County of Orange
and
Orange County
Operational Area

Flood, Dam and Reservoir Failure

May 2019

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I. Operational Area Executive Board and Emergency Management Council Letter of Approval

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II. Record of Changes

Date of Revision	Revision Description	Section/Component	Revision Completed By
July 2015	Annex Revision into the updated plan and annex template	Complete annex	EMD
September 2015	Annex Review	Complete annex	Disabilities, Access and Functional Needs Working Group
October 2015	Annex Review	Complete annex	OCEMO and EMC Sub-Committee
2019	Annex Revision	Added Flood Section	Flood, Dam and Reservoir Failure Working Group, Disabilities, Access and Functional Needs Working Group OCEMO and EMC Sub-Committee

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Chapter 1 Introduction

1.1 Purpose

The County of Orange and the Orange County Operational Area (OA) Flood, Dam and Reservoir Failure Annex is a document intended to be used in support of and in conjunction with local jurisdictional and State emergency plans. Its purpose is to provide an overview of the threat and the existing plans, procedures and response protocols within the County and OA that would be implemented in the event of a flood, dam or reservoir failure event within Orange County.

The concepts and procedures within this document conform to guidelines delineated by:

- Federal Guidelines for Dam Safety Risk Management, 2015
- U.S. Department of Homeland Security Dams Sector Crisis Management Handbook, 2015
- U.S. Department of Homeland Security National Incident Management System (NIMS)
- California Standardized Emergency Management System (SEMS)
- California Government Code, Section 8589.5
- California Code of Regulations, Title 23, Division 2
- California Water Code, Division 3
- County of Orange Hazard Mitigation Plan
- Unified County of Orange and Orange County Operational Area Emergency Operations Plan

1.2 Scope

The Orange County Emergency Management Organization (OCEMO) created the Flood, Dam and Reservoir Failure Planning Subcommittee under the authority of the Orange County Operational Area Executive Board and the Orange County Emergency Management Council (EMC) to develop a Flood, Dam and Reservoir Failure Annex to address issues of mutual interest to the jurisdictions within the Operational Area (OA) and the County of Orange in response to a dam and reservoir failure incident.

The intent of the Flood, Dam and Reservoir Failure Annex is to provide the framework for the County and OA response to flood, dam failures and to establish a county-wide understanding of the coordinated emergency actions of public agencies involved in a Flood or dam failure event.

1.3 Situation Overview

Different variables can influence if, how, or when a flooding may occur. These may include, but are not limited to:

- Series of storm systems
- Small isolated storm cells
- Storm systems passing over recent burn scar areas
- Accidental release from a dam or reservoir

- Partial failure of a dam or reservoir
- Coastal storm surge

To reduce the potential loss of life or property, the County of Orange has constructed a vast network of flood control channels, dams, retarding basins, pump stations and monitoring equipment. Dam and Reservoir operators have in place Emergency Actions Plans (EAP) to serve as standard operating and notification procedures should an emergency occur. Even though flood control, dam and reservoir infrastructure within Orange County, the State and surrounding areas have been constructed to minimize cascading emergencies, flooding or failure of systems is always possible. Flooding can occur when the flood control infrastructure is overwhelmed or at capacity which can occur over a short period of time and can be in less than hour when intense rain falls on saturated soil or dry soil with poor absorption capacity. Flooding can also occur when part of the flood control systems or dams has been compromised or fails.

1.3.1 Flood

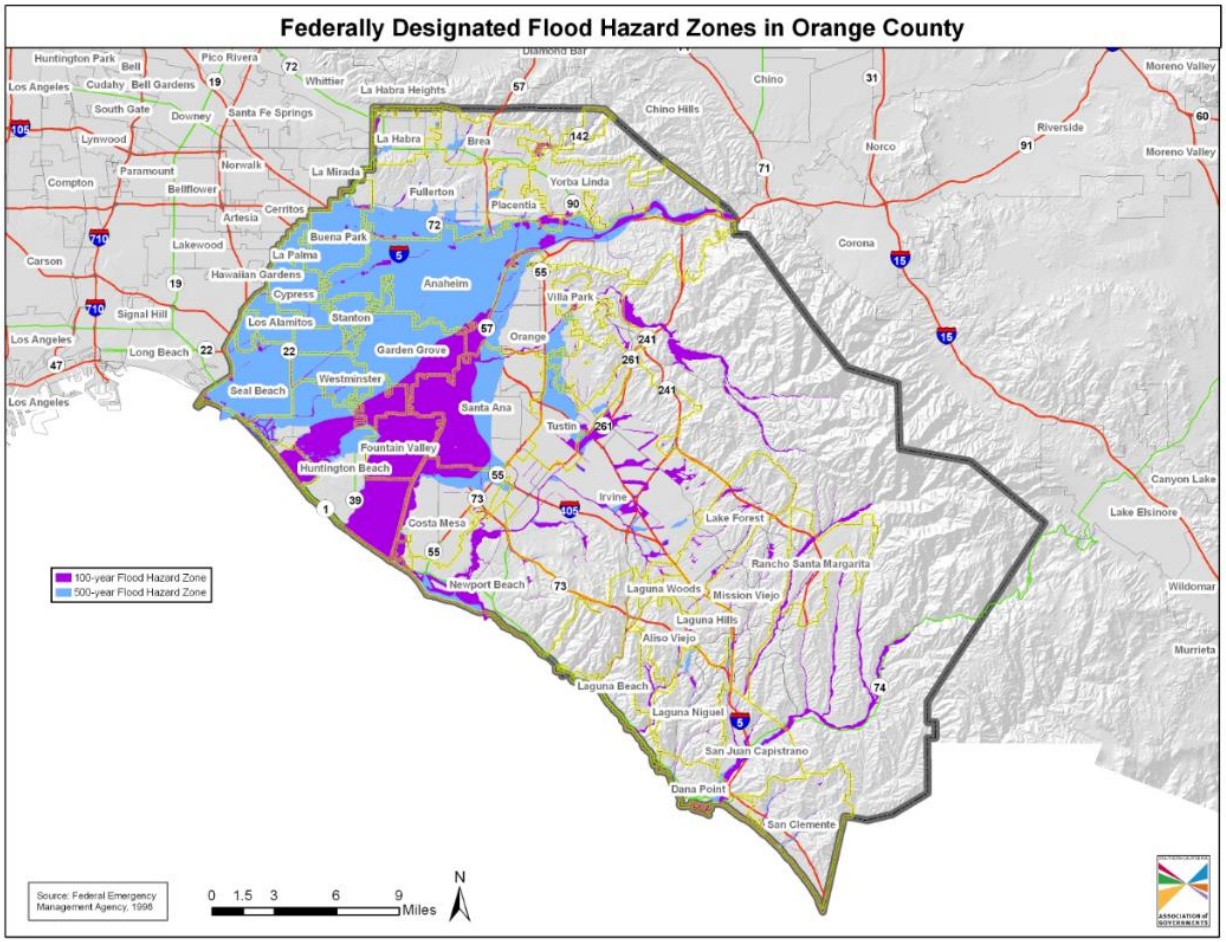
Floods can occur at any time, but weather patterns have a strong influence on when and where floods may happen. Cyclones**,** or storms that bring moisture inland from the ocean, can cause floods in the winter and early spring in the western United States**.** Thunderstorms are relatively small intense storms that can cause flash floods in smaller streams in late summer and fall. Floods are the most common and widespread of all natural disasters—except fire. Most communities in the United States can experience some kind of flooding after spring rains, heavy thunderstorms, or winter snow thaws. Floods can be slow, or fast rising, but generally develop over a period of days. Orange County has a long history of major flood events which have occurred in 1825, 1862, 1914, 1916, 1938, 1969, 1983, 1995, 1997, 1998, 2005, 2010, 2017 and 2019. Storms, in general, are of short duration and storm runoff accumulates rapidly with high velocities and volumes. These events have caused millions of dollars' worth of damages and have result in multiple fatalities. There are hundreds of miles of manmade and natural occurring channels in Orange County with 9 major watersheds/waterways that bring water down from higher elevations through Orange County on its way to the ocean illustrated in figure A. With an increased urbanization over the last several decades in Orange County many communities now lay within flood hazard areas surrounding these waterways or storm channels.

Figure A

Federal Emergency Management Agency (FEMA) Flood Map Service Center

The Federal Emergency Management Agency (FEMA) Flood Map Service Center (MSC) is the official public source for flood hazard information produced in support of the National Flood Insurance Program (NFIP). Use the MSC to find a community's official flood map, access a range of other flood hazard products, and take advantage of tools for better understanding flood risk. FEMA flood maps are continually updated through a variety of processes. See Figure B for overview of the FEMA Flood Mapping for Orange County. Current information that is downloadable or printed from the website are subject to change or may be superseded by new maps over time. Maps can be accessed at the FEMA MSC website at https://msc.fema.gov/portal.

Figure B



Localized Flooding

Floods can be local, short-lived events that happen suddenly, sometimes with little or no warning. Localized flooding is caused by intense storms that produce more runoff than an area can store or a stream can carry within its banks. Small streams are subject to flash floods (very rapid increases in runoff), which may last from a few minutes to a few hours. In larger streams, floods usually last from several hours to a few days. A series of storms might keep a river above flood stage (the water level at which a river overflows its banks) for several weeks. In urban and developed areas, street storm drains clogged with leaves and other debris from residences or businesses may not drain effectively and cause localize flooding during/after a heavy downpour.

Tropical Storms, EL Nino and Coastal Flooding

Another source of heavy rainfall is from summer storms or even hurricanes. These tropical storms usually coincide with El Nino years. El Nino is a disruption of the ocean-atmosphere system in the Pacific Ocean having important consequences for weather in California. Among these consequences is increased rainfall across the U.S. and Peru. During EL Nino periods, trade winds begin to relax in the central and western Pacific Ocean, leading to a depression of the thermocline in the east Pacific Ocean and elevation of the thermocline in the west. The result is

rise in sea surface temperature and heavier than normal rainfall in Southern California. While the term 'king tide' isn't a scientific term, it is used to describe an especially high tide event, when there is alignment of the gravitational pull between the sun and moon. When king tides occur during cyclones, floods or storms, water levels can rise to higher levels and have the potential to cause great damage to property and the coastline. This is due in part by storm runoff not being able flow into the ocean and backing up urban areas/below sea level. Coastal communities such as Seal Beach, Huntington Beach, Newport Beach, Laguna Beach, and Dana Point are most susceptible to this type of coastal flooding event. They occur naturally and regularly, are predictable and expected, and are not an everyday occurrence.

Soil Condition

Soil conditions affect a watershed hydrologic response to a storm. Soil saturation levels from back to back storms in areas identified by OC Public Works may be an area of concern. Existing conditions prior to the storm can influence the amount of storm water runoff. Dry soil allows greater infiltration of rainfall and reduces the amount of runoff entering the stream. Conversely, soil that is already wet from previous rains has a lower capacity for infiltration, allowing more runoff to enter the stream. Special consideration should also be given to areas with recently burn scares from wildfires or during extended extreme droughts conditions. Intense wildfires often leave steep hillsides barren of vegetation and cause the soil to become hydrophobic. After a fire of significant size in foothills or mountain areas, even a short-duration moderate rainfall on a burn scar area can cause debris flow. Because the soil is highly erodible, flood waters can transport significant amounts of debris that can wash away structures, roads and bridges, and can even cause injury or death. Debris flow and flooding potential from burn scar areas decreases with time as new vegetation grows and slopes begin to stabilize during the burn area's recovery period. During rainstorms these areas often seen debris flows carrying large amounts of rocks, trees and mixture of water and ash downstream. These areas should have post fire debris flow plans with specific rainfall thresholds and associated action items for agencies such as outlined in the current Canyon 2 and Holy Fire Post Fire Debris Flow Plans.

Flood Control

Since the flood of 1938 Orange County has taken major steps to mitigate the threat of flooding. There are two flood control dams that control flood flow along the Santa Ana River. The Seven Oaks Dam is located on the river in the upper Santa Ana Canyon northeast of the City of Redlands in San Bernardino County and the Prado Dam located in the City of Corona. Orange County Public Works maintains over 380 miles of concrete, rock lined and earthen flood control facilities. Flood control facilities are designed to handle discharge from storm drain systems and other runoff from tributary drainage basins. These flood control channels are supported 30 retarding basins by 7 pump stations, 3 ultra violet / filtration systems, and 4 urban runoff diversions containing 46 pumps throughout the Orange County watershed area.

Flood Monitoring

The Orange County Public Work utilizes the Automated Local Evaluation in Real time (ALERT) system for Orange County's creeks and tributaries. ALERT sensors have been installed in all the

major watersheds located in Orange County. Although the primary purpose of the sensors is for flood warning and detection, ALERT data additionally supports fluvial sediment monitoring programs and other federally mandated water quality monitoring programs in Orange County. The Orange County ALERT system monitors a total of 338 sensors within Southern California (Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and Orange County. Of the 338 sensors, 214 are used to monitor precipitation and 54 for flood control channel or reservoir water levels. Other sensors monitor temperature, wind speed, wind direction, transmitter/data logger battery voltage, and barometric pressure. Data from 58 of the monitored stations is received by a dedicated internet link connected directly to the Army Corps of Engineers (ACOE) telemetry system computer located in Los Angeles. The majority of these ACOE stations are located in the upper Santa Ana River (SAR) watershed.
Rainfall information including ALERT rainfall data are available on OC Watersheds website and can be accessed as follows: http://www.ocwatersheds.com/rainrecords/rainfalldata/stormdata

Flooding Notification Strategies for the Public

The National Weather Service (NWS) provides notification to media outlets and to public agencies. They use standard terminology for watches and warnings and authorized under Warning, Alert ad Response Network Act (WARN) to utilize Wireless Emergency Alerts (WEA) to alert the public:

- **Flash Flood Watch** means it is possible that rain will cause flash flooding in specified areas.
- **Flash Flood Warning** means flash flooding is either imminent or is occurring.
- **Flood Watch** means long term flooding is possible in specified areas.
- **Flood Warning** means long term flooding is either imminent or is occurring.
- **Coastal Flood Watch** means moderate to major coastal flooding is possible. Such flooding would potentially pose a serious risk to life and property.
- **Coastal Flood Warning** moderate to major coastal flooding is occurring or imminent. This flooding will pose a serious risk to life and property.

Flood Event Threshold Matrix

Response Level: Community Outreach and Enhanced Monitoring	**One or more Triggers:** • NWS partner e-mail *and/or* direct communication with the NWS. • Greater than 3" Rainfall in 12 hours • Notification of 8000 CFS release Prado Dam	Upon notification of event: • Forward NWS partner e-mail to OA • County and OA EOC requests from NWS for spot weather forecast for recent burn scar areas • Public information outreach (ex:Sand bag locations, Social media, press release)
Response Level: Modified Response / EOC Activation Level	**Current Flash Flood Watch and one or more of the following Trigge**rs: • Direct communication with the NWS • NWS has issued a Flash Flood Warning in a recent burn scar area and/or pre-identified debris flow triggers are met as indicated in specific plans • Greater than 6" Rainfall in 24 hours (100 yr storm) predicted. • Overtopping or degradation of flood channels and river beds is possible. • Actual or identified land slippage in 2 or more areas • Flooding and erosion of beach areas, and local jurisdictions requesting assistance • Hydrology-Soil Saturation levels from back to back storms identified by Public Works as an area of concern in multiple jurisdictions	12-24 hours in advance of storm: • OA conference call • Determine County and OA EOC staffing level • Consider evacuations for recent burn scar areas • Public information outreach (ex: Sand bag locations, social media, press release) 1-3 hours in advance of storm: • County and OA EOC activate as needed • County Public Works DOC activate as needed • OA conference call • Public Information (social media, press release) • Establish evacuation center/shelter if necessary

*Flood Event Threshold Matrix corresponds to the Orange County Public Works Department Operations Center activation matrix.

1.3.2 Dam and Reservoir

"Dam" means any artificial barrier, together with appurtenant works, which does or may impound or divert water as described in Sections 6002 and 6003 of the California Water Code. "Reservoir" means a body of water impounded by a dam and in which water can be stored. Where reservoirs are used for drinking water, during which EPA Guidelines for Responding to a Drinking Water Threat or Contamination, as well as local protocols would be followed.

Dams and reservoirs of jurisdictional size are defined in the California Water Code Sections 6000 through 6009. There are currently more than 1,400 dams of jurisdictional size in California. Approximately 1,250 of these dams are under the jurisdiction of California's Department of Water Resources, Division of Safety of Dams.[1] Dams and reservoirs owned by the federal government are not subject to state jurisdiction except as otherwise provided by federal law. In California, there are currently 287 dams owned by federal government agencies such as the United States Forest Service, Bureau of Reclamation, Army Corps of Engineers (USACE) and the U.S. military.

Los Angeles leads the state as being the county with the most jurisdictional size dams, with 91 dams. The county of Sonoma is second behind Los Angeles with 64 dams. Del Norte County is the only county in the state having no dams of jurisdictional size.

The term "dam or reservoir failure" encompasses a wide variety of circumstances. For the purposes of this plan any type of failure or potential failure, including the dam, appurtenant structures, or reservoir will be referred to as a "Dam Failure" from henceforth. For the purposes of this plan the term Dam Owner will be utilized to describe the jurisdiction with responsibility for a dam's EAP, assessment of a failure and determination to activate Emergency Notification Procedures. Concepts related to specifically to the damor reservoir itself, will be identified as such Situations that would constitute a dam failure vary widely, from developing problems to a partial or catastrophic collapse of the entire dam or reservoir. Potential causes of a dam failure are numerous and can be attributed to deficiencies in the original design of the dam or reservoir, the quality of construction, the maintenance of the dam or reservoir, operation of the appurtenances with the dam or reservoir and acts of nature including precipitation in excess of the design, flood and damage from earthquakes. Water over-topping the dam or reservoir crest is a common cause of failure in earth dams. Overtopping can cause erosion of the dam or reservoir crest and eventual breach. Piping of earth dams is another common form of failure. Piping is a form of erosion that occurs through the dam body when seepage starts through the soil in the body of the dam or through foundation underground caused by rodent burrowing and the presence of extensive root systems from vegetation growing on and around the dam and reservoir.

The dams and reservoirs affecting Orange County are considered potential terrorist targets. The weapon most likely to be used would be explosives with the goal of collapsing the dam. Such an event would result in an inundation event with little or no warning. The potential of using other types of weapons such as chemical or biological are considered low due to the large amount of material that would be required to contaminate the reservoirs, but the potential does exist. This scenario would only apply to those dams where the reservoirs are used for drinking water.

A dam failure can cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating

[1] State of California 2018 Hazard Mitigation Plan

facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas.

Governmental assistance could be required and may continue for an extended period. These efforts would be required to support evacuation, search and rescue, debris removal and roadway clearing, the demolishing of unsafe structures, reestablishment of public services and utilities, and continued care and welfare for the affected population including, as required, sheltering and temporary housing for displaced persons.

In the past 50 years, there have been a small number of dam failures in California. The most catastrophic dam failure in California's history is the St. Francis Dam in Los Angeles County, which failed in March 1928 shortly after construction of the dam was completed. This failure resulted in the deaths of more than 450 people and destruction of nearly 1,000 homes and buildings. Numerous roads and bridges were also destroyed and/or damaged beyond repair. The Division of Safety of Dams came into existence as a direct result of the event. Other significant dam failures in California's history include Baldwin Hills in 1963, the near failure of the Lower San Fernando Dam in 1971, and the failure of the spillway systems at Oroville Dam 2017.[2] Incidents within Orange County are rare but most notably include the1998 Westminster water tank failure and the 2005 Prado dam incident that was the result of seepage of coffer dam during construction.

Following the 2017 Orville Dam incident new state regulations were adopted under California Senate Bill 92 (SB92) that provide standards for preparing and submitting inundation maps to the Division of Safety of Dams (DSOD) and Dam owners must also submit Emergency Action Plans (EAP) to the Governor's Office of Emergency Services (Cal OES). EAPs and inundation maps must be updated no less frequently than 10 years or when significant changes occur at the dam or downstream. Dam owners must conduct an emergency action plan notification exercise at least once annually with a local public safety agency. While SB 92 requires inundation maps to be publicly available, EAPs will be protected from public disclosure.

During an emergency event it will be important for the dam operator to quickly assess the share their findings with emergency responders. Dam Operators should determine the event type and emergency Level using the guidelines provided in the Federal Guidelines for Dam Safety and as seen below in following two tables.

[2] State of California 2018 Hazard Mitigation Plan

Determining Emergency Event

Event	Situation	Emergency Level
Earth Spillway Flow	Reservoir water surface elevation at auxiliary spillway crest or spillway is flowing with no active erosion	Non-failure
	Spillway flowing with active gully erosion	Potential failure
	Spillway flow that could result in flood of people downstream if the reservoir level continues to rise	Potential failure
	Spillway flowing with an advancing headcut that is threatening the control section	Imminent failure
Embankment Overtopping	Reservoir level is XX feet/inches below the top of the dam	Potential failure
	Water from the reservoir is flowing over the top of the dam	Imminent failure
Seepage	New seepage areas in or near dam	Non-failure
	New seepage areas with cloudy discharge or increasing flow rate	Potential failure
	Seepage with discharge greater than XX gallons per minute	Imminent failure
Sinkholes	Observation of new sinkhole in reservoir area or on embankment	Potential failure
	Rapidly enlarging sinkhole	Imminent failure
Embankment Cracking	New cracks in the embankment greater than XX inches wide without seepage	Non-failure
	Cracks in the embankment with seepage	Potential failure
Embankment Movement	Visual movement/slippage of the embankment slope	Non-failure
	Sudden or rapidly proceeding slides of the embankment slopes	Imminent failure
Instruments	Instrumentation readings beyond predetermined values	Non-failure
Earthquake	Measurable earthquake felt or reported on or within XX miles of the dam	Non-failure
	Earthquake resulted in visible damage to the dam or appurtenances	Potential failure
	Earthquake resulted in uncontrolled release of water from the dam	Imminent failure
Security Threat	Verified bomb threat that, if carried out, could result in damage to the dam	Potential failure
	Detonated bomb that has resulted in damage to the dam or appurtenances	Imminent failure
Sabotage/ Vandalism	Damage that could adversely impact the functioning of the dam	Non-failure
	Damage that has resulted in seepage flow	Potential failure
	Damage that has resulted in uncontrolled water release	Imminent failure

Determining Emergency Event Level and Actions

Level	Information to External Organizations
High Flow	1. Explain how much flow the dam is currently passing, and the timing and amount of projected flows. 2. If known, describe at what flows downstream areas get flooded. 3. State that the dam is **NOT** in danger of failing. 4. Indicate when you will give the next status report. 5. Indicate who can be called for any follow-up questions.
Non-failure	1. Explain what is happening at the dam. 2. Describe if the event could pose a hazard to downstream areas (e.g., gate failure). 3. State that the dam is **NOT** in danger of failing. 4. Indicate when you will give the next status report. 5. Indicate who can be called for any follow-up questions.
Potential Failure	1. Explain what is happening at the dam. 2. State you are determining this to be a **POTENTIAL FAILURE**. 3. Describe what actions are being taken to prevent the dam failure. 4. Provide an estimate of how long before the dam would be at risk of failing (e.g., during floods that could overtop the dam). 5. Refer to the inundation maps and explain what downstream areas are at risk from a dam failure. 6. Indicate when you will give the next status report. 7. Indicate who can be called for any follow-up questions.
Imminent Failure	1. Explain that the dam is failing, is about to fail, or has failed. 2. State you are determining this to be an **IMMINENT FAILURE**. 3. Refer to the inundation maps and explain what downstream areas are at risk from a dam failure and estimate when flows should reach critical downstream areas. 4. Indicate when you will give the next status report. 5. Indicate who can be called for any follow-up questions.

Determination of a dam safety emergency is usually twofold. Both the dam owner and the emergency response authorities should coordinate closely while making decisions to determine both the dam safety event and response efforts. The dam owner should coordinate a follow-up evaluation after any emergency. All participants should be involved in this evaluation and should keep logs and records during the incident.

Currently, there are 44 jurisdictional dams and reservoirs registered within or immediately adjacent to Orange County. They include reservoirs which normally contain water from flood control facilities which may be dry most of the time. Their holding capacity range from 18 acre-feet (Deimer No. 8) to 314,400 acre-feet (Prado Dam).

The County of Orange owns and operates 16 jurisdictional dams and reservoirs, the smallest of which is Harbor View with a capacity of 28 acre-feet and is located in Newport Beach and the largest being Villa Park Dam with a capacity of 15,600 acre-feet and is located in Orange.

The following is a list of all registered jurisdictional dams and reservoirs in Orange County along with their owners and/or operators[3] and locations.

Dam and Reservoir Name	Owner	Year built	Capacity by acre feet	Risk Rating	Location (city and latitude and longitude)		
30 MG Central Reservoir	City of Brea	1924	92	High	Brea	33.926	-117.91
Agua Chinon	County of Orange	1998	256	High	Irvine	33.6888	-117.7
Bee Canyon Retention Basin	County of Orange	1994	243	Low	Irvine	33.7057	-117.71
Big Canyon	City of Newport Beach	1959	600	Extremely High	Newport Beach	33.6121	-117.86
Brea Dam	Army Corps of Engineers	1942	4,018	DSAC III	Fullerton	33.892	-117.93
Carbon Canyon Dam	Army Corps of Engineers	1961	7,033	DSAC III	Yorba Linda	33.915	-117.84

[3] https://water.ca.gov/Programs/All-Programs/Division-of-Safety-of-Dams

Diemer No. 8	Metropolitan Water District of Southern California	1968	18	High	Yorba Linda	33.9134	-117.82
Diemer Ozone Contact Basin	Metropolitan Water District of Southern California	2011	23	High	Yorba Linda	33.9115	-117.82
Diemer Reservoir	Metropolitan Water District of Southern California	1963	80	Extremely High	Yorba Linda	33.9109	-117.82
Dove Canyon	Dove Canyon Master Association	1989	415	High	Rancho Santa Margarita	33.6386	-117.57
East Hicks Canyon Retarding Basin	County of Orange	1997	75	Low	Irvine	33.7236	-117.72
Eastfoot Retarding Basin	City of Irvine	2007	213	High	Irvine	33.7525	-117.75
El Toro Reservoir	El Toro Water District	1967	877	Extremely High	Mission Viejo	33.6241	-117.67
Fullerton Dam	Army Corps of Engineers	1941	706	DSAC IV	Fullerton	33.898	-117.88

Galivan Retarding Basin	County of Orange	2000	169	Low	Laguna Niguel	33.5632	-117.68
Harbor View	County of Orange	1964	28	High	Newport Beach	33.6034	-117.87
Hicks Canyon Retention Basin	County of Orange	1997	110	Low	Irvine	33.7361	-117.72
Lake Mission Viejo	Lake Mission Viejo Association, Inc.	1976	4,300	Extremely High	Mission Viejo	33.6271	-117.65
Lower Peters Canyon Retarding Basin	County of Orange	1990	206	High	North Tustin	33.7603	-117.77
Marshburn Retarding Basin	County of Orange	1998	424	High	Irvine	33.6941	-117.73
Orange County (Humble) Reservoir	Metropolitan Water District of Southern California	1941	217	High	Brea	33.9367	-117.88
Orchard Estates Retarding Basin	County of Orange	1999	138	High	Irvine	33.7384	-117.75
Palisades Reservoir	South Coast	1963	147	Extremely High	San Clemente	33.4638	-117.65

	Water District						
Peters Canyon	County of Orange	1932	1,090	High	North Tustin	33.7797	-117.76
Portola	Santa Margarita Water District	1980	586	High	Coto de Caza	33.6307	-117.58
Prado Dam	Army Corps of Engineers	1941	314,400	DSCAC-III	Corona	33.89	-117.64
Rattlesnake Canyon	Irvine Ranch Water District	1959	1,480	High	Irvine	33.7295	-117.74
Rossmoor No. 1	El Toro Water District	1964	43	High	Laguna Woods	33.6192	-117.73
Rossmoor Retarding Basin	County of Orange	2002	175	Significant	Rossmoor	33.7877	-118.09
Round Canyon Retarding Basin	County of Orange	1994	286	Low	Irvine	33.6998	-117.7
San Joaquin Reservoir	Irvine Ranch Water District	1966	3,036	Extremely High	Newport Beach	33.6202	-117.84
Sand Canyon	Irvine Ranch Water District	1912	960	Extremely High	Irvine	33.6477	-117.79

Santiago Creek (Irvine Lake)	Serrano and Irvine Ranch Water Districts	1933	25,000	Extremely High	Silverado	33.7863	-117.72
Sulphur Creek	County of Orange	1966	520	High	Laguna Niguel	33.5500	-117.71
Syphon Canyon	Irvine Ranch Water District	1949	500	High	Irvine	33.7097	-117.73
Trabuco	Trabuco Canyon Water District	1984	138	High	Rancho Santa Margarita	33.6445	-117.56
Trabuco Retarding Basin	County of Orange	1996	390	High	Irvine	33.6965	-117.76
Trampas Canyon	Premier Silica LLC	1975	5,700	Extremely High	San Juan Capistrano	33.4988	-117.58
Upper Chiquita	Santa Margarita Water District	2012	753.5	Extremely High	Rancho Santa Margarita	33.5883	-117.62
Upper Oso	Santa Margarita Water District	1979	3,700	Extremely High	Mission Viejo	33.6597	-117.63
Villa Park Dam	County of Orange	1963	15,600	Extremely High	Orange	33.8163	-117.76

Veeh Reservoir	Lake Hills Community Church	1936	185	High	Laguna Hills	33.6254	-117.73
Walnut Canyon	City of Anaheim	1968	2,570	Extremely High	Anaheim	33.8412	-117.75
Yorba	County of Orange	1907	1,200	High	City of Anaheim	33.8713	-117.81

1.3.3 Whole Community – Preparing and Responding with the Whole Community

The County of Orange strives to incorporate the Whole Community perspective in its emergency planning. By planning for the Whole Community, complexities in the diversity in Orange County are assimilated into the County planning strategy.

Orange County's definition of disabilities and access and functional needs is as follows:

Populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence and the ability to perform the activities of daily living, communication, transportation, supervision, and medical care. Individuals in need of additional response assistance may include those who have disabilities; who live in institutionalized settings; who are elderly; who are children; who are from diverse cultures; who have limited English proficiency or are non-English speaking; or who are transportation disadvantaged.

Having recognized the need to be inclusive in its emergency planning, the Orange County Operational Area formed the Orange County Disabilities and Access and Functional Needs Working Group in 2011 to strengthen partnerships with the disability community and others with access and functional needs. This team includes representatives from county agencies, local jurisdictions and nonprofit organizations serving people with disabilities and access and functional needs in Orange County. This group's instrumental efforts have turned the OA towards more inclusive emergency planning for the Whole Community. This group reviewed the Dam and Reservoir Failure Annex in September 2015 and provided valuable feedback.

In order to meet the unique needs of children in disasters, the Operational Area formed the Kids in Disasters (KIDS) Working Group as a sub-committee of the Disabilities and Access and Functional Needs Working Group. The mission of the working group is to engage public and private community, government and healthcare organizations and individuals to promote coordinated efforts and partnerships to ensure that infants' and children's needs are met before, during, and after disasters. Integrating children (0-18) into disaster planning requires special emergency preparedness and planning. Disasters have proven evident that children are

vulnerable and require additional support during emergency situations, especially when displaced from their parents or guardians. The physical and psychological damage sustained by children can far outweigh the same effects inflicted on grown members of society, including children with disabilities and access and functional needs. The KIDS Working Group will assist in identifying and supporting community programs that help meet the physical, mental, and emotional needs of children in disasters.

Furthermore, the County of Orange is committed to maximizing compliance with the Americans with Disabilities Act and providing the best service to Orange County Residents and visitors. As such, the County of Orange adheres to the policy below:

Disability will not prevent accessibility to services or facilities provided by the County of Orange.

The County of Orange will not exclude or deny benefits of any sort based on a disability or access or functional need.

The County of Orange will work to accommodate people with disabilities and those with access and functional needs in the most integrated setting possible.

During all phases of disaster response, the County of Orange will make reasonable modifications to policies, practices and procedures, if necessary, to ensure programmatic and architectural access to all.

The County of Orange will shelter people with disabilities and access and functional needs with their families, friends and/or neighbors and in the most integrated setting possible.

1.4 Flood, Dam and Reservoir Failure Planning Assumptions

a. In planning for a potential flood or dam failure, a broad approach fits the needs of the County and Operational Area (OA).
b. Flash flooding and dam failures may occur without warning.
c. A flood and dam failures can result from a number of natural or human caused threats.
d. For most dam and reservoir events, the notification timeline is dependent of the Dam Operators analyze of the situation and relaying their findings to local emergency responses agencies per the Emergency Notifications Flowcharts in Dam Owners CalOES approved EAP. Typically primary notifications include local Public Safety Answering Point (PSAP).
e. Local emergency response agencies within a Unified Command are responsible for determining evacuation and public notification actions needed once notified of an event by a Dam Owner.
f. Media coverage and Emergency Alert System (EAS) messages may cause the public to call 911 or other emergency number for more information.
g. Heavy use of telephones by the public may impact the ability of public safety agencies to communicate and to warn the public.

h. The California Code of Regulations, dam and reservoir owners are required to provide California State Department of Water Resources (DWR) inundation map(s) to be updated every 10 years to include the identification of dam break hydrographs, flood arrival time, flooding time, flood-wave maximum elevation, peak time and de-flood time, or request a waiver from the inundation map by providing adequate evacuation procedures without benefit of an inundation map. [4]
i. Dam owners must also submit and Emergency Action Plan (EAP) to Cal OES along with their DWR arrived inundation maps.
j. Federal Guidelines for Dam Safety recommend all dam and reservoir owners develop an Emergency Action Plan (EAP) which is a document identifying potential emergency conditions at a dam and specifies preplanned actions to be followed to minimize property damage and loss of life.[5]
k. Educational and care facilities such as child care, schools, hospitals and nursing homes are located within some inundation risk areas. Special considerations for identifying, warning, evacuation and care for occupants should be arranged by the local emergency management agency in collaboration with police, fire, emergency medical services, and school districts.
l. Using this Annex as a guide, cities, special districts, dam owners and jurisdictions of the Operational Area with assigned responsibilities should prepare standard operating procedures and checklists to support this plan.
m. The County and OA response to other emergencies can be used as a foundation for preparation. The basic purpose is to coordinate, communicate and cooperate between jurisdictions and to share resources.
n. The County and OA Flood, Dam and Reservoir Failure Annex is:
    i. Linked to jurisdiction, discipline, mutual aid plans and standard operating procedures.
    ii. An operating plan including checklists, resource lists and contact lists.
    iii. Based on the Unified County of Orange and Orange County Operational Area Emergency Operations Plan, procedures and organizations.
    iv. Focused on issues unique to the dam failure hazard including notification, alert and warning, evacuation, large capacity shelter operations, search and rescue, debris removal and crisis intervention counseling.
    v. Based on the Standardized Emergency Management System (SEMS), National Incident Management System (NIMS) and the Incident Command System (ICS).

[4]California Code of Regulations, Title 23. Water, Division 2 Department of Water Resources, Chapter 2. Dams and Reservoirs, Article 6 Inundation Maps.
[5] http://www.fema.gov/plan/prevent/damfailure/fema64.shtm

Chapter 2 Concept of Operations

2.1 Concept of Operations (CONOPS)

This Annex will discuss only the flood and dam failure specific issues and those items different from normal operations. Emergency operations will follow jurisdictional procedures, SEMS, NIMS and mutual aid protocols, including interaction and cooperation.

As required by SEMS and NIMS, all mutual aid resources will be coordinated through the Operational Area EOC with the exception of law enforcement and fire mutual aid. These mutual aid systems will use the established protocol as specified in the Unified County of Orange and Orange County Operational Area Emergency Operations Plan. The following will provide support to the County and Operational Area as per standard operating procedures and agreements and as provided in other emergencies.

- County and OA Emergency Operations Centers (OA EOC) will activate to support major incidents involving dam or reservoir failure.
- County Department Operations Centers will activate and operate according to their emergency plans and procedures.
- Mutual Aid operates according to the Operational Area Agreement, the State Master Mutual Aid Agreement and the specific terms of each sector specific agreement.
- State and Federal resources – requests for state and federal resources will be coordinated between the OA EOC and the Cal OES Southern California Regional EOC (REOC), as shown in the Unified County of Orange and Orange County Operational Area Emergency Operations Plan.
- Establish a Joint Information Center (JIC), as outlined in the County and OA Joint Information Center Annex. Initially, due to time constraints, this may not be possible prior to the impacts to the community or the need for immediate notifications. After a dam and reservoir failure, a JIC may be formed closer to the impact area. When a JIC is established (either physical or virtual), Public Information Officers from the impacted jurisdictions and the County will join together to provide information and updates to the media.
- Each individual jurisdiction reserves the right to work with the media, hold press conferences, disseminate press releases, set up interviews with their elected officials and deal with the media as they determine is best for their jurisdiction.

2.2 Organization and Assignment of Responsibilities

The County and OA EOC will activate the appropriate SEMS and NIMS functions, based on the dam failure threat or actual event. A flood or dam failure event will require multi-jurisdiction, multi-agency and multi-discipline coordination at all levels, including first responders.

Areas of special concern will be:

- Protection of life, property and the environment.

- Alerting and warning the public, including people with disabilities and those with access and/or functional needs.
- Evacuation of the impacted population, including people with disabilities and those with access and/or functional needs.
- Identify applicable Dam EAP and distribute to UC and EOC staff
- Impacts to critical infrastructure downstream
- Care and shelter of large numbers of people.
- Search and rescue operations, including water rescues.
- Environmental and public health concerns.
- Debris removal.
- Animal care issues, including care, shelter and possible public health concerns.
- Behavioral health operations and support.
- Record keeping and monitoring.

The Orange County Sheriff's Department, Emergency Management Division will assist with implementation of this Annex.

EOC Position	Lead County Department
Director of Emergency Services (DES)/ Operational Area Coordinator (OAC)	CEO (County Executive Office) OC Public Works
Public Information Manager	CEO (County Executive Office)
Operations Section Chief	OC Public Works
Planning and Intelligence Section Chief	OC Public Works

2.3 Direction, Control, and Coordination

2.3.1 Management Section

The Management Section will ensure the Flood, Dam and Reservoir Failure Annex is implemented in conjunction with other Plans and Annexes, including but not limited to the Unified County of Orange and Orange County Operational Area Emergency Operations Plan, Joint Information System Annex, Evacuation Annex and Mass Care and Shelter Annex.

The Management Section is responsible for the overall direction and control of the County's emergency response and coordination with OA jurisdictions and agencies.

Director of Emergency Services and Operational Area Coordinator (DES/OAC)

Responsible Agency
DES - County Executive Office
OAC – OC Public Works

Responsibilities

- Has authority for protective action decisions pertaining to unincorporated Orange County areas.

- Coordinate with Operational Area jurisdictions during emergency response.
- Appoint a Public Information Manager (CEO designee) to coordinate dissemination of all emergency information.
- Appoint an Operations Section Chief (OC Public Works designee)
- Appoint a Planning and Intelligence Section Chief (OC Public Works designee).
- Provide direction to the Policy Group and assign objectives to Section Chief's and EOC staff when prioritization and/or policies must be created.
    - EOC objectives may include:
        - Alert and warning of the public and emergency responders
        - Evacuation of the impacted population
        - Care and shelter of the impacted population
        - Damage assessment
            - Conduct search and rescue operations
            - Emergency medical operations
            - Identify and isolate hazards
        - Security operations
        - Cleanup, reentry and recovery operations
- Prioritization may include:
        - Requests for conflicting resources including equipment and personnel
        - Resource allocation
        - Public messaging
        - Restoration priorities of critical infrastructure

Policy Group

Responsible Agency
The Policy Group will be comprised of those members, as identified in the Unified County of Orange and Orange County Operational Area Emergency Operations Plan directly needed to assist during a flood or dam failure incident and to support the DES/OAC.

Responsibilities

- Provide political leadership to set realistic expectations and maintain confidence in Orange County response and recovery operations.
- Provide resources to Orange County jurisdictions and agencies required to implement response and recovery operations.
- Prepare emergency proclamations and consider special ordinances as necessary to meet incident objectives.
- Provide information to the public and media in coordination with the Public Information Manager.

County and Operational Area EOC Manager (County and OA EOC Manager)

Responsible Agency
The County and OA EOC Manager is filled by the OCSD, Emergency Management Division Director or designee.

Responsibilities

- Establish and maintain contact with affected dam and reservoir owners or operators and maintain communication with all impacted jurisdictions to ensure coordination of response activities and situational information.
- Ensure the DES/OAC, Board of Supervisors (BOS) and Policy Group are notified and kept apprised of emergency conditions occurring due to a dam and reservoir failure event.
- Coordinate with the DES/OAC to establish activation level of the County and OA EOC.
- Direct Emergency Management Division (EMD) staff to notify appropriate key personnel to respond to the County and OA EOC, based upon the activation level established.
- Ensure situational information is provided to OA jurisdictions, County departments, response partners and Cal OES and updated on a regular basis.
- Assist with the coordination of the County's reentry and recovery efforts.

Public Information Manager (PIM) and Public Information Officer (PIO) Support Staff

Responsible Agency for PIM
The PIM is appointed by the DES/OAC from County Executive Office (CEO).

Responsible Agency for PIO Support Staff:
County departments with PIO's and/or impacted OA jurisdiction(s).

Responsibilities

- Establish and maintain communication with Public Information Officers from impacted jurisdictions agencies and field Unified Command Public Information Office.
- Preparation of press releases.
- Activation of and support needs for the County and OA EOC Public Information Hotline.
- Development and use of Mass Notification systems including AlertOC messages, County and OA EOC Website, Twitter and Facebook accounts.
- Coordination with impacted jurisdictions and agencies to effectively communicate with the public the following:
  - Evacuation orders, if any
  - Shelter locations
  - School information
  - AlertOC messaging
- Provide continual updates on the incident to the media and public.
- Monitor other websites to ensure posting of accurate information.
- Activate the Joint Information System Annex.
  - Establish a Joint Information Center (JIC), if not possible establish a virtual JIC.

EOC Liaison Officer

Responsible Agency
The EOC Liaison Officer will be appointed by the County and OA EOC Manager.

Responsibilities

- During a flood, dam and reservoir failure event, the EOC Liaison Officer will coordinate with agencies including, but not limited to:
  - Affected dam and reservoir owners or operators.
  - Impacted jurisdictions
  - County departments
  - Special Districts
  - Cal OES
  - State Department of Water Resources
  - U.S. Army Corps of Engineers
  - National Weather Service
  - FEMA
- Act as a point of contact for OA jurisdictions, county departments and external organizations.
- Interact with other sections, branches, units and groups with the County and OA EOC to obtain information to assist in coordination.
- Ensure the proper flow of information to and from external organizations.
- Ensure all developed guidelines, directives, action plans and appropriate situational information are disseminated to OA jurisdictions and other appropriate agencies.

2.3.2 Operations Section

The Operations Section will ensure the Flood, Dam and Reservoir Failure Annex is implemented in conjunction with other Plans and Annexes, including but not limited to the Unified County of Orange and Orange County Operational Area Emergency Operations Plan, Joint Information System Annex, Evacuation Annex and Mass Care and Shelter Annex.

Operations Section Chief

Responsible Agency
The Operations Section Chief is appointed by the DES/OAC from OC Public Works.

Responsibilities

- Manage and direct the Operations Section activities.
- Establish and maintain communications with:
  - Incident Command Post (ICP)
  - Impacted jurisdictions and agency's EOC Operations Section.
  - Support the field emergency response activities.
- Implement objectives established by the DES/OAC.
- Determine the need for immediate and anticipated resources.
- Provide Operations Section input to the EOC Incident Action Plan (IAP).
- Oversee the activities of the Operations Section and provide situational status information to the DES/OAC and Planning and Intelligence Section on Operations Section and field response activities.

Law Enforcement and Traffic Control Branch Director

Responsible Agency
The Law Enforcement and Traffic Control Branch Director is filled by a designee from the Orange County Sheriff's Department.

Responsibilities

- Coordinates the law enforcement, traffic control, movement, coroner functions and Law Enforcement Mutual Aid system in Orange County.
- Supervise activated positions within the branch. If a position is not activated, the Law Enforcement Branch Director is responsible for fulfilling that position's assignments.
- Primary responsibility for public safety and security.
- Support evacuation operations in the field.
- Provide traffic management information from within the impacted area.
    - Coordinate with California Highway Patrol (CHP), Caltrans and the Orange County Traffic Management Center on a traffic plan and information.
- Should traffic diversion measures be required, coordinate the efforts of the following:
    - California Highway Patrol (CHP)
    - California Department of Transportation (Caltrans)
    - Orange County Sheriff's Department
    - Local law enforcement agencies
- Ensure the Operations Section Chief is kept apprised of law enforcement status and activities.

Fire and Rescue Branch Director

Responsible Agency
The Fire and Rescue Branch Director is filled by a designee from the Orange County Fire Authority.

Responsibilities

- Support the Fire and Rescue Mutual Aid System in coordinating resources, fire suppression, urban search and rescue, mass casualty incidents, and hazardous materials functions.
- Assist in alerting and warning the impacted population in the affected areas.
- Assist with evacuation operations and medical response.
- Assist Law Enforcement and Traffic Control with aerial support activities.
- Ensure the Operations Section Chief is kept apprised of fire and rescue status and activities.
- Coordinate rescue operations.

Public Works and Utilities Branch Director

Responsible Agency
The Public Works and Utilities Branch Director position is filled by a designee from the OC Public Works (OCPW).

Responsibilities

- Coordinates public works, utility services and Public Works Mutual Aid system in Orange County.
- Assist Law Enforcement and Traffic Control Branch and impacted jurisdictions for the evacuation of the impacted population.
- Provide resources including changeable message signs, k-rail barricades and traffic cones to support road closures and detours.
- Ensure the Operations Section Chief is kept apprised of public infrastructure (flood control channels, roads, bridges, facilities and utilities) conditions and status.
- Establish and maintain communication with utility service providers within the impacted area.
- Coordinate with impacted jurisdictions to develop debris management strategies.
- Establish and maintain communication with Dam Owner or established Unified Command for response coordination.
- Assist with assessment and response coordination of possible remediation activities to prevent or mitigation full dam failure
- Share ALERT data and assessment of impacts.

Care and Shelter Branch Director

Responsible Agency
The Care and Shelter Branch Director is filled by a designee from the Social Services Agency.

Responsibilities

- Coordinate with local jurisdictions to support the establishment of shelter locations in accordance with Operational Area Mass Care and Shelter Annex.
- Establish and operate County unincorporated shelters, if required.
- Coordinate with the Operations Section, Movement Group Supervisor for transit assets to provide accessible transportation to and from shelter, reception center and other locations.
- Ensure deployment of Functional Assessment Service Teams (FAST), when requested.

2.3.3 Planning and Intelligence Section

The Planning and Intelligence Section will ensure the Flood, Dam and Reservoir Failure Annex is implemented in conjunction with other Plans and Annexes, including but not limited to the Unified County of Orange and Orange County Operational Area Emergency Operations Plan, Joint Information System Annex, Evacuation Annex and Mass Care and Shelter Annex.

Planning and Intelligence Section Chief

Responsible Agency
The Planning and Intelligence Section Chief is appointed by the DES/OAC from OC Public Works.

Responsibilities
Specific items for the Planning & Intelligence Section to focus on during a dam and reservoir failure include:

- Identify jurisdictions impacted.

- Number of households, residents, and businesses in the inundation area.
- Identification of critical infrastructure impacted and any specific issues.
- Identification of schools, hospitals and other sites of concern within the possible impact area.
- Provide the Unified Command real time maos indicating inundation areas, evuacatons routes and possible impacted areas.
- Locations of evacuation areas, if any.
- Impacted roadways.
- Assist with establishment of shelters and/or reception centers locations.
- Weather for the next 48 hours.
- Advanced planning for response priorities.
- Status of transportation systems.
- Assess the applicable Dam EAP or Post Fire Debris Plans when applicable for additional pertinent information to share.

2.3.4 Logistics Section

Responsibilities for the Logistics Section will follow the Operational Area and County of Orange Emergency Operations Plan.

2.3.5 Finance and Administration Section

Responsibilities for the Finance and Administration Section will follow the Operational Area and County of Orange Emergency Operations Plan.

2.4 Information Collection, Analysis, and Dissemination

Prior to the County and OA EOC being activated the Operational Area can directly receive alert and warning notifications from several sources such as, the State Warning Center, the National Weather Service and county departments and agencies. The Orange County Sheriff's Department Emergency Management Division has the responsibility to collect and disseminate these notifications based upon current plans and procedures.

Upon activation of the County and OA EOC, the Planning and Intelligence Section will be responsible for gathering timely, accurate, accessible and consistent intelligence during an emergency. EOC Incident Action Plans (EOC IAP) will be utilized to create a common operating picture and be used to adjust the operational goals, priorities and strategies.

- Information dissemination within the EOC: Information communication will take place using various communication tools. Primarily, the EOC provides the structure for face-to-face communication and coordination. The EOC Message form is used for written communications and documentation of key messages. WebEOC's situational status display boards are kept updated throughout the activation to provide instant status communications.
- Information disseminated outside of the EOC: The County and OA EOC provides the single point of contact for information sharing to OA jurisdictions, county departments and supporting agencies. Such communications take place via typical systems such as telephone, e-mail, radio, fax and WebEOC.

2.5 Communications

Public Notifications and Alerts

Emergency information, warnings and protective action instructions for a flood or dam failure event will be broadcasted to the public by one or more of the following methods:

- Emergency Alert System (EAS)
- Wireless Emergency Alert (WEA)
- Route alerting (vehicle mounted public address systems)
- AlertOC
- Media releases

Additional information can be found in the Joint Information System/Joint Information Center Annex, the Orange County Local Area EAS Plan and Orange County OA Countywide Public Mass Notification System Standard Operating System (AlertOC).

Chapter 3 Plan Development and Maintenance

3.1 Overview

The Flood, Dam and Reservoir Failure Annex is considered a working document evolving with each use. In addition to real world incidents, exercises, training, evaluation and management, maintenance of this Annex will ensure appropriate changes are addressed.

3.2 Plan Maintenance

The Flood, Dam and Reservoir Failure Annex will be reviewed and revised every two years or following an actual or training event to ensure plan elements are valid and current. The Orange County Sheriff's Department, Emergency Management Division will lead the responsible departments in reviewing and updating this Annex as required based on identified deficiencies experienced in real world incidents, exercises and trainings.

3.3 Training and Exercises

A well-developed training and exercise program is vital to ensuring overall readiness and preparedness of emergency response personnel. This program will provide personnel familiarity with procedures, plans, and tools that will be used in the event of a flood, or dam and reservoir failure. Training ensures personnel are prepared for their roles and responsibilities. Exercises test the capabilities, resources, and working relationships of responding agencies.

Exercises can be accomplished in several ways. Tabletop exercises provide a convenient and low cost method of introducing officials to problem situations for discussion and problem solving. Such exercises are a good way to see if adequate policies and procedures exist. Periodic tabletop exercises specific to short and long-term recovery operations within the Operational Area are recommended. Functional exercises (FE) are the most common exercise process used in Orange County. The functional exercise is used to execute specific plans and procedures and apply established policies, plans, and procedures under crisis conditions, within or by a particular function team(s). This Annex will be exercised in conjunction with the Unified

County of Orange and Orange County Operational Area Emergency Operations Plan and other Annexes.

Chapter 4 Authorities and References

The following Authorities and References are specific to or support the Flood, Dam and Reservoir Failure Annex:

4.1 Federal

- US Army Corps of Engineers Emergency Action and Notification Subplan – Brea Dam 2008
- US Army Corps of Engineers Emergency Action and Notification Subplan – Carbon Canyon Dam 2008
- US Army Corps of Engineers Emergency Action and Notification Subplan – Fullerton Dam 2008
- US Army Corps of Engineers Emergency Action and Notification Subplan – Prado Dam 2008
- FEMA Federal Guidelines for Dam Safety, 2013
- U.S. Department of Homeland Security Dams Sector Crisis Management Handbook, 2015
- U.S. Department of Homeland Security National Incident Management System (NIMS)

4.2 State

- California Standardized Emergency Management System (SEMS)
- California Government Code, Section 8589.5
- California Code of Regulations, Title 23, Division 2
- California Water Code, Division 3
- California Department of Water Resources Code Section 6160 – Dam Safety
- California Department of Water Resources Water Code Section 6161
- California State Hazard Mitigation Plan, 2018

4.3 County

- County of Orange Hazard Mitigation Plan, 2015
- Unified County of Orange and Orange County Operational Area EOP 2016

4.4 Acronyms

BFE	Base Flood Evaluation
CFS	Cubic Feet per Second
CMS	Cubic Meter per Second
DWR	California Department of Water Resources
ETA	Estimated time of arrival
MCM	Million Cubic Meters
MLLW	Mean Lower Low Water
MSL	Mean Sea Level
NGVD	National Geodetic Vertical Datum of 1929
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
ROC	Reservoir Operations Center

SWRCB	California State Water Resources Control Board
USACE	US Army Corps of Engineers

4.5 Glossary

Abutment: Part of the valley side against which the dam is constructed. An artificial abutment is sometimes constructed, as a concrete gravity section, to take thrust of an arch dam where there is no suitable natural abutment. The left and right abutments of dams are defined with the observer viewing the dam looking in the downstream direction, unless otherwise indicated.

Acre-foot: A unit of volumetric measure that would cover one acre to a depth of one foot. It is equal to 43,560 cubic feet.

Appurtenant structure: Ancillary features of a dam such as outlets, spillways, power plants, tunnels, etc.

Baffle block: A block, usually of concrete, constructed in a channel or stilling basin for purposes of dissipating the energy of water flowing at high velocity.

Base thickness: Also referred to as base width. The maximum thickness or width of the dam measured horizontally between upstream and downstream faces normal to the axis of the dam but excluding projections for outlets or other appurtenant structures.

Berm: A nearly horizontal step in the sloping profile of an embankment dam. Also a step in rock or earth cut.

Breach: An opening through a dam that allows the uncontrolled draining of a reservoir. A controlled breach is a constructed opening. An uncontrolled breach is an unintentional opening caused by discharge from the reservoir. A breach is generally associated with the partial or total failure of the dam.

Burn Scar: A charred barren strip of land void of vegetation due to a recent wildfire.

Channel: A general term for any natural or artificial facility for conveying water, storm flows, or for flood control.

Cofferdam: A temporary structure enclosing all or part of the construction area that construction can proceed in the dry. A diversion cofferdam diverts a stream into a pipe, channel, tunnel or other watercourse.

Concurrent floods: Flood flows expected at a point on the river system below the dam at the same time a flood inflow occurs above the dam.

Controllable emergency: An emergency condition not normally encountered in the routine operation of the dam in which the occurrence of a significant hazard to life and/or property and is possible unless timely repairs and/or modifications to operational procedures are conducted to prevent dam failure. Time must be available to eliminate the condition.

Core: A zone of low permeability material in an embankment dam. The core is sometimes referred to as central core, inclined core, puddle clay core, rolled clay core or impervious zone.

Core wall: A wall built of relatively impervious material, usually of concrete or asphaltic concrete in the body of an embankment dam to prevent seepage.

Crest length: The measured length of the dam along the crest or top of dam.

Cutoff trench: A foundation excavation later to be filled with impervious material so as to limit seepage beneath the dam.

Dam: An artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water.

> **Arch dam**: A concrete, masonry, or timber dam with the alignment curved upstream so as to transit the major part of the water load to the abutments.
>
> **Diversion dam**: A dam built to divert water from the waterway or stream into a different watercourse.
>
> **Earth dam**: An embankment dam in which more than 50% of the total volume is formed of compacted earth layers are generally smaller than 3-inch size.
>
> **Regulating dam**: A dam impounding a reservoir from which water is released to regulate the flow downstream.
>
> **Rock-fill dam**: An embankment dam in which more than 50% of the total volume is comprised of compacted or dumped cobbles, boulders, rock fragments, or quarried rock generally larger than 3-inch size.

Dam failure: Catastrophic type failure characterized by the sudden, rapid, and uncontrolled release of impounded water or the likelihood of such an uncontrolled release.

Design water level: The maximum water elevation, including the flood surcharge, which a dam is, designed to withstand.

Debris Flow: Geological phenomena in which water-laden masses of soil and fragmented rock rush down mountainsides, funnel into stream channels, entrain objects in their paths, and form thick, muddy deposits on valley floors.

Drainage area: The area that drains to a particular point on a river or stream.

Drawdown: The difference between a water level and a lower water level in a reservoir within a particular time.

Erosion: The wearing away of a surface (bank, streambed, embankment, or other surface) by floods, waves, wind, or any other natural process.

Extreme inflow condition: When the reservoir surface is expected to reach or exceed the critical elevation NGVD.

Flood: A temporary rise in water surface elevation resulting in inundation of areas not normally covered by water.

Flood plain: An area adjoining a body of water or natural stream that may be covered by floodwater. Also, the downstream area that would be inundated or otherwise affected by the failure of a dam or large flood flows. The area of the flood plain is generally delineated by a frequency (or size) of flood.

Flood routing: A process of determining progressively over time the amplitude of a flood as it moves past a dam or downstream to successive points along a river or stream.

Flood storage: The retention of water of delay of runoff either by planned operation, as in a reservoir, or by temporary filling of overflows areas, as in the progression of a flood wave through a natural stream channel.

Freeboard: Vertical distance between a specific Stillwater (or other) reservoir surface evaluation and the top of the dam, without camber.

Gate: A moveable water barrier for the control of water.

> **Crest gate (spillway gate)**: A gate on the crest of a spillway to control the discharge or reservoir water level.
>
> **Flood gate**: A gate to control flood release from a reservoir.
>
> **Regulating gate (regulating valve)**: A gate or valve that operates under full pressure flow conditions to regulate the rate of discharge.

Hazard: A situation that created the potential for adverse consequences such as loss of life, property damage, or other adverse impacts.

Hazard potential: The possible adverse incremental consequences that result from the release of water or stored contents due to failure of the dam or appurtenances. Impacts may be for a

defined area downstream of a dam from flood waters released through spillways and outlet works of the dam or waters released by partial or complete failure of the dam. There may also be impacts for an area upstream of the dam from effects of backwater flooding or landslides around the reservoir perimeter.

Hazard potential classification: A system that categorizes dams according to the degree of adverse incremental consequences of a failure or mis-operation of a dam. The hazard potential classification does not reflect in any way on the current condition of the dam (i.e., safety, structural integrity, flood routing capacity).

Flood hydrograph: A hydrograph may be used to show how the water flow in a drainage basin (particularly river runoff) responds to a period of rain. This type of hydrograph is known as a storm or flood hydrograph and it is generally drawn with two vertical axes.

Inundation map: A map showing areas that would be affected by flooding from releases from a dam's reservoir. The flooding may be from either controlled or uncontrolled releases or as a result of a dam failure.

Leakage: Uncontrolled loss of water by flow through a hole or crack.

Maximum flood control level: The highest elevation of the flood control storage.

Meters Above Sea Level (MSL): Measurement of water above the sea level line

NAVD (North American Vertical Datum): In this document "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929 it will differ to actual sea level by 71 cm or 2.3 feet. The acronym has been adopted by FEMA FIS and FIRM maps to NAVD.

NGVD (National Geodetic Vertical Datum of 1929): A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929, it will differ to actual sea level by 71 cm or 2.3 feet. This acronym has been adopted by FEMA FIS and FIRM maps to NAVD.

Peak flow: The maximum instantaneous discharge that occurs during a flood. It is coincident with the peak of a flood hydrograph.

Probability: The likelihood of an event occurring.

Probable: Likely to occur; reasonable expected; realistic.

Reservoir: A body of water impounded by a dam and in which water can be stored.

Reservoir surface area: The area covered by a reservoir when filled to a specified level.

Seepage: The internal movement of water that may take place through the dam, the foundation or the abutments.

Spillway: A structure over or through which flow is discharged from a reservoir. If the rate of flow is controlled by mechanical means, such as gates, it is considered a controlled spillway. If the geometry of the spillway is the only control, it is considered an uncontrolled spillway.

Uncontrollable emergency: The occurrence of a significant hazard to life and/or property is certain to occur and no time is available to repair and or modify operational procedures to prevent dam failure with subsequent uncontrolled water release.

Chapter 5 Flood, Dam and Reservoir Failure Specific Position Checklists

Management Section

Operations Section

Planning and Intelligence Section

County and Operational Area EOC Manager

Name:	Date:
Start Time:	End Time:

Responsible Department: Orange County Sheriff-Coroner Department/Emergency Management Division, Director or designee

Responsibilities

- Establish and maintain contact with affected dam and reservoir owners or operators,
- Request current situational status of the affected dam and reservoir.
- Ensure the DES/OAC, Board of Supervisors (BOS) and Policy Group are notified and kept apprised of emergency conditions occurring due to a dam failure event.
- Coordinate with the DES/OAC to establish activation level of the County and OA EOC.
- Direct Emergency Management Division (EMD) staff to notify appropriate key personnel to response to the County and OA EOC, based upon the activation level established.
- Establish and maintain communication with all impacted jurisdictions to ensure coordination of response activities and situational information.
- Ensure situational information is provided to OA jurisdictions, County departments and Cal OES and updated on a regular basis.
- Assist with the coordination of the County's reentry and recovery efforts.

Dam and Reservoir Failure Checklist

- ❑ Confirm with dam or reservoir owners/operators notifications have been made to agencies and/or individuals in the affected area(s).
- ❑ Contact and advise OC Public Works and CEO leadership of conditions occurring.
- ❑ Establish communications with impacted jurisdictions to maintain current situation status and updates.
- ❑ Ensure notifications to Board of Supervisors and Policy Group, advising of current situation.
- ❑ Establish conference call for large dams with regional impact.
- ❑ Alert the Social Service Agency and American Red Cross for possible opening of shelters.
- ❑ Activate the County and OA EOC to Levels Two or Three when directed by the DES and OAC.
- ❑ Ensure alerting and call-in of key personnel from all county departments as necessary.
- ❑ Notify Cal OES REOC to provide briefing of current situation.
- ❑ Ensure Planning and Intelligence establishes and maintains contact with the following (as required) to receive release and situation updates
    - ❑ OC Public Works Department Operations Center
    - ❑ U.S. Army Corps of Engineers
    - ❑ Dam and/or Reservoir owner/operator

- ❑ Represent the Orange County Operational Area in Cal OES conference calls.
- ❑ Participate in US Army Corp of Engineers conference calls, if requested.
- ❑ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Director of Emergency Services and Operational Area Coordinator

Name:	Date:
Start Time:	End Time:

Responsible Department: County Executive Office designee-Director of Emergency Services
OC Public Works designee-Operational Area Coordinator

Responsibilities

- Has authority for protective action decisions pertaining to unincorporated Orange County areas.
- Coordinate with Operational Area jurisdictions during emergency response.
- Appoint a Public Information Manager (CEO designee) to coordinate dissemination of all emergency information.
- Appoint an Operations Section Chief (OC Public Works designee).
- Appoint a Planning and Intelligence Section Chief (OC Public Works designee).
- Provide direction to the Policy Group and assign objectives to Section Chief's and EOC staff when prioritization and/or policies must be created.
- Incident objectives may include:
  - Alert and warning of the public and emergency responders
  - Evacuation of the impacted population
  - Care and shelter of the impacted population
  - Damage assessment
  - Conduct search and rescue operations
  - Emergency medical operations
  - Identify and isolate hazards
  - Security operations
  - Cleanup, reentry and recovery operations
- Prioritization may include:
  - Requests for conflicting resources including equipment and personnel
  - Resource allocation
  - Public messaging
  - Restoration priorities of critical infrastructure

Flood, Dam and Reservoir Failure Checklist

- ❑ If County and OA EOC activation is at Level One, establish direct communication with the County and OA EOC and request regular updates from the County and OA EOC Manager.
  - ❑ Direct the County and OA EOC Manager to brief the Policy Group.

- ❑ Direct the County and OA EOC Manager to report the situation and potential support requirements to the Cal OES Regional Emergency Operations Center (REOC).
- ❑ If the County and OA EOC activation is requested or required to activate to a Level Two or Three,
  - ❑ Report to the County and OA EOC
  - ❑ Receive an initial briefing from the County and OA Manager

- ❑ Activate the County and OA EOC to the appropriate level of organization and staffing necessary to support operations.
- ❑ Appoint a PIM (CEO designee), to coordinate dissemination of all emergency information.
- ❑ Appoint an Operations Section Chief (OC Public Works designee).
- ❑ Appoint a Planning and Intelligence Section Chief (OC Public Works designee).
- ❑ In coordination with the PIM, prepare and approve dam failure information statement and instructions for the public to be release via:
  - ❑ Media (Television, Radio)
  - ❑ Emergency Alert Systems
  - ❑ National Weather Service
  - ❑ AlertOC to unincorporated areas
- ❑ Ensure the Planning and Intelligence Section collects, evaluates situational information and damage information from the Operational Area.
  - ❑ Maintain contact with dam and reservoir owner/operator to receive regular updates on water releases and situation status.
- ❑ Participate in conference call for large dams with regional impact.
- ❑ Participate in US Army Corp of Engineers conference calls, if requested.
- ❑ Initiate discussion with Policy Group on the necessity to proclaim a Local Emergency and/or Operational Area Proclamation of Emergency.
- ❑ With concurrence from the Policy Group request the Board of Supervisors proclaim the existence of Local Emergency and
- ❑ Request a Gubernatorial Proclamation, as necessary.
- ❑ Request a Presidential Declaration, as necessary.
- ❑ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Policy Group

Name:	Date:
Start Time:	End Time:

Responsible Department: The Policy Group consists of representatives of organizations and departments with direct (functional) emergency response responsibilities in a dam/reservoir failure event.

Responsibilities

- Provide political leadership to set realistic expectations and maintain confidence in Orange County response and recovery operations.
- Provide resources to Orange County jurisdictions and agencies required to implement response and recovery operations.
- Prepare emergency proclamations and consider special ordinances as necessary to meet incident objectives.
- Provide information to the public and media in coordination with the Public Information Manager.

Flood, Dam and Reservoir Failure Checklist

- ❑ Assist in establishing strategies and policies for the emergency organization.
- ❑ Participate in conference call for large dams with regional impact.
- ❑ Participate in US Army Corp of Engineers conference calls, if requested.
- ❑ Maintain current status information concerning the overall response activities of respective agency.
- ❑ Act as an advisor to the DES and OAC and Board of Supervisors on emergency proclamations, legal matters, level of response, reentry, recovery operations, and termination of emergency operations.
- ❑ Ensure Department and County resources are made available and determine priorities for resource deployment.
- ❑ **Refer to the Position specific checklists in the Operational Area Emergency Operations Plan tab for additional tasks.**

EOC Liaison Officer

Name:	Date:
Start Time:	End Time:

Responsible Department: Orange County Sheriff-Coroner Department/Emergency Management Bureau designee

Responsibilities

- The EOC Liaison Officer will coordinate with agencies including, but not limited to, during a dam failure event:
  - Affected dam and reservoir owners or operators.
  - Impacted jurisdictions
  - County departments
  - Special Districts
  - Cal OES
  - State Department of Water Resources
  - U.S. Army Corps of Engineers
  - National Weather Service
  - FEMA
- Act as a point of contact for OA jurisdictions, county departments and external organizations.
- Interact with other sections, branches, units and groups with the County and OA EOC to obtain information to assist in coordination.
- Ensure the proper flow of information to and from external organizations.
- Ensure all developed guidelines, directives, action plans and appropriate situational information are disseminated to OA jurisdictions and other appropriate agencies.

Flood, Dam and Reservoir Failure Checklist

- ❑ Establish contact with dam and reservoir owners/operators
  - ❑ Confirm notifications have been made to agencies in the affected area(s).
  - ❑ Gather situation status information
- ❑ Notify OA jurisdictions, County departments of the County and OA EOC activation and request a status report.
- ❑ Establish and maintain communications with impacted jurisdictions to receive situation status and updates.
- ❑ Maintain and post all relevant phone contacts and numbers.
- ❑ Gather and maintain Operational Area situational status from all available resources.
- ❑ Ensure all OA jurisdictions, County departments and other appropriate organizations are kept appraised of the situation.
- ❑ Assist County and OA EOC Manager and DES and OAC as directed.

- ❑ Ensure all situational status and updates are forwarded to the Planning and Intelligence Section.
- ❑ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Public Information Manager

Name:	Date:
Start Time:	End Time:

Responsible Department: County Executive Office designee

Responsibilities

- Establish and maintain communication with Public Information Officers from impacted jurisdictions and agencies.
- Preparation of press releases.
- Activation and support needs of the County and OA EOC Public Information Hotline.
- Development and use of AlertOC messages, County and OA EOC Website, Twitter and Facebook accounts.
- Coordinate with impacted jurisdictions and agencies to effectively communicate with the public the following:
  - Evacuation orders, if any
  - Shelter locations
  - School information
  - AlertOC messaging
- Provide continual updates on the incident to the media and public.
- Monitor other websites to ensure posting of accurate information.
- Activate the Joint Information System Annex.
  - Establish a Joint Information Center (JIC), if not possible establish a virtual JIC.

Flood, Dam and Reservoir Failure Checklist

- ❑ Obtain situational status briefing from DES or OAC and/or County and OA EOC Manager.
- ❑ Establish and maintain communications with impacted jurisdictions Public Information Officers.
- ❑ Ensure the Public Information Hotline and Rumor Control is established, as required.
- ❑ Appoint a Public Information Hotline and Rumor Control Supervisor, as required.
- ❑ Establish a Joint Information Center (JIC), if not possible, establish a virtual JIC.
- ❑ Compile an initial press release for the DES and OAC approval on the County's operations:
  - ❑ Activation of the County and OA EOC.
  - ❑ Activation of the Public Information Hotline and Rumor Control with their telephone number (if activated).
- ❑ Coordinate the development of joint press releases, EAS messages with impacted jurisdictions on situational information and protective actions to be taken by the public.

- ❑ Ensure the DES and OAC reviews and approves all press releases, EAS messages and County AlertOC activations prior to dissemination and are posted to WebEOC
- ❑ Ensure all jurisdictions activating AlertOC provide their script prior to launching the message, if possible.
- ❑ Ensure all approved press releases, EAS message and AlertOC activation information is provided to the following:
  - ❑ Impacted jurisdictions
  - ❑ Law Enforcement and Traffic Control Branch
  - ❑ Public Information Hotline and Rumor Control
  - ❑ Operational Area jurisdictions
  - ❑ Logistics Section, Communications Alert & Warning Unit
  - ❑ Care and Shelter Branch
  - ❑ Posted to Orange County website (http://ocgov.com)
- ❑ Coordinate with the Public Information Hotline and Rumor Control Supervisor to monitor and identify rumor trends and false information concerning incident activities in order to clarify in future press releases, EAS messages and AlertOC activations.
- ❑ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Operations Section Chief

Name:	Date:
Start Time:	End Time:

Responsible Department: OC Public Works designee

Responsibilities

- Manage and direct the Operations Section activities.
- Establish and maintain communications with:
- Incident Command Post (ICP)
- Impacted jurisdictions and agencies EOC Operations Section.
- Support the field emergency response activities.
- Implement objectives established by the DES/OAC.
- Determine the need for immediate and anticipated resources.
- Provide Operations Section input to the EOC Incident Action Plan (IAP).
- Oversee the activities of the Operations Section and provide situational status information to the DES/OAC and Planning and Intelligence Section on Operations Section and field response activities.

Flood, Dam and Reservoir Failure Checklist

- ☐ Obtain situational status briefing from DES and OAC and/or County and OA EOC Manager.
- ☐ Establish communications with Incident Command and activated Department Operations Centers (OC Public Works and Sheriff's Department.
- ☐ Establish communications with impacted jurisdictions EOC's operations section to maintain current situation status and updates.
- ☐ Coordinate with Planning and Intelligence section for current weather and future forecasts.
- ☐ Update County and OA EOC and jurisdictions upon receipt of time sensitive information.
- ☐ Assist with the development of the area wide Damage Assessment Report.
- ☐ Provide situation updates to Management and Planning and Intelligence Section during operational periods.
- ☐ Participate in the County and OA EOC Action Plan (EAP) with situational information from:
  - ☐ Public Works and Utilities Branch
  - ☐ Law Enforcement and Traffic Control Branch
  - ☐ Fire and Rescue Branch
  - ☐ Health Care Branch
  - ☐ Care and Shelter Branch
- ☐ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Law Enforcement and Traffic Control Branch Director

Name:	Date:
Start Time:	End Time:

Responsible Department: Orange County Sheriff's Department designee

Responsibilities

- Coordinates the law enforcement, traffic control, movement, coroner functions and Law Enforcement Mutual Aid system in Orange County.
- Supervise activated positions within the branch. If a position is not activated, the Law Enforcement Branch Director is responsible for fulfilling that position's assignments.
- Primary responsibility for public safety and security.
- Support evacuation operations in the field.
- Provide traffic management information from within the impacted area.
    - Coordinate with California Highway Patrol (CHP), Caltrans and the Orange County Traffic Management Center on a traffic plan and information.
- Should traffic diversion measures be required, coordinate the efforts of the following:
    - California Highway Patrol (CHP)
    - California Department of Transportation (Caltrans)
    - Orange County Sheriff's Department
    - Local law enforcement agencies
    - Railroad companies
- Ensure the Operations Section Chief is kept apprised of law enforcement status and activities.

Flood, Dam and Reservoir Failure Checklist

- ☐ Obtain situational status briefing from Operations Section Chief.
- ☐ Establish and maintain communications with Law Incident Command.
- ☐ Coordinate with the Logistics Section, Communications/Alert & Warning Unit to assign talk groups as needed.
- ☐ Execute evacuation orders.
- ☐ Coordinate transportation assembly point locations for large dam events, when time is allowed.
- ☐ Ensure first responders have been notified of pending inundation area in a timely matter before expected water flow arrives at their location (coordinate with Communications/ Alert & Warning Unit in Logistics).
- ☐ Coordinate Air Support resources:
    - ☐ To monitor arrival and impact of flooding.

- ☐ Search and rescue operations
- ☐ Damage assessment operations

☐ Initiate, coordinate and gather information from windshield damage assessment of impacted area.

☐ Coordinate law enforcement resources, as needed, with:

- ☐ Shelter operations
- ☐ Health care branch
- ☐ Fire and rescue branch

☐ Request law enforcement mutual aid, as required.

☐ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Fire and Rescue Branch Director

Name:	Date:
Start Time:	End Time:

Responsible Department: Orange County Fire Authority designee

Responsibilities

- Support the Fire and Rescue Mutual Aid System in coordinating resources, fire suppression, urban search and rescue, mass casualty incidents, and hazardous materials functions.
- Assist in alerting and warning the impacted population in the affected areas.
- Assist with evacuation operations and medical response.
- Assist Law Enforcement and Traffic Control with aerial support activities.
- Ensure the Operations Section Chief is kept apprised of fire and rescue status and activities.
- Coordinate rescue operations.

Flood, Dam and Reservoir Failure Checklist

- ☐ Obtain situational status briefing from Operations Section Chief.
- ☐ Establish and maintain communications with Fire Incident Command.
- ☐ Coordinate fire and rescue resources, such as:
  - ☐ Hazardous materials teams
  - ☐ Urban search and rescue teams
  - ☐ Swift water rescue teams
- ☐ Coordinate Hazardous Materials Teams to impacted area to conduct materials field testing and analysis.
- ☐ Coordinate with Law Enforcement and Traffic Control and Public Works for traffic control efforts.
- ☐ Request fire and rescue mutual aid as required.
- ☐ Initiate, coordinate and gather information from windshield damage assessment of impacted area.
- ☐ Provide Fire and Rescue Branch situational status to Operations Section Chief during operational periods.
- ☐ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Public Works and Utilities Branch Director

Name:	Date:
Start Time:	End Time:

Responsible Department: OC Public Works designee

Responsibilities

- Coordinates public works, utility services and Public Works Mutual Aid system in Orange County.
- Assist Law Enforcement and Traffic Control Branch and impacted jurisdictions for the evacuation of the impacted population.
- Provide resources including changeable message signs, k-rail barricades and traffic cones to support road closures and detours.
- Ensure the Operations Section Chief is kept apprised of public infrastructure (flood control channels, roads, bridges, facilities and utilities) conditions and status.
- Establish and maintain communication with utility service providers within the impacted area.
- Coordinate with impacted jurisdictions to develop debris management strategies.
- Coordinate SAP inspectors for private property damages and safety.
- Coordinate appropriate subject matter experts for reconnaissance of public infrastructure

Flood, Dam and Reservoir Failure Checklist

- ☐ Obtain situational status briefing from Operations Section Chief.
- ☐ Establish and maintain communications with OC Public Works Department Operations Center.
- ☐ Coordinate public works and utility resources with OC Public Works Department Operations Center.
- ☐ Coordinate with Law Enforcement and Traffic Control for traffic control efforts.
- ☐ Assist with temporary shut-down of utilities systems in affected zones to minimize damage to the system or danger to the general public.
- ☐ Request public works mutual aid, as necessary.
- ☐ Coordinate reconnaissance of public infrastructure
    - ☐ Dams
    - ☐ Reservoirs
    - ☐ Roads
    - ☐ Bridges
    - ☐ Facilities
    - ☐ Utilities
- ☐ Plan and coordinate for restoration of
    - ☐ Broken utility pipelines

- ☐ Low to no potable water flow
- ☐ Downed utility poles
- ☐ Telecommunications system
- ☐ Contaminated ground water
- ☐ Raw-sewage

☐ Identify alternate routes, prioritize the clearance of essential road ways, building access, utility access rerouting.

☐ Identify SME Engineer from OC Public Works to be a technical liaison to the County and OA EOC

☐ Assist with identification of temporary locations for debris collection and holding sites

☐ Coordinate debris management with affected jurisdictions.

☐ Coordinate collection, storage, reduction and disposal of debris, environmental and public health issues related to debris removal.

☐ Provide Public Works and Utilities Branch situational status to Operations Section Chief during operational periods.

☐ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Care and Shelter Branch Director

Name:	Date:
Start Time:	End Time:

Responsible Department: OC Social Services Agency designee

Responsibilities

- Coordinate with local jurisdictions to support the establishment of shelter locations in accordance with Operational Area Mass Care and Shelter Annex.
- Establish and ensure continued operation of County unincorporated shelters, if required.
- Coordinate with the Operations Section, Movement Group Supervisor for transit assets to provide accessible transportation to and from shelter, reception center and other locations.
- Ensure deployment of Functional Assessment Service Teams (FAST), when requested.
- Support coordination of Water Distribution needs.

Flood, Dam and Reservoir Failure Checklist

- ☐ Obtain situational status briefing from Operations Section Chief.
- ☐ Coordinate with impacted jurisdictions, American Red Cross and OC Department of Education to establish shelter locations outside the impacted area.
- ☐ Coordinate support for shelter operations with affected jurisdictions.
- ☐ Establish contact with K-12 districts, community colleges and private schools identified within the inundation area for reception or shelter needs.
- ☐ Coordinate with Animal Care Services for animal sheltering.
- ☐ Coordinate with Law Enforcement and Traffic Control Branch for security support at shelter locations
- ☐ Coordinate with health care branch for medical and behavioral health support at shelter locations.
- ☐ Coordinate with Logistics Section for Shelter resource needs, such as:
    - ☐ Personnel
    - ☐ Equipment
    - ☐ Food
    - ☐ Communications
- ☐ Provide Care and Shelter Branch situational status to Operations Section Chief during operational periods.
- ☐ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

WEROC Liason

Name:	Date:
Start Time:	End Time:

Position Checklists: The Position Checklists are a tool designed to provide the County and Operational Area emergency response organization with proposed activities to support essential functions during an EOC activation. The following checklists serves as a point of reference to identify the scope of actions that may occur during response operations. The items listed in the checklist should not be considered final or static. As response operations evolve, so too will the requirements of the County and Operational Area emergency response organization and additions or modifications to actions outlined below will likely be required.

Responsible Department: Water Emergency Response Organization of Orange County (WEROC)

Responsible Position: WEROC

Immediate Supervisor: Public Works & Utilities Branch Director

Subordinates: None

Responsibilities

- Coordinates water and waste water resources and personnel (e.g. emergency repairs, temporary construction, restoration of essential utilities, etc.).
- Coordinates with the water and waste water utilities for damage assessments and restoration of water supplies and systems.
- Coordinates directly with Branches, Units and Groups in the EOC, ICP and with representatives at the OC Public Works Department Operations Center, if activated.

READ ENTIRE CHECKLIST AT START-UP AND AT BEGINNING OF EACH SHIFT

CHECKLIST ACTIONS

Start-Up Actions

- ❑ Upon notification, report to the County and Operational Area EOC and sign in.
- ❑ Report to the Public Works and Utilities Branch Director and obtain an initial briefing.
- ❑ Ensure telephone is off "forward".
- ❑ Login to EOC position computer:
  - ❑ **Login:** EOCPublicWorksOps
  - ❑ **Password:** utilize current EOC computer password
- ❑ Activate Outlook; for all EOC activations you must use your EOC position email account, not your work email account.
  - ❑ If Outlook has not been initiated on the assigned computer, follow the steps as directed on the computer:
    - ❑ If you need additional assistance or have issues with the computer contact the Logistics Section, Information Technology Support Group (Orange vests) or Emergency Management staff (Black vests).
- ❑ Monitor your EOC position email throughout your shift.
- ❑ Log into WebEOC - (http://webeoc.ocsd.org) for additional log in procedures, go to the WebEOC tab in this binder.
  - ❑ **Username:** Orange County Operational Area
  - ❑ **Password:** utilize current WebEOC password
  - ❑ **Position:** OOA WEROC Liaison
  - ❑ **Incident:** Utilize the "named" event or the default "OC Emergency"
  - ❑ **Name:** use your name (Last name, First name)
  - ❑ **Location:** OA EOC
  - ❑ **Phone Number:** 714-628-7135
  - ❑ **Email:** EOCPublicWorksOps@ocsd.org
- ❑ Maintain log of events, documenting all activities, either electronic or paper form activity log.
- ❑ Review position responsibilities and clarify any issues regarding your authority and assignment.

- ❑ Additional information, tools and documents can be found on the computers "K" drive and your Position Checklist binder.

General Operational Duties:

- ❑ Establish and maintain contact with the water and waste water utilities, ICP and other utilities.
- ❑ Determine the status of local resources available to mitigate the emergency.
- ❑ Determine the status of water and waste water utilities including; safety concerns, impact on services, location of the affected area, locations of damaged water mains, anticipated time of the restoration of service for:
  - ❑ Water service
  - ❑ Sewage and waste treatment plants
- ❑ Coordinate back-up power generator deployment to vital water and sewage pumping sites.
- ❑ Provide technical advice for the procurement of potable water and portable sewage pumps. Coordinate with the Logistics Section.
- ❑ Assist the Utilities Group Supervisor with:
  - ❑ Completion of the Potable Water Status Report and Waste Water Status Report for each operational period.
    - ❑ paper version located in this binder under the "Status Report Forms" Tab.
    - ❑ electronic version located on computers "K" drive, folder "2 Operations Section, Public Works and Utilities Information and Forms" Branch Status Reports.
- ❑ Maintain accurate records on the use of personnel, equipment and materials, and expenditures utilized in support of the incident.
- ❑ Advise the Public Information Officer of water and waste water utilities status.
- ❑ Provide the Public Information Officer and Medical and Health Branch, Public Health Group with information relating to water and waste water utility services.

Recovery: (see County of Orange and Orange County Operational Area Recovery Annex for additional activities)

- ❑ Coordinate the provision of resources as requested for preliminary damage assessment and recovery operations.
- ❑ Assist in recovery operations and ensure requested activities.

- ❑ Advise the Public Works and Utilities Branch Director on water and waste water issues regarding recovery.

Demobilization:

- ❑ Authorize the demobilization of organizational elements within the group when authorized by the Public Works and Utilities Branch Director. Ensure any open actions are handled or transferred to other County and Operational Area EOC elements as appropriate.
- ❑ Complete all required forms, reports, activity logs and other documentation. Provide all completed documentation to the Public Works and Utilities Branch Director prior to your departure from the EOC.
- ❑ Return all checked out equipment to the Public Works and Utilities Branch Director prior to your departure from EOC.
- ❑ Participate in all debriefings and critiques of the County and Operational Area emergency response and be prepared to provide input to the County and Operational Area After Action and Corrective Action report.

Precise information is essential to meet requirements for possible reimbursement by Cal OES and FEMA.

NOTES:

Planning and Intelligence Section Chief

Name:	Date:
Start Time:	End Time:

Responsible Department: OC Public Works designee

Responsibilities

Specific items for the Planning & Intelligence Section to focus on during a dam failure include:

- Number of jurisdictions impacted.
- Number of households, residents, and businesses in the inundation area.
- Identification of critical infrastructure impacted and any specific issues.
- Creation of maps indicating inundation areas.
- Creation of maps indicating evacuation routes.
- Locations of evacuation areas, if any.
- Impacted roadways, freeways and rail.
- Establishment of shelters and/or reception centers locations.
- Weather for the next 48 hours.
- Advanced planning for response priorities.
- Status of transportation systems.

Flood, Dam and Reservoir Failure Checklist

- ☐ Obtain situational status briefing from DES and OAC and/or County and OA EOC Manager
- ☐ Verify Dam and Reservoir Failure information with Public Works and Utilities Branch.
- ☐ Provide maps showing projected impacts due to Dam and Reservoir Failure inundation.
- ☐ Establish communications with impacted jurisdictions to maintain current situation status and updates.
- ☐ Coordinate with U.S. Army Corps of Engineers, if Prado, Brea, Carbon Canyon or Fullerton dam(s) are impacted.
- ☐ Coordinate with Public Works and Utilities Branch for information from Flood Channel Monitoring Teams.
- ☐ Coordinate with OC Public Works Flood Control District for analysis of de-flood times in impacted areas.
- ☐ Monitor weather and future forecasts.
- ☐ Compile an area wide Damage Assessment Report from the Operational Area and provide information to Management Section and Cal OES Regional Operations Center (REOC).
- ☐ Develop the County and OA EOC Incident Action Plan (IAP) with situational information from:
    - ☐ Operations Section
    - ☐ Logistics Section
    - ☐ Finance and Administration Section
    - ☐ Operational Area Jurisdictions

- ☐ Dam and Reservoir owner/operators

☐ **Refer to the Position specific checklists in the County and Operational Area Emergency Operations Plan tab for additional tasks.**

Chapter 6

Operational Area Conference Call: Storm / Flood Event

Conference Call Date & Time: _____

Facilitator: _____

Purpose of the call:

- This is the Orange County Operational Area EOC. The purpose of this conference call is the coordinating of action items and mutual aid requests related to the forecasted storm event expected to impact Orange County.
- As a reminder please mute your phone if you are not speaking and do not place it on hold.
- We will not be doing an agency roll call due the numbers of participants on the call.
- We will now hear from the National Weather Service San Diego forecast office for a weather briefing.

National Weather Service Briefing

County Actions:

- A WebEOC event **HAS** or **HAS NOT** been created:_____. Jurisdictions should report damage and their status in WebEOC.
- OCPW DOC "Storm Center" **IS** or **IS NOT** Activated. Their number is 714-955-0333
- County/OA EOC **IS** or **IS NOT** activated.
  - **IS**: You may contact the EOC by the EOC Liaison at 714-628-7060.

Mutual Aid Request:

Next Conference Call

Operational Area Conference Call: Dam/Reservoir Event

Conference Call Date & Time: _____

Facilitator: _____

Purpose of the call:

- This is the Orange County Operational Area EOC. The purpose of this conference call is to establish communications and discuss if any protective actions need to be implemented related to the reported event at (*Dam name*)_____ with potential impacts to the jurisdictions of_____
- As a reminder please mute your phone if you are not speaking and do not place it on hold.
- Each agency with public safety authority for their jurisdiction is expected to have a Decision Maker on the Conference Call for this event. We will do a juristiation roll call and then here a report from (Dam Operator)_____ on the current situation

Dam Operator	
Public Safety: Law	
Public Safety: Fire	
Impacted Jurisdictions	
WEROC	
Red Cross	
Other	

Dam Operator Report

Will now hear from the Dam operator_____for an update on the current situation to include: Event Type, Situation and Emergency Level. (*See pg15-16 for chart*)

- Event Type:_____
- Event Situation:_____
- Emergency Level:_____

Dam Operator Report:

Unified Command (UC) ***HAS*** or ***HAS NOT*** be established between_____

UC Incident Command Post ***HAS*** or ***HAS NOT*** be established at:_____

Recommend Protective Actions
Based on the Dam Operator Report what is UC recommendation:

- **Evacuations**
  Evacuations Areas:

  Shelter Locations:

- **Alert & Warning**
  What has already been implemented (*AlertOC, WebEOC, Press Release):*

  What will be implemented (*AlertOC, WebEOC, Press Release)*:

  Public Messaging:

Next Conference Call:

Chapter 7 Attachments

Attachment A – Resource Directory
Attachment B – Dam and Reservoir Listing A through L
Attachment C – Dam and Reservoir Listing M through Y