through one of two strategies:

- Rate structure. Specifically, a rate structure that includes block tiers, water budgets, or rate surcharges over and above base rates for excessive water use by a residential water customer.
- An excessive water use ordinance, Specifically an ordinance that includes a procedure to identify and address excessive water use by metered single-family residential customers and customers in multiunit housing complexes in which each unit is individually metered or submetered and may include a process to issue written warnings to a customer and perform a site audit of customer water usage prior to deeming the customer in violation.

PWD already has in place budget-based rates that discourage excessive water use. Should a drought emergency occur, PWD would already have the necessary processes in place to discourage excessive use. As discouraging excessive use is already a part of PWD's normal operations, the financial consequences of prohibiting excessive use would be minimal.

References

American Water Works Association, 2011. Drought Preparedness and Response. Manual of Water Supply Practices, M60.

American Water Works Association, 2008. Forecasting Urban Demand. Second Edition.

Palmdale Water District. 2019. Financial Planning, Revenue Requirements, Cost of Service, and Rate Setting Analysis. October.

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2775 N. Ventura Road, Suite 202
Oxnard, CA 93036
(805) 973- 5700

www.kennedyjenks.com

Kennedy Jenks

Appendix A

Resolution Adopting the 2021 Urban Water Management Plan and Water Shortage Contingency Plan

Materials to be provided in Final Draft

Appendix B

Palmdale Waste of Water Policy

APPENDIX O

WASTE OF WATER POLICY

Palmdale Water District is engaged in the production, transmission, storage and distribution of water to its Customers in accordance with California law.

California law prohibits the waste or unreasonable use of water and requires that the District take all appropriate actions to prevent such waste and unreasonable use of this finite resource.

Water waste includes but is not limited to:

- Application of potable water to outdoor landscapes in a manner that causes runoff.
- Failure to repair water leaks or to adjust sprinkler overspray in a timely manner.
- Hosing of hardscape surfaces, except where health and safety needs dictate.
- The use of potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system.
- Irrigation with potable water of ornamental turf on public street medians.
- Watering of outdoor landscapes within 48 hours of measurable rainfall.
- Car washing and outside cleaning activities except when performed with buckets and automatic hose shutoff devices.
- The serving of drinking water other than upon request in eating or drinking establishments.
- Failure of operators of hotels and motels to provide guests with the option of choosing not to have towels and linens laundered daily. (The hotel or motel shall prominently display notice of this option in each guestroom.)
- Inefficient use of water for construction purposes.
- Irrigation with potable water outside of newly constructed homes and buildings not delivered by drip or microspray is prohibited.

Categories of Water Waste:

The District recognizes that water waste can vary significantly in severity and for this reason will classify and deal with three levels of water waste.

Level 1 Water Waste:

This is the least severe category of water waste which includes any violation of the Water Waste Policy and any other form of water waste that leads to minor but avoidable water loss. Examples of this would be overspray from improperly adjusted sprinklers or small leaks leading to wetting of the sidewalk.

Penalties for Level 1 Water Waste:

Penalties for Level 1 waste violation will be an initial warning. Failure to repair the violation will result in a $50 fine. An additional new $50 fine will be assessed if the follow up inspection shows that the violation is unrepaired. Follow up inspection will occur no more frequently than once every 14 days. If a Level 1 water waste violation continues unrepaired for greater than 60 days, then the District may elevate the penalties to Level 2 fines as described below.

Level 2 Water Waste:

This category includes any form of water waste where water is visibly and measurably flowing off the property. Examples of this would be a sheared off sprinkler or an irrigation system that is stuck on. Follow up inspection will occur no more frequently than once every 7 days.

Penalties for Level 2 Water Waste:

The penalties will mirror the penalties found in the Water Shortage Contingency Plan. These penalties are currently as follows:

1st Notice of Violation-	The customer shall be notified in writing. The notice shall include a warning that further violations could result in stricter penalties.
2nd Notice of Violation-	is punishable by a fine of up to $50.
3rd Notice of Violation-	is punishable by a fine of up to $250.
4th Notice of Violation-	is punishable by a fine of up to $500.
5th Notice of Violation-	may result in termination of service.

Level 3 Water Waste:

This category includes any form of water waste where water leaving the property appears uncontrollable or poses a threat to public safety. Examples of this would be a broken water line flowing unrestrained off the property or water leaving the property causing a public safety threat due to icing or flooding.

Penalties for Level 3 Water Waste:

Level 3 water waste will result in the shutdown of service until the repair has been successfully accomplished. Repeat incidences of severe water waste will mirror the penalties found in the Water Shortage Contingency Plan.

District Process:

1. Upon notification or observation of waste or misuse of water, the District shall:

   (a) Make a photographic record of such activity;

   (b) Provide notice to the Customer in writing or by means of a door tag; and

   (c) Log the warning on the Customer's service record.

2. In the event of a recurring violation, the District shall:

   (a) Assess the appropriate fine upon the Customer for each notification of violation occurring after the warning has been given;

   (b) Give notice to the Customer in writing that if such waste or misuse continues, the Customer may be subject to increased penalties up to and including disconnection of service.

3. Upon determination that a violation is still unresolved and a final notice needs to be issued, the District shall:

   (a) Give written notice to the Customer that disconnection of the service will occur within five (5) working days of the date of the notice;

   (b) Disconnect the Customer's service after the appropriate time has been allotted; and

   (c) Charge the Customer a disconnection charge for waste or misuse of water as set forth in Appendix D and a turn-on fee as set forth in Appendix D if service is later restored. Service will be restored only when the Customer has provided evidence satisfactory to the District that waste and unreasonable use of water will no longer occur.

The District recognizes that there may be mitigating or intervening circumstances that bear upon a Customer's apparent misuse of water. Upon receipt of any notice regarding purported misuse or waste of water, the Customer shall have five (5) working days within which to file a written request for reconsideration with the General Manager. If the Customer is not satisfied with the General Manager's decision, the Customer shall have fifteen (15) days after the General Manager's decision within which to file a written appeal with the Board. The Board shall conduct a hearing on the appeal at the next Board meeting immediately following the appeal. The Board's decision following such hearing shall be final and conclusive.

ADOPTED BY THE BOARD OF DIRECTORS OF PALMDALE WATER DISTRICT AT A REGULAR MEETING HELD OCTOBER 11, 2017

Appendix C

Seismic Evaluation Report

Kennedy Jenks

3200 El Camino Real, 200
Irvine, CA 92602
949-261-1577

Seismic Risk Evaluation and Mitigation Report

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Prepared for

Palmdale Water District
2029 East Avenue Q
Palmdale, CA 93550

KJ Project No. 2044225*00

Table of Contents

Section 1: Draft Seismic Risk Analysis

1.1 Overview

The Act requires urban water suppliers to evaluate potential seismic risk to the facilities in their system and produce a mitigation plan. This section describes the review of the of the existing documentation and preliminary evaluation seismic risk the Palmdale Water District's (PWD) existing facilities. This section also provides recommendations for mitigation of the existing risks. Current structural design practice is to design structures for ground motion with a 2.5% probability of exceedance in any 50-year period. This design earthquake is highly dependent on conditions at any given location. Earthquake magnitude is an estimate of the total energy released by a given earthquake and cannot be directly translated into the design earthquake used for structural design. However, The U.S Geological Survey estimates that there is a 99% chance that California will experience a 6.7 magnitude earthquake within 30 years. The Current design earthquake has a lower probability of occurring than an earthquake of similar magnitude to the 1994 Northridge Earthquake, 6.7.

The facilities review as part of this assessment include approximately 29 well sites, 14 booster pump station, and 19 steel water storage tanks, one underground concrete water storage tank, Lake Palmdale, and Little Rock Reservoir. The facilities described in this report were constructed between 1965 and the present day. There are significant gaps in the construction documentation of many of these facilities. Final seismic risk mitigation planning will require site visits by a Structural or Civil Engineer experienced in design of water treatment facilities to evaluate the existing conditions. Where possible an initial determination of the seismic loads at the facilities has been determined in accordance with the 2010 Edition Minimum Design Loads Associate for Buildings and Other Structures (ASCE 7-10) using the web-based Hazard Maps by the Applied Technology Council (ATC). The 2010 edition was used in this stage because ASCE 7-16 as referenced in the current California Building Code (CBC) requires site specific geotechnical investigations for most conditions and structures. When implementing the final mitigation recommendations, a geotechnical investigation will be required for most of the Palmdale Water District's facilities.

1.2 Water Storage Tank Evaluation Summary

The seismic evaluation of SCV Water was conducted by applying the seismic design provision of the 2011 edition of Welded Carbon Steel Tanks for Water Storage by the American Water Works Association (AWWA D100-11). SCV Water currently operates over 90 steel water storage tanks. For our analysis we were provided the diameter, height to the overflow and maximum capacity of the storage tank. Using this information, ASCE 7-10 seismic parameters, and the seismic provision of AWWA D100-11, we determined the seismic loads, sloshing wave height, and anchorage requirements of SCV Water's storage tanks. Final design of welded and bolted steel water storage tanks is typically conducted by specialty contractors and submitted during construction. The construction drawings rarely indicate the final plate thicknesses,

location and size of columns, size and location of anchors or other significant aspects of design beyond size and design criteria. Further field investigations will be required quantify further risk.

Storage tanks build prior to 1984 are unlikely to be compliant with current building standards are unlikely to have been designed for lateral loads due to seismic events. Storage tanks built between 1984 and 2011 were probably designed with seismic loads however they may not be designed to withstand seismic loads determined in accordance with the current building code. Those storage tanks designed after 2011 are likely designed to meet current building code requirements.

Table 1: Tank Design Use Group

AWWA D100-11 Design Use Group and Seismic Importance Factor		
Use Group	*Importance Factor, I_e	Description
I	1	Tanks that provide service to facilities deemed essential for post-earthquake recovery and essential to the life, health, and safety of the public, including post-earthquake recovery
II	1.25	Tanks that provide service to facilities that are deemed important to the welfare of the public.
III	1.5	All Other

*Importance factor is used to amplify loads from earthquakes.

16 of the existing storage tanks require anchorage to the foundations. Neither the PWD standard tank details nor construction documents indicate that these tanks are anchored. The remaining storage tanks will experience uplift due to seismic loads but do not require anchors at the foundation. The sloshing wave height and required freeboard varies between nine and 16 feet in height. In most cases this exceeds the existing freeboard which is typically three feet from the maximum operating height to the roof structure. Record drawings of the underground concrete storage tank were not available for review however, the tank was designed and build in 1994 and built in accordance with ACI 350, Code Requirements for Reinforced Concrete Structures. Investigations should be conducted to determine what the existing conditions of the structure are and determine if any deficiencies may exist.

Table 2: Anchorage and Freeboard Requirements.

		Tank Details					AWWA D100-11 Welded Carbon Steel Tanks Chapter 13 Seismic Design[1,2]										
								Table 28	13.2.1	Table 24	Eqn 13-36		Eqn 13-52	Table 29		Eqn 13-57		
Tank Site	**Address**	***Date Built***	***Dia***	***Size***	***Top of Knuckle***	***Overflow Height***	***Freeboard Assumed to be 3 feet unless drawings indicate otherwise***	***Ri 3 if anchored 2.5 if unanchored***	***Seismic Use Group*** [3]	***I_E, assume that all tanks are Seismic Use Group III***	**Overturning Ratio, J**	**Anchor Requirements**	**Sloshing Wave Height (d), ft**	**Minimum Required Freeboard (D), ft**	**Actual Freeboard (Roof Height-Overflow)**	**Allowable Lateral Load, V_{allow} (kip)**	**Total Lateral Seismic Load, Vt (Kip)**	**Sliding Check**
3 MG Tank Site	850 East Avenue S	1960	124	3,000,000	Unknown	34	3	2.5	iii	1.5	2.54	Provide Anchors	16.65	16.65	3	12851	7225.517287	OK
5 MG Tank	2404 Old Nadeau Road		160	5,000,000	Unknown	20	3	2.5	iii	1.5	0.57	Tank Is Stable	10.08	10.08	3	12338	3533.246096	OK
6MG	641 East Ave S	1999	206	6,000,000	Unknown	24	3	2.5	iii	1.5	0.64	Tank Is Stable	9.58	9.58	3	24349	6291.49113	OK
25th Street	26496 Cemetery Road	1976	106	2,000,000	Unknown	30	3	2.5	iii	1.5	2.23	Provide Anchors	15.53	15.53	3	8304	4860.105574	OK
		1967	154	4,000,000	Unknown	30	3	2.5	iii	1.5	1.51	Uplift but Stable	14.15	14.15	3	17380	7130.096891	OK
45th Street	36510 45th St East	1988	130	3,000,000	Unknown	30	3	2.5	iii	1.5	1.77	Provide Anchors	14.95	14.95	3	12488	5845.275811	OK
		1990	150	4,000,000	Unknown	32	3	2.5	iii	1.5	1.74	Provide Anchors	14.33	14.33	3	17687	7540.066766	OK
		1990	150	4,000,000	Unknown	32	3	2.5	iii	1.5	1.74	Provide Anchors	14.33	14.33	3	17687	7540.066766	OK
47th Street	35645 47th St East	1967	106	2,000,000	Unknown	30	3	2.5	iii	1.5	2.24	Provide Anchors	15.64	15.64	3	8301	4879.725022	OK
		1990	132	3,000,000	Unknown	30	3	2.5	iii	1.5	1.87	Provide Anchors	16.32	16.32	3	12801	6303.069693	OK
50th Street	5001 East Ave, T-8	2007	150	4,000,000	Unknown	30	3	2.5	iii	1.5	1.55	Provide Anchors	14.22	14.22	3	16514	6902.168294	OK
		2007	150	4,000,000	Unknown		3	2.5	iii	1.5	1.55	Provide Anchors	14.22	14.22	3	16514	6902.168294	OK
Ana Verde	36800 Tovey Avenue	1963	40	300,000	Unknown	32	3	2.5	iii	1.5	5.44	Provide Anchors	9.95	9.95	3	1363	1351.046084	OK
El Camino Lower	36809 El Camino Dr.	1988	106	2,000,000	Unknown	32	3	2.5	iii	1.5	2.42	Provide Anchors	15.24	15.24	3	8916	5163.807319	OK
El Camino U.G[4]	36336 El Camino Road	1994	104	1,500,000	Unknown	26												
El Camino Upper	33030 Ridge Route Rd	1963	40	300,000	Unknown	32	3	2.5	iii	1.5	5.00	Provide Anchors	7.22	7.22	3	1371	1262.693411	OK
Walt Dahlitz	115 East Avenue S	1993	104	1,500,000	Unknown	31	3	2.5	iii	1.5	1.80	Provide Anchors	9.80	9.80	3	8455	3868.50122	OK
Well 14	36401 20th ST East		27	100,000	Unknown	22	3	2.5	iii	1.5	4.80	Provide Anchors	6.24	6.24	3	435	399.685968	OK
Well 18 and 19	4640 Barrel Springs Road	1963	22	41,000	Unknown	30	3	2.5	iii	1.5	11.47	Provide Anchors	8.06	8.06	3	387	488.3004155	Needs Anchors
Well 5	1036 Barrel Spring Road	1963	30	1,463,945	Unknown	22	3	2.5	iii	1.5	5.05	Provide Anchors	9.29	9.29	3	526	561.5710227	Needs Anchors

1. Design spectral response acceleration parameters, S_{D1} and S_{DS}, have been determined using the Applied Technology Council's (ATC) web-based hazard maps in accordance with the American Society of Civil Engineers Standard 7, Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
2. The Design spectrum for impulsive components, Sai and the Design Spectrum for convective components, Sac have been determined in accordance with Chapter 13 of the AWWA D100-11, Welded Carbon Steel Tanks for Water Storage. These parameters are expressed as a percentage of the acceleration due to gravity, g.
3. Minimum required freeboard is equal to the sloshing wave height for Use Group III and may be reduced for Use Group I and II
4. AWWA D100 calculations do not apply to the El Camino Underground tank. Construction drawings are not available to perform an analysis currently.

To determine if the storage tank walls and roof systems are adequate to resist potential seismic loads, field visits will be required to determine the existing plate thicknesses and structural sections used in construction. Further analysis will then be performed determine the capacity of the storage tank structural system. For those storage tanks that required anchors, greater freeboard, or do not have the structural capacity to meet demand we recommend reducing the operating capacity and overflow height to reduce the seismic demands on the structures. Water storage tanks designed in accordance with AWWA D100 and D103 can be classified in one of three seismic use groups as described in Table 1. The initial analysis has been conducted assuming all of the storage tanks are in Use Group III, essential for post-earthquake recovery and essential to the life, health, and safety of the public, including post-earthquake fire suppression. For those facilities that are not required for post-earthquake recovery, the use group may be designated as Use Group II, tanks that provide direct service to facilities that are teemed important to the welfare of the public. In rare cases they may be assigned to Use Group I, those that are not essential to the health and safety of the public. This will reduce the design seismic load by twenty-five percent and fifty percent.

Field investigation are necessary to determine the structural capacity of the existing storage tanks. Thickness of the tank shells and roofs will be determined using an ultrasonic thickness gauge, the size number and location of columns will be determined. In our experience the most common mode of failure for steel storage tanks is buckling of the lowest shell plate. Due do relatively significant consequences in the event of failure, we recommend that the steel tanks be given high priority for further investigation and mitigation efforts.

1.3 Source Water Supply

The District's source water consists of the Palmdale Lake, Little Rock Reservoir and more than 20 well sites. The Little Rock Lake Reservoir under the jurisdiction of the California Division of Safety of Dams. The Division of Safety of Dams inspects the Little Rock Reservoir Dam on an annual basis and periodically reviews the stability of dams considering improved design approaches. The Little Rock Dam represents minimal risk to the District due to the inspection and review by the Division of Damn Safety. The Little Rock Dam Recreation Areas include several small buildings and structures. These structures pose negligible risk to the public in the event of an earthquake. The facilities at the Little Rock Reservoir and Palmdale Lake are summarized in Table 3 below.

There are several facilities at Palmdale lake including a concrete box culvert, concrete spillway, and drainage channel. These structures consist of relatively minor reinforced concrete at or below grade. The primary risk to these structures is the potential for liquefiable soils in the area. In the event of failure, they pose a relatively minor risk to the public, however geotechnical investigations should eventually be conducted to determine susceptibility to earthquake damage.

The typical well site consists of vertical turbine pumps embedded directly into the soil and represent minimal risk of failure during or after an earthquake. Many of the well sites are co-located with booster pumpstations and tank sites. Site visits by a qualified civil or structural engineer should be conducted to verify the existing conditions at each site. Above ground piping is generally rigid and represents minimal risk of failure during an earthquake. It is typical for the piping systems at older well sites to lack support for lateral loads due to earthquakes. The inspections should take note of any pipe supports that are not anchored into concrete foundation. Where available, record drawings typically indicate that chemical storage tanks, generators and other equipment is anchored to foundations. The current building code requires anchors for steel storage tanks for liquids to fail in a ductile manner. It is unlikely that the anchorage for the existing facilities meet this requirement. The installations of older facilities are unlikely to follow current standard practices. The well sites are summarized in Table 4. Below. Facilities have been assigned a relative risk between one and 10. This assessment is subjective and intended to assist the district in prioritizing further investigation and mitigation. The factors increasing relative risk include the age of structures, lack of necessary record drawings, noted deficiencies.

Table 3: Miscellaneous Facilities

Site	Address	Facilities				
		Date Built	*Generator*	*Structural Record Drawings*	*Structures*	*Noted Risk/Deficiences*
Little Rock Canal	Mulitple	1995	No	1995	Cast-in-Place Concrete Canal	None Noted, subgrade reinforced concrete walls designed and built in 1995.
Little Rock Dam and Reservoir	33883 Cheseboro Road	1992	No	1992	Concrete buttressed earthwork Dam Reinforced Concrete Vault	Under the jurisdiction of the Bureau of Dam Safety, yearly inspection, and periodic review for structural soundness.
Little Rock Dam Recreation Area 1	Adjacent to Little Rock Reservoir	1997	No	1997	Walk-in campsite toilets, wood framed roof over CMU and Gazebo	None Noted.
Little Rock Dam Recreation Area 2	Adjacent to Little Rock Reservoir	1996	No	1996	N/A	None Noted
Little Rock Dam Recreation Area 3	Adjacent to Little Rock Reservoir	1994	No	1994	Cantilever column shelter structures	None noted
Little Rock Dam Recreation Area 4	Adjacent to Little Rock Reservoir	1994	No	1994	None	None Noted
Little Rock Dam Recreation Area 5	Adjacent to Little Rock Reservoir	1994	No	1994	Walk-in campsite toilets, wood framed roof over CMU	None Noted
Little Rock Dam Recreation Area 6	Adjacent to Little Rock Reservoir	1994	No	1994		None Noted
Little Rock Sluice Gate and Siphon	Adjacent to Little Rock Reservoir	Modifications 1998	No	1998	Cast-in-place concrete siphon structure	None Noted
Palmdale Lake Box Culvert	South East of Palmdale Lake	1992	No	1992	Cast-in-place box culvert	None Noted
Palmdale Lake Spillway	North shore of Palmdale Lake	1988	No	1988	Cast-in-place Concrete spillway	Subgrade should be investigated by a Geotechnical Engineer for potential erosion or liquefiable soils.
Palmdale Lake Drainage Channel	Adjacent to Palmdale Lake	1992	No	1992	Concrete lined channel	None noted

Table 4: Well Site Summary

Well Site	Address	Facilities										
		Date Built	*Building*	*Fuel Storage*	*Chemical Storage*	*Pump HP*	*Capacity (GPM)*	*Structural Record Drawings*	*Roof Type*	*Lateral System*	*Noted Risk/Deficiences*	**Relative Risk [1]**
2A	39400 20th St East	1968	Yes		NaOCl	125	265	1968	Steel deck over steel and wood framing	Solid grouted CMU and wood studs	Potential irregularity due to the mixed resisting System	4
3A	2163 East Ave P-8	1960	Yes	Propane	Salt	500	1,551	1992		Solid Grouted CMU with wood studs	Potential irregularity due to the mixed resisting System	3
4A	2475 East Ave P-8	1970	Yes		Salt/ NaOCl	200	778	Not Available				3
5	1036 Barrel Springs Rd	1965	yes			5	99	Not Available	Steel Deck over steel framing	Steel Braced Frame Steel Moment Frame	Rod Bracing is prone to buckling. Columns are pinned with (2) at shallow embedment	8
6A	39455 10th St East	1983	Yes		NaOCl	125	265	Not Available		Steel moment Frame	Drawings were inadequate to determine specific risks	8
7A	39395 25th St East	1985	Yes		Salt/ NaOCl	500	1,589	Not Available	Steel Deck over steel framing	Pre-engineered metal building	Inspection is required to determine specific vulnerabilities.	8
8A	2200 East Ave P	1987	Yes		NaOCl	600	2,024	Not Available			Drawings were inadequate to determine specific risks	8
10	3701 East Ave P-8	1956	Yes		NaOCl	100	254	1956	Steel Frame	Steel Framed	Drawings were inadequate to determine specific risks. The building is 65 years	8
11A	39501 15th St East	1963	Yes				1,161	1999	Wood deck over 2x wood framing	Wood stud shear wall	None	3
14 [2]	39401 20th St East	1965	Yes		Salt	250	1,188				None Noted	3
15	1003 East Ave P	1960	Yes		Salt/ NaOCl	590	998	1999	Wood deck over wood framing	Wood stud shear walls	None Noted	1
16	4125 East Ave S-4	1960	Yes		NaOCl	40	150	Not Available			Drawings were inadequate to determine specific risks	7
17	718 Denise Ave	1966	Yes			20	110	1996	Wood deck over wood framing	Wood stud shear walls	Thin floor slab may provide inadequate anchorage	3
18 and 19 [2]	4640 Barrel Springs Rd	1954	Yes		NaOCl	5	96					4
		1961					127					
20	5680 Pearl Blossom Hwy	1973			NaOCl	60	227	2001	Wood deck over wood framing	Wood stud shear walls	Thin floor slab may provide inadequate anchorage	3
21	36525 52 St East	1973			NaOCl	30	227	1999	Wood deck over wood framing	Wood stud shear walls	Thin floor slab may provide inadequate anchorage	1
22	5401 East Ave S	1974			None	75	347	1999	Wood deck over wood framing	Wood stud shear walls	Thin floor slab may provide inadequate anchorage	1
23A	2202 East Ave P-3	1977	Yes		NaOCl	250	743	1999	Wood deck over wood framing	Wood stud shear walls	Thin floor slab may provide inadequate anchorage	1
25	3750 70th St East	1989	Yes		Salt/ NaOCl	125	514	1992	Wood deck over wood framing	Solid CMU	Thin floor slab may provide inadequate anchorage	2
26	4701 Katrina Place	1989	Yes			50	304	1992	Wood deck over wood framing	Wood stud shear walls	Thin floor slab may provide inadequate anchorage	2
29	37700 67th st East	1989	Yes		NaOCl	40	250	1989			Drawings were inadequate to determine specific risks	
30	7392 East Ave R	1989	Yes		Salt/NaOCl	150	498	1990	Wood deck over wood framing	Solid CMU	Thin floor slab may provide inadequate anchorage	3
32	37301 35th St East	1989	Yes		NaOCl	60	293	1992	Wood deck over wood framing	Wood stud shear walls	Thin floor slab may provide inadequate anchorage	2
33	7160 East Ave R	1991	Yes		Salt/ NaOCl	75	418		Wood deck over wood framing	Solid CMU	Thin floor slab may provide inadequate anchorage	2
35	36549 60th St East	1991	Yes		Salt/ NaOCl	75	444		Wood deck over wood framing	Solid CMU	Thin floor slab may provide inadequate anchorage	2

1. Relative risk is a subjective measure based on risk to life and post-earthquake operation intended to assist in the District to prioritize further investigation
2. See Table 5 for building structures.

1.4 Booster Pump Stations

Pump stations consist of above grade or below grade structures with multiple pumps wet wells, and additional equipment. Like steel water storage tanks older facilities are less likely to be designed for lateral loads equivalent to modern building standards. Those designed and built later than 2000 are unlikely to pose a substantial risk in the event of an earthquake. Site visits should verify that the existing equipment is anchored to the foundations and walls, and that there is an adequate load path to transfer lateral loads from the roof and walls to the foundations. The booster pump station facilities are summarized in Table 4 below.

1.5 Well and Booster Pump Buildings

Where record drawings are available, they indicate that most of the buildings are relatively small one-story structures. The structural systems include reinforced concrete masonry unit shear walls, wood stud shear walls, and steel framed walls. The roof structures are wood or metal diaphragms over steel or wood framing. The 3 MG Tanks and 5 MG Tank pump stations includes two buildings with a mixed structural system. This may introduce irregularities in performance due lateral earthquake loads. Many buildings have relatively thin slabs. While this is common in earlier designs, the current building code typically requires greater depth of embedment for equipment anchors. The building structure at Well Site 10 appears to be a steel tube framed structure of a type that would no longer be permitted by the building code. The available documentation was not sufficient to fully analyze the system.

1.6 Mitigation Planning

The District should identify which facilities are required to operate immediately following an earthquake, are required for the health and safety of the public, and those that are not either. The highest priority should be given to those facilities that supply fire suppression systems, including water storage tanks and transmission system. The first step in mitigating the risks identified in this report will be to arrange for a civil or structural engineer experienced in design of water treatment and distribution systems to inspect the Districts facilities. Once the District and Kennedy Jenks has identified the most critical and at-risk facilities, the District should consult with a geotechnical engineering firm to perform site investigations of the most crucial facilities to allow a qualified engineer to perform a more accurate and detailed analysis and provide the most appropriate mitigation efforts.

For those storage tanks that require anchorage and or have insufficient freeboard height to accommodate wave action the district may take immediate action to reduce the risk. As shown in Table 2, the District may choose to reduce the operational capacity to prevent instability, increase freeboard, and reduce the sloshing wave height. The District may determine that some of the storage tanks are not required for immediate post-earthquake recovery and do not pose a substantial risk to human life. In those cases, the Seismic Use Group will be reduced to reduce the required freeboard and demands due to seismic loads. This may result in no further

action being required. Kennedy Jenks recommends providing anchors for all steel water storage tanks.

Table 5: Booster Pump Station Summary

Booster Pump Station Site	Address	Facilities							Structural Record Drawings	Roof Type	Lateral System	Noted Risk/Deficiences	Relative Risk [1]
		Date Built	*Building*	*Fuel Storage*	*Chemical Storage*	*Pump HP*	*Capacity (GPM)*	*Generator*					
3 MG Tanks	850 East Ave	1965	(2) CMU (1) Wood Framed		NaOCl	(6) 50 (1) 150	(7) 3500	Yes	1965	(2) Steel deck over steel and wood framing (1) Alumin Sheet over Wood	(2) Partially Grouted CMU (1) Aluminun and Wood Shear Wall	1. The building is lightly reinforced and partially grouted, it may not be up to current building standards 2. The building slab is 4", equipment is unlikely to have adequate anchorage	4
5 MG Tank	2404 Old Nadeua RD	1960	Yes	Propane	NaOCl	40	_	No	1992		Solid Grouted CMU with wood studs	Potential irregularity do the the mixed resisting System	4
6 MG Tank	700 East Avenue S	1999	Yes		Salt/ NaOCl	(1) 100 (1) 150 (2) 200 (2) 250 (2) 250	(1) 2000 (1) 2800 (2) 7000 (3) 3500	No	1999	(1) Open web steel joists (1) Steel deck over steel framing (1) Subgrade concrete structure for the hydropnuematic tank	Solid Grouted CMU	Relatively Thin Slab may result in inadequate anchorage for some equipment. Single story solid grouted CMU structures are very resistant to earthquake damage.	3
25th Street	26946 Cemetary Rd	1987/ 1996/ 2001	yes		Salt/ NaOCl	50 100	99	315 Kw	Not Available	Wood deck over 2x wood framing	Wood stud shearwall	Wood Stud buildings tend to be resiliant to earthquakes provided adeqate attachments are present. The 3 1/2" may result in inadequate anchorage for equipment. Structural drawings from the orignal construction are not availabe for review.	3
45th Street	36510 45th St E		Yes		NaOCl	(3) 150 (3) 125	(3) 3500 (3) 3500	NO	1998 2004 2001	(1) Wood Deck over Wood Framing (2) Steel deck over steel framing	(1) Wood stud shear wall (2) Solid grouted CMU	Both wood stud and Solid Grouted CMU shear wall structures are resistent to earthquake loads. All three buildings appear to have complete load paths. The generator buildng floor slab is only 4" thick and may not provide adequate anchorage to any floor mounted equipment.	8
Avenue T-8	4250 E. Ave. T-8	1995	Yes		Salt/NaOCl	(2) 15 (1) 50	(3) 3250	No	Addition 1998	Wood deck over 2x wood framing	Wood stud shearwall	Construction drawings for the original building are not available for review, wood framed structures are generally resistent to earthquake.	8
El Camino Lower	36336 El Camino Dr	2000	Yes		NaOCl	(1) 40 (1) 75	Not recorded on Drawings	No	2000	Wood deck over wood framing	Solid grouted CMU	Wood diaphrams with solid grouted CMU wall are generally resistent to earthquakes loads.	8
El Camino Under Ground					NaOCl								8
Well 14	36401 20th St E	1997	Yes		Salt	250	1,188		1997	Wood deck over 2x wood framing	Solid grouted CMU and wood stud shear walls	Potential irregularity do the the mixed resisting System. Construction drawings from the original building were not avaible for review.	8
Well 5	39401 20th St East	1663	Yes		Salt	250	1,188		Not avaiable				3
Alta Valley Well 18 and 19	4640 Barrel Springs Road	1976 1997	Yes		NaOCl	5	96 127		1976 1997	Wood deck over wood framing	Wood stud shearwall	Relatively thin slab may result in inadequate anchorage for some equipment. Single story solid grouted CMU structures are very resistant to earthquake damage.	3
3600 ft boosters	601 Lakeview Dr	1966	Yes			20	110		Not availalable			Record drawings were not avaible for the existing building, field investigations are required.	1
3900 boosters	36200 El Camino Dr	1954	Yes		NaOCl	5	96						7
		1961					127						3
Hilltop	35609 Cheseboro Rd	Multiple	Yes		NaOCl	60	227		Not Available			Record drawings are not aviable, howerver the small size of the buidlng represents minimal risk.	2

Appendix A: Detailed Calculations

Tank Site	Address	Coordinates: Latitude	Longitude	Tank Details: Tank Type	Piping Connection	Footing	Anchorage	Date Built		Dia	Size	Bottom of the Knuckle	Top of Knuckle	Overflow Height
3 MG Tank Site	850 East Avenue S	34.56	-118.11	Welded				1960		124	3,000,000		Unknown	34
5 MG Tank	2404 Old Nadeau Road	34.53	-118.08							160	5,000,000		Unknown	20
6MG	641 East Ave S	34.56	-118.15					1999		206	6,000,000		Unknown	24
25th Street	26496 Cemetary Road	34.55	-118.09					1976		106	2,000,000		Unknown	30
				Welded	Not Flexible	Ringwall with Sand Interior		1967		154	4,000,000		Unknown	30
45th Street	36510 45th St East	34.54	-118.05					1988		130	3,000,000		Unknown	30
								1990		150	4,000,000		Unknown	32
								1990		150	4,000,000		Unknown	32
47th Street	35645 47th St East	34.53	-118.05					1967		106	2,000,000		Unknown	30
								1990		132	3,000,000		Unknown	30
50th Street	5001 East Ave, T-8	34.54	-118.04					2007		150	4,000,000		Unknown	30
				Welded?	?	Concrete Ring Wall	None Shown	2007		150	4,000,000		Unknown	
Ana Verde	36800 Tovey Aveneu	34.55	-118.15	Welded	Not Flexible	Concrete Rink wall	Not Shown	1963		40	300,000		Unknown	32
El Camino Lower	36809 El Camino Dr.	34.55	-118.13					1988		106	2,000,000		Unknown	32
El Camino U.G[4]	36336 El Camino Road							1994		104	1,500,000		Unknown	26
El Camino Upper	33030 Ridge Route Rd	34.54	-118.13	Welded	Flexible	Ringwall with Sand Inte	None Shown	1963		40	300,000		Unknown	32
Walt Dahlitz	115 East Avenue S			Welded	Flexible	Concrete Ringwall, oil s	None Shown	1993		104	1,500,000		Unknown	31
Well 14	36401 20th ST East			Weled?	Not Flexible	Concrete Ringwall, grav	3/4" 5' OC 8" embed			27	100,000		Unknown	22
Well 18 and 19	4640 Barrel Springs Road							1963		22	41,000		Unknown	30
Well 5	1036 Barrel Spring Road							1963		30	1,463,945		Unknown	22

AWWA D100-11 Welded Carbon Steel Tanks Chapter 13 Seismic Design

Tank Site	Freeboard Assumed to be 3 feet unless drawings indicate otherwise	Table 28: Ri 3 if anchored 2.5 if unanchored	13.2.1: Seismic Use Group	Table 24: I_E, assume that all tanks are Seismic Use Group III	ATC[1]: Sd1, per ATC Seismic Hazard Maps	Eqn 13-9[1,2]: Sai, g Based on Sds from ASCE 7-10	Eqn 13-22: Sloshing Period, Tc(Ss	Eqn 13-12/13[2]: Sac, g Based on Sd1 from ASCE 7-10	D/H	3.67*D/H	Volume ft^3 Vol = π*(Dia^2)/4	13-27: Total Weight, lbf W = Vol*62.4pcf	13-25/26: Impulsive Weight, Moves with Tank, (Wi)	Eqn 13-28/29: Centroid of the lateral Force due to Sloshing (Xi), ft	Estimate: Weight of the Roof (Wr), lbf	Estimate: Weight of the Shell (Ws), lbf	Estimate: Weight of the Floor (Wf), lbf
3 MG Tank Site	3	2.5	iii	1.5	1.315	1.805	7.35	0.27	3.647	1.006	410594	25621040	8082906	13	92459	138480	92459
5 MG Tank	3	2.5	iii	1.5	1.302	1.764	11.13	0.13	8.000	0.459	402124	25092529	3621894	8	153938	104550	153938
6MG	3	2.5	iii	1.5	1.316	1.804	13.03	0.09	8.583	0.428	799900	49913745	6714999	9	255176	160865	255176
25th Street	3	2.5	iii	1.5	1.316	1.804	6.74	0.29	3.533	1.039	264742	16519902	5375203	11	67564	104870	67564
	3	2.5	iii	1.5	1.278	1.779	9.13	0.18	5.133	0.715	558795	34868813	7841520	11	142609	151052	142609
45th Street	3	2.5	iii	1.5	1.214	1.723	7.92	0.23	4.333	0.847	398197	24847485	6614006	11	101623	127961	101623
	3	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369	8687384	12	135297	157017	135297
	3	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369	8687384	12	135297	157017	135297
47th Street	3	2.5	iii	1.5	1.325	1.81	6.74	0.30	3.533	1.039	264742	16519902	5375203	11	67564	104870	67564
	3	2.5	iii	1.5	1.325	1.81	8.02	0.25	4.400	0.834	410543	25617904	6716566	11	104774	129885	104774
50th Street	3	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971	7637298	11	135297	147203	135297
	3	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971	7637298	11	135297	147203	135297
Ana Verde	3	2.5	iii	1.5	1.214	1.639	3.66	0.50	1.250	2.936	40212	2509253	1825481	12	9621	44129	9621
El Camino Lower	3	2.5	iii	1.5	1.27	1.714	6.63	0.29	3.313	1.108	282391	17621228	6103267	12	67564	111862	67564
El Camino U.G[4]																	
El Camino Upper	3	2.5	iii	1.5	0.881	1.543	3.66	0.36	1.250	2.936	40212	2509253	1825481	12	9621	44129	9621
Walt Dahlitz	3	2.5	iii	1.5	0.827	1.442	6.58	0.19	3.355	1.094	263341	16432470	5622265	12	65039	106378	65039
Well 14	3	2.5	iii	1.5	0.927	1.514	3.01	0.46	1.227	2.990	12596	786004	575712	8	4384	21166	4384
Well 18 and 19	3	2.5	iii	1.5	1.323	1.8	2.71	0.73	0.733	5.005	11404	711608	597846	13	2910	24053	2910
Well 5	3	2.5	iii	1.5	1.311	1.782	3.18	0.62	1.364	2.691	15551	970375	680168	8	5412	23283	5412

Tank Site	Eqn 13-16: Implusive Design Acceleration (Ai)	Impulsive Lateral Force (Vi), kip	Eqn 13-24/25: Overturning Moment due to Impulsive Lateral Force(Mi), ft-kip	Convective Weight (Wc), lbf	Eqn 13-30: Centroid of the lateral force do to convective mass (Xc), ft	Convective Design Acceleration (Ai)	Convective Lateral Force (Vc), kip	Eqn 13-26: Overturning Moment due to Convective Lateral Force(Mc), ft-kip	Eqn 13-31: Design Lateral Force at the top of the foundation (Vf), kip	Eqn 13-23: Design Overturning Moment (Ms), ft-kip Ms = $\sqrt{Mi^2+Mc^2}$	Eqn 13-37: Maximum Resting Weight of the Tank Contents (wL), lbf/ft		Eqn 13-41: Weight of the Tank Shell and Roof Resisting Overturning (wt), lbf/ft	Eqn 13-36: Overturning Ratio, J	Anchor Requirements	Eqn 13-53/54: Convective Design Accelaration, Af			Eqn 13-52: Sloshing Wave Height (d), ft	Table 29: Minimum Required Freeboard (D), ft	Actual Freeboard (Roof Height-Overflow)	Eqn 13-57: Allowable Lateral Load, V_{allow} (kip)	Total Lateral Seismic Load, Vt (Kip)	Sliding Check
3 MG Tank Site	0.774	6503	82912	16424329	18	0.192	3150	57649	7226	100984	2185	5396	474	2.54	Provide Anchors	0.27	0.29	0.27	16.65	16.65	3	12851	7225.51729	OK
5 MG Tank	0.756	3050	22875	19810034	10	0.090	1784	18144	3533	29197	1676	4096	361	0.57	Tank Is Stable	0.18	0.13	0.13	10.08	10.08	3	12338	3533.2461	OK
6MG	0.773	5711	51395	39739497	12	0.066	2640	32159	6291	60628	1836	6328	446	0.64	Tank Is Stable	0.15	0.09	0.09	9.58	9.58	3	24349	6291.49113	OK
25th Street	0.773	4341	48840	10436273	16	0.209	2185	35431	4860	60339	2052	4070	416	2.23	Provide Anchors	0.29	0.35	0.29	15.53	15.53	3	8304	4860.10557	OK
	0.762	6311	71001	25267634	16	0.131	3318	51781	7130	87878	2052	5914	460	1.51	Uplift but Stable	0.21	0.18	0.18	14.15	14.15	3	17380	7130.09689	OK
45th Street	0.738	5129	57696	17074207	16	0.164	2805	44414	5845	72811	2052	4992	438	1.77	Provide Anchors	0.23	0.23	0.23	14.95	14.95	3	12488	5845.27581	OK
	0.738	6731	80769	24894926	17	0.137	3398	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
	0.738	6731	80769	24894926	17	0.137	3398	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
47th Street	0.776	4356	49003	10436273	16	0.211	2200	35674	4880	60613	2052	4070	416	2.24	Provide Anchors	0.30	0.35	0.30	15.64	15.64	3	8301	4879.72502	OK
	0.776	5473	61576	17698347	16	0.177	3126	49427	6303	78960	2052	5069	440	1.87	Provide Anchors	0.25	0.25	0.25	16.32	16.32	3	12801	6303.06969	OK
50th Street	0.758	6103	68664	23796213	16	0.135	3223	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
	0.758	6103	68664	23796213	16	0.135	3223	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
Ana Verde	0.702	1327	16240	717357	22	0.355	255	5658	1351	17197	2120	1638	389	5.44	Provide Anchors	0.50	1.09	0.50	9.95	9.95	3	1363	1351.04608	OK
El Camino Lower	0.735	4665	55977	10784811	17	0.205	2215	38666	5164	68033	2120	4342	437	2.42	Provide Anchors	0.29	0.35	0.29	15.24	15.24	3	8916	5163.80732	OK
El Camino U.G[4]																								
El Camino Upper	0.661	1249	15289	717357	22	0.258	185	4106	1263	15830	2120	1638	389	5.00	Provide Anchors	0.36	0.79	0.36	7.22	7.22	3	1371	1262.69341	OK
Walt Dahlitz	0.618	3621	42091	10122208	17	0.135	1362	22997	3869	47963	2086	4127	425	1.80	Provide Anchors	0.19	0.23	0.19	9.80	9.80	3	8455	3868.50122	OK
Well 14	0.649	393	3325	220749	15	0.330	73	1119	400	3509	1758	760	275	4.80	Provide Anchors	0.46	1.23	0.46	6.24	6.24	3	435	399.685968	OK
Well 18 and 19	0.771	484	6262	120014	24	0.524	63	1513	488	6442	2052	845	369	11.47	Provide Anchors	0.73	2.17	0.73	8.06	8.06	3	387	488.300415	Needs Anchors
Well 5	0.764	546	4500	301560	15	0.442	133	1982	562	4918	1758	845	276	5.05	Provide Anchors	0.62	1.56	0.62	9.29	9.29	3	526	561.571023	Needs Anchors

1. Design spectral response acceleration parameters, S_{D1} and S_{DS}, have been determined using the Applied Technology Council's (ATC) web based hazard maps in accordance with the American Society of Civil Engineers Standard 7, Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)

2. The Design spectrum for impulsive components, Sai and the Design Spectrum for convective components, Sac have been determined in accordance with Chapter 13 of the AWWA D100-11, Welded Carbon Steel Tnaks for Water Storage. These parameters are expressed as a percentage of the accelration due to gravity, g.

3. Facility list indicates that these facilities conatain 0 gallons and does not provide the overflow height, therefore we were not apple to determine the seismic demands on these structures.
4. AWWA D100 calculations do not apply to the El Camino Underground tank. Construction drawings are not available to perform an analysis at this time.
4. Minimum required freeboard is equal to the sloshing wave height for Use Group III and may be reduced for Use Group I and II

Hazards by Location

Search Information

Coordinates: 34.557353817153206, -118.11224470422972

Elevation: 2750 ft

Timestamp: 2021-04-09T16:22:17.704Z

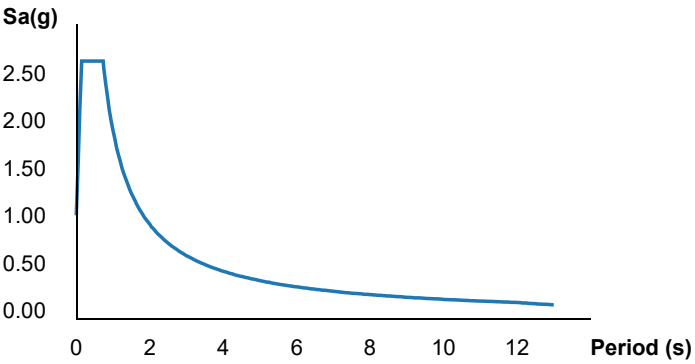
Hazard Type: Seismic

Reference Document: ASCE7-10

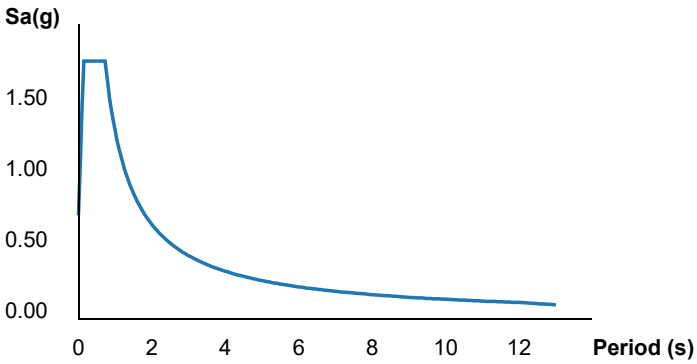
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.707	MCE_R ground motion (period=0.2s)
S_1	1.315	MCE_R ground motion (period=1.0s)
S_{MS}	2.707	Site-modified spectral acceleration value
S_{M1}	1.973	Site-modified spectral acceleration value
S_{DS}	1.805	Numeric seismic design value at 0.2s SA
S_{D1}	1.315	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.045	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.045	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.418	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.719	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.707	Factored deterministic acceleration value (0.2s)
S1RT	1.605	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.778	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.315	Factored deterministic acceleration value (1.0s)
PGAd	1.045	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53471326457233, -118.08343773439331

Elevation: 2968 ft

Timestamp: 2021-04-09T16:35:02.162Z

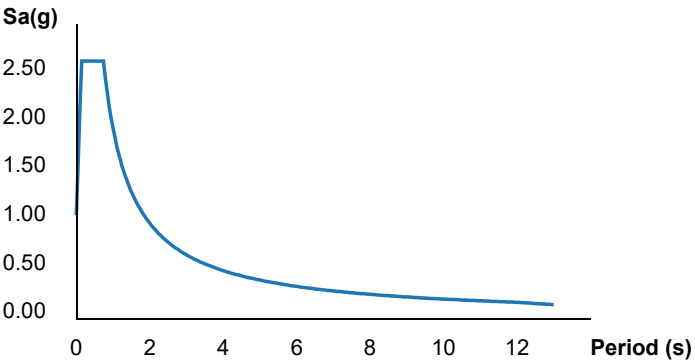
Hazard Type: Seismic

Reference Document: ASCE7-10

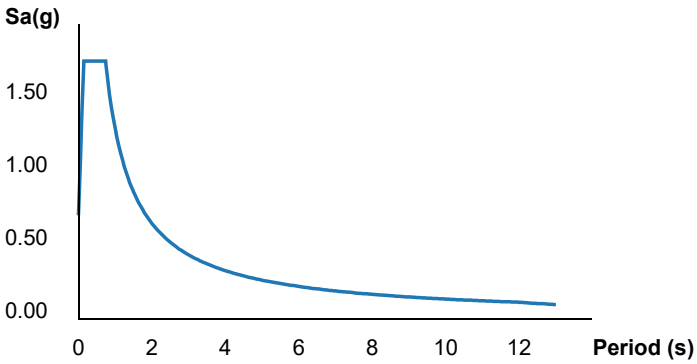
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.646	MCE_R ground motion (period=0.2s)
S_1	1.302	MCE_R ground motion (period=1.0s)
S_{MS}	2.646	Site-modified spectral acceleration value
S_{M1}	1.953	Site-modified spectral acceleration value
S_{DS}	1.764	Numeric seismic design value at 0.2s SA
S_{D1}	1.302	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.018	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.018	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.282	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.552	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.646	Factored deterministic acceleration value (0.2s)
S1RT	1.53	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.694	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.302	Factored deterministic acceleration value (1.0s)
PGAd	1.018	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.5497, -118.132821

Elevation: 2923 ft

Timestamp: 2021-04-08T21:00:34.329Z

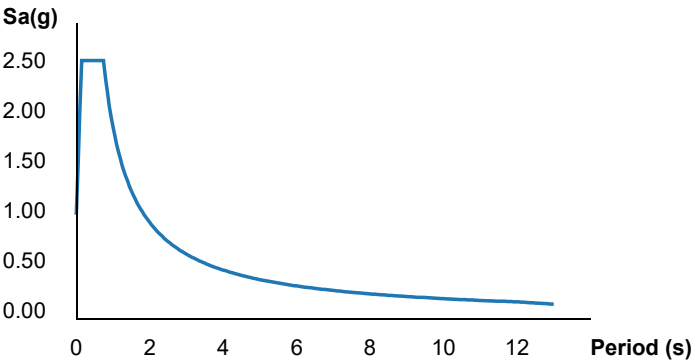
Hazard Type: Seismic

Reference Document: ASCE7-10

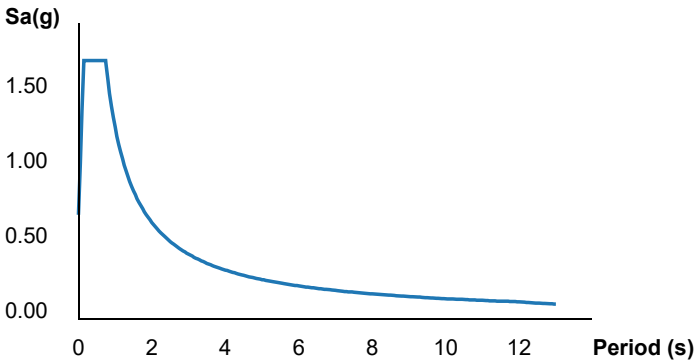
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.573	MCE_R ground motion (period=0.2s)
S_1	1.271	MCE_R ground motion (period=1.0s)
S_{MS}	2.573	Site-modified spectral acceleration value
S_{M1}	1.906	Site-modified spectral acceleration value
S_{DS}	1.715	Numeric seismic design value at 0.2s SA
S_{D1}	1.271	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.987	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.987	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.429	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.743	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.573	Factored deterministic acceleration value (0.2s)
S1RT	1.614	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.785	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.271	Factored deterministic acceleration value (1.0s)
PGAd	0.987	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.559419345037064, -118.11618400870667

Elevation: 2750 ft

Timestamp: 2021-04-09T16:36:57.402Z

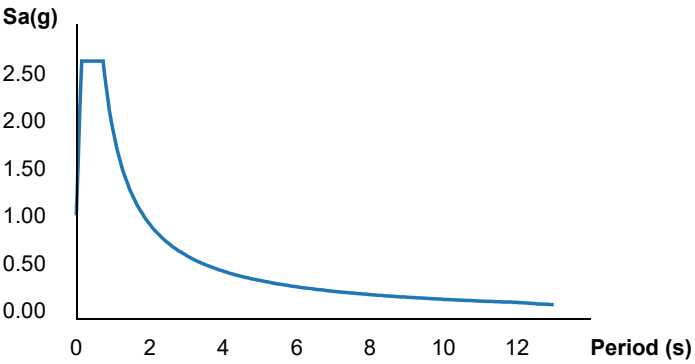
Hazard Type: Seismic

Reference Document: ASCE7-10

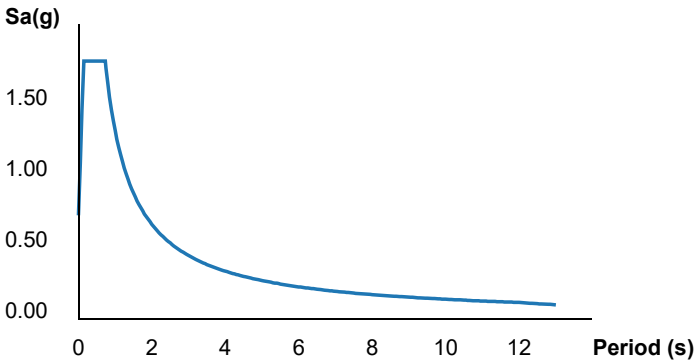
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.706	MCE_R ground motion (period=0.2s)
S_1	1.316	MCE_R ground motion (period=1.0s)
S_{MS}	2.706	Site-modified spectral acceleration value
S_{M1}	1.975	Site-modified spectral acceleration value
S_{DS}	1.804	Numeric seismic design value at 0.2s SA
S_{D1}	1.316	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.046	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.046	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.37	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.665	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.706	Factored deterministic acceleration value (0.2s)
S1RT	1.58	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.749	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.316	Factored deterministic acceleration value (1.0s)
PGAd	1.046	Factored deterministic acceleration value (PGA)

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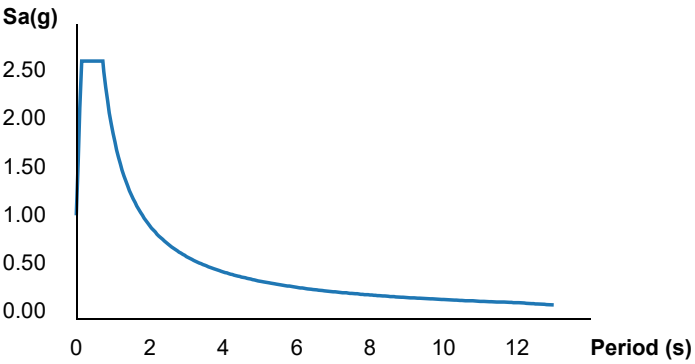
Hazards by Location

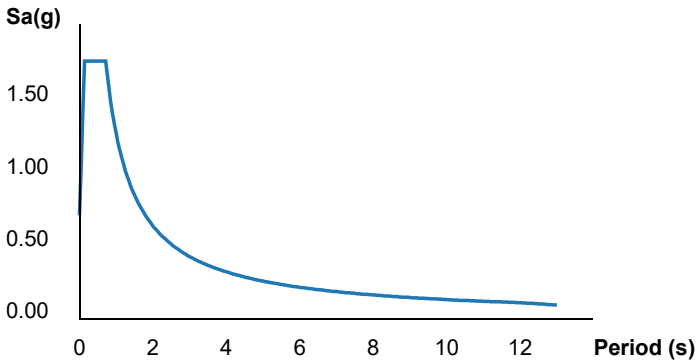
Search Information

Coordinates:	34.55371, -118.087856
Elevation:	2752 ft
Timestamp:	2021-04-09T16:19:01.173Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.668	MCE_R ground motion (period=0.2s)
S_1	1.278	MCE_R ground motion (period=1.0s)
S_{MS}	2.668	Site-modified spectral acceleration value
S_{M1}	1.917	Site-modified spectral acceleration value
S_{DS}	1.779	Numeric seismic design value at 0.2s SA
S_{D1}	1.278	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.902	Coefficient of risk (1.0s)

PGA	1.031	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.031	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.432	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.737	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.668	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.788	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.278	Factored deterministic acceleration value (1.0s)
PGAd	1.031	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.55371, -118.087856

Elevation: 2752 ft

Timestamp: 2021-04-09T16:17:53.781Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: IV

Site Class: D-default

Map data ©2021 Imagery ©2021 , CNES / Airbus, Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency

Basic Parameters

Name	Value	Description
S_S	2.404	MCE_R ground motion (period=0.2s)
S_1	1.025	MCE_R ground motion (period=1.0s)
S_{MS}	2.885	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.923	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.874	Coefficient of risk (0.2s)
CR_1	0.869	Coefficient of risk (1.0s)
PGA	1.033	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.24	Site modified peak ground acceleration

T_L	12	Long-period transition period (s)
SsRT	3.008	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.441	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.404	Factored deterministic acceleration value (0.2s)
S1RT	1.294	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.489	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.025	Factored deterministic acceleration value (1.0s)
PGAd	1.033	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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Hazards by Location

Search Information

Coordinates: 34.544961034712664, -118.04877924893493

Elevation: 2740 ft

Timestamp: 2021-04-09T16:27:34.922Z

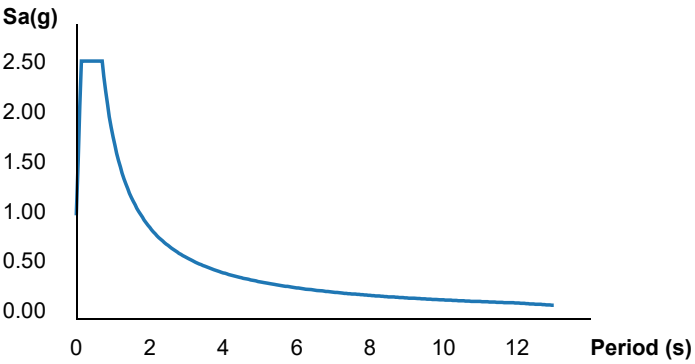
Hazard Type: Seismic

Reference Document: ASCE7-10

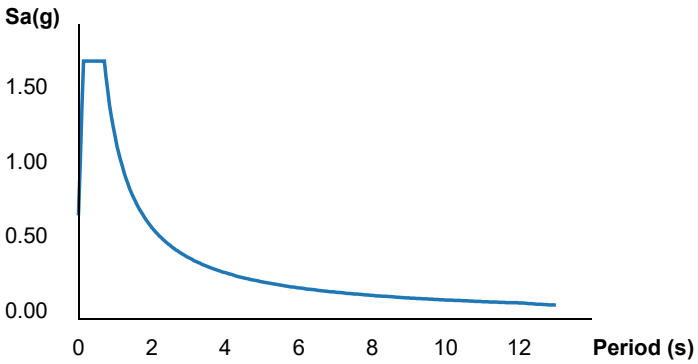
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.584	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.584	Site-modified spectral acceleration value
S_{M1}	1.821	Site-modified spectral acceleration value
S_{DS}	1.723	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.921	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	0.996	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.996	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.159	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.432	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.584	Factored deterministic acceleration value (0.2s)
S1RT	1.47	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.624	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.996	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.52903336279662, -118.04584351481934

Elevation: 2971 ft

Timestamp: 2021-04-09T16:31:06.633Z

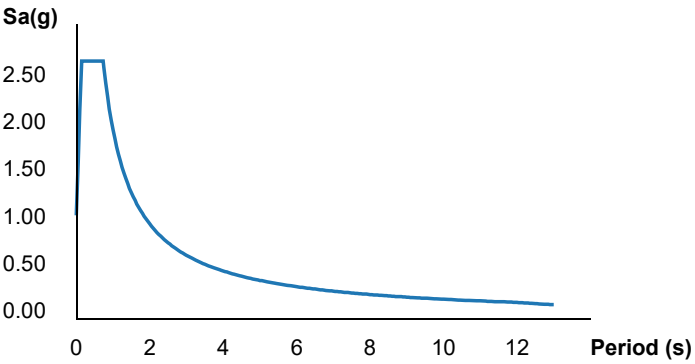
Hazard Type: Seismic

Reference Document: ASCE7-10

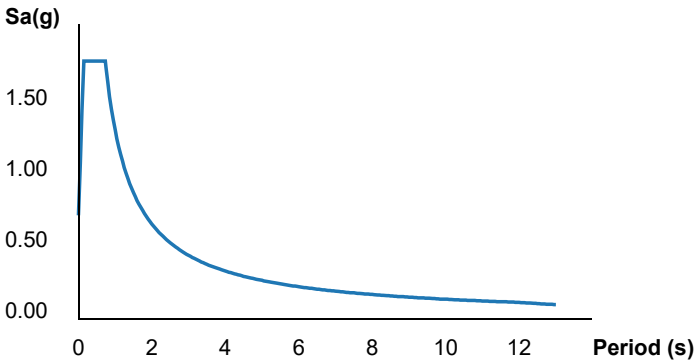
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.714	MCE_R ground motion (period=0.2s)
S_1	1.325	MCE_R ground motion (period=1.0s)
S_{MS}	2.714	Site-modified spectral acceleration value
S_{M1}	1.987	Site-modified spectral acceleration value
S_{DS}	1.81	Numeric seismic design value at 0.2s SA
S_{D1}	1.325	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.048	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.048	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.142	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.404	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.714	Factored deterministic acceleration value (0.2s)
S1RT	1.461	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.614	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.325	Factored deterministic acceleration value (1.0s)
PGAd	1.048	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.536316858195896, -118.04017088147585

Elevation: 2825 ft

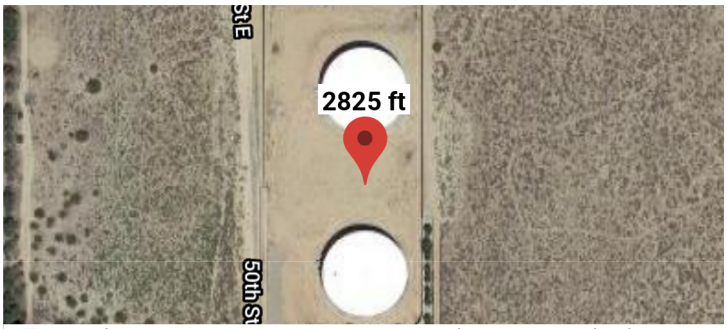
Timestamp: 2021-04-09T16:33:04.897Z

Hazard Type: Seismic

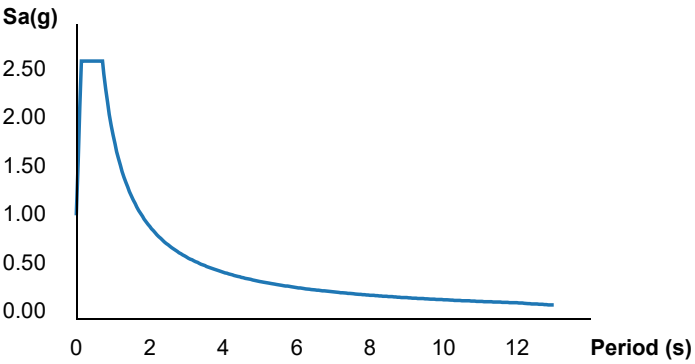
Reference Document: ASCE7-10

Risk Category: IV

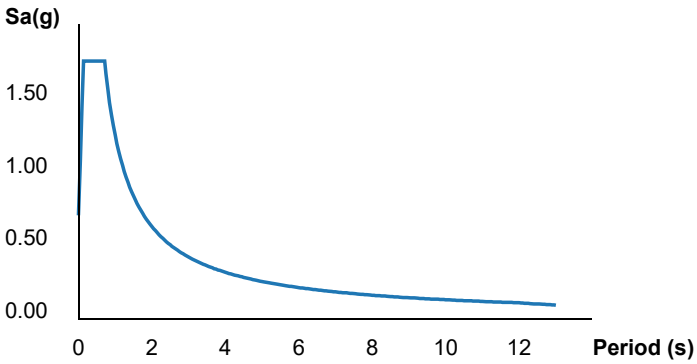
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.652	MCE_R ground motion (period=0.2s)
S_1	1.26	MCE_R ground motion (period=1.0s)
S_{MS}	2.652	Site-modified spectral acceleration value
S_{M1}	1.889	Site-modified spectral acceleration value
S_{DS}	1.768	Numeric seismic design value at 0.2s SA
S_{D1}	1.26	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.024	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.024	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.121	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.381	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.652	Factored deterministic acceleration value (0.2s)
S1RT	1.449	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.602	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.26	Factored deterministic acceleration value (1.0s)
PGAd	1.024	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.54972773620536, -118.1502535834671

Elevation: 3116 ft

Timestamp: 2021-04-09T16:41:41.594Z

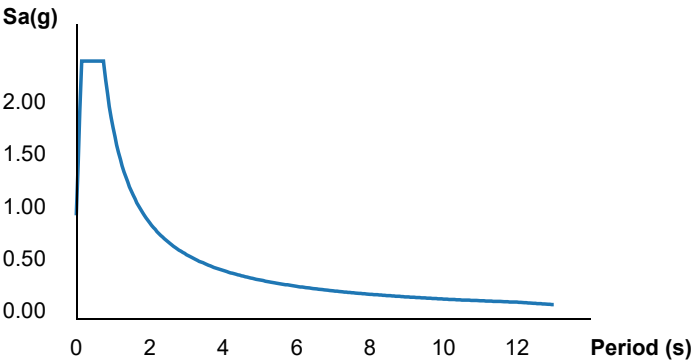
Hazard Type: Seismic

Reference Document: ASCE7-10

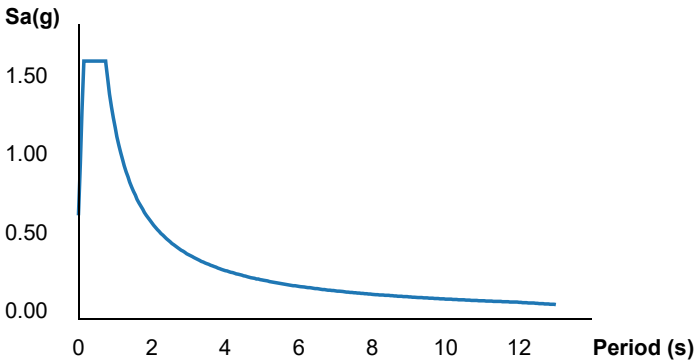
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.458	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.458	Site-modified spectral acceleration value
S_{M1}	1.82	Site-modified spectral acceleration value
S_{DS}	1.639	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)
CR_1	0.906	Coefficient of risk (1.0s)

PGA	0.945	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.945	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.335	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.642	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.458	Factored deterministic acceleration value (0.2s)
S1RT	1.566	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.728	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.945	Factored deterministic acceleration value (PGA)

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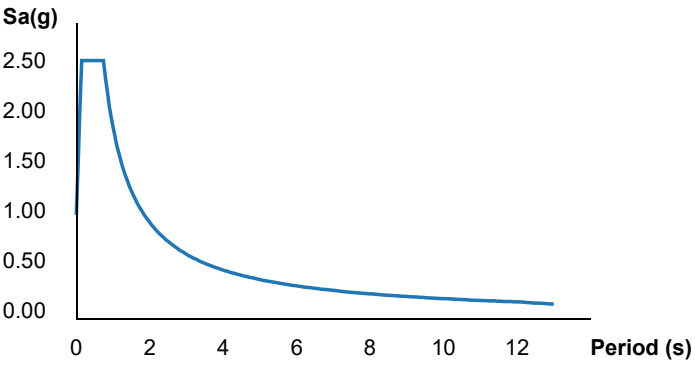
Hazards by Location

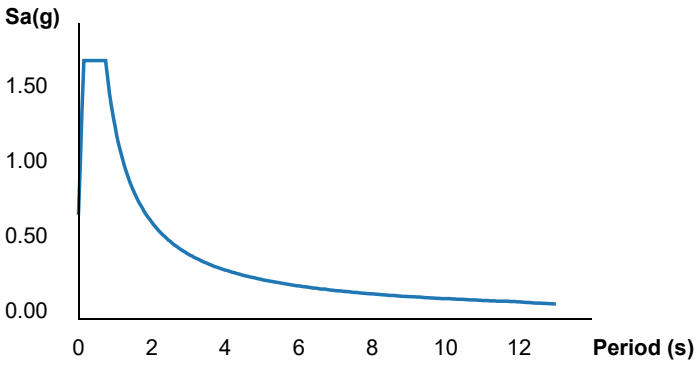
Search Information

Address:	36809 El Camino Dr, Palmdale, CA 93551, USA
Coordinates:	34.54952240000001, -118.1326806
Elevation:	2925 ft
Timestamp:	2021-04-09T16:20:57.078Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.571	MCE_R ground motion (period=0.2s)
S_1	1.27	MCE_R ground motion (period=1.0s)
S_{MS}	2.571	Site-modified spectral acceleration value
S_{M1}	1.905	Site-modified spectral acceleration value
S_{DS}	1.714	Numeric seismic design value at 0.2s SA
S_{D1}	1.27	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.986	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.986	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.426	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.74	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.571	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.783	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.27	Factored deterministic acceleration value (1.0s)
PGAd	0.986	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53840630847815, -118.13288506137695

Elevation: 3359 ft

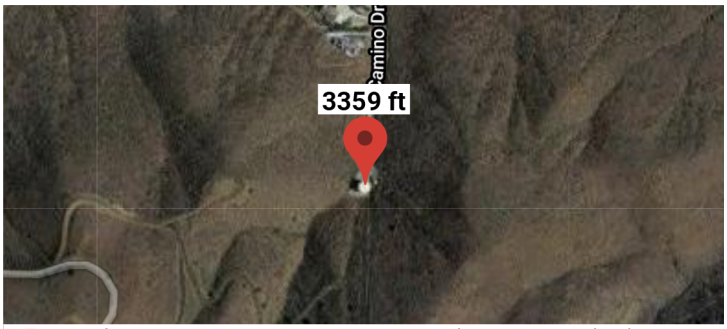
Timestamp: 2021-04-09T20:04:43.993Z

Hazard Type: Seismic

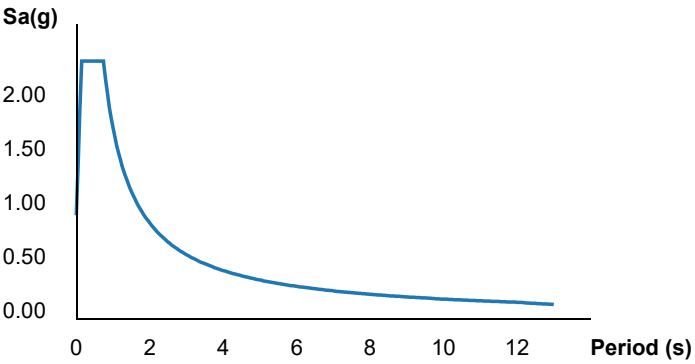
Reference Document: ASCE7-10

Risk Category: IV

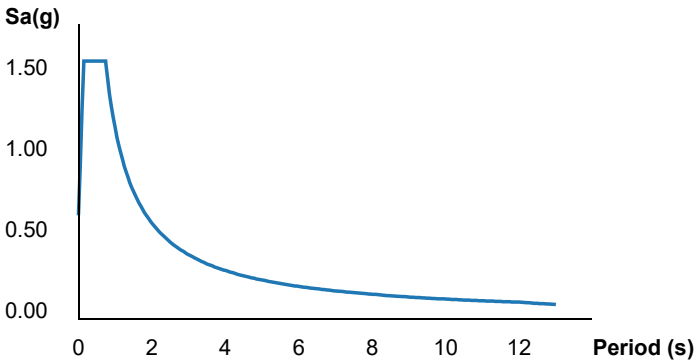
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.375	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.375	Site-modified spectral acceleration value
S_{M1}	1.756	Site-modified spectral acceleration value
S_{DS}	1.583	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)
CR_1	0.908	Coefficient of risk (1.0s)

PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.499	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.375	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.56128566737895, -118.12898168848265

Elevation: 2924 ft

Timestamp: 2021-04-09T20:40:24.218Z

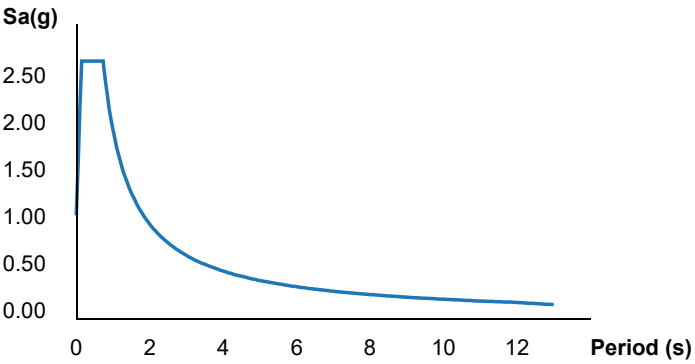
Hazard Type: Seismic

Reference Document: ASCE7-10

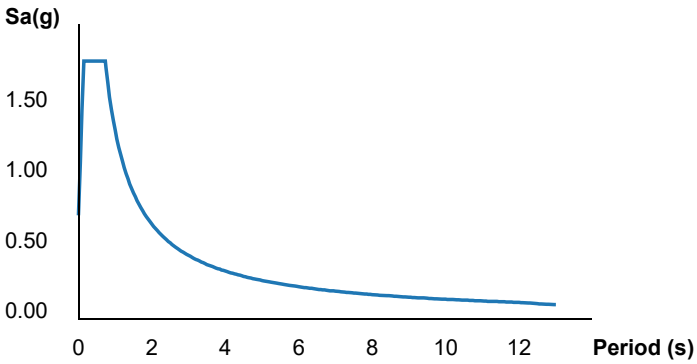
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.733	MCE_R ground motion (period=0.2s)
S_1	1.331	MCE_R ground motion (period=1.0s)
S_{MS}	2.733	Site-modified spectral acceleration value
S_{M1}	1.997	Site-modified spectral acceleration value
S_{DS}	1.822	Numeric seismic design value at 0.2s SA
S_{D1}	1.331	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.055	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.055	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.306	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.594	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.733	Factored deterministic acceleration value (0.2s)
S1RT	1.547	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.71	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.331	Factored deterministic acceleration value (1.0s)
PGAd	1.055	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.538438, -118.132863

Elevation: 3360 ft

Timestamp: 2021-04-08T22:06:10.243Z

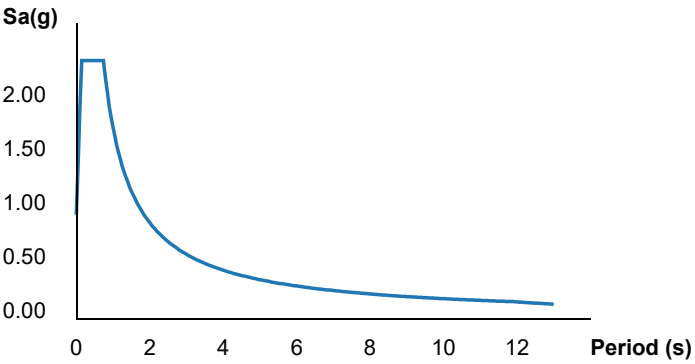
Hazard Type: Seismic

Reference Document: ASCE7-10

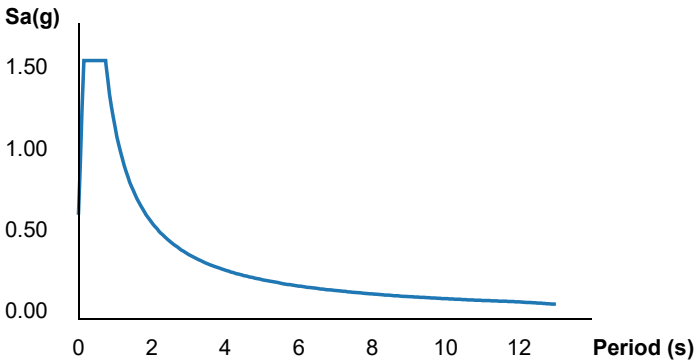
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.376	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.376	Site-modified spectral acceleration value
S_{M1}	1.757	Site-modified spectral acceleration value
S_{DS}	1.584	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)

CR_1	0.908	Coefficient of risk (1.0s)
PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.5	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.376	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.598759799594845, -118.09844223112182

Elevation: 2583 ft

Timestamp: 2021-04-09T20:48:48.917Z

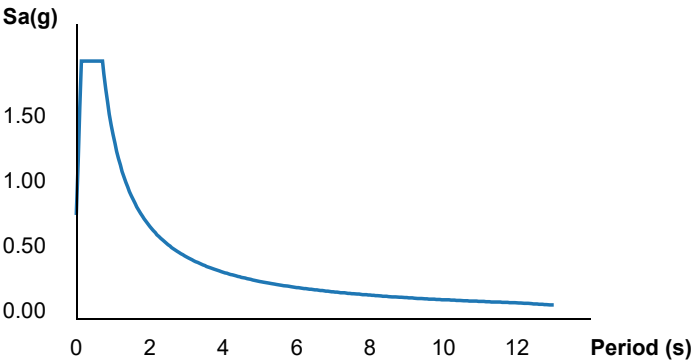
Hazard Type: Seismic

Reference Document: ASCE7-10

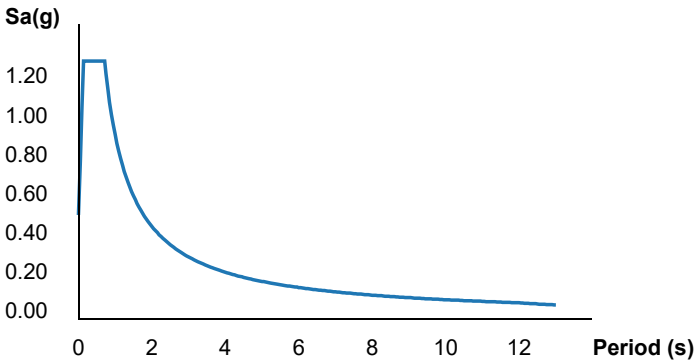
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.971	MCE_R ground motion (period=0.2s)
S_1	0.937	MCE_R ground motion (period=1.0s)
S_{MS}	1.971	Site-modified spectral acceleration value
S_{M1}	1.406	Site-modified spectral acceleration value
S_{DS}	1.314	Numeric seismic design value at 0.2s SA
S_{D1}	0.937	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.937	Coefficient of risk (0.2s)
CR_1	0.911	Coefficient of risk (1.0s)

PGA	0.77	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.77	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	2.602	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.776	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.971	Factored deterministic acceleration value (0.2s)
S1RT	1.168	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.282	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.937	Factored deterministic acceleration value (1.0s)
PGAd	0.77	Factored deterministic acceleration value (PGA)

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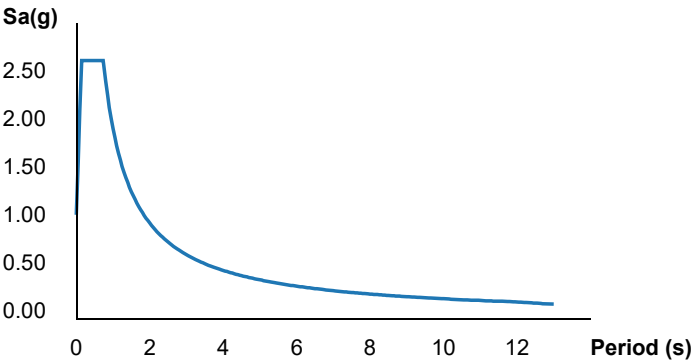
Hazards by Location

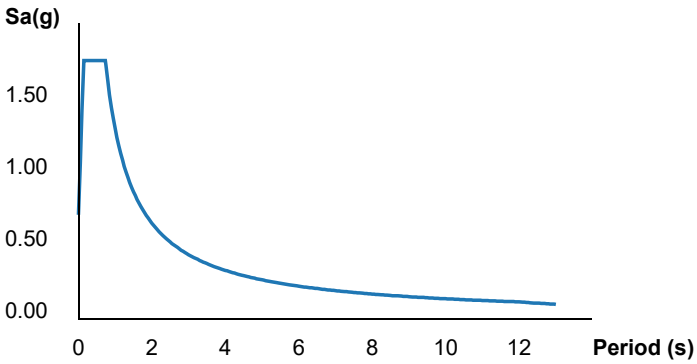
Search Information

Address:	1036 Barrel Spring Road palmdale, ca
Coordinates:	34.5457226, -118.1085956
Elevation:	2817 ft
Timestamp:	2021-05-04T20:11:47.998Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.674	MCE_R ground motion (period=0.2s)
S_1	1.311	MCE_R ground motion (period=1.0s)
S_{MS}	2.674	Site-modified spectral acceleration value
S_{M1}	1.967	Site-modified spectral acceleration value
S_{DS}	1.782	Numeric seismic design value at 0.2s SA
S_{D1}	1.311	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)

CR_1	0.902	Coefficient of risk (1.0s)
PGA	1.029	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.029	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.49	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.799	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.674	Factored deterministic acceleration value (0.2s)
S1RT	1.643	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.821	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.311	Factored deterministic acceleration value (1.0s)
PGAd	1.029	Factored deterministic acceleration value (PGA)

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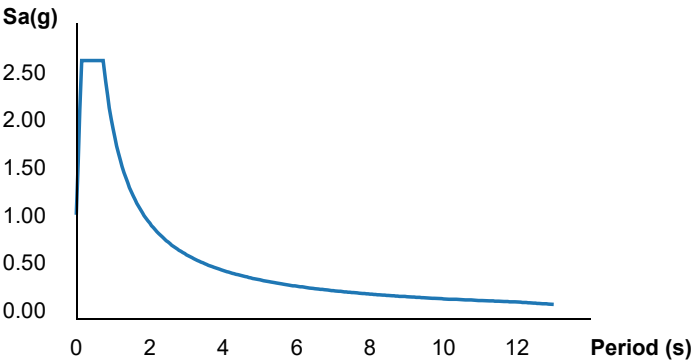
Hazards by Location

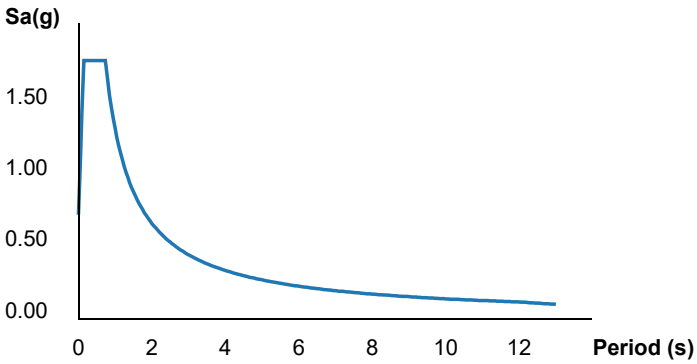
Search Information

Address:	15 4640 Barrel Spring Road palmdale, ca
Coordinates:	34.5268275, -118.0540864
Elevation:	3036 ft
Timestamp:	2021-05-04T20:14:23.952Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.7	MCE_R ground motion (period=0.2s)
S_1	1.323	MCE_R ground motion (period=1.0s)
S_{MS}	2.7	Site-modified spectral acceleration value
S_{M1}	1.984	Site-modified spectral acceleration value
S_{DS}	1.8	Numeric seismic design value at 0.2s SA
S_{D1}	1.323	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)

CR_1	0.905	Coefficient of risk (1.0s)
PGA	1.04	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.04	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.149	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.409	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.7	Factored deterministic acceleration value (0.2s)
S1RT	1.464	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.617	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.323	Factored deterministic acceleration value (1.0s)
PGAd	1.04	Factored deterministic acceleration value (PGA)

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Tank Site	Address	Coordinates		Tank Details											
		Latitude	Longitude	*Tank Type*	*Piping Connection*	*Footing*	*Anchorage*	*Date Built*		*Dia*	*Size*	*Bottom of the Knuckle*	*Top of Knuckle*	*Overflow Height*	*Freeboard Assumed to be 3 feet unless drawings indicate otherwise*
3 MG Tank Site	850 East Avenue S	34.56	-118.11	Welded				1960		124	3,000,000		Unknown	34	3
5 MG Tank	2404 Old Nadeau Road	34.53	-118.08							160	5,000,000		Unknown	20	3
6MG	641 East Ave S	34.56	-118.15					1999		206	6,000,000		Unknown	24	3
25th Street	26496 Cemetary Road	34.55	-118.09					1976		106	2,000,000		Unknown	30	3
				Welded	Not Flexible	Ringwall with Sand Interior		1967		154	4,000,000		Unknown	30	3
45th Street	36510 45th St East	34.54	-118.05					1988		130	3,000,000		Unknown	30	3
								1990		150	4,000,000		Unknown	32	3
								1990		150	4,000,000		Unknown	32	3
47th Street	35645 47th St East	34.53	-118.05					1967		106	2,000,000		Unknown	30	3
								1990		132	3,000,000		Unknown	30	3
50th Street	5001 East Ave, T-8	34.54	-118.04					2007		150	4,000,000		Unknown	30	3
				Welded?	?	Concrete Ring Wall	None Shown	2007		150	4,000,000		Unknown		3
Ana Verde	36800 Tovey Aveneu	34.55	-118.15	Welded	Not Flexible	Concrete Rink wall	Not Shown	1963		40	300,000		Unknown	32	3
El Camino Lower	36809 El Camino Dr.	34.55	-118.13					1988		106	2,000,000		Unknown	32	3
El Camino U.G[4]	36336 El Camino Road							1994		104	1,500,000		Unknown	26	
El Camino Upper	33030 Ridge Route Rd	34.54	-118.13	Welded	Flexible	Ringwall with Sand Inte	None Shown	1963		40	300,000		Unknown	32	3
Walt Dahlitz	115 East Avenue S			Welded	Flexible	Concrete Ringwall, oil s	None Shown	1993		104	1,500,000		Unknown	31	3
Well 14	36401 20th ST East			Weled?	Not Flexible	Concrete Ringwall, grav	3/4" 5' OC 8" embed			27	100,000		Unknown	22	3
Well 18 and 19	4640 Barrel Springs Road							1963		22	41,000		Unknown	30	3
Well 5	1036 Barrel Spring Road							1963		30	1,463,945		Unknown	22	3

AWWA D100-11 Welded Carbon Steel Tanks Chapter 13 Seismic Design

Tank Site	Table 28	13.2.1	Table 24	ATC[1]	Eqn 13-9[1,2]	Eqn 13-22	Eqn 13-12/13[2]				13-27	13-25/26	Eqn 13-28/29	Estimate	Estimate	Estimate	Eqn 13-16		Eqn 13-24/25
	Ri 3 if anchored 2.5 if unanchored	*Seismic Use Group*	*I_E, assume that all tanks are Seismic Use Group III*	*Sd1, per ATC Seismic Hazard Maps*	*Sai, g Based on Sds from ASCE 7-10*	Sloshing Period, Tc(Ss	*Sac, g Based on Sd1 from ASCE 7-10*	*D/H*	*3.67*D/H*	*Volume ft[3] Vol = π*(Dia^2)/4*	Total Weight, lbf W = Vol*62.4pcf	Impulsive Weight, Moves with Tank, (Wi)	Centroid of the lateral Force due to Sloshing (Xi), ft	Weight of the Roof (Wr), lbf	Weight of the Shell (Ws), lbf	Weight of the Floor (Wf), lbf	Implusive Design Acceleration (Ai)	Impulsive Lateral Force (Vi), kip	Overturning Moment due to Impulsive Lateral Force(Mi), ft-kip
3 MG Tank Site	2.5	iii	1.5	1.315	1.805	7.35	0.27	3.647	1.006	410594	25621040	8082906	13	92459	138480	92459	0.774	6503	82912
5 MG Tank	2.5	iii	1.5	1.302	1.764	11.13	0.13	8.000	0.459	402124	25092529	3621894	8	153938	104550	153938	0.756	3050	22875
6MG	2.5	iii	1.5	1.316	1.804	13.03	0.09	8.583	0.428	799900	49913745	6714999	9	255176	160865	255176	0.773	5711	51395
25th Street	2.5	iii	1.5	1.316	1.804	6.74	0.29	3.533	1.039	264742	16519902	5375203	11	67564	104870	67564	0.773	4341	48840
	2.5	iii	1.5	1.278	1.779	9.13	0.18	5.133	0.715	558795	34868813	7841520	11	142609	151052	142609	0.762	6311	71001
45th Street	2.5	iii	1.5	1.214	1.723	7.92	0.23	4.333	0.847	398197	24847485	6614006	11	101623	127961	101623	0.738	5129	57696
	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369	8687384	12	135297	157017	135297	0.738	6731	80769
	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369	8687384	12	135297	157017	135297	0.738	6731	80769
47th Street	2.5	iii	1.5	1.325	1.81	6.74	0.30	3.533	1.039	264742	16519902	5375203	11	67564	104870	67564	0.776	4356	49003
	2.5	iii	1.5	1.325	1.81	8.02	0.25	4.400	0.834	410543	25617904	6716566	11	104774	129885	104774	0.776	5473	61576
50th Street	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971	7637298	11	135297	147203	135297	0.758	6103	68664
	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971	7637298	11	135297	147203	135297	0.758	6103	68664
Ana Verde	2.5	iii	1.5	1.214	1.639	3.66	0.50	1.250	2.936	40212	2509253	1825481	12	9621	44129	9621	0.702	1327	16240
El Camino Lower	2.5	iii	1.5	1.27	1.714	6.63	0.29	3.313	1.108	282391	17621228	6103267	12	67564	111862	67564	0.735	4665	55977
El Camino U.G[4]																			
El Camino Upper	2.5	iii	1.5	0.881	1.543	3.66	0.36	1.250	2.936	40212	2509253	1825481	12	9621	44129	9621	0.661	1249	15289
Walt Dahlitz	2.5	iii	1.5	0.827	1.442	6.58	0.19	3.355	1.094	263341	16432470	5622265	12	65039	106378	65039	0.618	3621	42091
Well 14	2.5	iii	1.5	0.927	1.514	3.01	0.46	1.227	2.990	12596	786004	575712	8	4384	21166	4384	0.649	393	3325
Well 18 and 19	2.5	iii	1.5	1.323	1.8	2.71	0.73	0.733	5.005	11404	711608	597846	13	2910	24053	2910	0.771	484	6262
Well 5	2.5	iii	1.5	1.311	1.782	3.18	0.62	1.364	2.691	15551	970375	680168	8	5412	23283	5412	0.764	546	4500

Tank Site		Eqn 13-30			Eqn 13-26	Eqn 13-31	Eqn 13-23	Eqn 13-37		Eqn 13-41	Eqn 13-36		Eqn 13-53/54			Eqn 13-52	Table 29		Eqn 13-57		
	Convective Weight (Wc), lbf	Centroid of the lateral force do to convective mass (Xc), ft	Convective Design Acceleration (Ai)	Convective Lateral Force (Vc), kip	Overturning Moment due to Convective Lateral Force(Mc), ft-kip	Design Lateral Force at the top of the foundation (Vf), kip	Design Overturning Moment (Ms), ft-kip Ms = $\sqrt{Mi^2+Mc^2}$	Maximum Resting Weight of the Tank Contents (wL), lbf/ft		Weight of the Tank Shell and Roof Resisting Overturning (wt), lbf/ft	Overturning Ratio, J	Anchor Requirements	Convective Design Accelaration, Af			Sloshing Wave Height (d), ft	Minimum Required Freeboard (D), ft	Actual Freeboard (Roof Height-Overflow)	Allowable Lateral Load, V_{allow} (kip)	Total Lateral Seismic Load, Vt (Kip)	Sliding Check
3 MG Tank Site	16424329	18	0.192	3150	57649	7226	100984	2185	5396	474	2.54	Provide Anchors	0.27	0.29	0.27	16.65	16.65	3	12851	7225.51729	OK
5 MG Tank	19810034	10	0.090	1784	18144	3533	29197	1676	4096	361	0.57	Tank Is Stable	0.18	0.13	0.13	10.08	10.08	3	12338	3533.2461	OK
6MG	39739497	12	0.066	2640	32159	6291	60628	1836	6328	446	0.64	Tank Is Stable	0.15	0.09	0.09	9.58	9.58	3	24349	6291.49113	OK
25th Street	10436273	16	0.209	2185	35431	4860	60339	2052	4070	416	2.23	Provide Anchors	0.29	0.35	0.29	15.53	15.53	3	8304	4860.10557	OK
	25267634	16	0.131	3318	51781	7130	87878	2052	5914	460	1.51	Uplift but Stable	0.21	0.18	0.18	14.15	14.15	3	17380	7130.09689	OK
45th Street	17074207	16	0.164	2805	44414	5845	72811	2052	4992	438	1.77	Provide Anchors	0.23	0.23	0.23	14.95	14.95	3	12488	5845.27581	OK
	24894926	17	0.137	3398	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
	24894926	17	0.137	3398	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
47th Street	10436273	16	0.211	2200	35674	4880	60613	2052	4070	416	2.24	Provide Anchors	0.30	0.35	0.30	15.64	15.64	3	8301	4879.72502	OK
	17698347	16	0.177	3126	49427	6303	78960	2052	5069	440	1.87	Provide Anchors	0.25	0.25	0.25	16.32	16.32	3	12801	6303.06969	OK
50th Street	23796213	16	0.135	3223	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
	23796213	16	0.135	3223	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
Ana Verde	717357	22	0.355	255	5658	1351	17197	2120	1638	389	5.44	Provide Anchors	0.50	1.09	0.50	9.95	9.95	3	1363	1351.04608	OK
El Camino Lower	10784811	17	0.205	2215	38666	5164	68033	2120	4342	437	2.42	Provide Anchors	0.29	0.35	0.29	15.24	15.24	3	8916	5163.80732	OK
El Camino U.G[4]																					
El Camino Upper	717357	22	0.258	185	4106	1263	15830	2120	1638	389	5.00	Provide Anchors	0.36	0.79	0.36	7.22	7.22	3	1371	1262.69341	OK
Walt Dahlitz	10122208	17	0.135	1362	22997	3869	47963	2086	4127	425	1.80	Provide Anchors	0.19	0.23	0.19	9.80	9.80	3	8455	3868.50122	OK
Well 14	220749	15	0.330	73	1119	400	3509	1758	760	275	4.80	Provide Anchors	0.46	1.23	0.46	6.24	6.24	3	435	399.685968	OK
Well 18 and 19	120014	24	0.524	63	1513	488	6442	2052	845	369	11.47	Provide Anchors	0.73	2.17	0.73	8.06	8.06	3	387	488.300415	Needs Anchors
Well 5	301560	15	0.442	133	1982	562	4918	1758	845	276	5.05	Provide Anchors	0.62	1.56	0.62	9.29	9.29	3	526	561.571023	Needs Anchors

1. Design spectral response acceleration parameters, S_{D1} and S_{DS}, have been determined using the Applied Technology Council's (ATC) web based hazard maps in accordance with the American Society of Civil Engineers Standard 7, Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)

2. The Design spectrum for impulsive components, Sai and the Design Spectrum for convective components, Sac have been determined in accordance with Chapter 13 of the AWWA D100-11, Welded Carbon Steel Tnaks for Water Storage. These parameters are expressed as a percentage of the accelration due to gravity, g.

3. Facility list indicates that these facilities conatain 0 gallons and does not provide the overflow height, therefore we were not apple to determine the seismic demands on these structures.
4. AWWA D100 calculations do not apply to the El Camino Underground tank. Construction drawings are not available to perform an analysis at this time.
4. Minimum required freeboard is equal to the sloshing wave height for Use Group III and may be reduced for Use Group I and II

Hazards by Location

Search Information

Coordinates: 34.557353817153206, -118.11224470422972

Elevation: 2750 ft

Timestamp: 2021-04-09T16:22:17.704Z

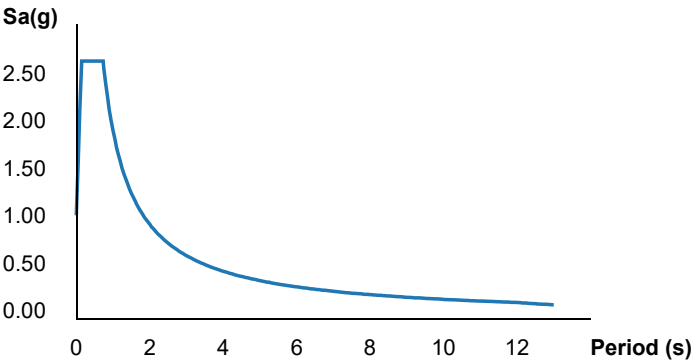
Hazard Type: Seismic

Reference Document: ASCE7-10

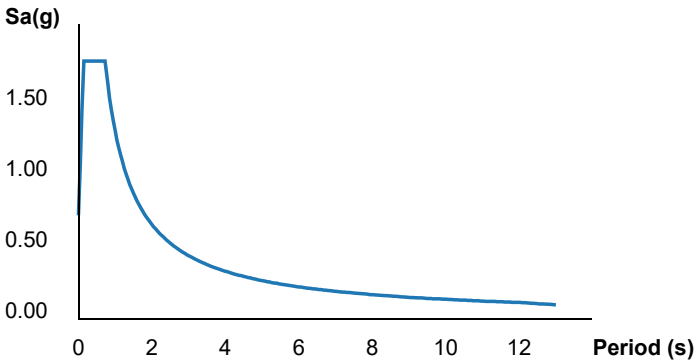
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.707	MCE_R ground motion (period=0.2s)
S_1	1.315	MCE_R ground motion (period=1.0s)
S_{MS}	2.707	Site-modified spectral acceleration value
S_{M1}	1.973	Site-modified spectral acceleration value
S_{DS}	1.805	Numeric seismic design value at 0.2s SA
S_{D1}	1.315	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.045	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.045	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.418	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.719	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.707	Factored deterministic acceleration value (0.2s)
S1RT	1.605	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.778	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.315	Factored deterministic acceleration value (1.0s)
PGAd	1.045	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53471326457233, -118.08343773439331

Elevation: 2968 ft

Timestamp: 2021-04-09T16:35:02.162Z

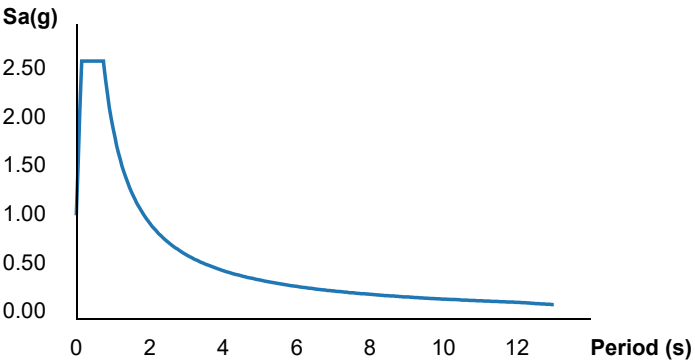
Hazard Type: Seismic

Reference Document: ASCE7-10

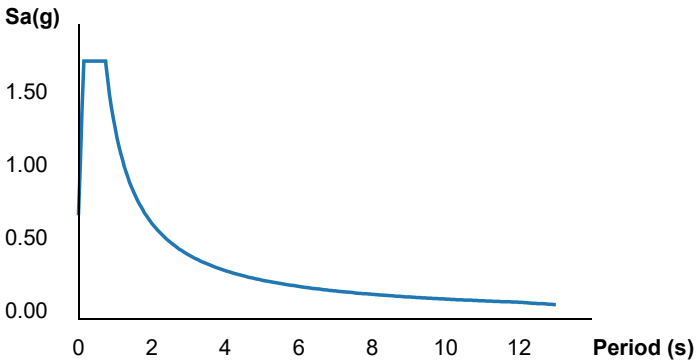
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.646	MCE_R ground motion (period=0.2s)
S_1	1.302	MCE_R ground motion (period=1.0s)
S_{MS}	2.646	Site-modified spectral acceleration value
S_{M1}	1.953	Site-modified spectral acceleration value
S_{DS}	1.764	Numeric seismic design value at 0.2s SA
S_{D1}	1.302	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.018	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.018	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.282	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.552	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.646	Factored deterministic acceleration value (0.2s)
S1RT	1.53	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.694	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.302	Factored deterministic acceleration value (1.0s)
PGAd	1.018	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.5497, -118.132821

Elevation: 2923 ft

Timestamp: 2021-04-08T21:00:34.329Z

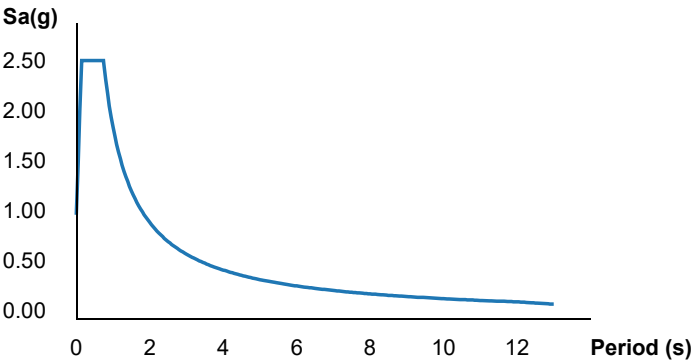
Hazard Type: Seismic

Reference Document: ASCE7-10

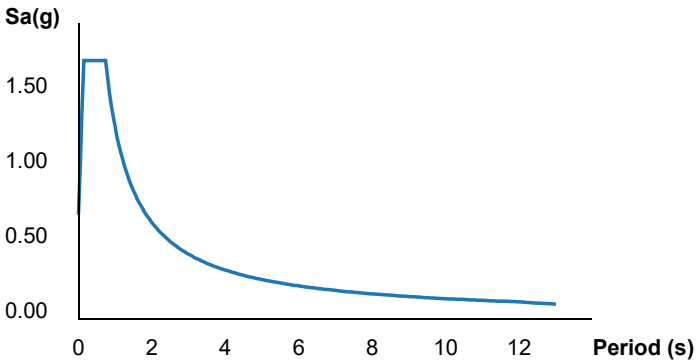
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.573	MCE_R ground motion (period=0.2s)
S_1	1.271	MCE_R ground motion (period=1.0s)
S_{MS}	2.573	Site-modified spectral acceleration value
S_{M1}	1.906	Site-modified spectral acceleration value
S_{DS}	1.715	Numeric seismic design value at 0.2s SA
S_{D1}	1.271	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.987	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.987	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.429	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.743	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.573	Factored deterministic acceleration value (0.2s)
S1RT	1.614	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.785	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.271	Factored deterministic acceleration value (1.0s)
PGAd	0.987	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.559419345037064, -118.11618400870667

Elevation: 2750 ft

Timestamp: 2021-04-09T16:36:57.402Z

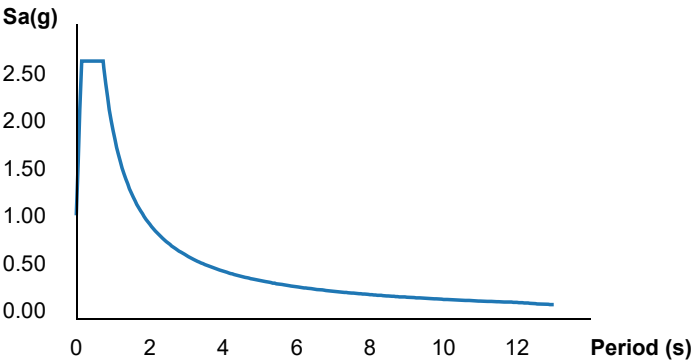
Hazard Type: Seismic

Reference Document: ASCE7-10

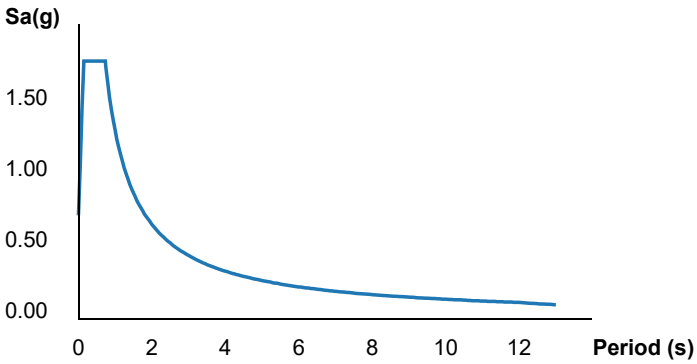
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.706	MCE_R ground motion (period=0.2s)
S_1	1.316	MCE_R ground motion (period=1.0s)
S_{MS}	2.706	Site-modified spectral acceleration value
S_{M1}	1.975	Site-modified spectral acceleration value
S_{DS}	1.804	Numeric seismic design value at 0.2s SA
S_{D1}	1.316	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.046	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.046	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.37	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.665	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.706	Factored deterministic acceleration value (0.2s)
S1RT	1.58	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.749	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.316	Factored deterministic acceleration value (1.0s)
PGAd	1.046	Factored deterministic acceleration value (PGA)

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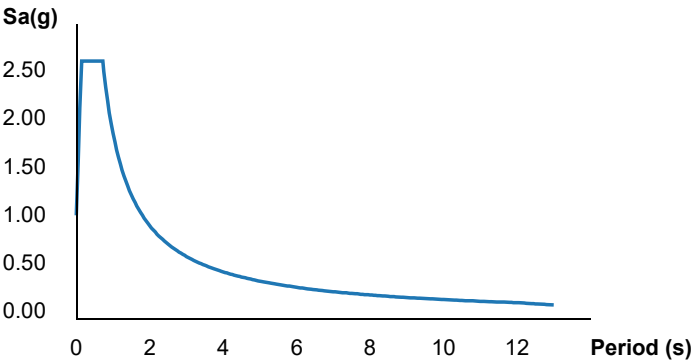
Hazards by Location

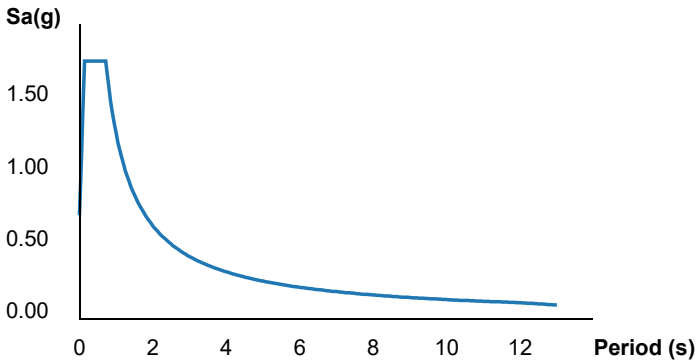
Search Information

Coordinates:	34.55371, -118.087856
Elevation:	2752 ft
Timestamp:	2021-04-09T16:19:01.173Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.668	MCE_R ground motion (period=0.2s)
S_1	1.278	MCE_R ground motion (period=1.0s)
S_{MS}	2.668	Site-modified spectral acceleration value
S_{M1}	1.917	Site-modified spectral acceleration value
S_{DS}	1.779	Numeric seismic design value at 0.2s SA
S_{D1}	1.278	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.902	Coefficient of risk (1.0s)

PGA	1.031	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.031	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.432	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.737	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.668	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.788	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.278	Factored deterministic acceleration value (1.0s)
PGAd	1.031	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.55371, -118.087856

Elevation: 2752 ft

Timestamp: 2021-04-09T16:17:53.781Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: IV

Site Class: D-default

Map data ©2021 Imagery ©2021 , CNES / Airbus, Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency

Basic Parameters

Name	Value	Description
S_S	2.404	MCE_R ground motion (period=0.2s)
S_1	1.025	MCE_R ground motion (period=1.0s)
S_{MS}	2.885	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.923	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.874	Coefficient of risk (0.2s)
CR_1	0.869	Coefficient of risk (1.0s)
PGA	1.033	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.24	Site modified peak ground acceleration

T_L	12	Long-period transition period (s)
SsRT	3.008	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.441	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.404	Factored deterministic acceleration value (0.2s)
S1RT	1.294	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.489	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.025	Factored deterministic acceleration value (1.0s)
PGAd	1.033	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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Hazards by Location

Search Information

Coordinates: 34.544961034712664, -118.04877924893493

Elevation: 2740 ft

Timestamp: 2021-04-09T16:27:34.922Z

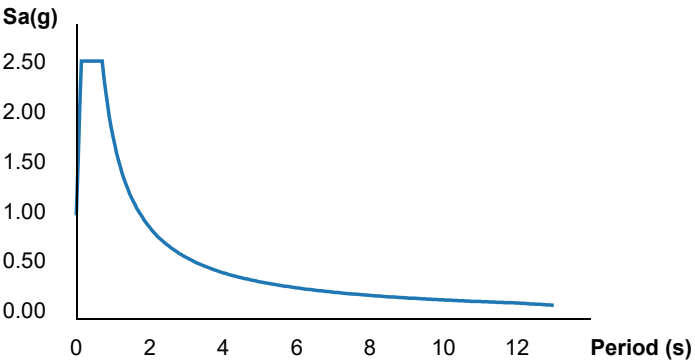
Hazard Type: Seismic

Reference Document: ASCE7-10

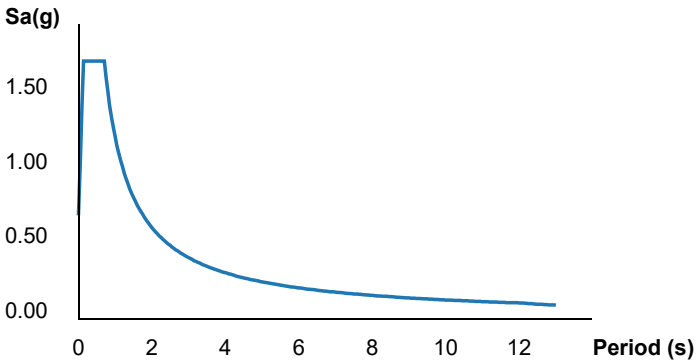
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.584	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.584	Site-modified spectral acceleration value
S_{M1}	1.821	Site-modified spectral acceleration value
S_{DS}	1.723	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.921	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	0.996	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.996	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.159	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.432	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.584	Factored deterministic acceleration value (0.2s)
S1RT	1.47	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.624	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.996	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.52903336279662, -118.04584351481934

Elevation: 2971 ft

Timestamp: 2021-04-09T16:31:06.633Z

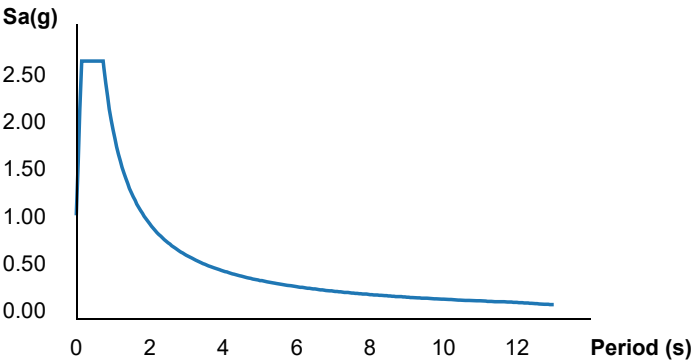
Hazard Type: Seismic

Reference Document: ASCE7-10

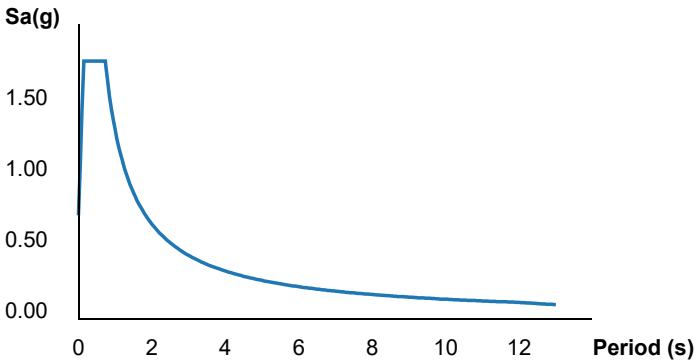
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.714	MCE_R ground motion (period=0.2s)
S_1	1.325	MCE_R ground motion (period=1.0s)
S_{MS}	2.714	Site-modified spectral acceleration value
S_{M1}	1.987	Site-modified spectral acceleration value
S_{DS}	1.81	Numeric seismic design value at 0.2s SA
S_{D1}	1.325	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.048	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.048	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.142	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.404	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.714	Factored deterministic acceleration value (0.2s)
S1RT	1.461	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.614	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.325	Factored deterministic acceleration value (1.0s)
PGAd	1.048	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.536316858195896, -118.04017088147585

Elevation: 2825 ft

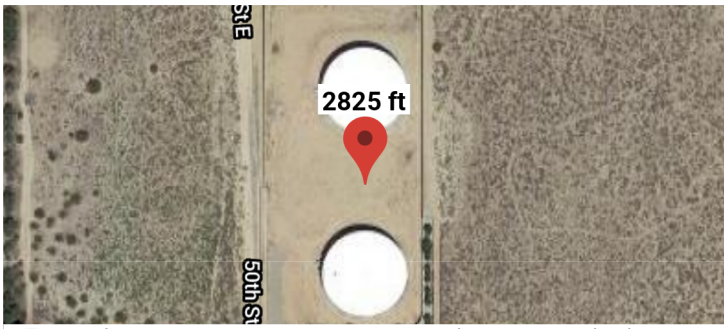
Timestamp: 2021-04-09T16:33:04.897Z

Hazard Type: Seismic

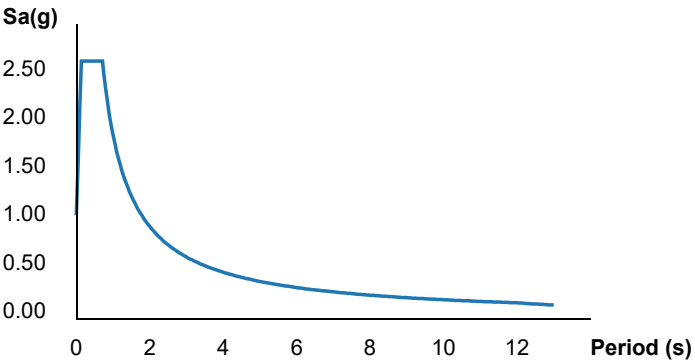
Reference Document: ASCE7-10

Risk Category: IV

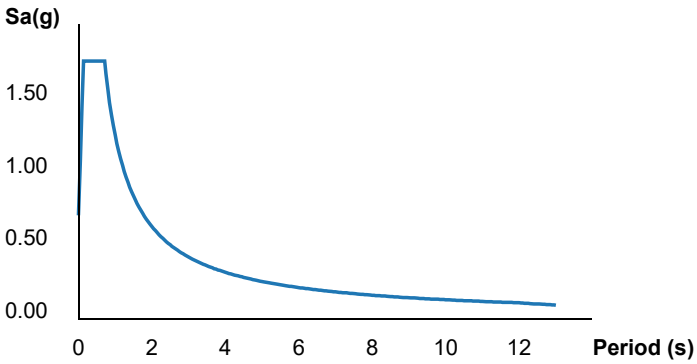
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.652	MCE_R ground motion (period=0.2s)
S_1	1.26	MCE_R ground motion (period=1.0s)
S_{MS}	2.652	Site-modified spectral acceleration value
S_{M1}	1.889	Site-modified spectral acceleration value
S_{DS}	1.768	Numeric seismic design value at 0.2s SA
S_{D1}	1.26	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.024	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.024	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.121	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.381	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.652	Factored deterministic acceleration value (0.2s)
S1RT	1.449	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.602	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.26	Factored deterministic acceleration value (1.0s)
PGAd	1.024	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.54972773620536, -118.1502535834671

Elevation: 3116 ft

Timestamp: 2021-04-09T16:41:41.594Z

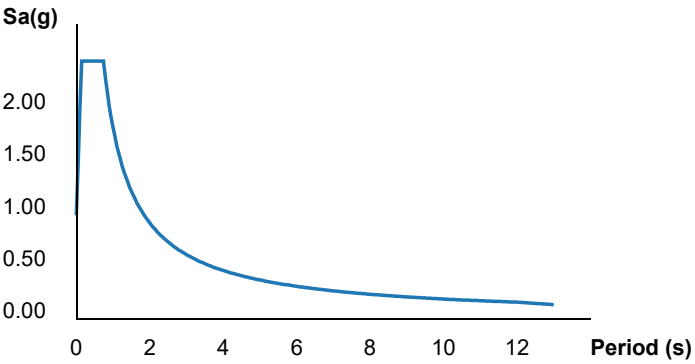
Hazard Type: Seismic

Reference Document: ASCE7-10

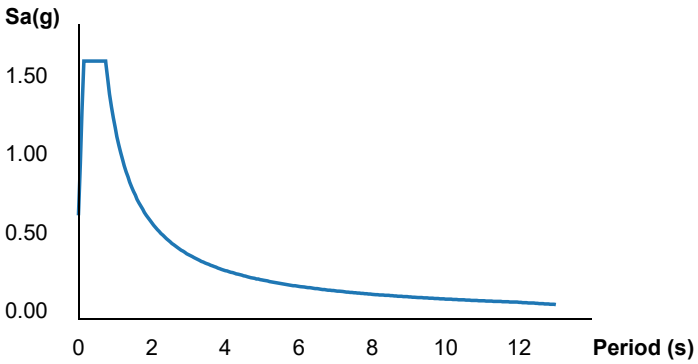
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.458	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.458	Site-modified spectral acceleration value
S_{M1}	1.82	Site-modified spectral acceleration value
S_{DS}	1.639	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)
CR_1	0.906	Coefficient of risk (1.0s)

PGA	0.945	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.945	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.335	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.642	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.458	Factored deterministic acceleration value (0.2s)
S1RT	1.566	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.728	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.945	Factored deterministic acceleration value (PGA)

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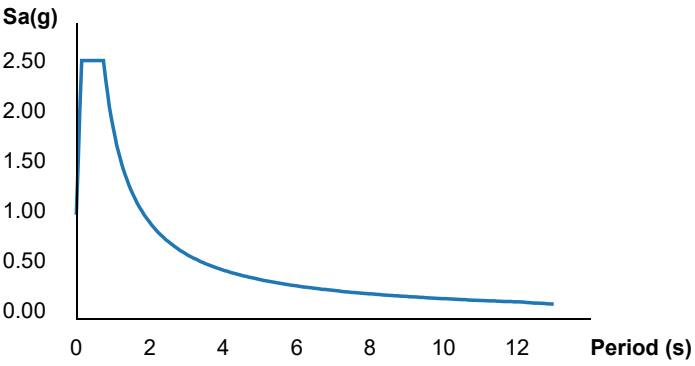
Hazards by Location

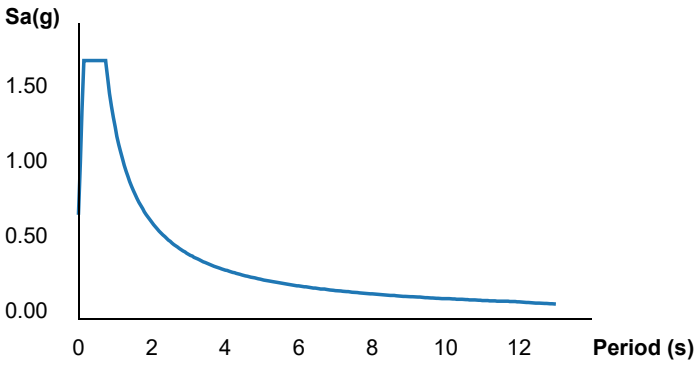
Search Information

Address:	36809 El Camino Dr, Palmdale, CA 93551, USA
Coordinates:	34.54952240000001, -118.1326806
Elevation:	2925 ft
Timestamp:	2021-04-09T16:20:57.078Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.571	MCE_R ground motion (period=0.2s)
S_1	1.27	MCE_R ground motion (period=1.0s)
S_{MS}	2.571	Site-modified spectral acceleration value
S_{M1}	1.905	Site-modified spectral acceleration value
S_{DS}	1.714	Numeric seismic design value at 0.2s SA
S_{D1}	1.27	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.986	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.986	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.426	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.74	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.571	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.783	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.27	Factored deterministic acceleration value (1.0s)
PGAd	0.986	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53840630847815, -118.13288506137695

Elevation: 3359 ft

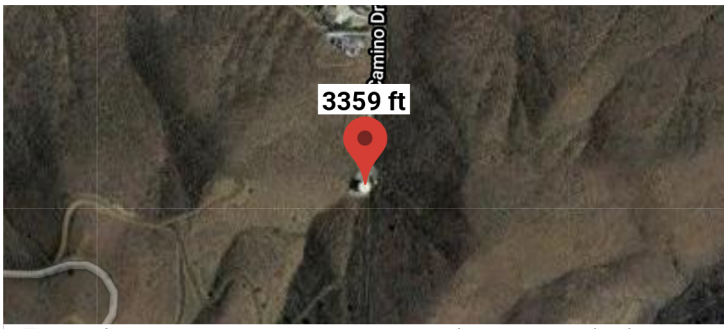
Timestamp: 2021-04-09T20:04:43.993Z

Hazard Type: Seismic

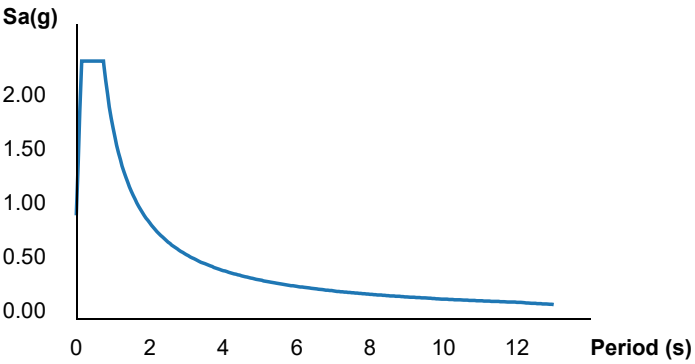
Reference Document: ASCE7-10

Risk Category: IV

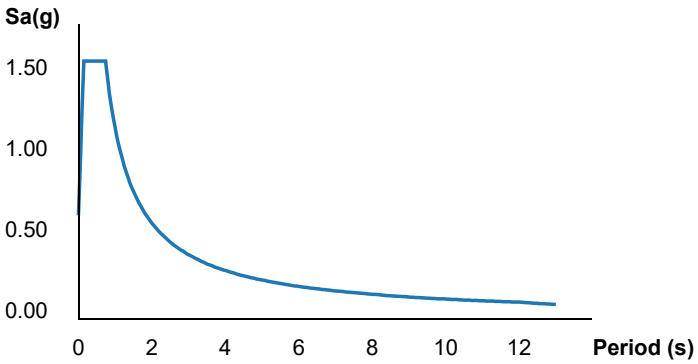
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.375	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.375	Site-modified spectral acceleration value
S_{M1}	1.756	Site-modified spectral acceleration value
S_{DS}	1.583	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)
CR_1	0.908	Coefficient of risk (1.0s)

PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.499	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.375	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.56128566737895, -118.12898168848265

Elevation: 2924 ft

Timestamp: 2021-04-09T20:40:24.218Z

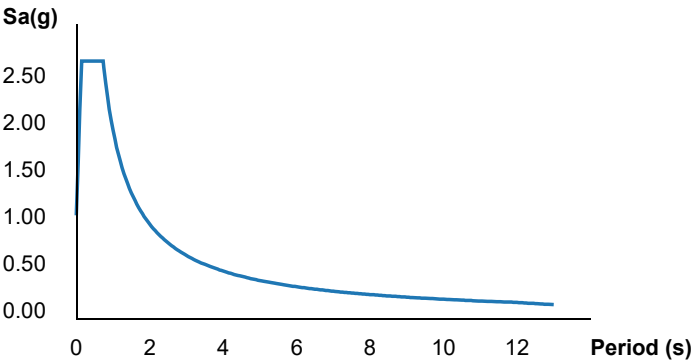
Hazard Type: Seismic

Reference Document: ASCE7-10

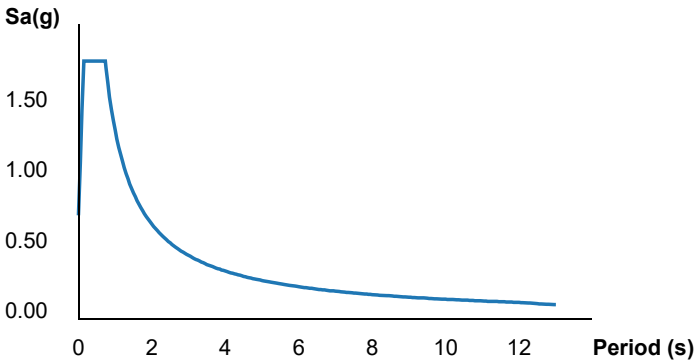
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.733	MCE_R ground motion (period=0.2s)
S_1	1.331	MCE_R ground motion (period=1.0s)
S_{MS}	2.733	Site-modified spectral acceleration value
S_{M1}	1.997	Site-modified spectral acceleration value
S_{DS}	1.822	Numeric seismic design value at 0.2s SA
S_{D1}	1.331	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.055	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.055	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.306	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.594	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.733	Factored deterministic acceleration value (0.2s)
S1RT	1.547	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.71	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.331	Factored deterministic acceleration value (1.0s)
PGAd	1.055	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.538438, -118.132863

Elevation: 3360 ft

Timestamp: 2021-04-08T22:06:10.243Z

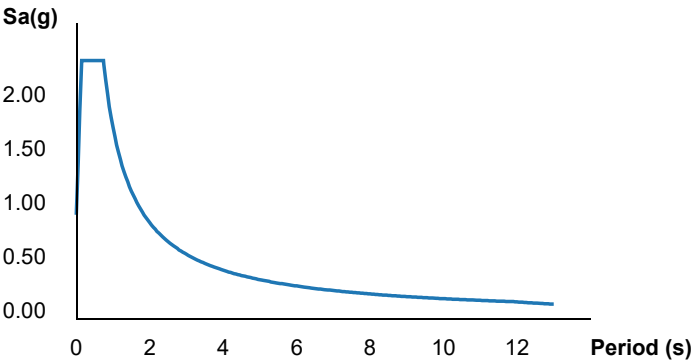
Hazard Type: Seismic

Reference Document: ASCE7-10

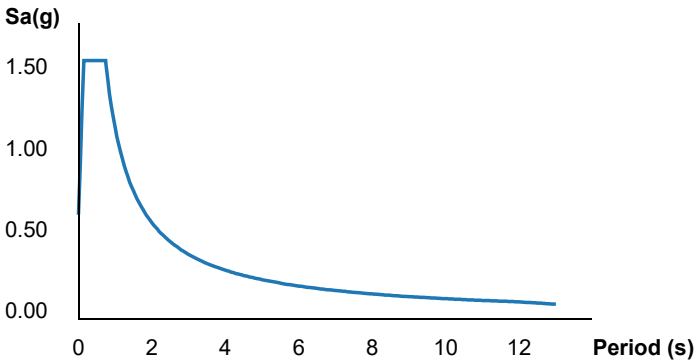
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.376	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.376	Site-modified spectral acceleration value
S_{M1}	1.757	Site-modified spectral acceleration value
S_{DS}	1.584	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)

CR_1	0.908	Coefficient of risk (1.0s)
PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.5	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.376	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.598759799594845, -118.09844223112182

Elevation: 2583 ft

Timestamp: 2021-04-09T20:48:48.917Z

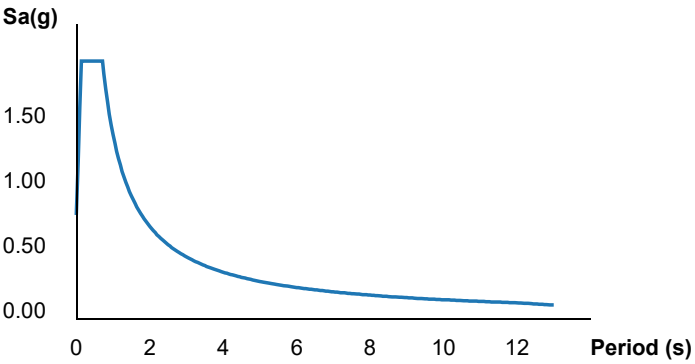
Hazard Type: Seismic

Reference Document: ASCE7-10

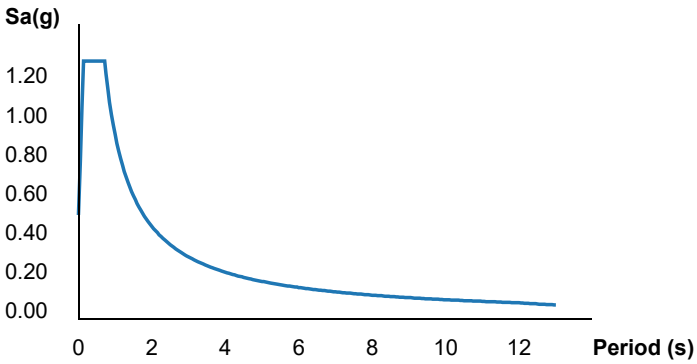
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.971	MCE_R ground motion (period=0.2s)
S_1	0.937	MCE_R ground motion (period=1.0s)
S_{MS}	1.971	Site-modified spectral acceleration value
S_{M1}	1.406	Site-modified spectral acceleration value
S_{DS}	1.314	Numeric seismic design value at 0.2s SA
S_{D1}	0.937	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.937	Coefficient of risk (0.2s)
CR_1	0.911	Coefficient of risk (1.0s)

PGA	0.77	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.77	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	2.602	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.776	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.971	Factored deterministic acceleration value (0.2s)
S1RT	1.168	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.282	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.937	Factored deterministic acceleration value (1.0s)
PGAd	0.77	Factored deterministic acceleration value (PGA)

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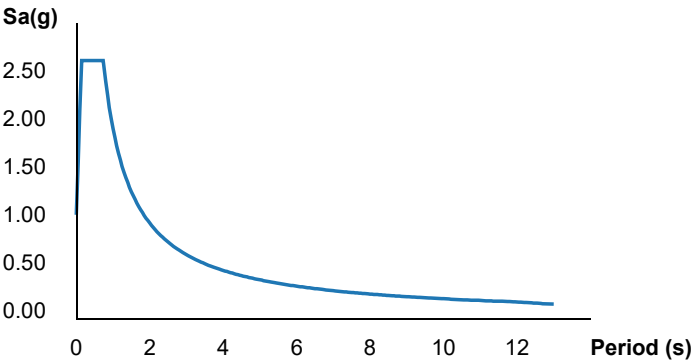
Hazards by Location

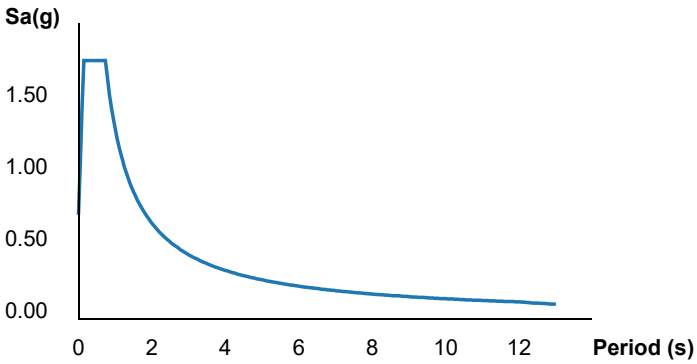
Search Information

Address:	1036 Barrel Spring Road palmdale, ca
Coordinates:	34.5457226, -118.1085956
Elevation:	2817 ft
Timestamp:	2021-05-04T20:11:47.998Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.674	MCE_R ground motion (period=0.2s)
S_1	1.311	MCE_R ground motion (period=1.0s)
S_{MS}	2.674	Site-modified spectral acceleration value
S_{M1}	1.967	Site-modified spectral acceleration value
S_{DS}	1.782	Numeric seismic design value at 0.2s SA
S_{D1}	1.311	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)

CR_1	0.902	Coefficient of risk (1.0s)
PGA	1.029	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.029	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.49	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.799	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.674	Factored deterministic acceleration value (0.2s)
S1RT	1.643	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.821	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.311	Factored deterministic acceleration value (1.0s)
PGAd	1.029	Factored deterministic acceleration value (PGA)

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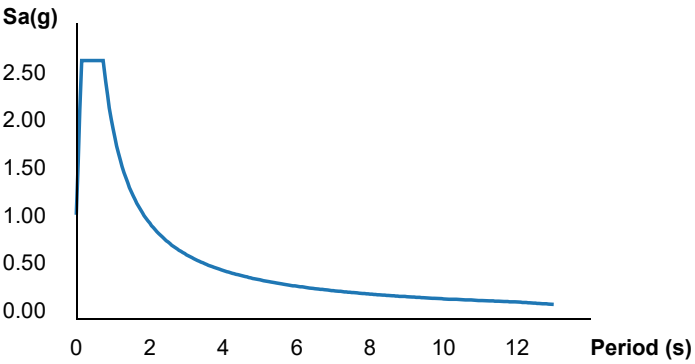
Hazards by Location

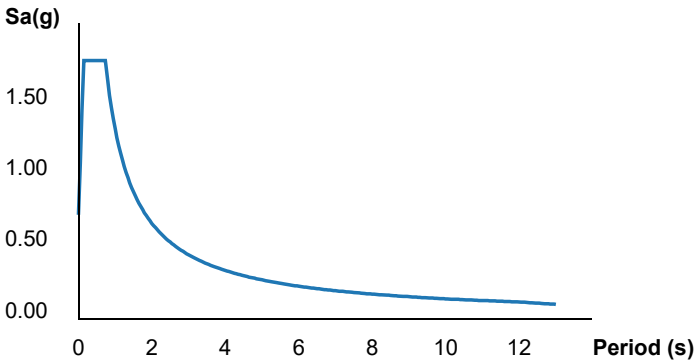
Search Information

Address:	15 4640 Barrel Spring Road palmdale, ca
Coordinates:	34.5268275, -118.0540864
Elevation:	3036 ft
Timestamp:	2021-05-04T20:14:23.952Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.7	MCE_R ground motion (period=0.2s)
S_1	1.323	MCE_R ground motion (period=1.0s)
S_{MS}	2.7	Site-modified spectral acceleration value
S_{M1}	1.984	Site-modified spectral acceleration value
S_{DS}	1.8	Numeric seismic design value at 0.2s SA
S_{D1}	1.323	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)

CR_1	0.905	Coefficient of risk (1.0s)
PGA	1.04	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.04	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.149	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.409	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.7	Factored deterministic acceleration value (0.2s)
S1RT	1.464	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.617	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.323	Factored deterministic acceleration value (1.0s)
PGAd	1.04	Factored deterministic acceleration value (PGA)

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AWWA D100-11 Welded Carbon Steel Tanks Chapter 13 Seismic Design

Tank Site	Address	Coordinates: Latitude	Coordinates: Longitude	Tank Details: Tank Type	Piping Connection	Footing	Anchorage	Date Built		Dia	Size	Bottom of the Knuckle	Top of Knuckle	Overflow Height
3 MG Tank Site	850 East Avenue S	34.56	-118.11	Welded				1960		124	3,000,000		Unknown	34
5 MG Tank	2404 Old Nadeau Road	34.53	-118.08							160	5,000,000		Unknown	20
6MG	641 East Ave S	34.56	-118.15					1999		206	6,000,000		Unknown	24
25th Street	26496 Cemetary Road	34.55	-118.09					1976		106	2,000,000		Unknown	30
				Welded	Not Flexible	Ringwall with Sand Interior		1967		154	4,000,000		Unknown	30
45th Street	36510 45th St East	34.54	-118.05					1988		130	3,000,000		Unknown	30
								1990		150	4,000,000		Unknown	32
								1990		150	4,000,000		Unknown	32
47th Street	35645 47th St East	34.53	-118.05					1967		106	2,000,000		Unknown	30
								1990		132	3,000,000		Unknown	30
50th Street	5001 East Ave, T-8	34.54	-118.04					2007		150	4,000,000		Unknown	30
				Welded?	?	Concrete Ring Wall	None Shown	2007		150	4,000,000		Unknown	
Ana Verde	36800 Tovey Aveneu	34.55	-118.15	Welded	Not Flexible	Concrete Rink wall	Not Shown	1963		40	300,000		Unknown	32
El Camino Lower	36809 El Camino Dr.	34.55	-118.13					1988		106	2,000,000		Unknown	32
El Camino U.G[4]	36336 El Camino Road							1994		104	1,500,000		Unknown	26
El Camino Upper	33030 Ridge Route Rd	34.54	-118.13	Welded	Flexible	Ringwall with Sand Inte	None Shown	1963		40	300,000		Unknown	32
Walt Dahlitz	115 East Avenue S			Welded	Flexible	Concrete Ringwall, oil s	None Shown	1993		104	1,500,000		Unknown	31
Well 14	36401 20th ST East			Weled?	Not Flexible	Concrete Ringwall, grav	3/4" 5' OC 8" embed			27	100,000		Unknown	22
Well 18 and 19	4640 Barrel Springs Road							1963		22	41,000		Unknown	30
Well 5	1036 Barrel Spring Road							1963		30	1,463,945		Unknown	22

Tank Site	Freeboard Assumed to be 3 feet unless drawings indicate otherwise	Table 28: Ri 3 if anchored 2.5 if unanchored	13.2.1: Seismic Use Group	Table 24: I_E, assume that all tanks are Seismic Use Group III	ATC [1]: Sd1, per ATC Seismic Hazard Maps	Eqn 13-9 [1,2]: Sai, g Based on Sds from ASCE 7-10	Eqn 13-22: Sloshing Period, Tc(Ss	Eqn 13-12/13 [2]: Sac, g Based on Sd1 from ASCE 7-10	D/H	3.67*D/H	Volume ft³ Vol = π*(Dia^2)/4	13-27: Total Weight, lbf W = Vol*62.4pcf
3 MG Tank Site	3	2.5	iii	1.5	1.315	1.805	7.35	0.27	3.647	1.006	410594	25621040
5 MG Tank	3	2.5	iii	1.5	1.302	1.764	11.13	0.13	8.000	0.459	402124	25092529
6MG	3	2.5	iii	1.5	1.316	1.804	13.03	0.09	8.583	0.428	799900	49913745
25th Street	3	2.5	iii	1.5	1.316	1.804	6.74	0.29	3.533	1.039	264742	16519902
	3	2.5	iii	1.5	1.278	1.779	9.13	0.18	5.133	0.715	558795	34868813
45th Street	3	2.5	iii	1.5	1.214	1.723	7.92	0.23	4.333	0.847	398197	24847485
	3	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369
	3	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369
47th Street	3	2.5	iii	1.5	1.325	1.81	6.74	0.30	3.533	1.039	264742	16519902
	3	2.5	iii	1.5	1.325	1.81	8.02	0.25	4.400	0.834	410543	25617904
50th Street	3	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971
	3	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971
Ana Verde	3	2.5	iii	1.5	1.214	1.639	3.66	0.50	1.250	2.936	40212	2509253
El Camino Lower	3	2.5	iii	1.5	1.27	1.714	6.63	0.29	3.313	1.108	282391	17621228
El Camino U.G[4]												
El Camino Upper	3	2.5	iii	1.5	0.881	1.543	3.66	0.36	1.250	2.936	40212	2509253
Walt Dahlitz	3	2.5	iii	1.5	0.827	1.442	6.58	0.19	3.355	1.094	263341	16432470
Well 14	3	2.5	iii	1.5	0.927	1.514	3.01	0.46	1.227	2.990	12596	786004
Well 18 and 19	3	2.5	iii	1.5	1.323	1.8	2.71	0.73	0.733	5.005	11404	711608
Well 5	3	2.5	iii	1.5	1.311	1.782	3.18	0.62	1.364	2.691	15551	970375

Tank Site	13-25/26: Impulsive Weight, Moves with Tank, (Wi)	Eqn 13-28/29: Centroid of the lateral Force due to Sloshing (Xi), ft	Estimate: Weight of the Roof (Wr), lbf	Estimate: Weight of the Shell (Ws), lbf	Estimate: Weight of the Floor (Wf), lbf	Eqn 13-16: Implusive Design Acceleration (Ai)	Impulsive Lateral Force (Vi), kip	Eqn 13-24/25: Overturning Moment due to Impulsive Lateral Force(Mi), ft-kip	Convective Weight (Wc), lbf	Eqn 13-30: Centroid of the lateral force do to convective mass (Xc), ft	Convective Design Acceleration (Ai)	Convective Lateral Force (Vc), kip
3 MG Tank Site	8082906	13	92459	138480	92459	0.774	6503	82912	16424329	18	0.192	3150
5 MG Tank	3621894	8	153938	104550	153938	0.756	3050	22875	19810034	10	0.090	1784
6MG	6714999	9	255176	160865	255176	0.773	5711	51395	39739497	12	0.066	2640
25th Street	5375203	11	67564	104870	67564	0.773	4341	48840	10436273	16	0.209	2185
	7841520	11	142609	151052	142609	0.762	6311	71001	25267634	16	0.131	3318
45th Street	6614006	11	101623	127961	101623	0.738	5129	57696	17074207	16	0.164	2805
	8687384	12	135297	157017	135297	0.738	6731	80769	24894926	17	0.137	3398
	8687384	12	135297	157017	135297	0.738	6731	80769	24894926	17	0.137	3398
47th Street	5375203	11	67564	104870	67564	0.776	4356	49003	10436273	16	0.211	2200
	6716566	11	104774	129885	104774	0.776	5473	61576	17698347	16	0.177	3126
50th Street	7637298	11	135297	147203	135297	0.758	6103	68664	23796213	16	0.135	3223
	7637298	11	135297	147203	135297	0.758	6103	68664	23796213	16	0.135	3223
Ana Verde	1825481	12	9621	44129	9621	0.702	1327	16240	717357	22	0.355	255
El Camino Lower	6103267	12	67564	111862	67564	0.735	4665	55977	10784811	17	0.205	2215
El Camino U.G[4]												
El Camino Upper	1825481	12	9621	44129	9621	0.661	1249	15289	717357	22	0.258	185
Walt Dahlitz	5622265	12	65039	106378	65039	0.618	3621	42091	10122208	17	0.135	1362
Well 14	575712	8	4384	21166	4384	0.649	393	3325	220749	15	0.330	73
Well 18 and 19	597846	13	2910	24053	2910	0.771	484	6262	120014	24	0.524	63
Well 5	680168	8	5412	23283	5412	0.764	546	4500	301560	15	0.442	133

Tank Site	Eqn 13-26: Overturning Moment due to Convective Lateral Force(Mc), ft-kip	Eqn 13-31: Design Lateral Force at the top of the foundation (Vf), kip	Eqn 13-23: Design Overturning Moment (Ms), ft-kip $Ms = \sqrt{Mi^2+Mc^2}$	Eqn 13-37: Maximum Resting Weight of the Tank Contents (wL), lbf/ft		Eqn 13-41: Weight of the Tank Shell and Roof Resisting Overturning (wt), lbf/ft	Eqn 13-36: Overturning Ratio, J	Anchor Requirements	Eqn 13-53/54: Convective Design Accelaration, Af			Eqn 13-52: Sloshing Wave Height (d), ft	Table 29: Minimum Required Freeboard (D), ft	Actual Freeboard (Roof Height-Overflow)	Eqn 13-57: Allowable Lateral Load, V_{allow} (kip)	Total Lateral Seismic Load, Vt (Kip)	Sliding Check
3 MG Tank Site	57649	7226	100984	2185	5396	474	2.54	Provide Anchors	0.27	0.29	0.27	16.65	16.65	3	12851	7225.51729	OK
5 MG Tank	18144	3533	29197	1676	4096	361	0.57	Tank Is Stable	0.18	0.13	0.13	10.08	10.08	3	12338	3533.2461	OK
6MG	32159	6291	60628	1836	6328	446	0.64	Tank Is Stable	0.15	0.09	0.09	9.58	9.58	3	24349	6291.49113	OK
25th Street	35431	4860	60339	2052	4070	416	2.23	Provide Anchors	0.29	0.35	0.29	15.53	15.53	3	8304	4860.10557	OK
	51781	7130	87878	2052	5914	460	1.51	Uplift but Stable	0.21	0.18	0.18	14.15	14.15	3	17380	7130.09689	OK
45th Street	44414	5845	72811	2052	4992	438	1.77	Provide Anchors	0.23	0.23	0.23	14.95	14.95	3	12488	5845.27581	OK
	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
47th Street	35674	4880	60613	2052	4070	416	2.24	Provide Anchors	0.30	0.35	0.30	15.64	15.64	3	8301	4879.72502	OK
	49427	6303	78960	2052	5069	440	1.87	Provide Anchors	0.25	0.25	0.25	16.32	16.32	3	12801	6303.06969	OK
50th Street	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
Ana Verde	5658	1351	17197	2120	1638	389	5.44	Provide Anchors	0.50	1.09	0.50	9.95	9.95	3	1363	1351.04608	OK
El Camino Lower	38666	5164	68033	2120	4342	437	2.42	Provide Anchors	0.29	0.35	0.29	15.24	15.24	3	8916	5163.80732	OK
El Camino U.G[4]																	
El Camino Upper	4106	1263	15830	2120	1638	389	5.00	Provide Anchors	0.36	0.79	0.36	7.22	7.22	3	1371	1262.69341	OK
Walt Dahlitz	22997	3869	47963	2086	4127	425	1.80	Provide Anchors	0.19	0.23	0.19	9.80	9.80	3	8455	3868.50122	OK
Well 14	1119	400	3509	1758	760	275	4.80	Provide Anchors	0.46	1.23	0.46	6.24	6.24	3	435	399.685968	OK
Well 18 and 19	1513	488	6442	2052	845	369	11.47	Provide Anchors	0.73	2.17	0.73	8.06	8.06	3	387	488.300415	Needs Anchors
Well 5	1982	562	4918	1758	845	276	5.05	Provide Anchors	0.62	1.56	0.62	9.29	9.29	3	526	561.571023	Needs Anchors

1. Design spectral response acceleration parameters, S_{D1} and S_{DS}, have been determined using the Applied Technology Council's (ATC) web based hazard maps in accordance with the American Society of Civil Engineers Standard 7, Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)

2. The Design spectrum for impulsive components, Sai and the Design Spectrum for convective components, Sac have been determined in accordance with Chapter 13 of the AWWA D100-11, Welded Carbon Steel Tnaks for Water Storage. These parameters are expressed as a percentage of the accelration due to gravity, g.

3. Facility list indicates that these facilities conatain 0 gallons and does not provide the overflow height, therefore we were not apple to determine the seismic demands on these structures.
4. AWWA D100 calculations do not apply to the El Camino Underground tank. Construction drawings are not available to perform an analysis at this time.
4. Minimum required freeboard is equal to the sloshing wave height for Use Group III and may be reduced for Use Group I and II

Hazards by Location

Search Information

Coordinates: 34.557353817153206, -118.11224470422972

Elevation: 2750 ft

Timestamp: 2021-04-09T16:22:17.704Z

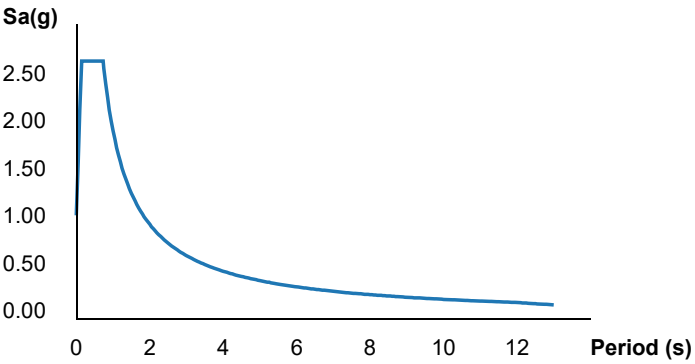
Hazard Type: Seismic

Reference Document: ASCE7-10

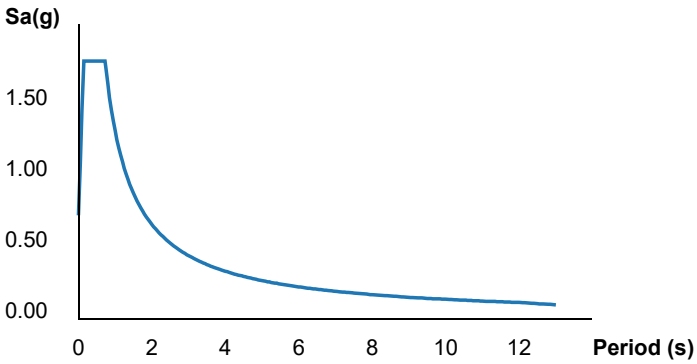
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.707	MCE_R ground motion (period=0.2s)
S_1	1.315	MCE_R ground motion (period=1.0s)
S_{MS}	2.707	Site-modified spectral acceleration value
S_{M1}	1.973	Site-modified spectral acceleration value
S_{DS}	1.805	Numeric seismic design value at 0.2s SA
S_{D1}	1.315	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.045	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.045	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.418	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.719	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.707	Factored deterministic acceleration value (0.2s)
S1RT	1.605	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.778	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.315	Factored deterministic acceleration value (1.0s)
PGAd	1.045	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53471326457233, -118.08343773439331

Elevation: 2968 ft

Timestamp: 2021-04-09T16:35:02.162Z

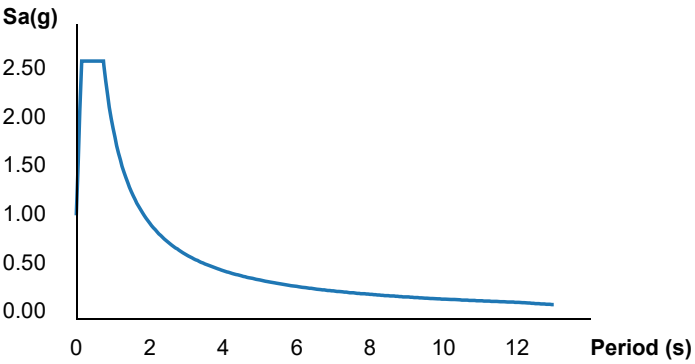
Hazard Type: Seismic

Reference Document: ASCE7-10

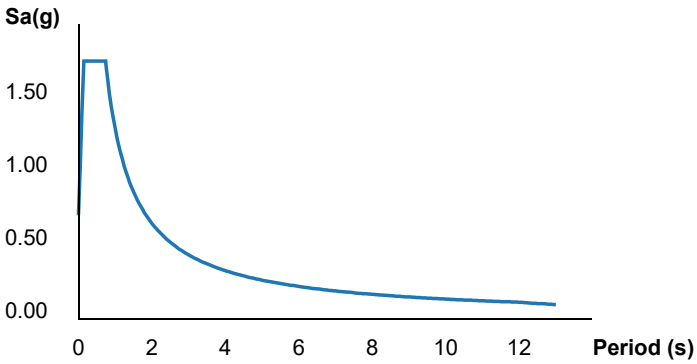
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.646	MCE_R ground motion (period=0.2s)
S_1	1.302	MCE_R ground motion (period=1.0s)
S_{MS}	2.646	Site-modified spectral acceleration value
S_{M1}	1.953	Site-modified spectral acceleration value
S_{DS}	1.764	Numeric seismic design value at 0.2s SA
S_{D1}	1.302	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.018	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.018	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.282	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.552	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.646	Factored deterministic acceleration value (0.2s)
S1RT	1.53	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.694	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.302	Factored deterministic acceleration value (1.0s)
PGAd	1.018	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.5497, -118.132821

Elevation: 2923 ft

Timestamp: 2021-04-08T21:00:34.329Z

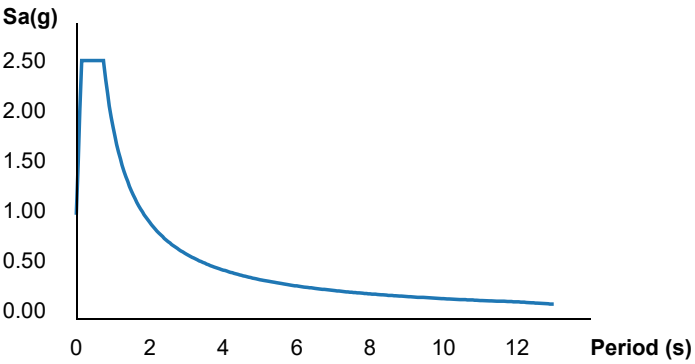
Hazard Type: Seismic

Reference Document: ASCE7-10

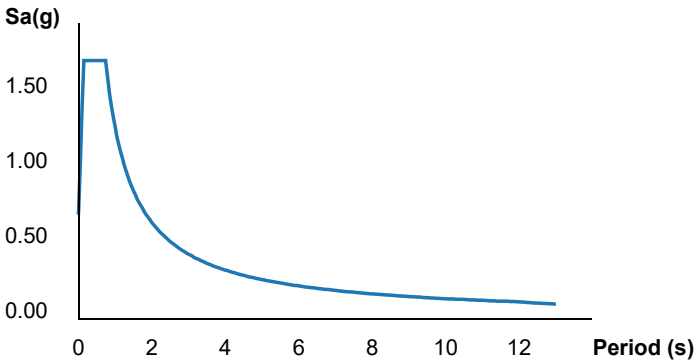
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.573	MCE_R ground motion (period=0.2s)
S_1	1.271	MCE_R ground motion (period=1.0s)
S_{MS}	2.573	Site-modified spectral acceleration value
S_{M1}	1.906	Site-modified spectral acceleration value
S_{DS}	1.715	Numeric seismic design value at 0.2s SA
S_{D1}	1.271	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.987	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.987	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.429	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.743	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.573	Factored deterministic acceleration value (0.2s)
S1RT	1.614	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.785	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.271	Factored deterministic acceleration value (1.0s)
PGAd	0.987	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.559419345037064, -118.11618400870667

Elevation: 2750 ft

Timestamp: 2021-04-09T16:36:57.402Z

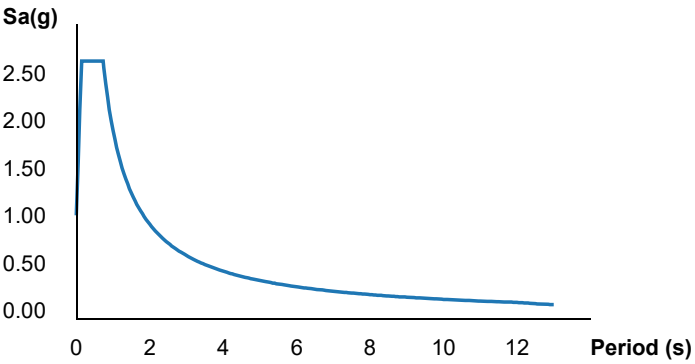
Hazard Type: Seismic

Reference Document: ASCE7-10

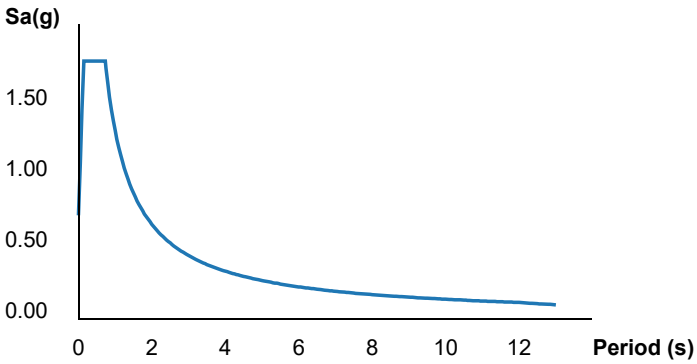
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.706	MCE_R ground motion (period=0.2s)
S_1	1.316	MCE_R ground motion (period=1.0s)
S_{MS}	2.706	Site-modified spectral acceleration value
S_{M1}	1.975	Site-modified spectral acceleration value
S_{DS}	1.804	Numeric seismic design value at 0.2s SA
S_{D1}	1.316	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.046	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.046	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.37	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.665	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.706	Factored deterministic acceleration value (0.2s)
S1RT	1.58	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.749	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.316	Factored deterministic acceleration value (1.0s)
PGAd	1.046	Factored deterministic acceleration value (PGA)

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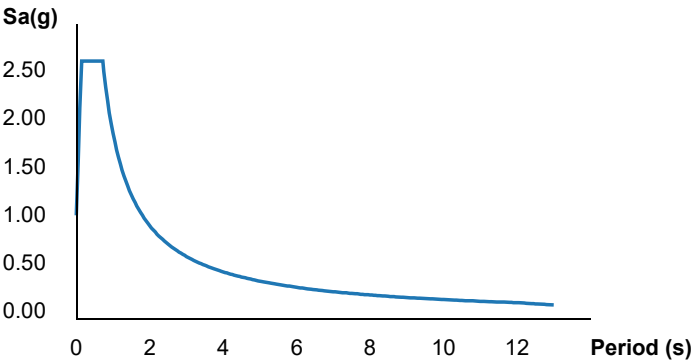
Hazards by Location

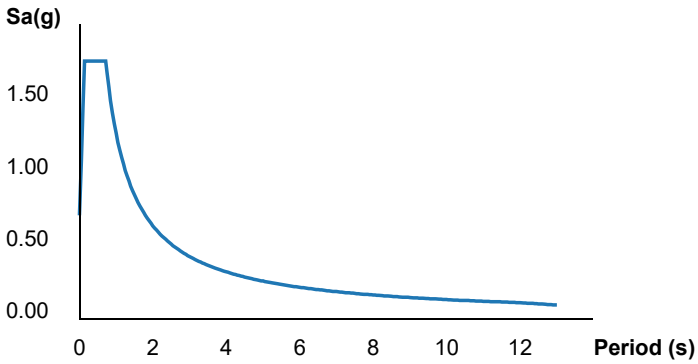
Search Information

Coordinates:	34.55371, -118.087856
Elevation:	2752 ft
Timestamp:	2021-04-09T16:19:01.173Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.668	MCE_R ground motion (period=0.2s)
S_1	1.278	MCE_R ground motion (period=1.0s)
S_{MS}	2.668	Site-modified spectral acceleration value
S_{M1}	1.917	Site-modified spectral acceleration value
S_{DS}	1.779	Numeric seismic design value at 0.2s SA
S_{D1}	1.278	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.902	Coefficient of risk (1.0s)

PGA	1.031	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.031	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.432	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.737	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.668	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.788	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.278	Factored deterministic acceleration value (1.0s)
PGAd	1.031	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.55371, -118.087856

Elevation: 2752 ft

Timestamp: 2021-04-09T16:17:53.781Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: IV

Site Class: D-default

Map data ©2021 Imagery ©2021 , CNES / Airbus, Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency

Basic Parameters

Name	Value	Description
S_S	2.404	MCE_R ground motion (period=0.2s)
S_1	1.025	MCE_R ground motion (period=1.0s)
S_{MS}	2.885	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.923	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.874	Coefficient of risk (0.2s)
CR_1	0.869	Coefficient of risk (1.0s)
PGA	1.033	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.24	Site modified peak ground acceleration

T_L	12	Long-period transition period (s)
SsRT	3.008	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.441	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.404	Factored deterministic acceleration value (0.2s)
S1RT	1.294	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.489	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.025	Factored deterministic acceleration value (1.0s)
PGAd	1.033	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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Hazards by Location

Search Information

Coordinates: 34.544961034712664, -118.04877924893493

Elevation: 2740 ft

Timestamp: 2021-04-09T16:27:34.922Z

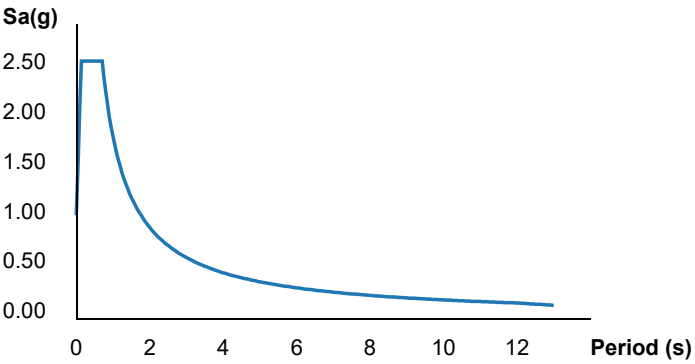
Hazard Type: Seismic

Reference Document: ASCE7-10

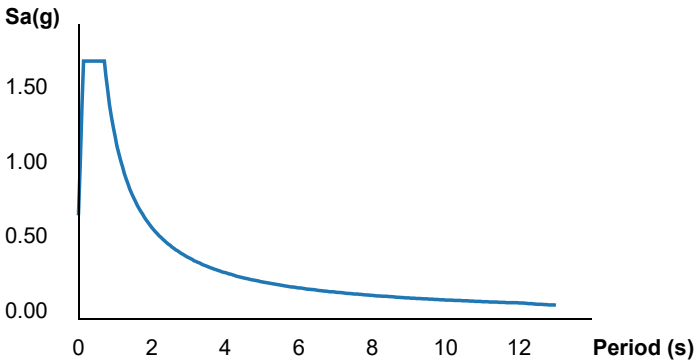
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.584	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.584	Site-modified spectral acceleration value
S_{M1}	1.821	Site-modified spectral acceleration value
S_{DS}	1.723	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.921	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	0.996	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.996	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.159	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.432	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.584	Factored deterministic acceleration value (0.2s)
S1RT	1.47	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.624	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.996	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.52903336279662, -118.04584351481934

Elevation: 2971 ft

Timestamp: 2021-04-09T16:31:06.633Z

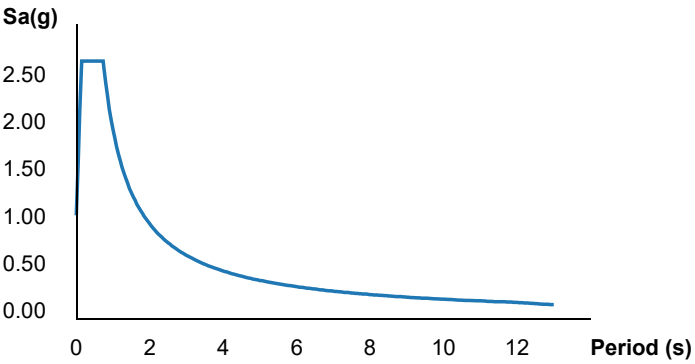
Hazard Type: Seismic

Reference Document: ASCE7-10

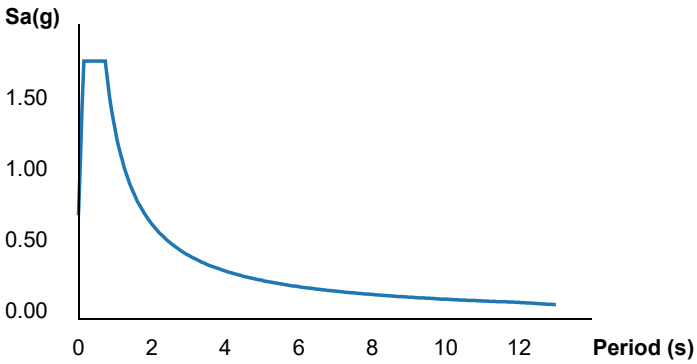
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.714	MCE_R ground motion (period=0.2s)
S_1	1.325	MCE_R ground motion (period=1.0s)
S_{MS}	2.714	Site-modified spectral acceleration value
S_{M1}	1.987	Site-modified spectral acceleration value
S_{DS}	1.81	Numeric seismic design value at 0.2s SA
S_{D1}	1.325	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.048	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.048	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.142	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.404	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.714	Factored deterministic acceleration value (0.2s)
S1RT	1.461	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.614	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.325	Factored deterministic acceleration value (1.0s)
PGAd	1.048	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.536316858195896, -118.04017088147585

Elevation: 2825 ft

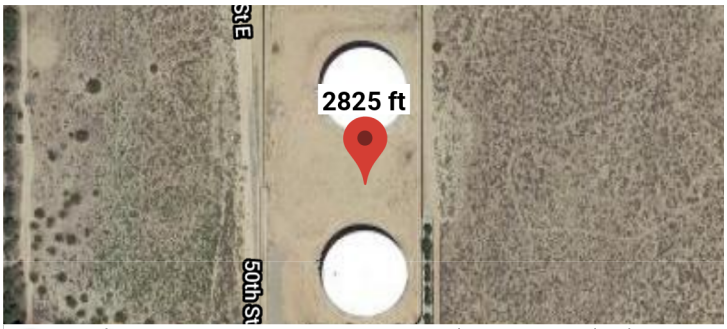
Timestamp: 2021-04-09T16:33:04.897Z

Hazard Type: Seismic

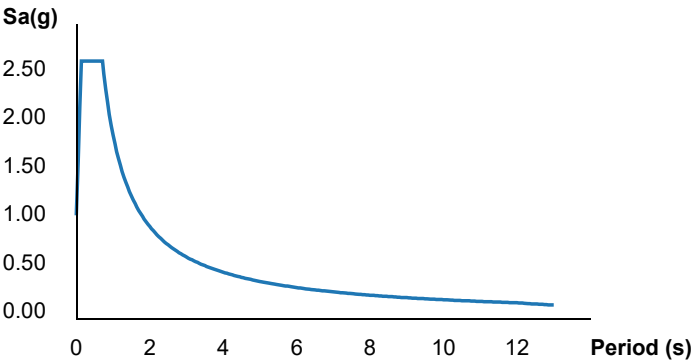
Reference Document: ASCE7-10

Risk Category: IV

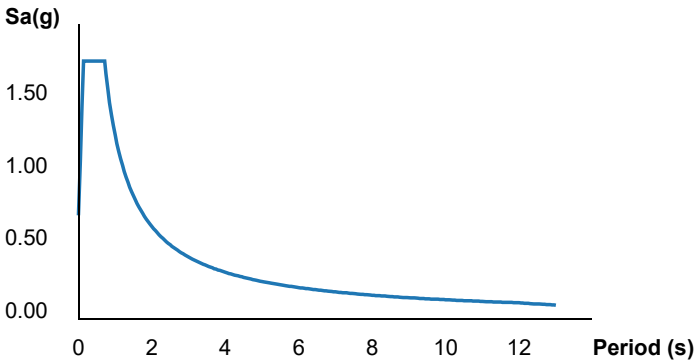
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.652	MCE_R ground motion (period=0.2s)
S_1	1.26	MCE_R ground motion (period=1.0s)
S_{MS}	2.652	Site-modified spectral acceleration value
S_{M1}	1.889	Site-modified spectral acceleration value
S_{DS}	1.768	Numeric seismic design value at 0.2s SA
S_{D1}	1.26	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.024	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.024	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.121	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.381	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.652	Factored deterministic acceleration value (0.2s)
S1RT	1.449	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.602	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.26	Factored deterministic acceleration value (1.0s)
PGAd	1.024	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.54972773620536, -118.1502535834671

Elevation: 3116 ft

Timestamp: 2021-04-09T16:41:41.594Z

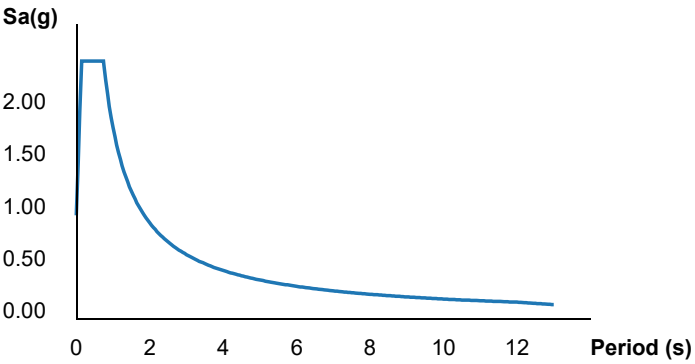
Hazard Type: Seismic

Reference Document: ASCE7-10

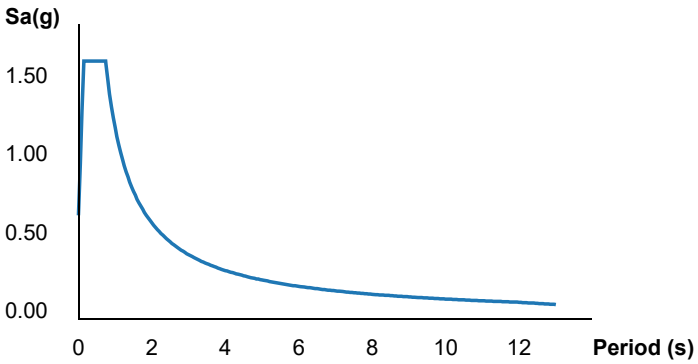
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.458	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.458	Site-modified spectral acceleration value
S_{M1}	1.82	Site-modified spectral acceleration value
S_{DS}	1.639	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)
CR_1	0.906	Coefficient of risk (1.0s)

PGA	0.945	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.945	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.335	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.642	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.458	Factored deterministic acceleration value (0.2s)
S1RT	1.566	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.728	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.945	Factored deterministic acceleration value (PGA)

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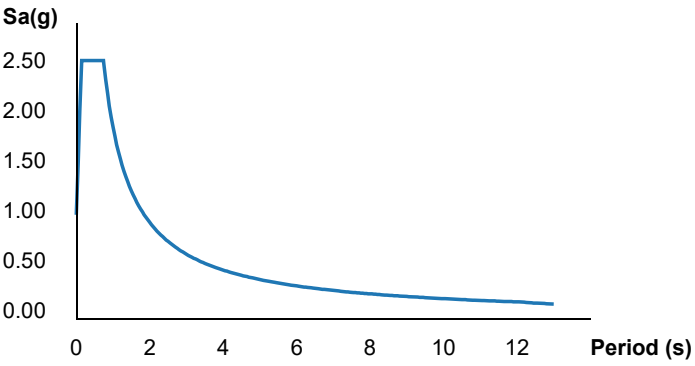
Hazards by Location

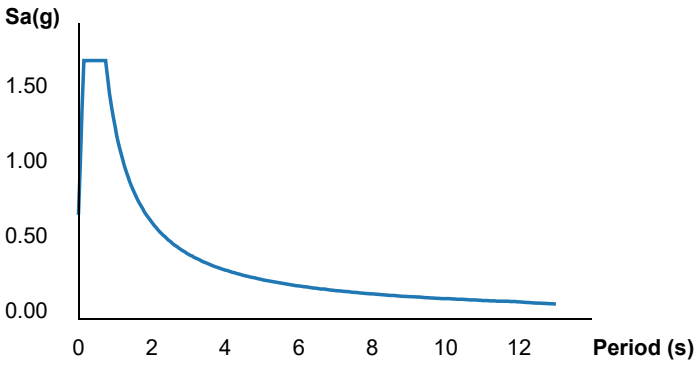
Search Information

Address:	36809 El Camino Dr, Palmdale, CA 93551, USA
Coordinates:	34.54952240000001, -118.1326806
Elevation:	2925 ft
Timestamp:	2021-04-09T16:20:57.078Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.571	MCE_R ground motion (period=0.2s)
S_1	1.27	MCE_R ground motion (period=1.0s)
S_{MS}	2.571	Site-modified spectral acceleration value
S_{M1}	1.905	Site-modified spectral acceleration value
S_{DS}	1.714	Numeric seismic design value at 0.2s SA
S_{D1}	1.27	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.986	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.986	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.426	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.74	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.571	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.783	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.27	Factored deterministic acceleration value (1.0s)
PGAd	0.986	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53840630847815, -118.13288506137695

Elevation: 3359 ft

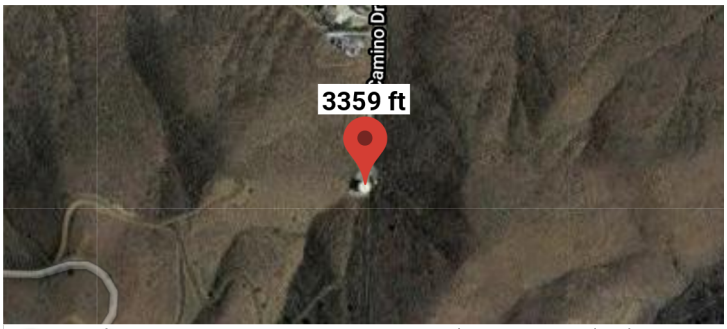
Timestamp: 2021-04-09T20:04:43.993Z

Hazard Type: Seismic

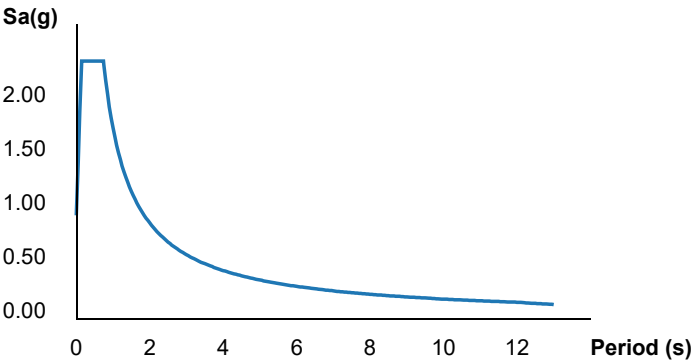
Reference Document: ASCE7-10

Risk Category: IV

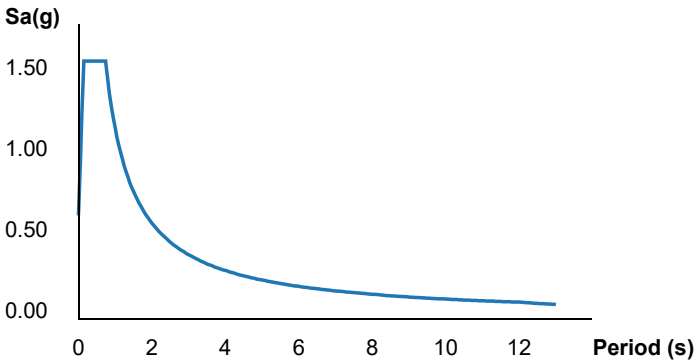
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.375	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.375	Site-modified spectral acceleration value
S_{M1}	1.756	Site-modified spectral acceleration value
S_{DS}	1.583	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)
CR_1	0.908	Coefficient of risk (1.0s)

PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.499	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.375	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.56128566737895, -118.12898168848265

Elevation: 2924 ft

Timestamp: 2021-04-09T20:40:24.218Z

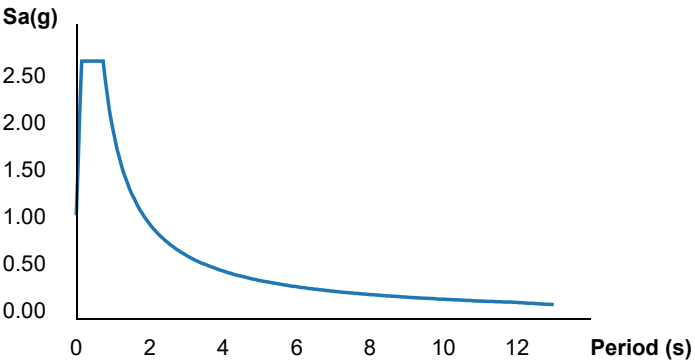
Hazard Type: Seismic

Reference Document: ASCE7-10

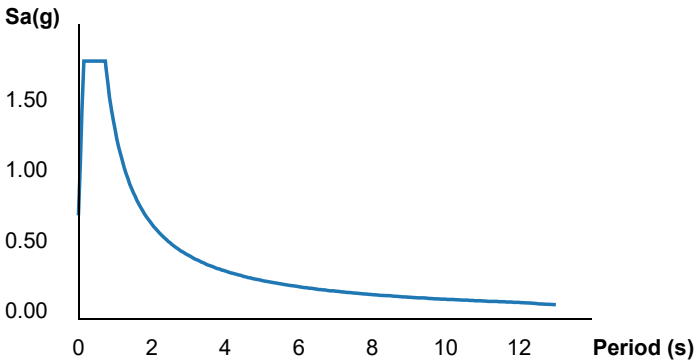
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.733	MCE_R ground motion (period=0.2s)
S_1	1.331	MCE_R ground motion (period=1.0s)
S_{MS}	2.733	Site-modified spectral acceleration value
S_{M1}	1.997	Site-modified spectral acceleration value
S_{DS}	1.822	Numeric seismic design value at 0.2s SA
S_{D1}	1.331	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.055	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.055	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.306	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.594	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.733	Factored deterministic acceleration value (0.2s)
S1RT	1.547	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.71	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.331	Factored deterministic acceleration value (1.0s)
PGAd	1.055	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.538438, -118.132863

Elevation: 3360 ft

Timestamp: 2021-04-08T22:06:10.243Z

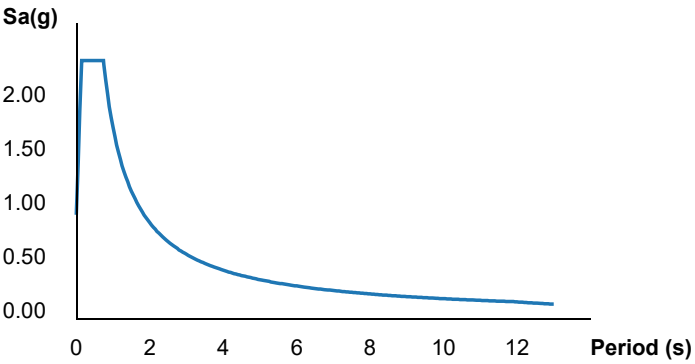
Hazard Type: Seismic

Reference Document: ASCE7-10

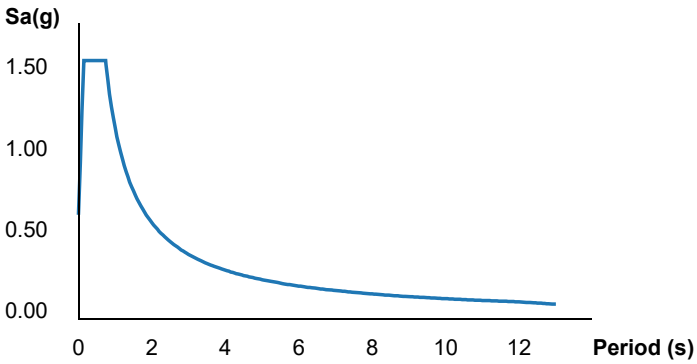
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.376	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.376	Site-modified spectral acceleration value
S_{M1}	1.757	Site-modified spectral acceleration value
S_{DS}	1.584	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)

CR_1	0.908	Coefficient of risk (1.0s)
PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.5	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.376	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.598759799594845, -118.09844223112182

Elevation: 2583 ft

Timestamp: 2021-04-09T20:48:48.917Z

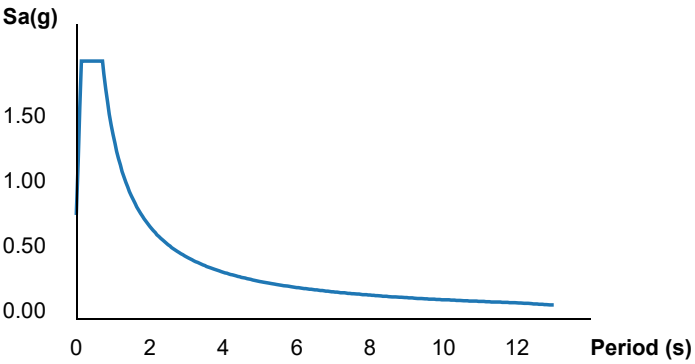
Hazard Type: Seismic

Reference Document: ASCE7-10

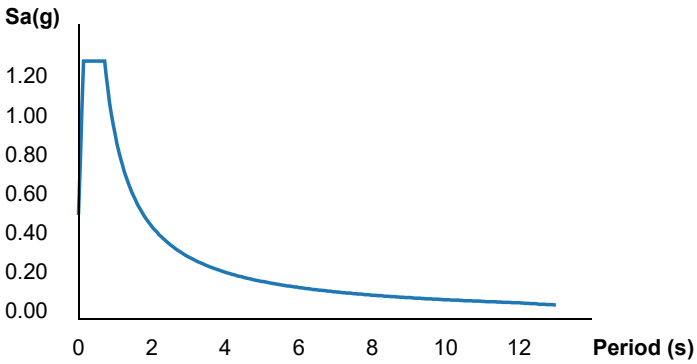
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.971	MCE_R ground motion (period=0.2s)
S_1	0.937	MCE_R ground motion (period=1.0s)
S_{MS}	1.971	Site-modified spectral acceleration value
S_{M1}	1.406	Site-modified spectral acceleration value
S_{DS}	1.314	Numeric seismic design value at 0.2s SA
S_{D1}	0.937	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.937	Coefficient of risk (0.2s)
CR_1	0.911	Coefficient of risk (1.0s)

PGA	0.77	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.77	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	2.602	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.776	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.971	Factored deterministic acceleration value (0.2s)
S1RT	1.168	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.282	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.937	Factored deterministic acceleration value (1.0s)
PGAd	0.77	Factored deterministic acceleration value (PGA)

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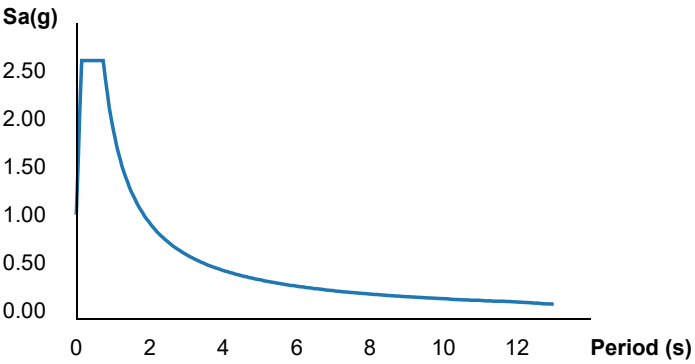
Hazards by Location

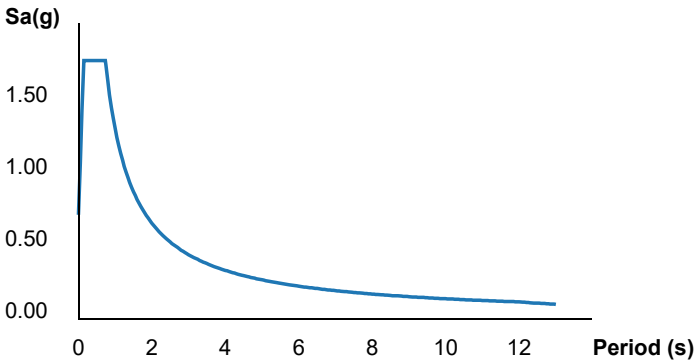
Search Information

Address:	1036 Barrel Spring Road palmdale, ca
Coordinates:	34.5457226, -118.1085956
Elevation:	2817 ft
Timestamp:	2021-05-04T20:11:47.998Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.674	MCE_R ground motion (period=0.2s)
S_1	1.311	MCE_R ground motion (period=1.0s)
S_{MS}	2.674	Site-modified spectral acceleration value
S_{M1}	1.967	Site-modified spectral acceleration value
S_{DS}	1.782	Numeric seismic design value at 0.2s SA
S_{D1}	1.311	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)

CR_1	0.902	Coefficient of risk (1.0s)
PGA	1.029	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.029	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.49	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.799	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.674	Factored deterministic acceleration value (0.2s)
S1RT	1.643	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.821	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.311	Factored deterministic acceleration value (1.0s)
PGAd	1.029	Factored deterministic acceleration value (PGA)

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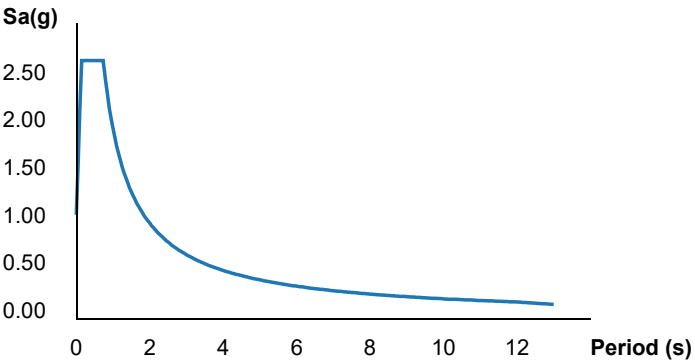
Hazards by Location

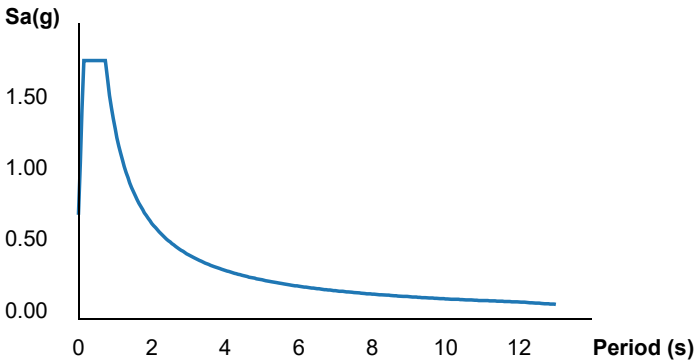
Search Information

Address:	15 4640 Barrel Spring Road palmdale, ca
Coordinates:	34.5268275, -118.0540864
Elevation:	3036 ft
Timestamp:	2021-05-04T20:14:23.952Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.7	MCE_R ground motion (period=0.2s)
S_1	1.323	MCE_R ground motion (period=1.0s)
S_{MS}	2.7	Site-modified spectral acceleration value
S_{M1}	1.984	Site-modified spectral acceleration value
S_{DS}	1.8	Numeric seismic design value at 0.2s SA
S_{D1}	1.323	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)

CR_1	0.905	Coefficient of risk (1.0s)
PGA	1.04	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.04	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.149	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.409	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.7	Factored deterministic acceleration value (0.2s)
S1RT	1.464	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.617	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.323	Factored deterministic acceleration value (1.0s)
PGAd	1.04	Factored deterministic acceleration value (PGA)

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AWWA D100-11 Welded Carbon Steel Tanks Chapter 13 Seismic Design

Tank Site	Address	Coordinates: Latitude	Coordinates: Longitude	Tank Details: Tank Type	Piping Connection	Footing	Anchorage	Date Built		Dia	Size	Bottom of the Knuckle	Top of Knuckle	Overflow Height	Freeboard Assumed to be 3 feet unless drawings indicate otherwise
3 MG Tank Site	850 East Avenue S	34.56	-118.11	Welded				1960		124	3,000,000		Unknown	34	3
5 MG Tank	2404 Old Nadeau Road	34.53	-118.08							160	5,000,000		Unknown	20	3
6MG	641 East Ave S	34.56	-118.15					1999		206	6,000,000		Unknown	24	3
25th Street	26496 Cemetary Road	34.55	-118.09					1976		106	2,000,000		Unknown	30	3
				Welded	Not Flexible	Ringwall with Sand Interior		1967		154	4,000,000		Unknown	30	3
45th Street	36510 45th St East	34.54	-118.05					1988		130	3,000,000		Unknown	30	3
								1990		150	4,000,000		Unknown	32	3
								1990		150	4,000,000		Unknown	32	3
47th Street	35645 47th St East	34.53	-118.05					1967		106	2,000,000		Unknown	30	3
								1990		132	3,000,000		Unknown	30	3
50th Street	5001 East Ave, T-8	34.54	-118.04					2007		150	4,000,000		Unknown	30	3
				Welded?	?	Concrete Ring Wall	None Shown	2007		150	4,000,000		Unknown		3
Ana Verde	36800 Tovey Aveneu	34.55	-118.15	Welded	Not Flexible	Concrete Rink wall	Not Shown	1963		40	300,000		Unknown	32	3
El Camino Lower	36809 El Camino Dr.	34.55	-118.13					1988		106	2,000,000		Unknown	32	3
El Camino U.G[4]	36336 El Camino Road							1994		104	1,500,000		Unknown	26	
El Camino Upper	33030 Ridge Route Rd	34.54	-118.13	Welded	Flexible	Ringwall with Sand Inte	None Shown	1963		40	300,000		Unknown	32	3
Walt Dahlitz	115 East Avenue S			Welded	Flexible	Concrete Ringwall, oil s	None Shown	1993		104	1,500,000		Unknown	31	3
Well 14	36401 20th ST East			Weled?	Not Flexible	Concrete Ringwall, grav	3/4" 5' OC 8" embed			27	100,000		Unknown	22	3
Well 18 and 19	4640 Barrel Springs Road							1963		22	41,000		Unknown	30	3
Well 5	1036 Barrel Spring Road							1963		30	1,463,945		Unknown	22	3

Tank Site	Table 28: Ri 3 if anchored 2.5 if unanchored	13.2.1: Seismic Use Group	Table 24: I_E, assume that all tanks are Seismic Use Group III	ATC [1]: Sd1, per ATC Seismic Hazard Maps	Eqn 13-9 [1,2]: Sai, g Based on Sds from ASCE 7-10	Eqn 13-22: Sloshing Period, Tc(Ss	Eqn 13-12/13 [2]: Sac, g Based on Sd1 from ASCE 7-10	D/H	3.67*D/H	Volume ft^3 Vol = π*(Dia^2)/4	13-27: Total Weight, lbf W = Vol*62.4pcf
3 MG Tank Site	2.5	iii	1.5	1.315	1.805	7.35	0.27	3.647	1.006	410594	25621040
5 MG Tank	2.5	iii	1.5	1.302	1.764	11.13	0.13	8.000	0.459	402124	25092529
6MG	2.5	iii	1.5	1.316	1.804	13.03	0.09	8.583	0.428	799900	49913745
25th Street	2.5	iii	1.5	1.316	1.804	6.74	0.29	3.533	1.039	264742	16519902
	2.5	iii	1.5	1.278	1.779	9.13	0.18	5.133	0.715	558795	34868813
45th Street	2.5	iii	1.5	1.214	1.723	7.92	0.23	4.333	0.847	398197	24847485
	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369
	2.5	iii	1.5	1.214	1.723	8.73	0.19	4.688	0.783	565487	35286369
47th Street	2.5	iii	1.5	1.325	1.81	6.74	0.30	3.533	1.039	264742	16519902
	2.5	iii	1.5	1.325	1.81	8.02	0.25	4.400	0.834	410543	25617904
50th Street	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971
	2.5	iii	1.5	1.26	1.768	8.93	0.19	5.000	0.734	530144	33080971
Ana Verde	2.5	iii	1.5	1.214	1.639	3.66	0.50	1.250	2.936	40212	2509253
El Camino Lower	2.5	iii	1.5	1.27	1.714	6.63	0.29	3.313	1.108	282391	17621228
El Camino U.G[4]											
El Camino Upper	2.5	iii	1.5	0.881	1.543	3.66	0.36	1.250	2.936	40212	2509253
Walt Dahlitz	2.5	iii	1.5	0.827	1.442	6.58	0.19	3.355	1.094	263341	16432470
Well 14	2.5	iii	1.5	0.927	1.514	3.01	0.46	1.227	2.990	12596	786004
Well 18 and 19	2.5	iii	1.5	1.323	1.8	2.71	0.73	0.733	5.005	11404	711608
Well 5	2.5	iii	1.5	1.311	1.782	3.18	0.62	1.364	2.691	15551	970375

Tank Site	13-25/26: Impulsive Weight, Moves with Tank, (Wi)	Eqn 13-28/29: Centroid of the lateral Force due to Sloshing (Xi), ft	Estimate: Weight of the Roof (Wr), lbf	Estimate: Weight of the Shell (Ws), lbf	Estimate: Weight of the Floor (Wf), lbf	Eqn 13-16: Implusive Design Acceleration (Ai)	Impulsive Lateral Force (Vi), kip	Eqn 13-24/25: Overturning Moment due to Impulsive Lateral Force(Mi), ft-kip	Convective Weight (Wc), lbf	Eqn 13-30: Centroid of the lateral force do to convective mass (Xc), ft	Convective Design Acceleration (Ai)	Convective Lateral Force (Vc), kip
3 MG Tank Site	8082906	13	92459	138480	92459	0.774	6503	82912	16424329	18	0.192	3150
5 MG Tank	3621894	8	153938	104550	153938	0.756	3050	22875	19810034	10	0.090	1784
6MG	6714999	9	255176	160865	255176	0.773	5711	51395	39739497	12	0.066	2640
25th Street	5375203	11	67564	104870	67564	0.773	4341	48840	10436273	16	0.209	2185
	7841520	11	142609	151052	142609	0.762	6311	71001	25267634	16	0.131	3318
45th Street	6614006	11	101623	127961	101623	0.738	5129	57696	17074207	16	0.164	2805
	8687384	12	135297	157017	135297	0.738	6731	80769	24894926	17	0.137	3398
	8687384	12	135297	157017	135297	0.738	6731	80769	24894926	17	0.137	3398
47th Street	5375203	11	67564	104870	67564	0.776	4356	49003	10436273	16	0.211	2200
	6716566	11	104774	129885	104774	0.776	5473	61576	17698347	16	0.177	3126
50th Street	7637298	11	135297	147203	135297	0.758	6103	68664	23796213	16	0.135	3223
	7637298	11	135297	147203	135297	0.758	6103	68664	23796213	16	0.135	3223
Ana Verde	1825481	12	9621	44129	9621	0.702	1327	16240	717357	22	0.355	255
El Camino Lower	6103267	12	67564	111862	67564	0.735	4665	55977	10784811	17	0.205	2215
El Camino U.G[4]												
El Camino Upper	1825481	12	9621	44129	9621	0.661	1249	15289	717357	22	0.258	185
Walt Dahlitz	5622265	12	65039	106378	65039	0.618	3621	42091	10122208	17	0.135	1362
Well 14	575712	8	4384	21166	4384	0.649	393	3325	220749	15	0.330	73
Well 18 and 19	597846	13	2910	24053	2910	0.771	484	6262	120014	24	0.524	63
Well 5	680168	8	5412	23283	5412	0.764	546	4500	301560	15	0.442	133

Tank Site	Eqn 13-26: Overturning Moment due to Convective Lateral Force(Mc), ft-kip	Eqn 13-31: Design Lateral Force at the top of the foundation (Vf), kip	Eqn 13-23: Design Overturning Moment (Ms), ft-kip Ms = √(Mi²+Mc²)	Eqn 13-37: Maximum Resting Weight of the Tank Contents (wL), lbf/ft		Eqn 13-41: Weight of the Tank Shell and Roof Resisting Overturning (wt), lbf/ft	Eqn 13-36: Overturning Ratio, J	Anchor Requirements	Eqn 13-53/54: Convective Design Accelaration, Af			Eqn 13-52: Sloshing Wave Height (d), ft	Table 29: Minimum Required Freeboard (D), ft	Actual Freeboard (Roof Height-Overflow)	Eqn 13-57: Allowable Lateral Load, V_{allow} (kip)	Total Lateral Seismic Load, Vt (Kip)	Sliding Check
3 MG Tank Site	57649	7226	100984	2185	5396	474	2.54	Provide Anchors	0.27	0.29	0.27	16.65	16.65	3	12851	7225.51729	OK
5 MG Tank	18144	3533	29197	1676	4096	361	0.57	Tank Is Stable	0.18	0.13	0.13	10.08	10.08	3	12338	3533.2461	OK
6MG	32159	6291	60628	1836	6328	446	0.64	Tank Is Stable	0.15	0.09	0.09	9.58	9.58	3	24349	6291.49113	OK
25th Street	35431	4860	60339	2052	4070	416	2.23	Provide Anchors	0.29	0.35	0.29	15.53	15.53	3	8304	4860.10557	OK
	51781	7130	87878	2052	5914	460	1.51	Uplift but Stable	0.21	0.18	0.18	14.15	14.15	3	17380	7130.09689	OK
45th Street	44414	5845	72811	2052	4992	438	1.77	Provide Anchors	0.23	0.23	0.23	14.95	14.95	3	12488	5845.27581	OK
	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
	56992	7540	98852	2120	6144	477	1.74	Provide Anchors	0.21	0.19	0.19	14.33	14.33	3	17687	7540.06677	OK
47th Street	35674	4880	60613	2052	4070	416	2.24	Provide Anchors	0.30	0.35	0.30	15.64	15.64	3	8301	4879.72502	OK
	49427	6303	78960	2052	5069	440	1.87	Provide Anchors	0.25	0.25	0.25	16.32	16.32	3	12801	6303.06969	OK
50th Street	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
	50405	6902	85178	2052	5760	456	1.55	Provide Anchors	0.21	0.19	0.19	14.22	14.22	3	16514	6902.16829	OK
Ana Verde	5658	1351	17197	2120	1638	389	5.44	Provide Anchors	0.50	1.09	0.50	9.95	9.95	3	1363	1351.04608	OK
El Camino Lower	38666	5164	68033	2120	4342	437	2.42	Provide Anchors	0.29	0.35	0.29	15.24	15.24	3	8916	5163.80732	OK
El Camino U.G[4]																	
El Camino Upper	4106	1263	15830	2120	1638	389	5.00	Provide Anchors	0.36	0.79	0.36	7.22	7.22	3	1371	1262.69341	OK
Walt Dahlitz	22997	3869	47963	2086	4127	425	1.80	Provide Anchors	0.19	0.23	0.19	9.80	9.80	3	8455	3868.50122	OK
Well 14	1119	400	3509	1758	760	275	4.80	Provide Anchors	0.46	1.23	0.46	6.24	6.24	3	435	399.685968	OK
Well 18 and 19	1513	488	6442	2052	845	369	11.47	Provide Anchors	0.73	2.17	0.73	8.06	8.06	3	387	488.300415	Needs Anchors
Well 5	1982	562	4918	1758	845	276	5.05	Provide Anchors	0.62	1.56	0.62	9.29	9.29	3	526	561.571023	Needs Anchors

1. Design spectral response acceleration parameters, S_{D1} and S_{DS}, have been determined using the Applied Technology Council's (ATC) web based hazard maps in accordance with the American Society of Civil Engineers Standard 7, Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)

2. The Design spectrum for impulsive components, Sai and the Design Spectrum for convective components, Sac have been determined in accordance with Chapter 13 of the AWWA D100-11, Welded Carbon Steel Tnaks for Water Storage. These parameters are expressed as a percentage of the accelration due to gravity, g.

3. Facility list indicates that these facilities conatain 0 gallons and does not provide the overflow height, therefore we were not apple to determine the seismic demands on these structures.
4. AWWA D100 calculations do not apply to the El Camino Underground tank. Construction drawings are not available to perform an analysis at this time.
4. Minimum required freeboard is equal to the sloshing wave height for Use Group III and may be reduced for Use Group I and II

Hazards by Location

Search Information

Coordinates: 34.557353817153206, -118.11224470422972

Elevation: 2750 ft

Timestamp: 2021-04-09T16:22:17.704Z

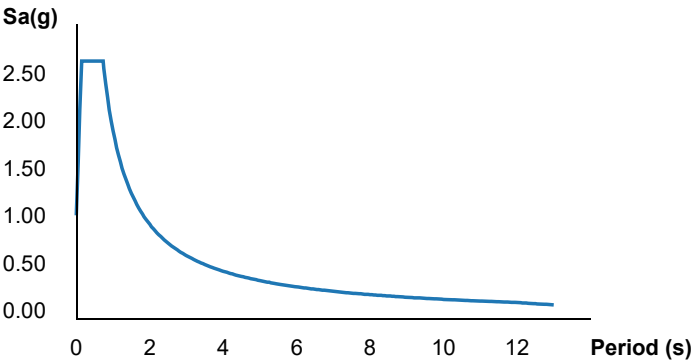
Hazard Type: Seismic

Reference Document: ASCE7-10

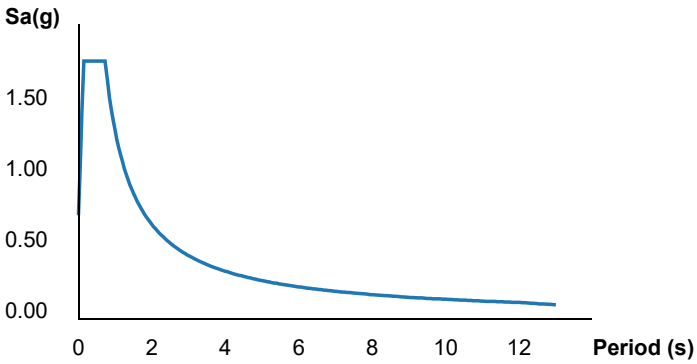
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.707	MCE_R ground motion (period=0.2s)
S_1	1.315	MCE_R ground motion (period=1.0s)
S_{MS}	2.707	Site-modified spectral acceleration value
S_{M1}	1.973	Site-modified spectral acceleration value
S_{DS}	1.805	Numeric seismic design value at 0.2s SA
S_{D1}	1.315	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.045	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.045	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.418	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.719	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.707	Factored deterministic acceleration value (0.2s)
S1RT	1.605	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.778	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.315	Factored deterministic acceleration value (1.0s)
PGAd	1.045	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53471326457233, -118.08343773439331

Elevation: 2968 ft

Timestamp: 2021-04-09T16:35:02.162Z

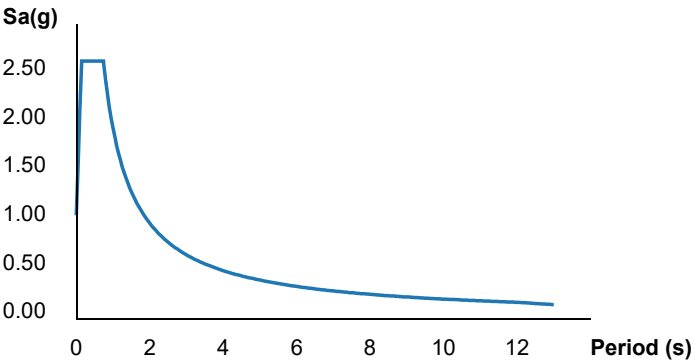
Hazard Type: Seismic

Reference Document: ASCE7-10

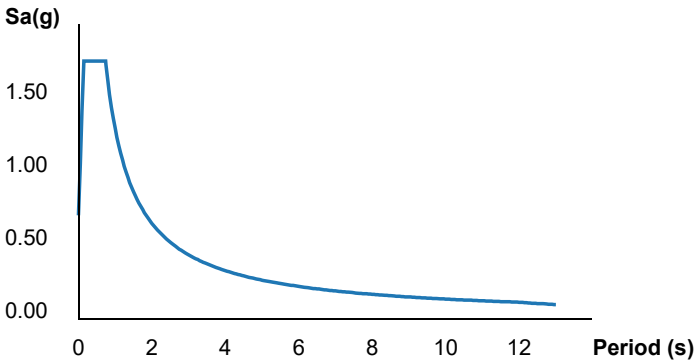
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.646	MCE_R ground motion (period=0.2s)
S_1	1.302	MCE_R ground motion (period=1.0s)
S_{MS}	2.646	Site-modified spectral acceleration value
S_{M1}	1.953	Site-modified spectral acceleration value
S_{DS}	1.764	Numeric seismic design value at 0.2s SA
S_{D1}	1.302	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.018	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.018	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.282	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.552	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.646	Factored deterministic acceleration value (0.2s)
S1RT	1.53	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.694	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.302	Factored deterministic acceleration value (1.0s)
PGAd	1.018	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.5497, -118.132821

Elevation: 2923 ft

Timestamp: 2021-04-08T21:00:34.329Z

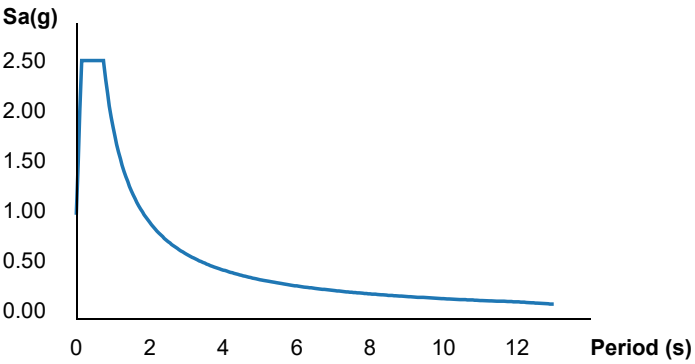
Hazard Type: Seismic

Reference Document: ASCE7-10

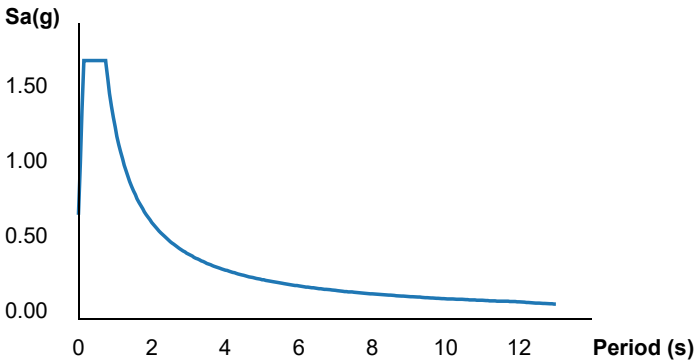
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.573	MCE_R ground motion (period=0.2s)
S_1	1.271	MCE_R ground motion (period=1.0s)
S_{MS}	2.573	Site-modified spectral acceleration value
S_{M1}	1.906	Site-modified spectral acceleration value
S_{DS}	1.715	Numeric seismic design value at 0.2s SA
S_{D1}	1.271	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.987	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.987	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.429	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.743	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.573	Factored deterministic acceleration value (0.2s)
S1RT	1.614	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.785	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.271	Factored deterministic acceleration value (1.0s)
PGAd	0.987	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.559419345037064, -118.11618400870667

Elevation: 2750 ft

Timestamp: 2021-04-09T16:36:57.402Z

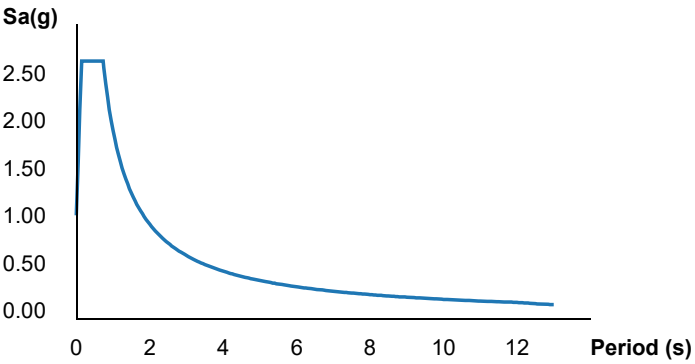
Hazard Type: Seismic

Reference Document: ASCE7-10

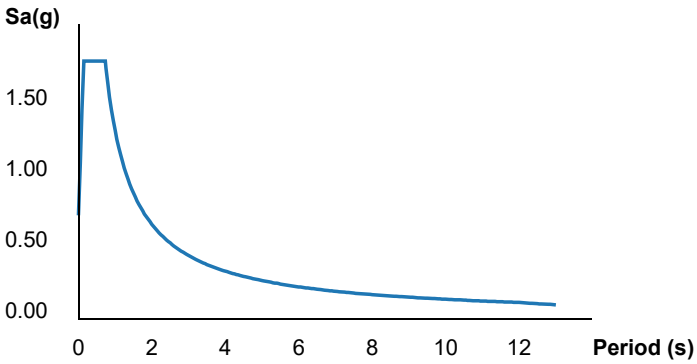
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.706	MCE_R ground motion (period=0.2s)
S_1	1.316	MCE_R ground motion (period=1.0s)
S_{MS}	2.706	Site-modified spectral acceleration value
S_{M1}	1.975	Site-modified spectral acceleration value
S_{DS}	1.804	Numeric seismic design value at 0.2s SA
S_{D1}	1.316	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.903	Coefficient of risk (1.0s)

PGA	1.046	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.046	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.37	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.665	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.706	Factored deterministic acceleration value (0.2s)
S1RT	1.58	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.749	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.316	Factored deterministic acceleration value (1.0s)
PGAd	1.046	Factored deterministic acceleration value (PGA)

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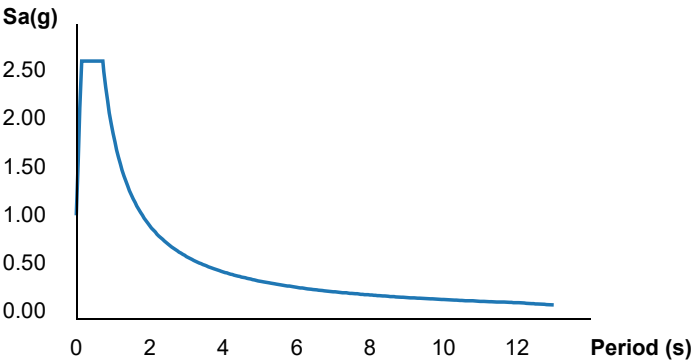
Hazards by Location

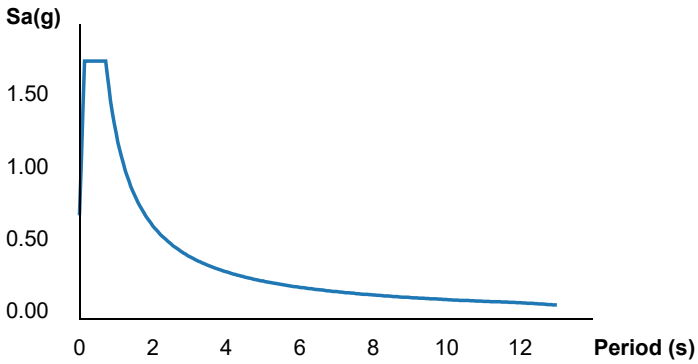
Search Information

Coordinates:	34.55371, -118.087856
Elevation:	2752 ft
Timestamp:	2021-04-09T16:19:01.173Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.668	MCE_R ground motion (period=0.2s)
S_1	1.278	MCE_R ground motion (period=1.0s)
S_{MS}	2.668	Site-modified spectral acceleration value
S_{M1}	1.917	Site-modified spectral acceleration value
S_{DS}	1.779	Numeric seismic design value at 0.2s SA
S_{D1}	1.278	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)
CR_1	0.902	Coefficient of risk (1.0s)

PGA	1.031	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.031	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.432	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.737	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.668	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.788	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.278	Factored deterministic acceleration value (1.0s)
PGAd	1.031	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.55371, -118.087856

Elevation: 2752 ft

Timestamp: 2021-04-09T16:17:53.781Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: IV

Site Class: D-default

Map data ©2021 Imagery ©2021 , CNES / Airbus, Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency

Basic Parameters

Name	Value	Description
S_S	2.404	MCE_R ground motion (period=0.2s)
S_1	1.025	MCE_R ground motion (period=1.0s)
S_{MS}	2.885	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.923	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.874	Coefficient of risk (0.2s)
CR_1	0.869	Coefficient of risk (1.0s)
PGA	1.033	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.24	Site modified peak ground acceleration

T_L	12	Long-period transition period (s)
SsRT	3.008	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.441	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.404	Factored deterministic acceleration value (0.2s)
S1RT	1.294	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.489	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.025	Factored deterministic acceleration value (1.0s)
PGAd	1.033	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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Hazards by Location

Search Information

Coordinates: 34.544961034712664, -118.04877924893493

Elevation: 2740 ft

Timestamp: 2021-04-09T16:27:34.922Z

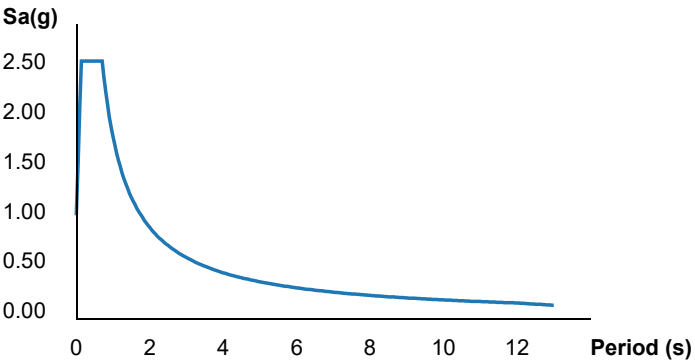
Hazard Type: Seismic

Reference Document: ASCE7-10

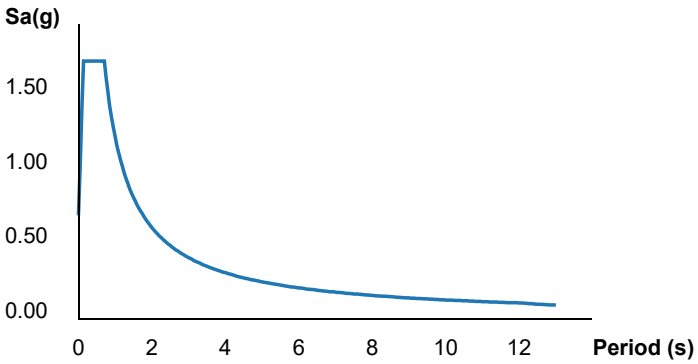
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.584	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.584	Site-modified spectral acceleration value
S_{M1}	1.821	Site-modified spectral acceleration value
S_{DS}	1.723	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.921	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	0.996	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.996	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.159	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.432	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.584	Factored deterministic acceleration value (0.2s)
S1RT	1.47	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.624	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.996	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.52903336279662, -118.04584351481934

Elevation: 2971 ft

Timestamp: 2021-04-09T16:31:06.633Z

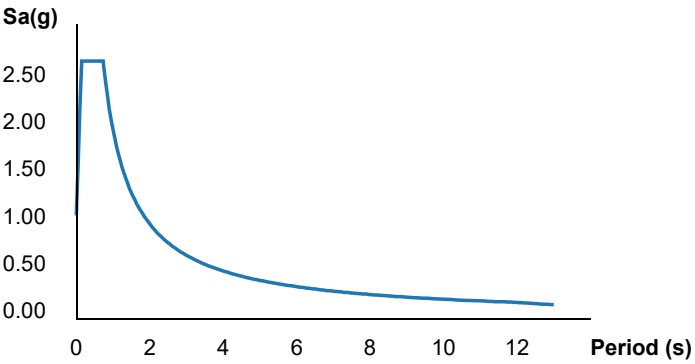
Hazard Type: Seismic

Reference Document: ASCE7-10

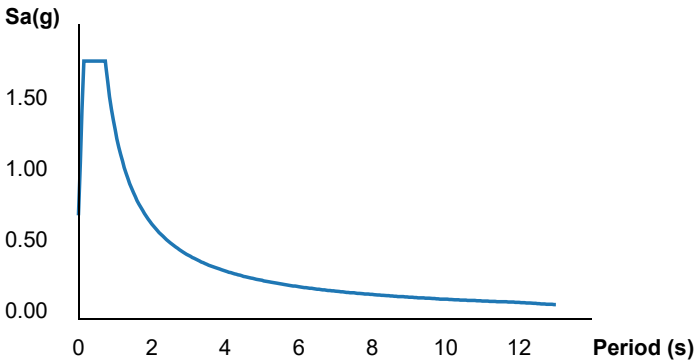
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.714	MCE_R ground motion (period=0.2s)
S_1	1.325	MCE_R ground motion (period=1.0s)
S_{MS}	2.714	Site-modified spectral acceleration value
S_{M1}	1.987	Site-modified spectral acceleration value
S_{DS}	1.81	Numeric seismic design value at 0.2s SA
S_{D1}	1.325	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.048	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.048	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.142	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.404	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.714	Factored deterministic acceleration value (0.2s)
S1RT	1.461	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.614	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.325	Factored deterministic acceleration value (1.0s)
PGAd	1.048	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.536316858195896, -118.04017088147585

Elevation: 2825 ft

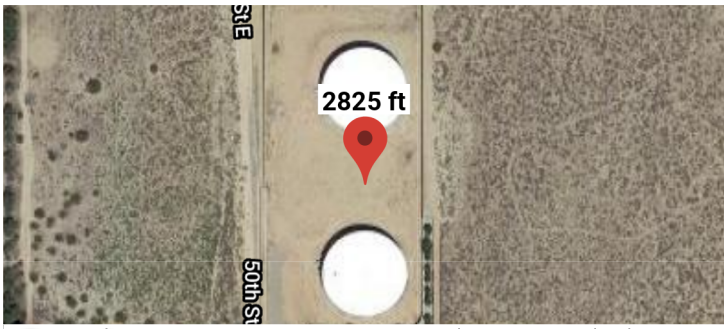
Timestamp: 2021-04-09T16:33:04.897Z

Hazard Type: Seismic

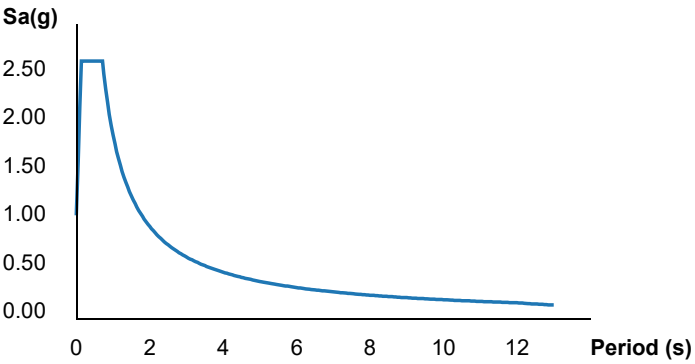
Reference Document: ASCE7-10

Risk Category: IV

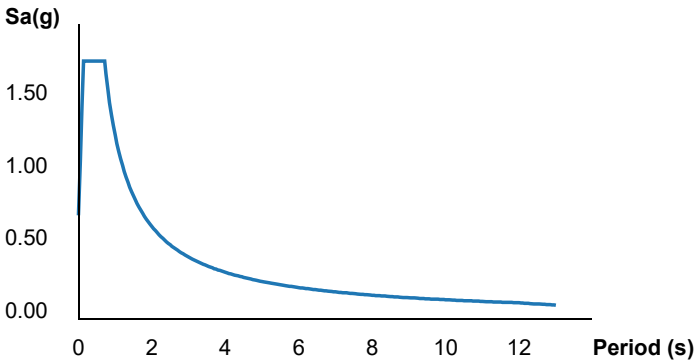
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.652	MCE_R ground motion (period=0.2s)
S_1	1.26	MCE_R ground motion (period=1.0s)
S_{MS}	2.652	Site-modified spectral acceleration value
S_{M1}	1.889	Site-modified spectral acceleration value
S_{DS}	1.768	Numeric seismic design value at 0.2s SA
S_{D1}	1.26	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.923	Coefficient of risk (0.2s)
CR_1	0.905	Coefficient of risk (1.0s)

PGA	1.024	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.024	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.121	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.381	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.652	Factored deterministic acceleration value (0.2s)
S1RT	1.449	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.602	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.26	Factored deterministic acceleration value (1.0s)
PGAd	1.024	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.54972773620536, -118.1502535834671

Elevation: 3116 ft

Timestamp: 2021-04-09T16:41:41.594Z

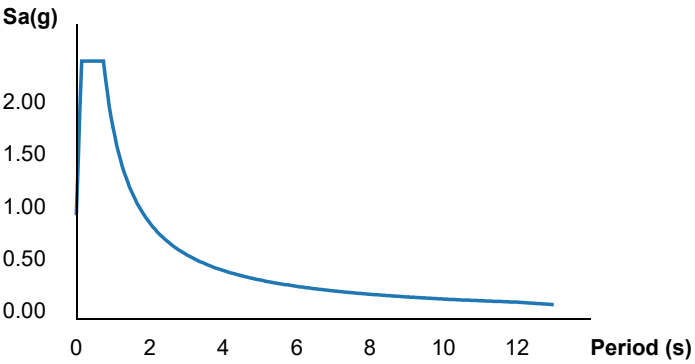
Hazard Type: Seismic

Reference Document: ASCE7-10

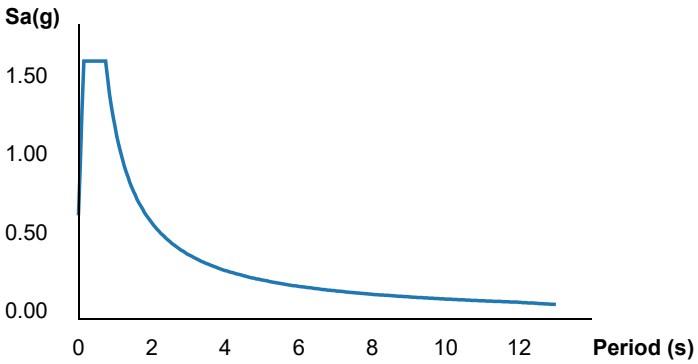
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.458	MCE_R ground motion (period=0.2s)
S_1	1.214	MCE_R ground motion (period=1.0s)
S_{MS}	2.458	Site-modified spectral acceleration value
S_{M1}	1.82	Site-modified spectral acceleration value
S_{DS}	1.639	Numeric seismic design value at 0.2s SA
S_{D1}	1.214	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)
CR_1	0.906	Coefficient of risk (1.0s)

PGA	0.945	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.945	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.335	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.642	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.458	Factored deterministic acceleration value (0.2s)
S1RT	1.566	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.728	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.214	Factored deterministic acceleration value (1.0s)
PGAd	0.945	Factored deterministic acceleration value (PGA)

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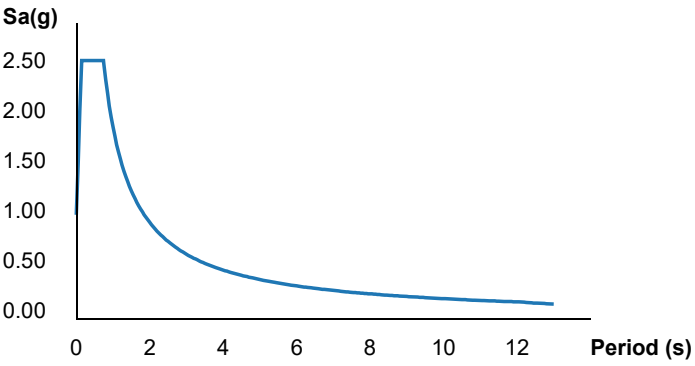
Hazards by Location

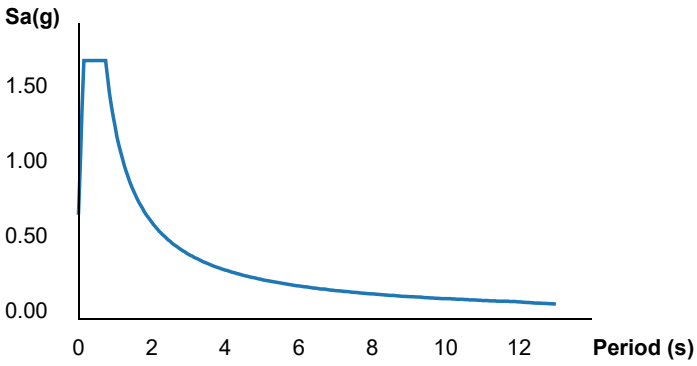
Search Information

Address:	36809 El Camino Dr, Palmdale, CA 93551, USA
Coordinates:	34.54952240000001, -118.1326806
Elevation:	2925 ft
Timestamp:	2021-04-09T16:20:57.078Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	IV
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.571	MCE_R ground motion (period=0.2s)
S_1	1.27	MCE_R ground motion (period=1.0s)
S_{MS}	2.571	Site-modified spectral acceleration value
S_{M1}	1.905	Site-modified spectral acceleration value
S_{DS}	1.714	Numeric seismic design value at 0.2s SA
S_{D1}	1.27	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.916	Coefficient of risk (0.2s)

CR_1	0.904	Coefficient of risk (1.0s)
PGA	0.986	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.986	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.426	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.74	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.571	Factored deterministic acceleration value (0.2s)
S1RT	1.613	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.783	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.27	Factored deterministic acceleration value (1.0s)
PGAd	0.986	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.53840630847815, -118.13288506137695

Elevation: 3359 ft

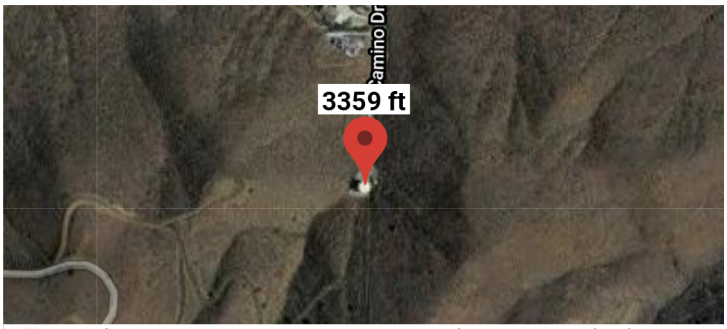
Timestamp: 2021-04-09T20:04:43.993Z

Hazard Type: Seismic

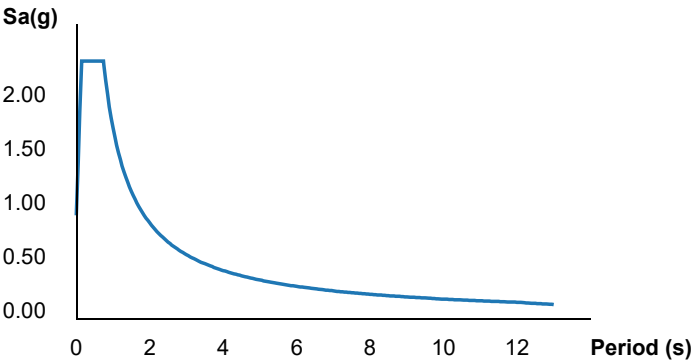
Reference Document: ASCE7-10

Risk Category: IV

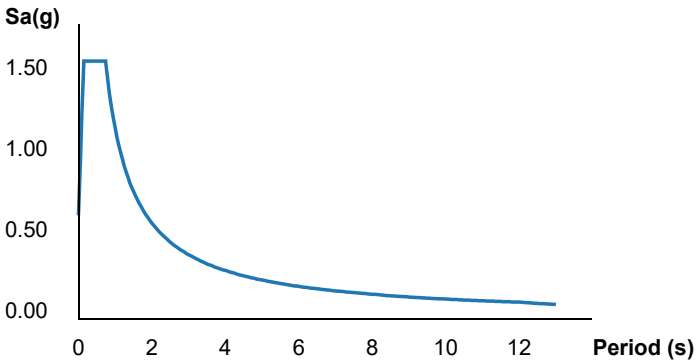
Site Class: D



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.375	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.375	Site-modified spectral acceleration value
S_{M1}	1.756	Site-modified spectral acceleration value
S_{DS}	1.583	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)
CR_1	0.908	Coefficient of risk (1.0s)

PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.499	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.375	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.56128566737895, -118.12898168848265

Elevation: 2924 ft

Timestamp: 2021-04-09T20:40:24.218Z

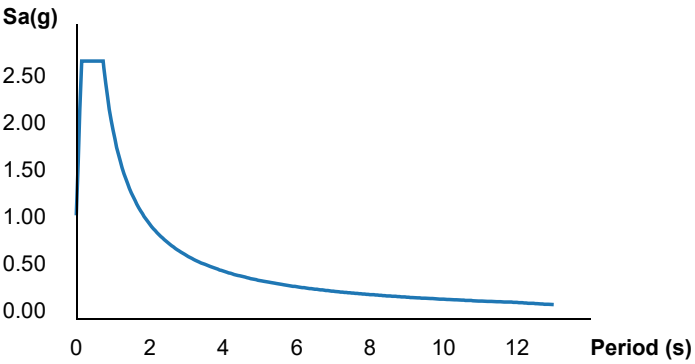
Hazard Type: Seismic

Reference Document: ASCE7-10

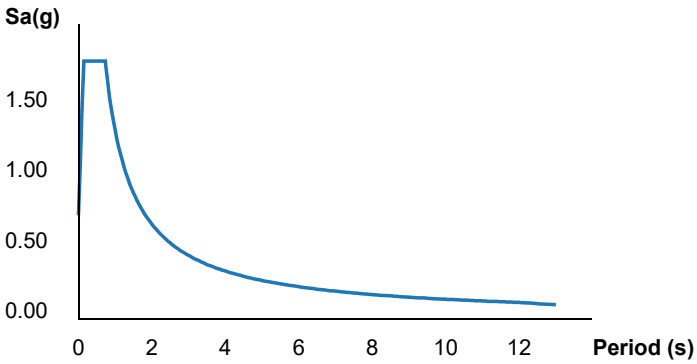
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.733	MCE_R ground motion (period=0.2s)
S_1	1.331	MCE_R ground motion (period=1.0s)
S_{MS}	2.733	Site-modified spectral acceleration value
S_{M1}	1.997	Site-modified spectral acceleration value
S_{DS}	1.822	Numeric seismic design value at 0.2s SA
S_{D1}	1.331	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.92	Coefficient of risk (0.2s)
CR_1	0.904	Coefficient of risk (1.0s)

PGA	1.055	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.055	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.306	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.594	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.733	Factored deterministic acceleration value (0.2s)
S1RT	1.547	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.71	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.331	Factored deterministic acceleration value (1.0s)
PGAd	1.055	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Address: 34547

Coordinates: 34.538438, -118.132863

Elevation: 3360 ft

Timestamp: 2021-04-08T22:06:10.243Z

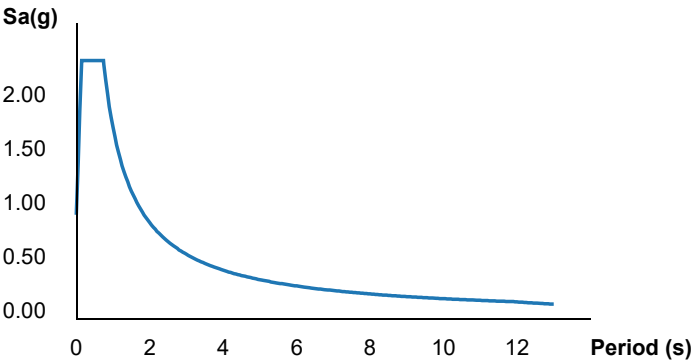
Hazard Type: Seismic

Reference Document: ASCE7-10

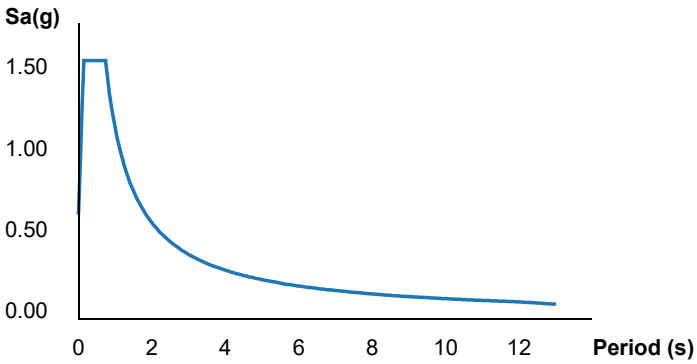
Risk Category: III

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.376	MCE_R ground motion (period=0.2s)
S_1	1.171	MCE_R ground motion (period=1.0s)
S_{MS}	2.376	Site-modified spectral acceleration value
S_{M1}	1.757	Site-modified spectral acceleration value
S_{DS}	1.584	Numeric seismic design value at 0.2s SA
S_{D1}	1.171	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.925	Coefficient of risk (0.2s)

CR_1	0.908	Coefficient of risk (1.0s)
PGA	0.917	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.236	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.5	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.376	Factored deterministic acceleration value (0.2s)
S1RT	1.505	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.657	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.171	Factored deterministic acceleration value (1.0s)
PGAd	0.917	Factored deterministic acceleration value (PGA)

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Hazards by Location

Search Information

Coordinates: 34.598759799594845, -118.09844223112182

Elevation: 2583 ft

Timestamp: 2021-04-09T20:48:48.917Z

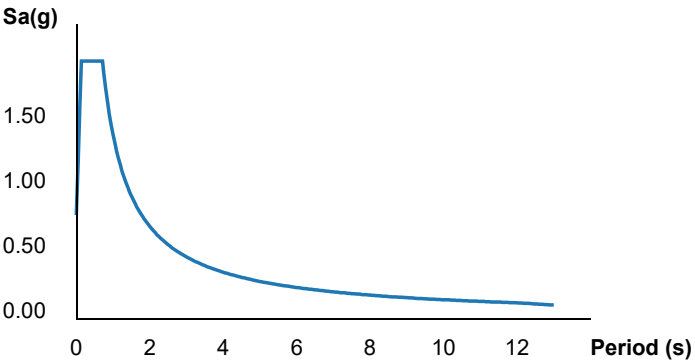
Hazard Type: Seismic

Reference Document: ASCE7-10

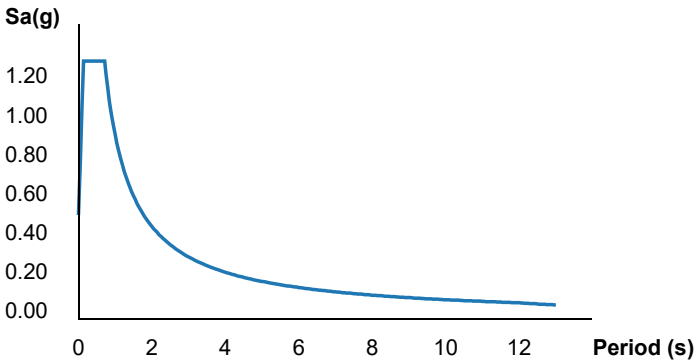
Risk Category: IV

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.971	MCE_R ground motion (period=0.2s)
S_1	0.937	MCE_R ground motion (period=1.0s)
S_{MS}	1.971	Site-modified spectral acceleration value
S_{M1}	1.406	Site-modified spectral acceleration value
S_{DS}	1.314	Numeric seismic design value at 0.2s SA
S_{D1}	0.937	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.937	Coefficient of risk (0.2s)
CR_1	0.911	Coefficient of risk (1.0s)

PGA	0.77	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.77	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	2.602	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.776	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.971	Factored deterministic acceleration value (0.2s)
S1RT	1.168	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.282	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.937	Factored deterministic acceleration value (1.0s)
PGAd	0.77	Factored deterministic acceleration value (PGA)

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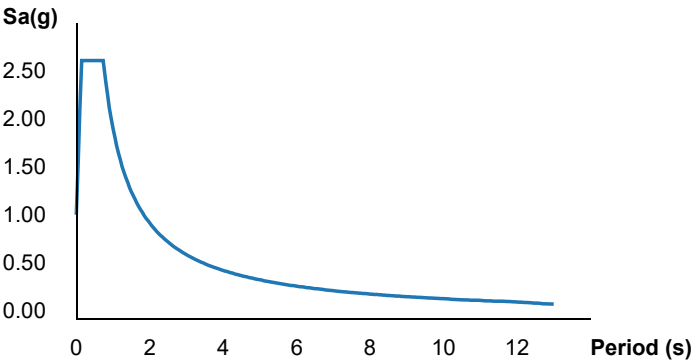
Hazards by Location

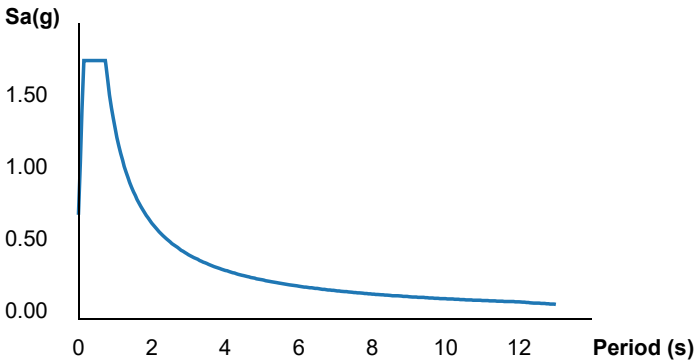
Search Information

Address:	1036 Barrel Spring Road palmdale, ca
Coordinates:	34.5457226, -118.1085956
Elevation:	2817 ft
Timestamp:	2021-05-04T20:11:47.998Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.674	MCE_R ground motion (period=0.2s)
S_1	1.311	MCE_R ground motion (period=1.0s)
S_{MS}	2.674	Site-modified spectral acceleration value
S_{M1}	1.967	Site-modified spectral acceleration value
S_{DS}	1.782	Numeric seismic design value at 0.2s SA
S_{D1}	1.311	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.919	Coefficient of risk (0.2s)

CR_1	0.902	Coefficient of risk (1.0s)
PGA	1.029	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.029	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.49	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.799	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.674	Factored deterministic acceleration value (0.2s)
S1RT	1.643	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.821	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.311	Factored deterministic acceleration value (1.0s)
PGAd	1.029	Factored deterministic acceleration value (PGA)

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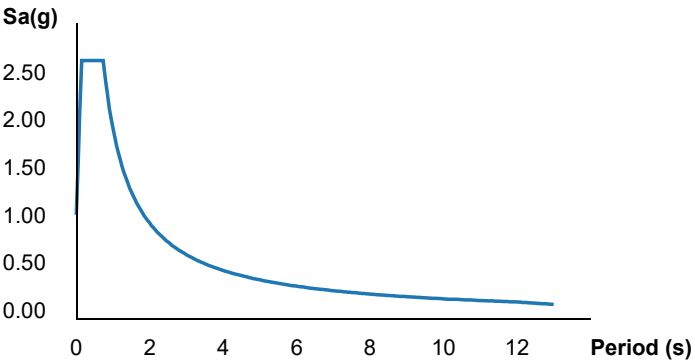
Hazards by Location

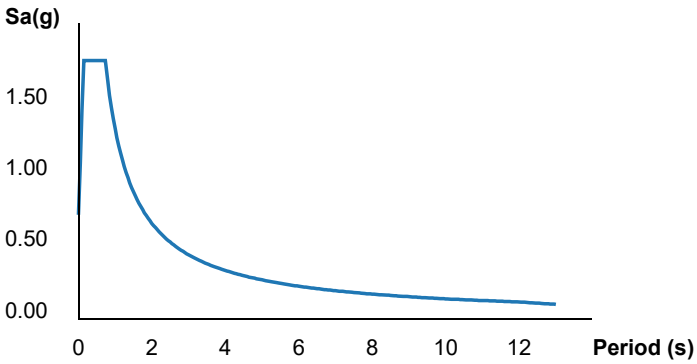
Search Information

Address:	15 4640 Barrel Spring Road palmdale, ca
Coordinates:	34.5268275, -118.0540864
Elevation:	3036 ft
Timestamp:	2021-05-04T20:14:23.952Z
Hazard Type:	Seismic
Reference Document:	ASCE7-10
Risk Category:	III
Site Class:	D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	2.7	MCE_R ground motion (period=0.2s)
S_1	1.323	MCE_R ground motion (period=1.0s)
S_{MS}	2.7	Site-modified spectral acceleration value
S_{M1}	1.984	Site-modified spectral acceleration value
S_{DS}	1.8	Numeric seismic design value at 0.2s SA
S_{D1}	1.323	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	E	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.924	Coefficient of risk (0.2s)

CR_1	0.905	Coefficient of risk (1.0s)
PGA	1.04	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	1.04	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	3.149	Probabilistic risk-targeted ground motion (0.2s)
SsUH	3.409	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.7	Factored deterministic acceleration value (0.2s)
S1RT	1.464	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.617	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.323	Factored deterministic acceleration value (1.0s)
PGAd	1.04	Factored deterministic acceleration value (PGA)

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