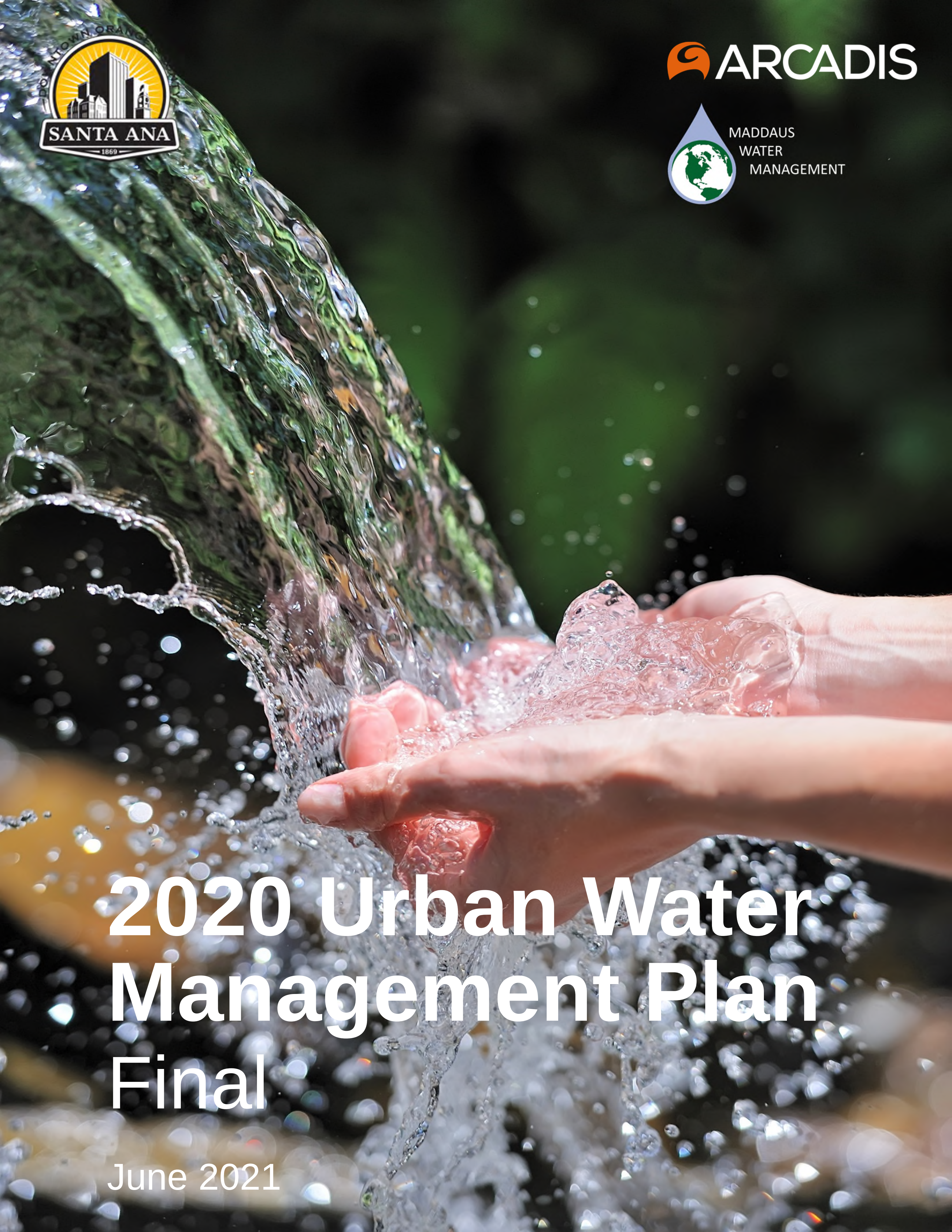

SANTA ANA

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ARCADIS

MADDAUS WATER MANAGEMENT

2020 Urban Water Management Plan

Final

June 2021

2020 URBAN WATER MANAGEMENT PLAN

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ACRONYMS AND ABBREVIATIONS

%	Percent
20x2020	20% water use reduction in GPCD by year 2020
ADU	Accessory Dwelling Unit
Act	Urban Water Management Planning Act of 1983
AF	Acre-Feet
AFY	Acre-Feet per Year
AWWA	American Water Works Association
BEA	Basin Equity Assessment
Biops	Biological Opinions
BPP	Basin Production Percentage
CCC	California Coastal Commission
CDR	Center for Demographic Research at California State Fullerton
CEC	Constituents of Emerging Concern
CEE	Consortium for Energy Efficiency
CII	Commercial/Industrial/Institutional
CIP	Capital Improvement Program
City	City of Westminster
CPTP	Coastal Pumping Transfer Program
CRA	Colorado River Aqueduct
CTE	Career Technical Education
CUP	Conjunctive Use Program
CVP	Central Valley Project
DAC	Disadvantaged Communities
DCP	Delta Conveyance Project
DDW	California State Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
DRA	Drought Risk Assessment
DMM	Demand Management Measure
DOF	Department of Finance
DVL	Diamond Valley Lake
DWR	Department of Water Resources
FIRO	Forecast Informed Reservoir Operations
FY	Fiscal Year
GAP	Green Acres Project
GHG	Greenhouse Gas
GPCD	Gallons per Capita per Day
gpf	Gallons per Flush
GSA	Groundwater Sustainability Agency

GSP	Groundwater Sustainability Plan
GWRS	Groundwater Replenishment System
GWRSFE	Groundwater Replenishment System Final Expansion
H_2O_2	Hydrogen Peroxide
HECW	High Efficiency Clothes Washer
HEN	High Efficiency Nozzle
HET	High Efficiency Toilet
HOA	Home Owners Association
IPR	Indirect Potable Reuse
IRP	Integrated Water Resources Plan
JADU	Junior Accessory Dwelling Unit
kWh	Kilowatt-Hour
LRP	Local Resources Program
LTFP	Long-Term Facilities Plan
MAF	Million Acre-Feet
MCL	Maximum Contaminant Level
MET	Metropolitan Water District of Southern California
MF	Microfiltration
MG	Million Gallon
MGD	Million Gallons per Day
MHI	Median Household Income
MNWD	Moulton Niguel Water District
MTBE	Methyl Tertiary Butyl Ether
MWDOC	Municipal Water District of Orange County
MWELO	Model Water Use Efficiency Landscape Ordinance
NDMA	N-nitrosodimethylamine
NPDES	National Pollutant Discharge Elimination System
NRW	Non-Revenue Water
OC	Orange County
OC Basin	Orange County Groundwater Basin
OC San	Orange County Sanitation District
OCWD	Orange County Water District
ORP	On-Site Retrofit Program
PFAS	Per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfanate
Poseidon	Poseidon Resources LLC
PPCP	Pharmaceuticals and Personal Care Product
PPT	Parts Per Trillion
PSA	Public Service Announcement

QWEL	Qualified Water Efficient Landscaper
RA	Replenishment Assessment
RHNA	Regional Housing Needs Assessment
RO	Reverse Osmosis
RUWMP	Regional Urban Water Management Plan
SBx7-7	Senate Bill 7 as part of the Seventh Extraordinary Session
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCWD	South Coast Water District
SMWD	Santa Margarita Water District
SDP	Seawater Desalination Program
sf	Square Feet
STEAM	Science Technology Engineering Arts and Mathematics
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TAF	Thousand Acre-Feet
TDS	Total Dissolved Solids
USBR	United States Bureau of Reclamation
UV	Ultraviolet
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act of 1983
VOC	Volatile Organic Compound
Water Code	California Water Code
WBIC	Weather-Based Irrigation Controller
WF-21	Water Factory 21
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSIP	Water Savings Inventory Program
WUO	Water Use Objective

EXECUTIVE SUMMARY

INTRODUCTION AND UWMP OVERVIEW

The City of Santa Ana prepared this 2020 Urban Water Management Plan (UWMP) to submit to the California Department of Water Resources (DWR) to satisfy the UWMP Act of 1983 (UWMP Act or Act) and subsequent California Water Code (Water Code) requirements. The City is a retail water supplier that provides water to its residents and other customers using the imported potable water supply obtained from its regional wholesaler, Metropolitan Water District of Southern California (MET), local groundwater from the Orange County Groundwater Basin (OC Basin), and recycled water from the Orange County Water District (OCWD).

UWMPs are comprehensive documents that present an evaluation of a water supplier's reliability over a long-term (20-25 year) horizon. This 2020 UWMP provides an assessment of the present and future water supply sources and demands within the City's service area. It presents an update to the 2015 UWMP on the City's water resource needs, water use efficiency programs, water reliability assessment and strategies to mitigate water shortage conditions. It also presents a new 2020 Water Shortage Contingency Plan (WSCP) designed to prepare for and respond to water shortages. This 2020 UWMP contains all elements to meet compliance of the new requirements of the Act as amended since 2015.

UWMP PREPARATION

The City coordinated the preparation of this 2020 UWMP with other key entities, including MET (regional wholesaler for Southern California and the direct supplier of imported water to the City, Municipal Water District of Orange County ([MWDOC] (regional wholesale supplier for OC)), and OCWD (OC Basin manager and provider of recycled water in north OC). While the City is not a member agency of MWDOC, the City developed this UWMP in conjunction with other MWDOC-led efforts such as population projection from the Center for Demographic Research at California State University Fullerton (CDR).

SYSTEM DESCRIPTION

Governed by a non-partisan seven-member City Council, the City is one of the oldest cities in Orange County, incorporated in 1886 and became an original member agency of the MET on February 27, 1931.

The City's water service area covers 27.5 square miles and includes the City of Santa Ana and a small neighborhood in the City of Orange, near Tustin Avenue and Fairhaven by the northeast corner of Santa Ana. The City operates ten reservoirs with a storage capacity of 49 million gallons (MG), seven pumping stations, 21 groundwater wells, four pressure regulating stations and seven import water connections and manages 510-mile water mains system with 45,037 service connections.

Situated in the South Coast Air Basin (SCAB), the City's climate is characterized by Southern California's "Mediterranean" climate with mild winters, warm summers and moderate rainfall. Regarding land use, the City is predominantly single and multi-family residential community. Moving forward, the City will continue planning for its Regional Housing Needs Assessment (RHNA) allocation and future planned developments beyond 2020 will primarily be multiuse projects, in the 'focus areas' identified in the City's General Plan. The current population of 335,086 is projected to increase by 2.9% over the next 25 years.

WATER USE CHARACTERIZATION

Water use within the City's service area has been relatively stable in the past decade with an annual average of 36,245 AF. Potable and non-potable water use accounts for an average of 99% and 1% of total City water use, respectively. In fiscal year (FY) 2019/20, the City's water use was 33,240 AF of potable water (groundwater and imported) and 249 AF of direct recycled water for landscape irrigation. In FY 2019-20, the City's potable water use profile comprised of 65.5% residential use, 24.5% commercial, industrial, and institutional (CII), and 4.0% large landscape/irrigation. Non-revenue water and other uses account for 5.9% of City's water demand.

Water Use Projections: 5-year and 25-year

The City's service area is almost completely built-out and is projected to add minimum land use and small population increase. Water demand is likely to increase by 1.2% over the next 5 years. In the longer term, water demand is projected to be stable from 2025 through 2045 (a slight decrease of 0.2% over the 20-year period). The projected potable and non-potable water use for 2045 is 33,578 AF and 249 AF, respectively.

This demand projection considers such factors as current and future demographics, future water use efficiency measures, and long-term weather variability.

CONSERVATION TARGET COMPLIANCE

Retail water suppliers are required to comply with the requirements of Water Conservation Act of 2009, also known as SBx7-7 (Senate Bill 7 as part of the Seventh Extraordinary Session), which was signed into law in 2010 and requires the State of California to reduce urban water use by 20% by 2020 from a 2013 baseline.

The retail water suppliers can comply individually or as a region in collaboration with other retail water suppliers, in order to be eligible for water related state grants and loans. The City is part of the Orange County 20x2020 Regional Alliance created in collaboration with MWDOC, its retail member agencies as well as the Cities of Anaheim and Fullerton. The Alliance was created to assist OC retail agencies in complying with SBx7-7.

The City met its 2020 water use target and is in compliance with SBx7-7; the actual 2020 consumption was 66 gallons per capita per day (GPCD), which is below its 2020 target of 116 GPCD.

WATER SUPPLY CHARACTERIZATION

The City meets all of its demands with a combination of local groundwater, imported water, and recycled water. The City works together with two primary agencies, MET and OCWD, to ensure a safe and reliable water supply that will continue to serve the community in periods of drought and shortage. The sources of imported water supplies include water from the Colorado River and the State Water Project (SWP) provided by MET.

The City's main source of water supply is groundwater from the OC Basin. Imported water and recycled water supplement the City's water supply portfolio. In FY 2019-20, the City's water supplies consisted of 76% groundwater, 23% imported water, and 1% recycled water.

It is projected that by 2045, the City's water supply portfolio will shift to 84% groundwater, 15% imported water, and 1% recycled water. Note that these representations of supply match the projected demand.

The City also has a ten-year purchase agreement with MET that allows the City to purchase significantly more imported water, should the need arise.

The City does not own or operate wastewater treatment facilities but owns and operates the wastewater collection system in its service area that sends all wastewater to OC San for treatment and disposal. The City benefits from its direct and indirect uses of recycled water. OCWD's Green Acres Project (GAP) produces recycled water for direct non-potable reuses such as landscape irrigation. OCWD's Groundwater Replenishment System (GWRS) produces recycled water for indirect potable reuse (IPR) through the replenishment of the OC Basin.

WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

Every urban water supplier is required to assess the reliability of their water service to its customers under a normal year, a single dry year, and a drought period lasting five consecutive years. The water service reliability assessment compares projected supply to projected demand for the three hydrological conditions between 2025 and 2045. Factors affecting reliability, such as climate change and regulatory impacts, are accounted for as part of the assessment.

The City depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to ensure it has adequate supplies. MET's 2020 UWMP concludes that they can meet full-service demands of their member agencies through 2045 during normal years, single-dry years, and multiple-dry years. Consequently, the City is projected to meet full-service demands through 2045 for all scenarios, due to diversified supply and conservation measures.

The Drought Risk Assessment (DRA) evaluates the City's near-term ability to supply water assuming the City is experiencing a drought over the next five years. Even under the assumption of a drought over the next five years, MET's 2020 UWMP concludes a surplus of water supplies would be available to all of its Member Agencies, including the City, should the need for additional supplies arise to close any local supply gap. Additionally, the City partakes in various efforts to reduce its reliance on imported water supplies such as increasing the use of local groundwater and recycled water supplies.

WATER SHORTAGE CONTINGENCY PLANNING

Water shortage contingency planning (WSCP) is a strategic planning process that the City engages in to prepare for and respond to water shortages. A water shortage, when water supply available is insufficient to meet the normally expected customer water use at a given point in time, may occur due to a number of reasons, such as water supply quality changes, climate change, drought, and catastrophic events (e.g., earthquake). The City's WSCP provides real-time water supply availability assessment and structured steps designed to respond to actual conditions. This level of detailed planning and preparation will help maintain reliable supplies and reduce the impacts of supply interruptions.

The WSCP serves as the operating manual that the City will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The WSCP contains the processes and procedures that will be deployed when shortage conditions arise so that the City's governing body, its staff, and its retail agencies can easily identify and efficiently implement pre-determined steps to mitigate a water shortage to the level appropriate to the degree of water shortfall anticipated.

DEMAND MANAGEMENT MEASURES

The City, along with other retail water agencies in Orange County, recognizes the need to use existing water supplies efficiently. This ethic of efficient use of water has evolved as a result of the development and implementation of water use efficiency programs that make good economic sense and reflect responsible stewardship of the region's water resources. The City participate in regional water savings programs and works closely with MET and MWDOC to promote regional efficiency.

PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

The Water Code requires the UWMP to be adopted by the Supplier's governing body. Before the adoption of the UWMP, the City notified the public and the cities and counties within its service area per the Water Code and held a public hearing to receive input from the public on the UWMP. Post adoption, the City submitted the UWMP to DWR and other key agencies and made the document available for public review no later than 30 days after filing with DWR.

1 INTRODUCTION AND UWMP OVERVIEW

The City of Santa Ana (City) prepared this 2020 Urban Water Management Plan (UWMP or Plan) to submit to the California Department of Water Resources (DWR) to satisfy the UWMP Act of 1983 (Act or UWMP Act) and subsequent California Water Code (Water Code) requirements. The City is a retail water supplier that provides water to its residents and other customers using the imported potable water supply obtained from its regional wholesaler, Metropolitan Water District of Southern California (MET), local groundwater from the Orange County Groundwater Basin (OC Basin), and recycled water from the Orange County Water District (OCWD). The City, as one of MET's 26 member agencies, prepared this 2020 UWMP in collaboration with MET, Municipal Water District of Orange County (MWDOC), OCWD, and other key agencies.

UWMPs are comprehensive documents that present an evaluation of a water supplier's reliability over a long-term (20-25 year) horizon. In response to the changing climatic conditions and regulatory updates since the 2015 UWMP, the City has been proactively managing its water supply and demand. The water loss audit program, water conservation measures and efforts for increased self-reliance in order to reduce dependency on imported water from the Sacramento-San Joaquin River Delta (Delta) are some of the water management efforts that the City is a part of to maintain the reliability of water supply for its service area.

This 2020 UWMP provides an assessment of the present and future water supply sources and demands within the City's service area. It presents an update to the 2015 UWMP on City's water resource needs, water use efficiency programs, water reliability assessment and strategies to mitigate water shortage conditions. It presents a new 2020 Water Shortage Contingency Plan (WSCP) designed to prepare for and respond to water shortages. This 2020 UWMP contains all elements to meet compliance of the new requirements of the Act as amended since 2015.

1.1 Overview of Urban Water Management Plan Requirements

The UWMP Act enacted by California legislature requires every urban water supplier (Supplier) providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually to prepare, adopt, and file an UWMP with the California DWR every five years in the years ending in zero and five.

For this 2020 UWMP cycle, DWR placed emphasis on achieving improvements for long term reliability and resilience to drought and climate change in California. Legislation related to water supply planning in California has evolved to address these issues, namely Making Conservation a Way of Life [Assembly Bill (AB) 1668 and Senate Bill (SB) 606] and Water Loss Performance Standard SB555. New UWMP requirements in 2020 are a direct result of these new water regulations. Two complementary components were added to the 2020 UWMP. First is the WSCP to assess the Supplier's near term 5-year drought risk assessment (DRA) and provide a structured guide for the Supplier to deal with water shortages. Second is the Annual Water Supply Demand Assessment (WSDA) to assess the current year plus one dry year i.e., short-term demand/supply outlook. Analyses over near- and long-term horizons together will provide a more complete picture of Supplier's reliability and will serve to inform appropriate actions it needs to take to build up capacity over the long term.

The various key new additions in the 2020 UWMP included as a result of the most recent water regulations are:

- **Water Shortage Contingency Plan (WSCP) –** WSCP helps a Supplier to better prepare for drought conditions and provides the steps and water use efficiency measures to be taken in times of water shortage conditions. WSCP now has more prescriptive elements, including an analysis of water supply reliability; the water use efficiency measures for each of the six standard water shortage levels, that correspond to water shortage percentages ranging from 0 - 10% to greater than 50%; an estimate of potential to close supply gap for each measure; protocols and procedures to communicate identified actions for any current or predicted water shortage conditions; procedures for an annual water supply and demand assessment; monitoring and reporting requirements to determine customer compliance; reevaluation and improvement procedures for evaluating the WSCP.
- **Drought Risk Assessment –** The Suppliers are now required to compare their total water use and supply projections and conduct a reliability assessment of all their sources for a consecutive five-year drought period beginning 2021.
- **Five Consecutive Dry-Year Water Reliability Assessment** - The three-year multiple dry year reliability assessment in previous UWMPs has now been extended from three to five consecutive dry years to include a more comprehensive assessment of the reliability of the water sources to improve preparedness of Suppliers for extended drought conditions.
- **Seismic Risk –** The UWMP now includes a seismic risk assessment of the water supply infrastructure and a plan to mitigate any seismic risks on the water supply assets.
- **Groundwater Supplies Coordination –** The UWMP should be in accordance with the Sustainable Groundwater Management Act of 2014 and consistent with the Groundwater Sustainability Plans, wherever applicable.
- **Lay Description** – To provide a better understanding of the UWMP to the general public, a lay description of the UWMP is included, especially summarizing the Supplier's detailed water service reliability assessment and the planned management steps and actions to mitigate any possible shortage scenarios.

1.2 UWMP Organization

This UWMP is organized into 10 main sections aligned with the DWR Guidebook recommendations. The subsections are customized to tell the City's story of water supply reliability and ways to overcome any water shortages over a planning horizon of the next 25 years.

Section 1 Introduction and UWMP Overview gives an overview of the UWMP fundamentals and briefly describes the new additional requirements passed by the Legislature for 2020 UWMP.

Section 2 UWMP Preparation identifies this UWMP as an individual planning effort of the City, lists the type of year and units of measure used and introduces the coordination and outreach activities conducted by the City to develop this UWMP.

Section 3 System Description gives a background on the City's water system and its climate characteristics, population projection, demographics, socioeconomics, and predominant current and projected land uses of its service area.

Section 4 Water Use Characterization provides historical, current, and projected water use by customer category for the next 25 years within the City's service area and the projection methodology used by MWDOC to develop the 25-year projections**.**

Section 5 Conservation Target Compliance reports the SB X7-7 water use conservation target compliance of the City (individually and as a member of the OC 20x2020 Regional Alliance).

Section 6 Water Supply Characterization describes the current water supply portfolio of the City as well as the planned and potential water supply projects and water exchange and transfer opportunities.

Section 7 Water Service Reliability and Drought Risk Assessment assesses the reliability of the City's water supply service to its customers for a normal year, single dry year, and five consecutive dry years scenarios. This section also includes a DRA of all the supply sources for a consecutive five-year drought period beginning 2021.

Section 8 Water Shortage Contingency Planning is a brief summary of the standalone WSCP document (Appendix H) which provides a structured guide for the City to deal with water shortages, incorporating prescriptive information and standardized action levels, lists the appropriate actions and water use efficiency measures to be taken to ensure water supply reliability in times of water shortage conditions, along with implementation actions in the event of a catastrophic supply interruption.

Section 9 Demand Management Measures provides a comprehensive description of the water conservation programs that the City has implemented, is currently implementing, and plans to implement in order to meet its urban water use reduction targets.

Section 10 Plan Adoption, Submittal, and Implementation provides a record of the process the City followed to adopt and implement its UWMP.

2 UWMP PREPARATION

The City's 2020 UWMP is an individual UWMP for the City to meet the Water Code compliance as a retail water supplier. While the City opted to prepare its own UWMP and meet Water Code compliance individually, the development of this UWMP involved close coordination with its whole supplier, MET and the regional whole supplier for Orange County (OC), MWDOC along with other key entities within the region.

2.1 Individual Planning and Compliance

The City opted to prepare its own UWMP (Table 2-1) and comply with the Water Code individually, while closely coordinating with MET, MWDOC and various key entities as discussed in Section 2.2 to ensure regional integration. The UWMP Checklist was completed to confirm the compliance of this UWMP with the Water Code (Appendix A).

One consistency with MWDOC and the majority of its retail member agencies that are part of the OC 20x2020 Regional Alliance is that the City selected to report demands and supplies using fiscal year (FY) basis (Table 2-2).

Table 2-1: Plan Identification

DWR Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☑	Water Supplier is also a member of a Regional Alliance	Orange County 20x2020 Regional Alliance
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Table 2-2: Supplier Identification

DWR Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables are in calendar years
☑	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
7/1	
Units of measure used in UWMP (select from drop down)	
Unit	AF
NOTES: The energy intensity data is reported in calendar year consistent with the Greenhouse Gas Protocol.	

2.2 Coordination and Outreach

2.2.1 Integration with Other Planning Efforts

The City, as a retail water supplier, coordinated this UWMP preparation effort with other key entities, including MET (regional wholesaler for Southern California and the direct supplier of imported water to the City and MWDOC), MWDOC (regional wholesale supplier for OC), and OCWD (OC Basin manager and provider of recycled water in north OC). While the City is not a member agency of MWDOC, the City developed this Plan in conjunction with other MWDOC-led efforts such as population projection from the Center for Demographic Research at California State University Fullerton (CDR).

Some of the key planning and reporting documents that were used to develop this UWMP are:

- **MET's 2020 UWMP** was developed as a part of the 2020 IRP planning process and provides the basis for the projections of the imported supply availability over the next 25 years for the City's service area.
- **MET's 2020 WSCP** provides a water supply assessment and guide for MET's intended actions during water shortage conditions.

- **2021 OC Water Demand Forecast for MWDOC and OCWD Technical Memorandum (Demand Forecast TM)** provides the basis for water demand projections for the City, MWDOC's member agencies as well as Anaheim and Fullerton.
- **MET's 2020 Integrated Water Resources Plan (IRP)** is a long-term planning document to ensure water supply availability in Southern California and provides a basis for water supply reliability in Orange County.
- **OCWD's Groundwater Reliability Plan** (to be finalized after July 2021) provides the latest information on groundwater management and supply projection for the OC Basin, the primary source of groundwater for 19 retail water suppliers in OC.
- **OCWD's 2019-20 Engineer's Report** provides information on the groundwater conditions and basin utilization of the OC Basin.
- **OCWD's 2017 Basin 8-1 Alternative** is an alternative to the Groundwater Sustainability Plan (GSP) for the OC Basin and provides significant information related to sustainable management of the basin in the past and hydrogeology of the basin, including groundwater quality and basin characteristics.
- **Local Hazard Mitigation Plan** provides the basis for the seismic risk analysis of the water system facilities.
- **Water Master Plan** of the City provides information on water infrastructure planning projects and plans to address any required water system improvements.

Statewide Water Planning

In addition to regional coordination with various agencies described above, the City as a MET member agency is currently a part of MET's statewide planning effort to reduce reliance on the water imported from the Delta.

It is the policy of the State of California to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. This policy is codified through the Delta Stewardship Council's Delta Plan Policy WR P1 and is measured through Supplier reporting in each Urban Water Management Planning cycle. WR P1 is relevant to water suppliers that plan to participate in multi-year water transfers, conveyance facilities, or new diversions in the Delta.

Through significant local and regional investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts, the City has demonstrated a reduction in Delta reliance and a subsequent improvement in regional self-reliance. For a detailed description and documentation of the City's consistency with Delta Plan Policy WR P1 see Section 7.4 and Appendix C.

2.2.2 Wholesale and Retail Coordination

The City developed its UWMP in conjunction with the MET's 2020 UWMP. As part of the 2020 UWMP coordination process, the City provided its water demand projections over the next 25 years to MET (Table 2-3). The projections of the City's water demand over the next 25 years were facilitated by MWDOC, the wholesale member of the OC 20x2020 Regional Alliance, by using the historical water use and initial water use projections provided to MWDOC by the City.

Table 2-3 Retail: Water Supplier Information Exchange

DWR Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
MET
NOTES:

2.2.3 Public Participation

For further coordination with other key agencies and to encourage public participation in the review and update of this Plan, the City held a public hearing and notified key entities and the public per the Water Code requirements. Sections 10.2 and 10.3 describe these efforts in detail.

3 SYSTEM DESCRIPTION

Governed by a non-partisan seven-member City Council, the City is one of the oldest cities in Orange County, incorporated in 1886 and became an original member agency of the MET on February 27, 1931.

The City's water service area covers 27.5 square miles and includes the City of Santa Ana and a small neighborhood in the City of Orange, near Tustin Avenue and Fairhaven by the northeast corner of Santa Ana. The City operates ten reservoirs with a storage capacity of 49 million gallons (MG), seven pumping stations, 21 groundwater wells, four pressure regulating stations and seven import water connections and manages 510.1-mile water mains system with 45,037 service connections.

Lying in the South Coast Air Basin (SCAB), its climate is characterized by Southern California's "Mediterranean" climate with mild winters, warm summers and moderate rainfall. In terms of land use, the City is a predominantly single and multi-family residential community. Moving forward, the City will continue planning for its Regional Housing Needs Assessment (RHNA) allocation and future planned developments beyond 2020 will primarily be multiuse projects, in the 'focus areas' listed in the General Plan of the City. The current population of 335,086 is projected to increase by only 2.9% over the next 25 years.

3.1 Agency Overview

This section provides information on the formation and history of the City, its organizational structure, roles, objectives and relationship to MET.

3.1.1 Formation and Purpose

The City is one of the oldest cities in Orange County incorporated in 1886. The City was, for many years, a ranching community with some farming. To serve this growing agricultural and domestic community, a municipal water system was formed in 1886. The original source of water supply for the City was from shallow irrigation wells. As the City continued to grow and change from agriculture to an urban community, the need for additional sources of water was recognized if economic development were to continue.

To tap into water sources from outside the area, the City joined with 12 other Southern California cities to form and be an original member agency of the MET on February 27, 1931. MET, as a regional wholesaler, supplies imported water to Southern California from the Colorado River and from the State Water Project from Northern California. MET's primary purpose is to develop, store and distribute water at wholesale rates to its member public agencies for domestic and municipal uses. The City's location is shown on Figure 3-1.

In 1933, the OCWD was formed by a special act of the State Legislature to manage Orange County's groundwater supply and protection of the County's rights to water in the Santa Ana River. In 1953, the City became a member of OCWD.

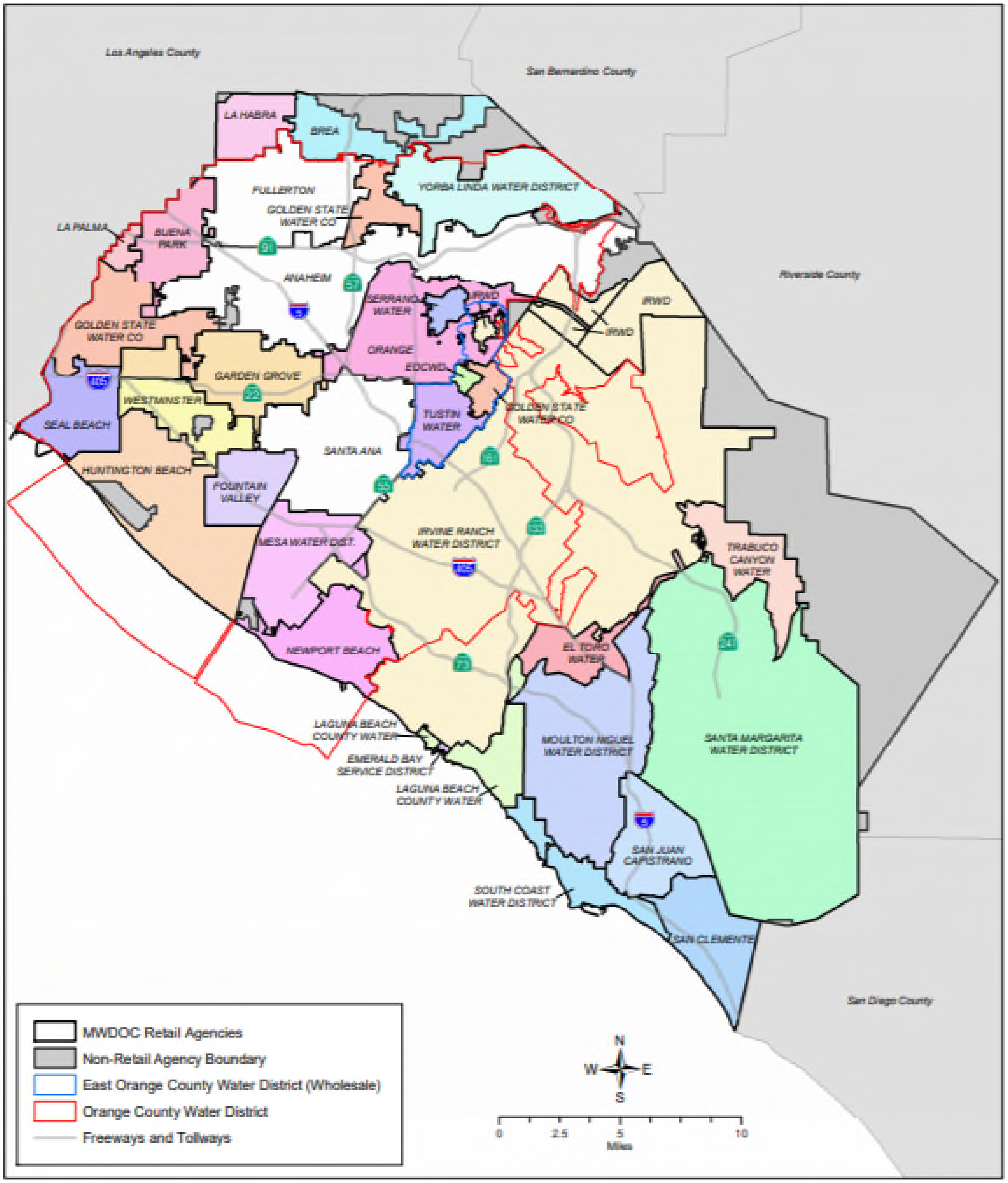

Figure 3-1: Regional Location of City of Santa Ana

3.1.2 City Council

The City is governed by a non-partisan seven-member City Council, elected to serve staggered four-year terms, except for the Mayor, who serves a two-year term. The City Council appoints the City Manager and various members of commissions, committees, and citizen advisory groups, all of which may weigh in on water management issues and decisions for the City. The current Council members are:

- Vicente Sarmiento, Mayor
- Thai Viet Phan (Ward 1)
- David Penaloza, Mayor Pro Tem (Ward 2)
- Jessie Lopez (Ward 3)
- Phil Bacerra (Ward 4)
- Johnathan Ryan Hernandez (Ward 5)
- Nelida Mendoza (Ward 6)

3.2 Water Service Area and Facilities

3.2.1 Water Service Area

The City is in the heart of Orange County and is the eleventh largest City in California. The City's Water Utility provides water service within a 27.5 square mile service area. The service area includes the City of Santa Ana and a small neighborhood in the City of Orange, near Tustin Avenue and Fairhaven by the northeast corner of Santa Ana. A map of the City's water service area is shown as Figure 3-2.

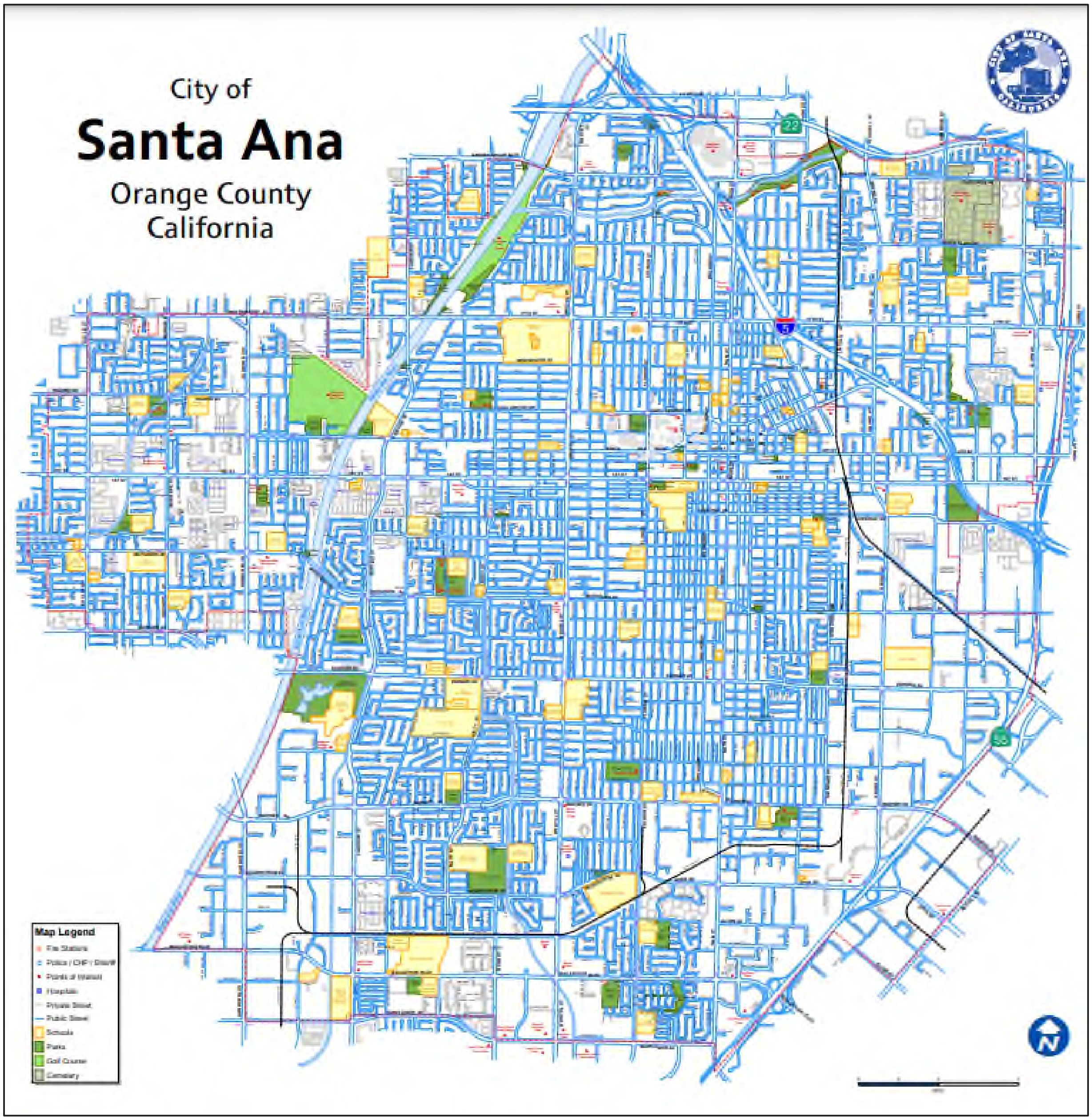

Figure 3-2: City of Santa Ana Water Service Area

3.2.2 Water Facilities

The City maintains 510.1 miles of water mains, ten reservoirs with a storage capacity of 49 MG, seven pumping stations, 21 groundwater wells, four pressure regulating stations and seven import water connections. Figure 3-3 shows the City's water system facilities.

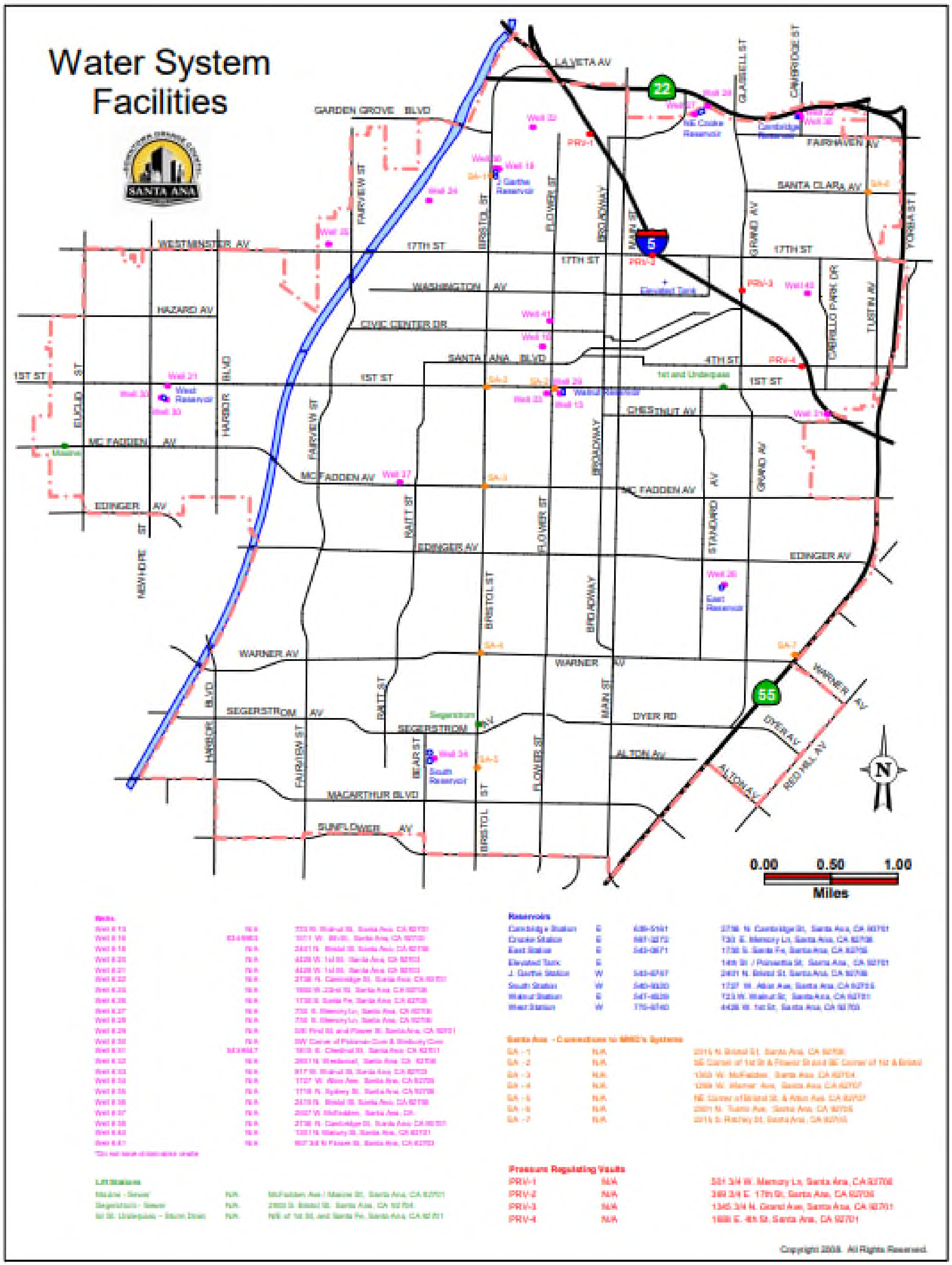

Figure 3-3: Water System Facilities

Fourteen of the City Wells pump into surface reservoirs with booster stations pumping the water into the distribution system. The remaining seven wells pump directly into the City's distribution system. Water pumped from all of the wells has been naturally filtered as it passes through underlying aquifers of sand, gravel, and soil. This well water only requires disinfectant treatment for system distribution.

The City maintains seven imported water connections to receive water through MET's Orange County and East Orange County Feeder pipelines. These seven metered connections with a total capacity of 60,580 gallons per minute (gpm) transfer water into the City's distribution system.

System Pressures – Reducing distribution system pressures will, to a certain degree, conserve water and pumping energy by reducing leaking in water and plumbing systems, as well as reducing waste or water when turning water fixtures on and off. The City continually reviews the pressure zones to determine the feasibility of reducing system pressures by lowering settings on distribution system pressure regulators. The reviews have indicated that potential fire protection requirement deficiencies occur when pressures are reduced. Therefore, the City maintains safe yet efficient system pressures.

Peak Demand – Water system demand patterns are a result of climatological, land use, sociological, and institutional factors, all of which affect the amount of water consumed. Reduction in peak demands can reduce the need for construction of new water storage and conveyance facilities and, in certain instances, the development of new water sources. The City's computerized telemetry system allows water system operators to operate the system more efficiently through the ability to stage and prioritize water production facilities usage to meet these ever-changing demand patterns.

The system connections and water volume supplied are summarized in Table 3-1.

Table 3-1: Retail Only: Public Water Systems

DWR Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020
CA3010038	City of Santa Ana	45,037	33,489
	TOTAL	45,037	33,489
NOTES:			

3.3 Climate

The City is located within the SCAB that encompasses all of OC, and the urban areas of Los Angeles, San Bernardino, and Riverside counties. The SCAB climate is characterized by Southern California's "Mediterranean" climate: a semi-arid environment with mild winters, warm summers, and moderate rainfall.

Local rainfall has limited impacts on reducing water demand in the City, except for landscape irrigation demand. Water that infiltrates into the soil may enter groundwater supplies depending on the local geography. However, due to the large extent of impervious cover in Southern California, rainfall runoff quickly flows to a system of concrete storm drains and channels that lead directly to the ocean. OCWD is one agency that has successfully captured stormwater along the Santa Ana River and in recharge basins for years and used it as an additional source of supply for groundwater recharge. Based on the 2017 Basin 8-1 Alternative Plan, OCWD captured an average annual stormwater volume of approximately 44,000 AF over the period of ten years, from Water Year 2006-07 to 2015-16; however, this period's rainfall was 17% below the long term average using San Bernardino precipitation data. Based on a longer period (1989-2015) of rainfall and captured stormwater records, the average year water budget of OCWD assumes a stormwater capture volume of 52,000 AF.

3.4 Population, Demographics, and Socioeconomics

3.4.1 Population

According to CDR, the City's service area has a 2020 population of 335,086, a decrease from the 2015 population of 338,336. Overall, the population increases with a moderate growth of 2.9% over the 25-year period from 2020 to 2045. The growth is slightly higher in the first 15 years until 2035 and tapered off from there. Table 3-2 shows the population projections in five-year increments out to 2045 within the City's service area.

Table 3-2: Retail: Population - Current and Projected

DWR Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	335,086	343,358	347,511	347,952	347,785	345,018
NOTES: Source - Center for Demographic Research at California State University, Fullerton, 2020						

3.4.2 Demographics and Socioeconomics

As shown in Table 3-3 below, the total number of dwelling units in the City is expected to increase by 4.6% in the next 25 years from 78,650 in 2020 to 82,243 in 2045. Table 3-3 also shows a breakdown of the total dwelling units by type for the 25-year period from 2020 to 2045.

Table 3-3: City of Santa Ana Service Area Dwelling Units by Type

City of Santa Ana Service Area Dwelling Units by Type						
Dwelling Units	2020	2025	2030	2035	2040	2045
Total	**78,650**	**82,043**	**82,061**	**82,225**	**82,238**	**82,243**
Single Family	34,133	34,329	34,329	34,333	34,337	34,341
All Other*	44,517	47,714	47,732	47,892	47,901	47,902
Source: Center for Demographic Research at California State University, Fullerton, 2020 *Includes duplex, triplex, apartment, condo, townhouse, mobile home, etc. Yachts, houseboats, recreational vehicles, vans, etc. are included if is primary place of residence. Does not include group quartered units, cars, railroad box cars, etc.						

In addition to the types and proportions of dwelling units, various socio-economic factors such as age distribution, education levels, general health status, income and poverty levels affect City's water management and planning. Based on U.S. Census Bureau's QuickFacts, the City has about 9% of population of 65 years and over, 26.9% under the age of 18 years and 7.4% under the age of 5 years. 59.6% of the City's population with an age of more than 25 years has a minimum of high school graduate and 15% of this age group has at least a bachelor's degree.

3.4.3 CDR Projection Methodology

The City obtains its services area population and dwelling unit data from MWDOC via CDR. MWDOC contracts with CDR to update the historic population estimates for 2010 to the current year and provide an annual estimate of population served by the water suppliers in OC. CDR uses GIS and data from the 2000 and 2010 U.S. Decennial Censuses, State Department of Finance (DOF) population estimates, and the CDR annual population estimates. These annual estimates incorporate annual revisions to the DOF annual population estimates, often for every year back to the most recent Decennial Census. As a result, all previous estimates were set aside and replaced with the most current set of annual estimates. Annexations and boundary changes for water suppliers are incorporated into these annual estimates.

In the summer of 2020, projections by water supplier for population and dwelling units by type were estimated using the 2018 Orange County Projections dataset. Growth for each of the five-year increments was allocated using GIS and a review of the traffic analysis zones (TAZ) with a 2019 aerial photo. The growth was added to the 2020 estimates by the water supplier.

3.5 Land Uses

3.5.1 Current Land Uses

The City's service area can best be described as a predominantly single and multi-family residential community located in central Orange County.

Based on the zoning designation collected and aggregated by Southern California Association of Governments (SCAG) around 2018, the current land use within the City's service area can be categorized as follows:

- Single family residential – 48%
- Multi-family residential – 14.1%
- Commercial – 10.8%
- Industrial – 7.1%
- Institutional/Governmental – 10.3%
- Open space and parks – 8.4%
- Other – 1.1% (e.g., Undevelopable or Protected Land, Water, and Vacant)
- No land use designations – 0.2%

3.5.2 Projected Land Uses

Moving forward, the City will continue planning for its RHNA allocation and new developments may potentially include Accessory Dwelling Units (ADUs).

RHNA - State law requires jurisdictions to provide their share of the RHNA allocation. SCAG determines the housing growth needs by income for local jurisdictions through RHNA. The City's RHNA allocation for the 2021 - 2029 is 3,095 units. This includes 586 units for very low-income households, 362 units for low-income households, 523 units for moderate-income households, and 1,624 units for above moderate-income households.

Accessory Dwelling Units – ADUs are separate small dwellings embedded within residential properties. There has been an increase in the construction of ADUs in California in response to the rise in interest to provide affordable housing supply. The Legislature updated the ADU law effective January 1, 2020 to clarify and improve various provisions to promote the development of ADUs. (AB-881, "Accessory dwelling units," and AB-68, "Land use: accessory dwelling units") These include:

- allowing ADUs and Junior Accessory Dwelling Units (JADUs) to be built concurrently with a single-family dwelling. JADUs max size is 500 square feet (sf).
- opening areas where ADUs can be created to include all zoning districts that allow single-family and multi-family uses
- maximum size cannot be less than 850 sf for a one-bedroom ADU or 1,000 sf for more than one bedroom (California Department of Housing and Community Development, 2020)

About 92% of the ADUs in California are being built in the single family zoned parcels (University of California Berkeley, 2020). The increase in ADUs implies an increase in number of people per dwelling unit which potentially translates to higher water demand.

In coordination with the General Plan Advisory Group, the City identified the following five focus areas suitable for new growth and development in the October 2020 Public Hearing Draft General Plan:

- South Main Street
- Grand Avenue/17th Street
- West Santa Ana Boulevard
- 55 Freeway/Dyer Road

- South Bristol Street

These five areas are along major travel corridors, the Orange County Streetcar line, and/or linked to the Downtown. The intent is to expand opportunities for development through a transition to multiuse land use designations near transit corridors. The Industrial Flex designation is being introduced on areas already designated for industrial land uses in order to allow for cleaner industrial and commercial uses, professional office, and creative live-work spaces.

Additionally, the City has seven planning areas including specific plans and other special zoning areas, that were adopted before the General Plan and have remaining development capacity:

- Adaptive Reuse Overlay (2014)
- Bristol Street Corridor Specific Plan (1991/2018)
- Harbor Mixed Use Corridor Specific Plan (2014)
- MainPlace Specific Plan (2019)
- Metro East Overlay Zone (2007/2018)
- Midtown Specific Plan (1996)
- Transit Zoning Code Specific Devt (2010)

Figure 3-4 below shows the above listed five focus areas and the seven planning areas of the City.

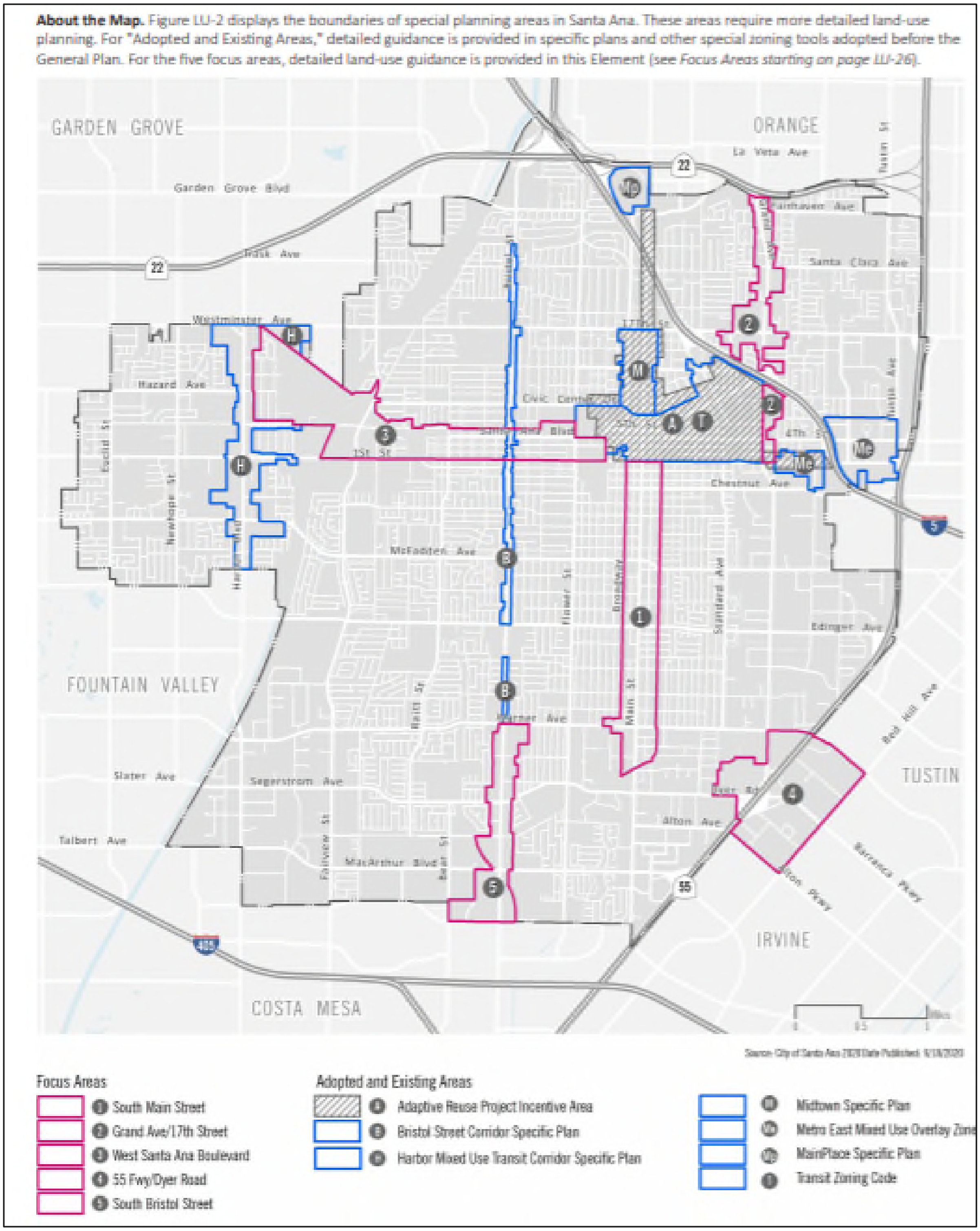

Figure 3-4: Special Planning Areas of the City of Santa Ana

Table 3-4 lists the buildout potential of the City based on the City's October 2020 Public Hearing Draft General Plan.

Table 3-4: Buildout Potential of the City

Planning Area	Existing[1]		Buildout	
	Dwelling Units	Building (square feet)[2]	Dwelling Units	Building (square feet)[2]
Specific Plan / Special Zoning	**4,685**	**13,924,891**	**20,524**	**16,958,445**
Adaptive Reuse Overlay Zone[3]	260	976,935	1,260	976,935
Bristol Street Corridor Specific Plan	136	140,348	135	143,139
Harbor Corridor Specific Plan	1,324	1,767,937	4,622	1,967,982
MainPlace Specific Plan	0	1,108,080	1,900	2,426,923
Metro East Overlay Zone	844	2,516,056	5,551	4,685,947
Midtown Specific Plan	607	1,885,065	607	1,818,253
Transit Zoning Code	1,514	5,530,470	6,449	4,939,266
Focus Areas	**6,380**	**13,421,155**	**23,955**	**15,684,285**
South Main Street	1,720	1,685,978	2,308	946,662
Grand Avenue/17th Street	561	1,400,741	2,283	703,894
West Santa Ana Boulevard	2,658	3,090,472	3,920	2,808,805
55 Freeway/Dyer Road	1,221	5,666,453	9,952	6,142,283
South Bristol Street	220	1,577,511	5,492	5,082,641
All Other Areas of the City[4]	67,727	39,772,550	70,574	40,325,086
Citywide Total	**78,792**	**67,118,596**	**115,053**	**72,967,816**

Source: City of Santa Ana with assistance from PlaceWorks, 2020.

Notes:

1. "Existing" represents conditions as of December 2019 as derived from the City of Santa Ana Planning Information Network and projects already under construction per the January 2020 monthly development project report.
2. Only includes nonresidential building square footage.

Planning Area	Existing[1]		Buildout	
	Dwelling Units	Building (square feet)[2]	Dwelling Units	Building (square feet)[2]

3. The figures shown on the row for the Adaptive Reuse Overlay represent parcels that are exclusively in the Adaptive Reuse Overlay boundary. Figures for parcels that are within the boundaries of both the Adaptive Reuse Overlay Zone and a specific plan, other special zoning, or focus area boundary are accounted for in the respective specific plan, other special zoning, or focus area.
4. The City has included an assumption for growth on a small portion (5%) of residential parcels through the construction of second units, which is distributed throughout the City and is not concentrated in a subset of neighborhoods. Additional growth includes known projects in the pipeline and an increase of 10% in building square footage and employment for the professional office surrounding the Orange County Global Medical Center and along Broadway north of the Midtown Specific Plan as well as the commercial and retail along 1st Street south of the West Santa Ana Boulevard focus area.

4 WATER USE CHARACTERIZATION

4.1 Water Use Overview

Water use within the City's service area has been relatively stable in the past decade with an annual average of 36,245 AF. The potable and non-potable water use accounts for an average of 99% and 1% of total City water use, respectively. In FY2019/20, the City's water use was 33,240 AF of potable water (groundwater and imported) and 249 AF of direct recycled water for landscape irrigation. In FY2019-20, the City's potable water use profile was comprised of 65.5% residential use, 24.5% commercial, industrial, and institutional (CII), and 4.0% large landscape/irrigation, with non-revenue water and other uses comprising about 5.9%. As described in Section 3, the City's service area is almost completely built-out and is projected to add minimum land use and small population increase. Water demand is likely to increase ~1.2% over the next 5 years. In the longer term, water demand is projected to decrease ~0.2% from 2025 through 2045. The projected potable and non-potable water use for 2045 is 33,578 AF and 249 AF, respectively. The passive savings are anticipated to continue for the next 25 years and are considered in the water use projections. Permanent water conservation requirements and water conservation strategies are discussed in Section 8 and 9 of this document.

4.2 Past and Current Water Use

Water use within the City's service area has been relatively stable in the past decade with an annual average of 36,245 AF. A stable trend is expected because the city is essentially built-out and the rate of population growth is expected to average less than 0.12% per year for the next 25 years. Water conservation efforts also kept per capita water use down.

As a result of Governor Jerry Brown's mandatory water conservation order in 2014, the City's water use in the last five years decreased below the 10-year average. Between FY2015/16 and FY2019/20, water use within the City's service area ranged from 33,148 to 35,343 acre-feet per year (AFY) (potable and non-potable combined). In the past decade, between FY2010/11 and FY 2019/20, potable and non-potable water use accounts for an average of 99% and 1% of total City water use, respectively. Potable water uses include demands from residential, CII, and large landscape irrigation. Non-potable use includes the use of recycled water for large landscape and golf course irrigation.

As of FY2019/20 there are 45,037 active service connections in the City's water distribution system. Of these, 18 are recycled water accounts. Table 4-1 summarizes the City's total water demand for potable and non-potable water for FY2019-20. The City has a mix of commercial uses (markets, restaurants, etc.), public entities (schools, fire stations and government offices), industrial uses and office complexes. Single and multi- family residential water demand combined accounts for 65.5% of the total water demand. Commercial use, governmental/institutional, and industrial account for 16.1%, 5.4%, and 3.0% of total demand, respectively. Large landscape (irrigation) accounts for 4.0% of total demand. Other uses and non-revenue water account for 5.9%.

Table 4-1 Retail: Demands for Potable and Non-Potable Water – Actual

DWR Submittal Table 4-1 Retail: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
	Additional Description (as needed)	Level of Treatment When Delivered	Volume[2]
Single Family		Drinking Water	11,916
Multi-Family		Drinking Water	9,872
Commercial		Drinking Water	5,364
Industrial		Drinking Water	987
Institutional/Governmental		Drinking Water	1,788
Landscape	Represents large landscape (with irrigation meters) served by potable water and not recycled water	Drinking Water	1,349
Losses	Non-revenue water	Drinking Water	1,940
Other	Water-only customer outside of City boundary	Drinking Water	24
		TOTAL	33,240

[1] Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.
[2] Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

NOTES: Volumes reported in AF. This table only represents potable water; recycled water projections are shown in Table 4-4 (DWR Submittal Tables 4-3) and Table 6-8 (DWR Submittal Tables 6-4).

4.3 Water Use Projections

A key component of this 2020 UWMP is to provide an insight into the City's future water demand outlook. This section discusses the considerations and methodology used to estimate the 25-year water use projection. Overall, total water demand is projected to increase 1.0% between 2020 and 2045. While both single residential use is projected to decrease, multifamily residential use and usage by CII are projected to increase. Demands for large landscape applications are projected to increase. Non-revenue water is projected to decrease in the same period.

4.3.1 Water Use Projection Methodology

In 2021, MWDOC and OCWD, in collaboration with member agencies and MET member agencies, led the effort to update water demand projections originally done as part of the 2021 OC Water Demand Forecast for MWDOC and OCWD. The updated demand projections, prepared by CDM Smith, were for the Orange County region as a whole, and provided retail agency specific demands. The projections span the years of 2025-2050 and are based upon information surveyed from each Orange County water agency.

The forecast methodology began with a retail water agency survey that asked for FY 2017-18, FY 2018-19 and FY 2019-20 water use by major sector, including number of accounts. If an agency provided recycled water to customers that information was also requested. Given that FY 2017-18 was a slightly above-normal demand year (warmer/drier than average) and FY 2018-19 was a slightly below-normal demand year (cooler/wetter than average), water use from these two years were averaged to represent an average-year base water demand.

For the residential sectors (single-family and multifamily) the base year water demand was divided by households in order to get a total per unit water use (gallons per home per day). In order to split household water use into indoor and outdoor uses, three sources of information were used, along with CDM Smith's expertise. The sources of information included: (1) *the Residential End Uses of Water* (Water Research Foundation, 2016); (2) California's plumbing codes and landscape ordinances; and (3) CA DWR's Model Water Efficient Landscape Ordinance (MWELO) calculator.

Three different periods of residential end uses of water were analyzed as follows:

- **Pre-2010 efficiency levels** – Has an average indoor water use that is considered to be moderately efficient, also does not include the most recent requirements for MWELO.
- **High-efficiency levels** – Includes the most recent plumbing codes that are considered to be highly efficient, and also includes the most recent requirements for MWELO.
- **Current average efficiency levels** – Represents the weighted average between pre-2010 efficiency and high efficiency levels, based on average age of homes for each retail water agency.

For outdoor residential water use, the indoor per capita total was multiplied by each agency-specific persons per household in order to get an indoor residential household water use (gallons per day per home), and then was subtracted from the base year total household water use for single-family and multifamily for each agency based on actual water use as reported by the agency surveys.

For existing residential homes, the current average indoor and outdoor water use for each agency were used for the year 2020. It was assumed that indoor water uses would reach the high efficiency level by 2040. Based on current age of homes, replacement/remodeling rates, and water utility rebate programs it is believed this assumption is very achievable. It was also assumed that current outdoor water use would be reduced by 5% by 2050.

For new homes, the indoor high efficiency level was assumed for the years 2025 through 2050. Outdoor uses for new homes were assumed to be 25% and 30% lower than current household water use for single-family and multifamily homes, respectively. This methodology is illustrated in Figure 4-1 below.

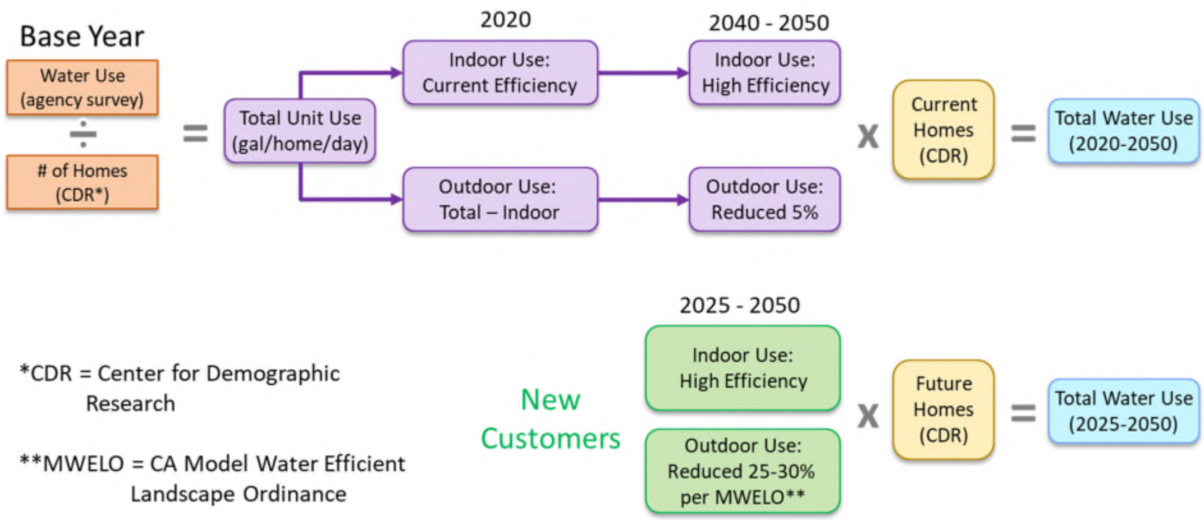

Figure 4-1: Water Use Projection Methodology Diagram

Existing and projected population, single-family and multifamily households for each retail water agency were provided by CDR under contract by MWDOC and OCWD. CDR provides historical and future demographics by census tracts for all of Orange County (Section 3.4). Census tract data is then clipped to retail water agency service boundaries in order to produce historical and projected demographic data by agency.

For the CII water demands, which have been fairly stable from a unit use perspective (gallons/account/day), it was assumed that the unit demand in FY 2019-20 would remain the same from 2020-2025 to represent COVID-19 impacts. Reviewing agency water use data from FY 2017-18 through FY2019-20 revealed that residential water use increased slightly in FY 2019-20 while CII demands decreased slightly as a result of COVID-19. From 2030 to 2050, the average CII unit use from FY 2017-18 and 2018-19 was used. These unit use factors were then multiplied by an assumed growth of CII accounts under three broad scenarios:

- Low Scenario – assuming no growth in CII accounts
- Mid Scenario – assuming 0.5% annual growth in CII accounts
- High Scenario – assuming 1.5% annual growth in CII accounts

For most retail agencies, the Mid Scenario of CII account growth was used, but for those retail agencies that have had faster historical growth the High Scenario was used. For those retail agencies that have had relatively stable CII water demand, the Low Scenario was used. For Santa Ana, the mid-scenario was used.

For those agencies that supply recycled water for non-potable demands, MWDOC used agency-specified growth assumptions. Most agencies have already maximized their recycled water and thus are not expecting for this category of demand to grow. However, a few agencies in South Orange County do expect moderate growth in recycled water customers.

For large landscape customers served currently by potable water use, MWDOC assumed these demands to be constant through 2050, except for agencies that have growing recycled water demands. For the agencies that have growing recycled water demands, large landscape demands served by potable water reduced accordingly. For non-revenue water, which represents the difference in total water production less all water billed to customers, this percentage was held constant through 2050. Note that 2050 data was not presented in the UWMP.

An agency's water use demand projection is the summation of their residential water demand, CII demands, large landscape and recycled water demands, and water losses all projected over the 25-year time horizon. These demands were provided to each of the Orange County water agencies for their review, feedback, and revision before being finalized.

4.3.1.1 Weather Variability and Long-Term Climate Change Impacts

In any given year water demands can vary substantially due to weather. In addition, long-term climate change can have an impact on water demands into the future. For the 2014 OC Water Reliability Study, CDM Smith developed a statistical model of total water monthly production from 1990 to 2014 from a sample of retail water agencies. This model removed impacts from population growth, the economy and drought restrictions in order to estimate the impact on water use from temperature and precipitation.

The results of this statistical analysis are:

- Hot/dry weather demands will be 5.5% greater than current average weather demands
- Cooler/wet weather demands will be 6% lower than current average weather demands
- Climate change impacts will increase current average weather demands by:
  - 2% in 2030
  - 4% in 2040
  - 6% in 2050

4.3.2 25-Year Water Use Projection

The projected demand values were provided by MWDOC and reviewed by the City as part of the UWMP effort. As the regional wholesale supplier for much of Orange County, MWDOC works in collaboration with each of its retail agencies as well as MET (its wholesaler), and the City (who is a direct Member Agency of MET) to develop demand projections for imported water. The City has been proactively decreasing its reliance on imported water by pursuing a variety of water conservation strategies within the service area. Future water savings and low-income water use are included in these projected values.

4.3.2.1 Water Use Projections for 2021-2025

The water use projection for normal year conditions without drought for 2021-2025 is presented in Table 4-2. This table will be adjusted to estimate the five-years' cumulative drought effects as described in the five-year DRA in Section 7. A linear increase in total water demand is expected between 2021 and 2025.

Table 4-2: Water Use Projections for 2021 to 2025

Retail: Total Water Demand					
FY Ending	2021	2022	2023	2024	2025
Total Water Demand (AF)	33,568	33,647	33,725	33,804	33,882
NOTES:					

4.3.2.2 Water Use Projections for 2025-2045

Table 4-3 is a projection of the City's water demand for 2025-2045. While single and multifamily residential use is projected to decrease due to water use efficiency measures, usage by CII is projected to increase. CII projections for 2025 through 2045 were broken down into commercial, industrial, and institutional/governmental using proportions reported for each billing sector in FY 2019-20. Demands for large landscape applications are projected to stay consistent, as are projections for non-revenue water.

The demand data presented in this section accounts for passive savings in the future. Passive savings are water savings as a result of codes, standards, ordinances and public outreach on water conservation and higher efficiency fixtures. Passive savings are anticipated to continue through 2045 and will result in continued water saving and reduced consumption levels. Permanent water conservation requirements and water conservation strategies are discussed in Section 8 and 9 of this document.

Table 4-3: Retail: Use for Potable and Non-Potable Water – Projected

DWR Submittal Table 4-2 Retail: Use for Potable and Non-Potable[1] Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use[2] *Report To the Extent that Records are Available*				
		2025	2030	2035	2040	2045
Add additional rows as needed						
Single Family		11,961	11,675	11,390	11,105	11,101
Multi-Family		10,648	10,415	10,211	9,976	9,967
Commercial		5,486	6,155	6,309	6,466	6,466
Industrial		1,009	1,132	1,161	1,190	1,190
Institutional/Governmental		1,828	2,051	2,102	2,155	2,155
Landscape		1,501	1,501	1,501	1,501	1,501
Losses	Non-revenue water	1,198	1,217	1,207	1,197	1,196
	TOTAL	33,633	34,146	33,881	33,589	33,578

[1] Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.
[2] Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

NOTES: Volumes reported in AF. This table only represents potable water; recycled water projections are shown in Table 4-4 (DWR Submittal Tables 4-3) and Table 6-8 (DWR Submittal Tables 6-4).
Source - CDM Smith, 2021

Based on the information provided above, the total demand for potable water is listed below in (Table 4-4). The City currently provides recycled water in its service area and is projected to grow its use.

Table 4-4 Retail: Total Water Use (Potable and Non-Potable)

DWR Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable	33,240	33,633	34,146	33,881	33,589	33,578
Recycled Water Demand[1]	249	249	249	249	249	249
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	33,489	33,882	34,395	34,130	33,838	33,827
*[1]Recycled water demand fields will be blank until Table 6-4 is complete [2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*						
NOTES: Volumes in AF						

Future water savings and low-income water use are included in these projected values (Table 4-5).

Table 4-5 Retail Only: Inclusion in Water Use Projections

DWR Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook)	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	Section 8 and 9
Are Lower Income Residential Demands Included In Projections?	Yes
NOTES:	

4.3.2.3 Water Use Projections for Lower Income Households

Since 2010, the UWMP Act has required retail water suppliers to include water use projections for single-family and multi-family residential housing for lower income and affordable households. This will assist the City in complying with the requirement under Government Code Section 65589.7 granting priority for providing water service to lower income households. A lower income household is defined as a household earning below 80% of the MHI.

DWR recommends retail suppliers rely on the housing elements of city or county general plans to quantify planned lower income housing with the City's service area (DWR, 2020). RHNA assists jurisdictions in updating general plan's housing elements section. The RHNA identifies additional housing needs and assesses households by income level for the City through 2010 decennial Census and 2005-2009 American Community Survey data. The sixth cycle of the RHNA covers the planning period of October 2021 to October 2029. The SCAG adopted the RHNA Allocation Plan for this cycle on March 4, 2021. The California Department of Housing and Community Development reviewed the housing elements data submitted by jurisdictions in the SCAG region and concluded the data meets statutory requirements for the assessment of current housing needs.

Under the assumption that the RHNA household allocations adequately represent ratios of the City's overall future income categories (not the exact ratio of all household by income but a conservative one for low-income household estimates), the RHNA low-income percentage can be used to estimate future low income demands. One objective of RHNA is to increase affordable housing, therefore RHNA has been allocating additional low-income households to various regions. Because relying on the RHNA distribution of households by income category is likely to produce an overestimate of low-income water demands, this approach represents a conservative projection of future low-income water use.

Table 4-6 presents the City's RHNA housing allocation. RHNA classifies low income housing into two categories: very low income (<30% - 50% MHI), and low income (51% - 80% MHI). Altogether 30.6% of the City's allocated housing need for the planning period of October 2021 to October 2029 are considered low-income housing (SCAG, 2021).

Table 4-6: SCAG 6th Cycle Household Allocation Based on Median Household Income

Household Category by Income	Number of Households	% of Total Allocated Households
Very Low Income	586	18.9%
Low Income	362	11.7%
Moderate Income	523	16.9%
Above Moderate Income	1,624	52.5%
Total Future Allocated Households	3,095	100.0%

By applying the percentage of low-income housing from the SCAG report to the total projected SF/MF residential demand calculated in Table 4-3 above, low-income demand can be conservatively estimated for both SF and MF through 2045. For example, the total low-income single family residential demand is projected to be 3,664 AF in 2025 and 3,400 AF in 2045 (Table 4-7).

Table 4-7: Projected Water Use Needed for Low Income Households (AF)

Water Use Sector	FY Ending				
	2025	2030	2035	2040	2045
Total Residential Demand (AF)	22,609	22,090	21,601	21,081	21,068
Single-Family Residential Demand - Low Income Households (AF)	3,664	3,576	3,489	3,401	3,400
Multi-Family Residential Demand - Low Income Households (AF)	3262	3190	3128	3056	3053
Total Low Income Households Demand (AF)	6,925	6,766	6,616	6,457	6,453

4.4 Water Loss

The City has conducted annual water loss audit since 2015 per the American Water Works Association (AWWA) methodology per SB 555 to understand the relationship between water loss, operating costs, and revenue losses. Non-revenue water for FY2015/16 – FY2019/20 (Figure 4-2) consists of three components: real losses (e.g., leakage in mains and service lines, and storage tank overflows), apparent losses (unauthorized consumption, customer metering inaccuracies and systematic data handling errors), and unbilled water (e.g., hydrant flushing, firefighting, and blow-off water from well start-ups). The City's real losses ranged from 157 AFY to 1,007 AFY and apparent losses ranged from 803 AFY to 858 AFY between FY2015/16 – FY2019/20. The unbilled water ranged from 82 AFY to 411 AFY in the same timeframe.

In the latest water loss audit (FY2019/20), the City's total water loss was 1856 AFY (Table 4-8), compared to the total water use of 33,489 AF in FY2019/20. The total water loss consists of real loss of 1,007 AFY and apparent loss of 849 AFY in FY2019/20. The non-revenue water was 1,940 AFY. The active and inactive service connections were relatively consistent in the last five years with 45,037 connections in FY2019/20. The real loss performance indicator was 20 gals/connection/day in FY2019/20. Figure 4-3 presents the performance indicators of gallons of real and apparent loss per connection per day. Understanding and controlling water loss from a distribution system is an effective way for the City to achieve regulatory standards and manage their existing resources. The California State Water Resources Control Board (SWRCB) is still developing water loss performance standards; these standards have not yet been adopted.

Table 4-8: Retail: Last Five Years of Water Loss Audit Reporting

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
07/2015	961
07/2016	1236
07/2017	1638
07/2018	1649
07/2019	1856
[1] *Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.* [2] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Water Loss in AFY	

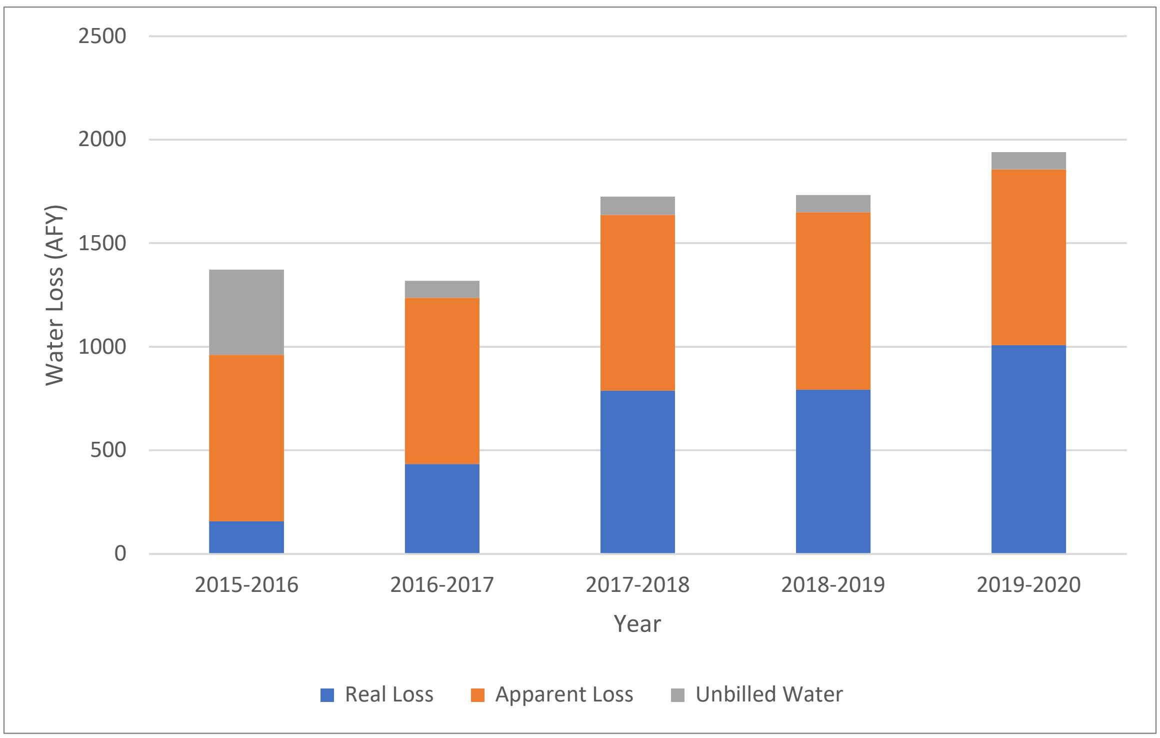

Figure 4-2: Water Loss Audit for FY 2015/16 to FY 2019/20

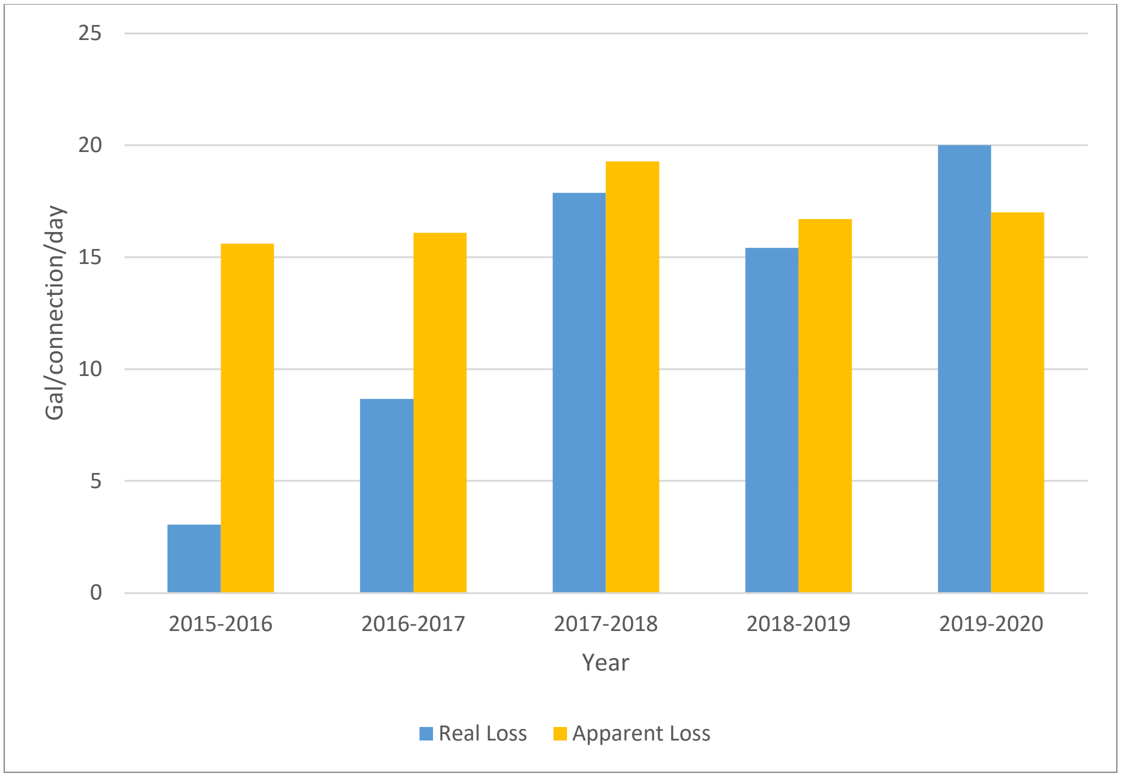

Figure 4-3: Water Loss Performance Indicators for FY 2015/16 to FY 2019/20

5 CONSERVATION TARGET COMPLIANCE

The Water Conservation Act of 2009, also known as SBx7-7 (Senate Bill 7 as part of the Seventh Extraordinary Session), signed into law on February 3, 2010, requires the State of California to reduce urban water use by 20% by the year 2020 (20x2020). To achieve this each retail urban water supplier must determine baseline water use during their baseline period and target water use for the years 2015 and 2020 to meet the state's water reduction goal. Retail water suppliers are required to comply with SBx7-7 individually or as a region in collaboration with other retail water suppliers, or demonstrate they have a plan or have secured funding to be in compliance, in order to be eligible for water related state grants and loans on or after July 16, 2016.

The City's actual 2020 water use is lower than its 2020 water use target, therefore, demonstrating compliance with SBx7-7. In its 2015 UWMP, the City revised its baseline per capita water use calculations using 2010 U.S. Census data. Changes in the baseline calculations resulted in updated per capita water use targets.

The following sections describe the efforts by the City to comply with the requirements of SBx7-7 and efforts by MWDOC to assist retail agencies, including the formation of a Regional Alliance to provide additional flexibility to all water suppliers in Orange County. A discussion of programs implemented to support retail agencies in achieving their per capita water reduction goals is covered in Section 8 – Demand Management Measures of this UWMP.

Complimentary to information presented in this section are SBx7-7 Verification and Compliance Forms, a set of standardized tables required by DWR to demonstrate compliance with the Water Conservation Act in this 2020 UWMP (Appendix D) including calculations of recycled water used for groundwater recharge (indirect reuse) to offset a portion of the agency's potable demand when meeting the regional as well as individual water use targets.

5.1 Baseline Water Use

The baseline water use is the City's gross water use divided by its service area population, reported in GPCD. Gross water use is a measure of water that enters the distribution system of the supplier over a 12-month period with certain allowable exclusions. These exclusions are:

- Recycled water delivered within the service area
- Indirect recycled water
- Water placed in long term storage
- Water conveyed to another urban supplier
- Water delivered for agricultural use
- Process water

Water suppliers within the OCWD Groundwater Basin, including the City, have the option of choosing to deduct recycled water used for indirect potable reuse (IPR) from their gross water use to account for the recharge of recycled water into the OC Basin by OCWD, historically through Water Factory 21 (WF-21), and now by the Groundwater Replenishment System (GWRS).

Water suppliers must report baseline water use for two baseline periods, the 10- to 15-year baseline (baseline GPCD) and the five-year baseline (target confirmation) as described below.

5.1.1 Ten to 15-Year Baseline Period (Baseline GPCD)

The first step to calculating the City's water use targets is to determine its base daily per capita water use (baseline water use). The baseline water use is calculated as a continuous (rolling) 10-year average during a period, which ends no earlier than December 31, 2004 and no later than December 31, 2010. Water suppliers whose recycled water made up 10% or more of their 2008 retail water delivery can use up to a 15-year average for the calculation. The City did not have recycled water use in 2008; therefore, a 10-year baseline period is used.

The City's baseline water use is 130 GPCD, obtained from the 10-year period July 1, 1995 to June 30, 2005.

5.1.2 Five-Year Baseline Period (Target Confirmation)

Water suppliers are required to calculate water use, in GPCD, for a five-year baseline period. This number is used to confirm that the selected 2020 target meets the minimum water use reduction requirements. Regardless of the compliance option adopted by the City, it will need to meet a minimum water use target of 5% reduction from the five-year baseline water use. This five-year baseline water use is calculated as a continuous five-year average during a period, which ends no earlier than December 31, 2007 and no later than December 31, 2010. The City's five-year baseline water use is 122 GPCD, obtained from the five-year period July 1, 2003 to June 30, 2008.

5.1.3 Service Area Population

The City's service area boundaries correspond with the boundaries for a city or census designated place. This allows the City to use service area population estimates prepared by the DOF. CDR is the entity which compiles population data for Orange County based on DOF data. The calculation of the City's baseline water use and water use targets in the 2010 UWMP was based on the 2000 U.S. Census population numbers obtained from CDR. The baseline water use and water use targets in the 2015 UWMP were revised based on the 2010 U.S. Census population obtained from CDR in 2012. That baseline remained in use in the 2020 calculations.

5.2 SBx7-7 Water Use Targets

In the 2020 UWMP, the City may update its 2020 water use target by selecting a different target method than what was used previously. The target methods and determination of the 2015 and 2020 targets are described below. The City selected Option 3 consistent with 2015 and maintained the same 2015 and 2020 target water uses as reported in its 2015 UWMP.

5.2.1 SBx7-7 Target Methods

DWR has established four target calculation methods for urban retail water suppliers to choose from. The City is required to adopt one of the four options to comply with SBx7-7 requirements. The four options include:

- *Option 1* requires a simple 20% reduction from the baseline by 2020 and 10% by 2015.
- *Option 2* employs a budget-based approach by requiring an agency to achieve a performance standard based on three metrics
  - Residential indoor water use of 55 GPCD
  - Landscape water use commensurate with the Model Landscape Ordinance
  - 10% reduction in baseline CII water use
- *Option 3* is to achieve 95% of the applicable state hydrologic region target as set forth in the State's 202020 Water Conservation Plan.
- *Option 4* requires the subtraction of Total Savings from the baseline GPCD:
  - Total savings includes indoor residential savings, meter savings, CII savings, and landscape and water loss savings.

With MWDOC's assistance in the calculation of the City's base daily per capita use and water use targets, the City selected to comply with Option 3 consistent with the option selected in 2010 and 2015.

5.2.2 2020 Targets and Compliance

Under Compliance Option 3, to achieve 95% of the South Coast Hydrologic Region target as set forth in the State's 20x2020 Water Conservation Plan, the City's 2020 target is 142 GPCD. In addition, the confirmed 2020 target needs to meet a minimum of 5% reduction from the five-year baseline water use which is 116 GPCD. Therefore, the City's confirmed 2020 target is 116 GPCD as summarized in Table 5-1.

Table 5-1: Baselines and Targets Summary

DWR Submittal Table 5-1 Baselines and Targets Summary from SB X7-7 Verification Form *Retail Supplier or Regional Alliance Only*				
Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1996*	*2005*	*130*	*116*
5 Year	*2004*	*2008*	*122*	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES:				

The City's actual 2020 consumption is 66 GPCD which is below its 2020 target of 116 GPCD (Table 5-2). The City met its 2020 water use target and is in compliance with SBx7-7. As shown in Table 5-2, the City did not make any adjustments in its compliance for GPCD using weather normalization, economic adjustment, or extraordinary events.

Table 5-2: 2020 Compliance

DWR Submittal Table 5-2: 2020 Compliance from **SB X7-7 2020 Compliance Form** *Retail Supplier or Regional Alliance Only*				
2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
66	0	66	116	Y
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES:				

5.3 Orange County 20x2020 Regional Alliance

A retail supplier may choose to meet the SBx7-7 targets on its own or it may form a regional alliance with other retail suppliers to meet the water use target as a region. Within a Regional Alliance, each retail water supplier will have an additional opportunity to achieve compliance under both an individual target and a regional target.

- If the Regional Alliance meets its water use target on a regional basis, all agencies in the alliance are deemed compliant.
- If the Regional Alliance fails to meet its water use target, each individual supplier will have an opportunity to meet their water use targets individually.

The City is a member of the Orange County 20x2020 Regional Alliance formed by MWDOC, its wholesaler. This regional alliance consists of 29 retail agencies in Orange County as described in MWDOC's 2020 UWMP. MWDOC provides assistance in the calculation of each retail agency's baseline water use and water use targets.

In 2020, the regional baseline and targets were revised from 2015 to account for any revisions made by the retail agencies to their individual 2015 and 2020 targets. The regional water use target is the weighted average of the individual retail agencies' targets (by population). The Orange County 20x2020 Regional Alliance weighted 2020 target is 159 GPCD. The actual 2020 water use in the region is 109 GPCD, i.e., the region met its 2020 GPCD goal.

6 WATER SUPPLY CHARACTERIZATION

As a counterpart to Section 4's Water Use Characterization, this section characterizes the City's water supply. This section includes identification and quantification of water supply sources through 2045, descriptions of each water supply source and their management, opportunities for exchanges and transfers, and discussion regarding any planned future water supply projects. This section also includes the energy intensity of the water service, a new UWMP requirement.

6.1 Water Supply Overview

The City meets all of its demands with a combination of imported water, local groundwater, and recycled water. The City works together with two primary agencies, MET and OCWD, to ensure a safe and reliable water supply that will continue to serve the community in periods of drought and shortage. The sources of imported water supplies include water from the Colorado River and the State Water Project (SWP) provided by MET.

The City's main source of water supply is groundwater from the Orange County Groundwater Basin. Imported water and recycled water make up the rest of the City's water supply portfolio. In FY 2019-20, the City relied on 76% groundwater, 23% imported water, and 1% recycled water (Table 6-1).

It is projected that by 2045, the water supply portfolio will change to approximately to 84% groundwater, 15% imported water, and 1% recycled water (Table 6-2 and Figure 6-1). Note that these representations of supply match the projected demand. However, the City has a ten-year purchase agreement with MET that allows the City to purchase significantly more MET water, should the need arise.
This agreement is further discussed is Section 6.2 Additionally, GWRS supplies are included as part of groundwater pumping numbers.

The following subsections provide a detailed discussion of the City's water sources as well as the future water supply portfolio for the next 25 years.

Table 6-1: Retail: Water Supplies – Actual

DWR Submittal Table 6-8 Retail: Water Supplies — Actual			
Water Supply	Additional Detail on Water Supply	2020	
		Actual Volume (AF)	Water Quality
Groundwater (not desalinated)	Orange County Groundwater Basin	25,591	Drinking Water
Purchased or Imported Water	MET	7,649	Drinking Water
Recycled Water	Green Acres Project (OCWD)	249	Recycled Water
	Total	33,489	
NOTES: Source - MWDOC, 2020			

Table 6-2: Retail: Water Supplies – Projected

DWR Submittal Table 6-9 Retail: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	**Projected Water Supply (AF)** *Report To the Extent Practicable*				
		2025	**2030**	**2035**	**2040**	**2045**
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Groundwater (not desalinated)	Orange County Groundwater Basin	28,588	29,024	28,799	28,551	28,541
Purchased or Imported Water	MET	5,045	5,122	5,082	5,038	5,037
Recycled Water	OCWD	249	249	249	249	249
	Total	33,882	34,395	34,130	33,838	33,827

NOTES:
Source - CDM Smith, 2021
Groundwater volumes assume OCWD’s basin production percentage (BPP) to be 85% for all years. Volumes of groundwater and imported water may vary depending on OCWD's actual BPP projections, which are established annually. This table only considers direct use of recycled water - this does not include indirect potable recharge.

Per the ten-year (CY 2015 through CY 2024) purchase agreement with MET, the City is contractually able to purchase more MET water, should the need arise.

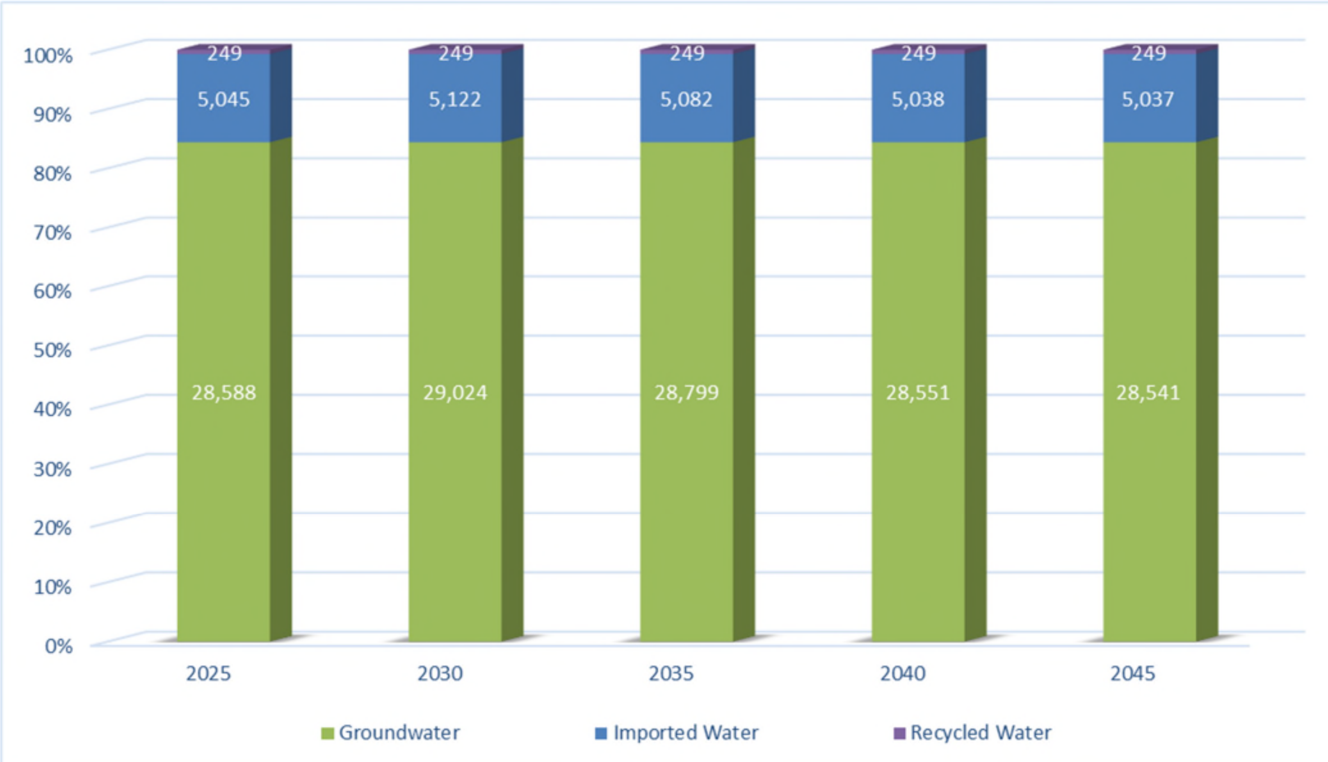

Figure 6-1: City's Projected Water Supply Sources (AF)

6.2 Imported Water

The City supplements its local water supply with imported water purchased from MET. In FY 2019-20, the City relied on approximately 7,649 AFY – approximately 23% of the City's water supply portfolio for FY 2019-20 – of imported water from MET to meet its demands. MET's principal sources of water are the Colorado River via the Colorado River Aqueduct (CRA) and the Lake Oroville watershed in Northern California through the SWP. For Orange County, the water obtained from these sources is treated at the Robert B. Diemer Filtration Plant located in Yorba Linda. Typically, the Diemer Filtration Plant receives a blend of Colorado River water from Lake Mathews through the MET Lower Feeder and SWP water through the Yorba Linda Feeder. The City currently maintains seven imported water connections to the MET system.

In December 2002, the City entered into a 10-year water purchase agreement with MET. This water purchase agreement is a 10-year commitment to purchase a minimum quantity of water on an annual basis and a minimum quantity of water over the course of the 10-year commitment. In return, the City is able to purchase a greater percentage of MET water at a lower, Tier 1 rate. This purchase agreement was renewed, and the current ten-year term is effective January 1, 2015 through December 31, 2024. The City's annual purchase commitment average is 8,086 AF, with a maximum average annual value set at 19,617 AF.

6.2.1 Colorado River Supplies

Background

The Colorado River was MET's original source of water after MET's establishment in 1928. The CRA, which is owned and operated by MET, transports water from the Colorado River to its terminus Lake Mathews, in Riverside County. The actual amount of water per year that may be conveyed through the CRA to MET's member agencies is subject to the availability of Colorado River water. Approximately 40 million people rely on the Colorado River and its tributaries for water with 5.5 million acres of land using Colorado River water for irrigation. The CRA includes supplies from the implementation of the Quantification Settlement Agreement and its related agreements to transfer water from agricultural agencies to urban uses. The 2003 Quantification Settlement Agreement enabled California to implement major Colorado River water conservation and transfer programs, in order to stabilize water supplies and reduce the state's demand on the river to its 4.4 million acre-feet (MAF) entitlement. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 MAF on an as-needed basis. Water from the Colorado River or its tributaries is available to users in California, Arizona, Colorado, Nevada, New Mexico, Utah, Wyoming, and Mexico. California is apportioned the use of 4.4 MAF of water from the Colorado River each year plus one-half of any surplus that may be available for use collectively in Arizona, California, and Nevada. In addition, California has historically been allowed to use Colorado River water apportioned to, but not used by, Arizona or Nevada. MET has a basic entitlement of 550,000 AFY of Colorado River water, plus surplus water up to an additional 662,000 AFY when the following conditions exists (MET, 2021):

- Water is unused by the California holders of priorities 1 through 3
- Water is saved by the Palo Verde land management, crop rotation, and water supply program
- When the U.S. Secretary of the Interior makes available either one or both of the following:
    - Surplus water
    - Colorado River water that is apportioned to but unused by Arizona and/or Nevada.

Current Conditions and Supply

MET has not received surplus water for a number of years. The Colorado River supply faces current and future imbalances between water supply and demand in the Colorado River Basin due to long-term drought conditions. Analysis of historical records suggests a potential change in the relationship between precipitation and runoff in the Colorado River Basin. The past 21 years (1999-2020) have seen an overall drying trend, even though the period included several wet or average years. The river basin has substantial storage capacity, but the significant reduction in system reservoir storage in the last two decades is great enough to consider the period a drought (DWR, 2020a). At the close of 2020, system storage was at or near its lowest since 2000, so there is very little buffer to avoid a shortage from any future period of reduced precipitation and runoff (MET, 2021). Looking ahead, the long-term imbalance in the Colorado River Basin's future supply and demand is projected to be approximately 3.2 MAF by the year 2060 (USBR, 2012).

Over the years, MET has helped fund and implement various programs to improve Colorado River supply reliability and help resolve the imbalance between supply and demand. Implementation of such programs have contributed to achievements like achieving a record low diversion of the Colorado River in 2019, a level not seen since the 1950s. Colorado River water management programs include:

- **Imperial Irrigation District / MET Conservation Program** – Under agreements executed in 1988 and 1989, this program allows MET to fund water efficiency improvements within Imperial Irrigation District's service area in return for the right to divert the water conserved by those investments. An average of 105,000 AFY of water has been conserved since the program's implementation.
- **Palo Verde Land Management, Crop Rotation, and Water Supply Program** – Authorized in 2004, this 35-year program allows MET to pay participating farmers to reduce their water use, and for MET to receive the saved water. Over the life of the program, an average of 84,500 AFY has been saved and made available to MET.
- **Bard Seasonal Fallowing Program** – Authorized in 2019, this program allows MET to pay participating farmers in Bard to reduce their water use between the late spring and summer months of selected years, which provides up to 6,000 AF of water to be available to MET in certain years.
- **Management of MET-Owned Land in Palo Verde** – Since 2001, MET has acquired approximately 21,000 acres of irrigable farmland that are leased to growers, with incentives to grow low water-using crops and experiment with low water-consumption practices. If long-term water savings are realized, MET may explore ways to formally account them for Colorado River supplies.
- **Southern Nevada Water Authority (SNWA) and MET Storage and Interstate Release Agreement** – Entered in 2004, this agreement allows SNWA to store its unused, conserved water with MET, in exchange for MET to receive additional Colorado River water supply. MET has relied on the additional water during dry years, especially during the 2011-2016 California drought, and SNWA is not expected to call upon MET to return water until after 2026.
- **Lower Colorado Water Supply Projects** – Authorized in 1980s, this project provides up to 10,000 AFY of water to certain entities that do not have or have insufficient rights to use Colorado River water. A contract executed in 2007 allowed MET to receive project water left unused by the project contractors along the River – nearly 10,000 AF was received by MET in 2019 and is estimated for 2020.
- **Exchange Programs** – MET is involved in separate exchange programs with the United States Bureau of Reclamation, which takes place at the Colorado River Intake and with San Diego County Water Authority (SDCWA), which exchanges conserved Colorado River water.
- **Lake Mead Storage Program** – Executed in 2006, this program allows MET to leave excessively conserved water in Lake Mead, for exclusive use by MET in later years.
- **Quagga Mussel Control Program** – Developed in 2007, this program introduced surveillance activities and control measures to combat quagga mussels, an invasive species that impact the Colorado River's water quality.

- **Lower Basin Drought Contingency Plan** – Signed in 2019, this agreement incentivizes storage in Lake Mead through 2026 and overall, it increases MET's flexibility to fill the CRA as needed (MET, 2021).

Future Programs / Plans

The Colorado River faces long-term challenges of water demands exceeding available supply with additional uncertainties due to climate change. Climate change impacts expected in the Colorado River Basin include the following:

- More frequent, more intense, and longer lasting droughts, which will result in water deficits
- Continued dryness in the Colorado River Basin, which will increase the likelihood of triggering a first-ever shortage in the Lower Basin
- Increased temperatures, which will affect the percentage of precipitation that falls as rain or snow, as well as the amount and timing of mountain snowpack (DWR, 2020b)

Acknowledging the various uncertainties regarding reliability, MET plans to continue ongoing programs, such as those listed earlier in this section. Additionally, MET supports increasing water recycling in the Colorado River Basin and is in the process of developing additional transfer programs for the future (MET, 2021).

6.2.2 State Water Project Supplies

Background

The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR and is an integral part of the effort to ensure that business and industry, urban and suburban residents, and farmers throughout much of California have sufficient water. Water from the SWP originates at Lake Oroville, which is located on the Feather River in Northern California. Much of the SWP water supply passes through the Delta. The SWP is the largest state-built, multipurpose, user-financed water project in the United States. Nearly two-thirds of residents in California receive at least part of their water from the SWP, with approximately 70% of SWP's contracted water supply going to urban users and 30% to agricultural users. The primary purpose of the SWP is to divert and store water during wet periods in Northern and Central California and distribute it to areas of need in Northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and SSouthern California (MET, 2021).

The Delta is key to the SWP's ability to deliver water to its agricultural and urban contractors. All but five of the 29 SWP contractors receive water deliveries below the Delta (pumped via the Harvey O. Banks or Barker Slough pumping plants). However, the Delta faces many challenges concerning its long-term sustainability such as climate change posing a threat of increased variability in floods and droughts. Sea level rise complicates efforts in managing salinity levels and preserving water quality in the Delta to ensure a suitable water supply for urban and agricultural use. Furthermore, other challenges include continued subsidence of Delta islands, many of which are below sea level, and the related threat of a catastrophic levee failure as the water pressure increases, or as a result of a major seismic event.

Current Conditions and Supply

“Table A” water is the maximum entitlement of SWP water for each water contracting agency. Currently, the combined maximum Table A amount is 4.17 million acre-feet per year (MAFY). Of this amount, 4.13 MAFY is the maximum Table A water available for delivery from the Delta. On average, deliveries are approximately 60% of the maximum Table A amount (DWR, 2020b).

SWP contractors may receive Article 21 water on a short-term basis in addition to Table A water if requested. Article 21 of SWP contracts allows contractors to receive additional water deliveries only under specific conditions, generally during wet months of the year (December through March). Because a SWP contractor must have an immediate use for Article 21 supply or a place to store it outside of the SWP, there are few contractors like MET that can access such supplies.

Carryover water is SWP water allocated to an SWP contractor and approved for delivery to the contractor in a given year, but not used by the end of the year. The unused water is stored in the SWP’s share of San Luis Reservoir, when space is available, for the contractor to use in the following year.

Turnback pool water is Table A water that has been allocated to SWP contractors that has exceeded their demands. This water can then be purchased by another contractor depending on its availability.

SWP Delta exports are the water supplies that are transferred directly to SWP contractors or to San Luis Reservoir storage south of the Delta via the Harvey O. Banks pumping plant. Estimated average annual Delta exports and SWP Table A water deliveries have generally decreased since 2005, when Delta export regulations affecting SWP pumping operations became more restrictive due to federal biological opinions (Biops). The Biops protect species listed as threatened or endangered under the federal and state Endangered Species Acts (ESAs) and affect the SWP’s water delivery capability because they restrict SWP exports in the Delta and include Delta outflow requirements during certain times of the year, thus reducing the available supply for export or storage.

Before being updated by the 2019 Long-Term Operations Plan, the prior 2008 and 2009 Biops resulted in an estimated reduction in SWP deliveries of 0.3 MAF during critically dry years to 1.3 MAF in above normal water years as compared to the previous baseline. However, the 2019 Long-Term Operations Plan and Biops are expected to increase SWP deliveries by an annual average of 20,000 AF as compared to the previous Biops (MET, 2021). Average Table A deliveries decreased in the 2019 SWP Final Delivery Capability Report compared to 2017, mainly due to the 2018 Coordinated Operation Agreement (COA) Addendum and the increase in the end of September storage target for Lake Oroville. Other factors that also affected deliveries included changes in regulations associated with the Incidental Take Permit (ITP) and the Reinitiation of Consultation for Long-Term Operations (RoC on LTO), a shift in Table A to Article 21 deliveries which occurred due to higher storage in SWP San Luis, and other operational updates to the SWP and federal Central Valley Project (CVP) (DWR, 2020b). Since 2005, there are similar decreasing trends for both the average annual Delta exports and the average annual Table A deliveries (Table 6-3).

Table 6-3: MET SWP Program Capabilities

Year	Average Annual Delta Exports (MAF)	Average Annual Table A Deliveries (MAF)
2005	2.96	2.82
2013	2.61	2.55
2019	2.52	2.41
Percent Change*	-14.8%	-14.3%

*Percent change is between the years 2019 and 2005.

Ongoing regulatory restrictions, such as those imposed by the Biops on the effects of SWP and the CVP operations on certain marine life, also contribute to the challenge of determining the SWP's water delivery reliability. In dry, below-normal conditions, MET has increased the supplies delivered through the California Aqueduct by developing flexible CVP/SWP storage and transfer programs. The goal of the storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Harvey O. Banks pumping plant capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions. In addition, SWRCB has set water quality objectives that must be met by the SWP including minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity level.

The following factors affect the ability to estimate existing and future water delivery reliability:

- **Water availability at the source**: Availability can be highly variable and depends on the amount and timing of rain and snow that fall in any given year. Generally, during a single-dry year or two, surface and groundwater storage can supply most water deliveries, but multiple-dry years can result in critically low water reserves. Fisheries issues can also restrict the operations of the export pumps even when water supplies are available.
- **Water rights with priority over the SWP**: Water users with prior water rights are assigned higher priority in DWR's modeling of the SWP's water delivery reliability, even ahead of SWP Table A water.
- **Climate change**: Mean temperatures are predicted to vary more significantly than previously expected. This change in climate is anticipated to bring warmer winter storms that result in less snowfall at lower elevations, reducing total snowpack. From historical data, DWR projects that by 2050, the Sierra snowpack will be reduced from its historical average by 25 to 40%. Increased precipitation as rain could result in a larger number of "rain-on-snow" events, causing snow to melt earlier in the year and over fewer days than historically, affecting the availability of water for pumping by the SWP during summer. Furthermore, water quality may be adversely affected due to the anticipated increase in wildfires. Rising sea levels may result in potential pumping cutbacks on the SWP and CVP.
- **Regulatory restrictions on SWP Delta exports**: The Biops protect special-status species such as delta smelt and spring- and winter-run Chinook salmon and imposed substantial constraints on

Delta water supply operations through requirements for Delta inflow and outflow and export pumping restrictions. Restrictions on SWP operations imposed by state and federal agencies contribute substantially to the challenge of accurately determining the SWP's water delivery reliability in any given year (DWR, 2020b).

- **Ongoing environmental and policy planning efforts**: Governor Gavin Newsom ended California WaterFix in May 2019 and announced a new approach to modernize Delta Conveyance through a single tunnel alternative. The EcoRestore Program aims to restore at least 30,000 acres of Delta habitat, with the near-term goal of making significant strides toward that objective by 2020 (DWR, 2020b).
- **Delta levee failure**: The levees are vulnerable to failure because most original levees were simply built with soils dredged from nearby channels and were not engineered. A breach of one or more levees and island flooding could affect Delta water quality and SWP operations for several months. When islands are flooded, DWR may need to drastically decrease or even cease SWP Delta exports to evaluate damage caused by salinity in the Delta.

Operational constraints likely will continue until a long-term solution to the problems in the Bay-Delta is identified and implemented. New Biops for listed species under the Federal ESA or by the California Department of Fish and Game's issuance of incidental take authorizations under the Federal ESA and California ESA might further adversely affect SWP and CVP operations. Additionally, new litigation, listings of additional species or new regulatory requirements could further adversely affect SWP operations in the future by requiring additional export reductions, releases of additional water from storage or other operational changes impacting water supply operations.

Future Programs / Plans

MET's Board approved a Delta Action Plan in June 2007 that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. The Delta Action Plan aims to prioritize immediate short-term actions to stabilize the Delta while an ultimate solution is selected, and mid-term steps to maintain the Delta while a long-term solution is implemented. Currently, MET is working towards addressing four elements: Delta ecosystem restoration, water supply conveyance, flood control, protection and storage development.

In May 2019, Governor Newsom ended California WaterFix, announced a new approach to modernize Delta Conveyance through a single tunnel alternative, and released Executive Order 10-19 that directed state agencies to inventory and assess new planning for the project. DWR then withdrew all project approvals and permit applications for California WaterFix, effectively ending the project. The purpose of the Delta Conveyance Project (DCP) gives rise to several project objectives (MET, 2021). In proposing to make physical improvements to the SWP Delta conveyance system, the project objectives are:

- To address anticipated rising sea levels and other reasonably foreseeable consequences of climate change and extreme weather events.
- To minimize the potential for public health and safety impacts from reduced quantity and quality of SWP water deliveries, and potentially CVP water deliveries, south of the Delta resulting from a major earthquake that causes breaching of Delta levees and the inundation of brackish water into the areas in which existing pumping plants operate.

- To protect the ability of the SWP, and potentially the CVP, to deliver water when hydrologic conditions result in the availability of sufficient amounts, consistent with the requirements of state and federal law.
- To provide operational flexibility to improve aquatic conditions in the Delta and better manage risks of further regulatory constraints on project operations.

6.2.3 Storage

Storage is a major component of MET's dry year resource management strategy. MET's likelihood of having adequate supply capability to meet projected demands, without implementing its Water Supply Allocation Plan (WSAP), is dependent on its storage resources. Due to the pattern of generally drier hydrology, the groundwater basins and local reservoirs have dropped to low operating levels and remain below healthy storage levels. For example, the Colorado River Basin's system storage at the close of 2020, was at or near its lowest since 2000, so there is very little buffer to avoid a shortage from any future period of reduced precipitation and runoff (MET, 2021).

MET stores water in both DWR and MET surface water reservoirs. MET's surface water reservoirs are Lake Mathews, Lake Skinner, and Diamond Valley Lake, which have a combined storage capacity of over 1 MAF. Approximately 650,000 AF are stored for seasonal, regulatory, and drought use, while approximately 370,000 AF are stored for emergency use.

MET also has contractual rights to DWR surface Reservoirs, such as 65 TAF of flexible storage at Lake Perris (East Branch terminal reservoir) and 154 TAF of flexible storage at Castaic Lake (West Branch terminal reservoir) that provides MET with additional options for managing SWP deliveries to maximize the yield from the project. This storage can provide MET with up to 44 TAF of additional supply over multiple dry years, or up to 219 TAF to Southern California in a single dry year (MET, 2021).

MET endeavors to increase the reliability of water supplies through the development of flexible storage and transfer programs including groundwater storage (MET, 2021). These include:

- **Lake Mead Storage Program:** Executed in 2006, this program allows MET to leave excessively conserved water in Lake Mead, for exclusive use by MET in later years. MET created "Intentionally Created Surplus" (ICS) water in 2006-2007, 2009-2012, and 2016-2019, and withdrew ICS water in 2008 and 2013-2015. As of January 1, 2021, MET had a total of 1.3 MAF of Extraordinary Conservation ICS water.
- **Semitropic Storage Program:** The maximum storage capacity of the program is 350 TAF, and the minimum and maximum annual yields available to MET are 34.7 TAF and 236.2 TAF, respectively. The specific amount of water MET can expect to store in and subsequently receive from the program depends on hydrologic conditions, any regulatory requirements restricting MET's ability to export water for storage and demands placed by other program participants. During wet years, MET has the discretion to use the program to store portions of its SWP supplies which are in excess, and during dry years, the Semitropic Water Storage District returns MET's previously stored water to MET by direct groundwater pump-in or by exchange of surface water supplies.
- **Arvin-Edison Storage Program:** The storage program is estimated to deliver 75 TAF, and the specific amount of water MET can expect to store in and subsequently receive from the program

depends on hydrologic conditions and any regulatory requirements restricting MET's ability to export water for storage. During wet years, MET has the discretion to use to program to store portions of its SWP supplies which are in excess, and during dry years, the Arvin-Edison Water Storage District returns MET's previously stored water to MET by direct groundwater pump-in or by exchange of surface water supplies.

- **Antelope Valley-East Kern (AVEK) Water Agency Exchange and Storage Program:** Under the exchange program, for every two AF MET receives, MET returns 1 AF back to AVEK, and MET will also be able to store up to 30 TAF in the AVEK's groundwater basin, with a dry-year return capability of 10 TAF.
- **High Desert Water Bank Program:** Under this program, MET will have the ability to store up to 280 TAF of its SWP Table A or other supplies in the Antelope Valley groundwater basin, and in exchange will provide funding for the construction of monitoring and production wells, turnouts from the California Aqueduct, pipelines, recharge basins, water storage, and booster pump facilities. The project is anticipated to be in operation by 2025.
- **Kern-Delta Water District Storage Program:** This groundwater storage program has 250 TAF of storage capacity, and water for storage can either be directly recharged into the groundwater basin or delivered to Kern-Delta Water District farmers in lieu of pumping groundwater. During dry years, the Kern-Delta Water District returns MET's previously stored water to MET by direct groundwater pump-in return or by exchange of surface water supplies.
- **Mojave Storage Program:** MET entered into a groundwater banking and exchange transfer agreement with Mojave Water Agency that allows for the cumulative storage of up to 390 TAF. The agreement allows for MET to store water in an exchange account for later return.

6.2.4 Planned Future Sources

Beyond the programs highlighted in Sections 6.2.1 through 6.2.3, MET continues to invest in efforts to meet its goal of long-term regional water supply reliability, focusing on the following:

- Continuing water conservation
- Developing water supply management programs outside of the region
- Developing storage programs related to the Colorado River and the SWP
- Developing storage and groundwater management programs within the Southern California region
- Increasing water recycling, groundwater recovery, stormwater and seawater desalination
- Pursuing long-term solutions for the ecosystem, regulatory and water supply issues in the California Bay-Delta (MET, 2021)

6.3 Groundwater

Historically, local groundwater has been the cheapest and most reliable source of supply for the City. The City draws water from the Basin. In FY 2019-20, the City relied on approximately 25,591 AFY –

approximately 76% of the City's water supply portfolio for FY 2019-20 – from the OC Basin to meet its demands.

This section describes the OC Basin and the management measures taken by OCWD, the basin manager to optimize local supply and minimize overdraft. This section also provides information on historical groundwater production as well as a 25-year projection of the City's groundwater supply.

The OCWD was formed in 1933 by a special legislative act of the California State Legislature to protect and manage the County's vast, natural, groundwater supply using the best available technology and defend its water rights to the OC Basin. This legislation is found in the State of California Statutes, Water – Uncodified Acts, Act 5683, as amended. The OC Basin is managed by OCWD under the Act, which functions as a statutorily-imposed physical solution. The OCWD Management Area includes approximately 89% of the land area of the OC Basin, and 98% of all groundwater production occurs within the area. OCWD monitors the basin by collecting groundwater elevation and quality data from wells and manages an electronic database that stores water elevation, water quality, production, recharge, and other data on over 2,000 wells and facilities within and outside OCWD boundaries (City of La Habra et al., 2017).

Groundwater levels are managed within a safe basin operating range to protect the long-term sustainability of the OC Basin and to protect against land subsidence. OCWD regulates groundwater levels in the OC Basin by regulating the annual amount of pumping and setting the Basin Production Percentage (BPP) for the water year. As defined in the District Act, the BPP is the ratio of water produced from groundwater supplies within the district to all water produced within the district from both supplemental sources and groundwater within the district (OCWD, 2020). On a per agency basis including the City, the BPP is the total percentage amount of groundwater allowed to be produced towards that agency's or city's demand. For the City, the remaining percentage of potable water demand is achieved through MET water.

6.3.1 Historical Groundwater Production

The City pumps groundwater through its 21 active operating groundwater wells. One of the City's wells is currently offline but is being rehabilitated with goals to be completed by the end of 2021. The City has experienced relative stability in the groundwater volume pumped for the last five years (Table 6-4).

Table 6-4: Retail: Groundwater Volume Pumped

DWR Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	Orange County Groundwater Basin	24,722	24,357	21,327	25,505	25,591
	TOTAL	24,722	24,357	21,327	25,505	25,591
NOTES: Source: MWDOC, 2020						

6.3.2 Basin Characteristics

The OC Basin underlies the northerly half of Orange County beneath broad lowlands. The OC Basin, managed by OCWD, covers an area of approximately 350 square miles, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, and the Pacific Ocean to the southwest. The OC Basin boundary extends to the Orange County-Los Angeles Line to the northwest, where groundwater flows across the county line into the Central Groundwater Basin of Los Angeles County. A map of the OC Basin is shown on Figure 6-2. The total thickness of sedimentary rocks in the OC Basin is over 20,000 feet, with only the upper 2,000 to 4,000 feet containing fresh water. The OC Basin's full volume is approximately 66 MAF.

There are three major aquifer systems that have been subdivided by OCWD, the Shallow Aquifer System, the Principal Aquifer System, and the Deep Aquifer System. These three aquifer systems are hydraulically connected as groundwater is able to flow between each other through intervening aquitards or discontinuities in the aquitards. The Shallow Aquifer system occurs from the surface to approximately 250 feet below ground surface. Most of the groundwater from this aquifer system is pumped by small water systems for industrial and agricultural use. The Principal Aquifer system occurs at depths between 200 and 1,300 feet below ground surface. Over 90% of groundwater production is from wells that are screened within the Principal Aquifer system. Only a minor amount of groundwater is pumped from the Deep Aquifer system, which underlies the Principal Aquifer system and is up to 2,000 feet deep in the center of the OC Basin.

Per- and polyfluoroalkyl substances (PFAS) are a group of thousands of manmade chemicals that includes perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). PFAS compounds were once commonly used in many products including, among many others, stain- and water-repellent fabrics, nonstick products (e.g., Teflon), polishes, waxes, paints, cleaning products, and fire-fighting foams.

Beginning in the summer of 2019, the California State Division of Drinking Water (DDW) began requiring testing for PFAS compounds in some groundwater production wells in the OCWD area.

Groundwater production in FY 2019-20 was expected to be approximately 325,000 AF but declined to 286,550 AF primarily due to PFAS impacted wells being turned off around February 2020.
OCWD expects groundwater production to be in the area of 245,000 AF in FY 2020-21 due to the currently idled wells and additional wells being impacted by PFAS and turned off. As PFAS treatment systems are constructed, OCWD expects total annual groundwater production to slowly increase back to normal levels (310,000 to 330,000 AF) (OCWD, 2020).

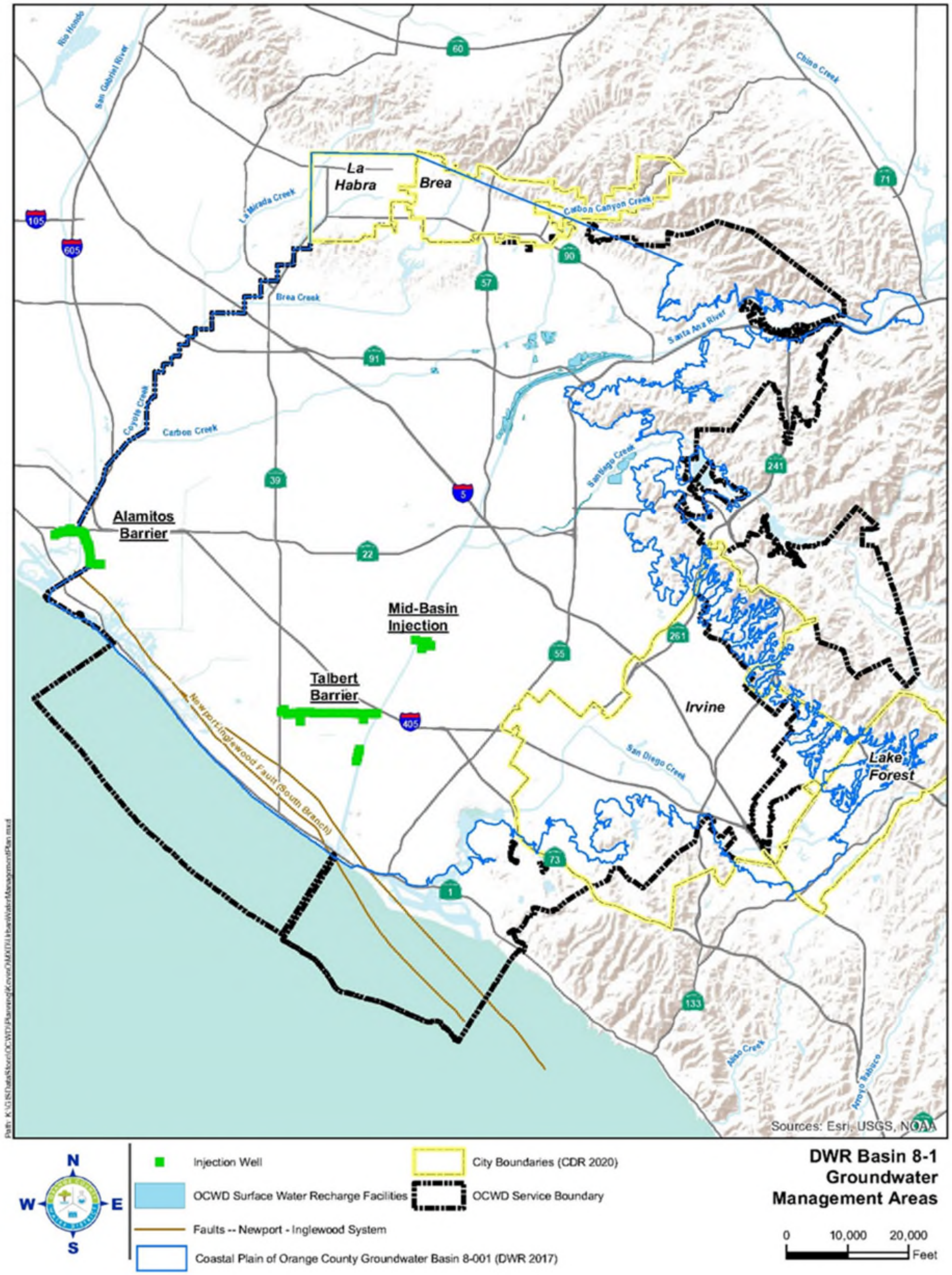

Figure 6-2: Map of the OC Basin

6.3.3 Sustainable Groundwater Management Act

In 2014, the State of California adopted the Sustainable Groundwater Management Act (SGMA) to help manage its groundwater sustainably, and limit adverse effects such as significant groundwater-level declines, land subsidence, and water quality degradation. SGMA requires all high- and medium-priority basins, as designated by DWR, be sustainably managed. DWR designated the non-adjudicated Coastal Plain of OC Basin ("Basin 8-1" or "Basin") as a medium-priority basin, primarily due to heavy reliance on the Basin's groundwater as a source of water supply. Compliance with SGMA can be achieved in one of two ways:

1) A Groundwater Sustainability Agency (GSA) is formed, and a Groundwater Sustainability Plan (GSP) is adopted, or
2) Special Act Districts created by statute, such as OCWD, and other agencies may prepare and submit an Alternative to a GSP (City of La Habra et al., 2017)

The agencies within Basin 8-1, led by OCWD collaborated to submit an Alternative to a GSP in 2017, titled the "Basin 8-1 Alternative" to meet SGMA compliance. This document will be updated every five years. The current (2017) version is included in Appendix G.

6.3.4 Basin Production Percentage

Background

The OC Basin is not adjudicated and as such, pumping from the OC Basin is managed through a process that uses financial incentives to encourage groundwater producers to pump a sustainable amount of water. The framework for the financial incentives is based on establishing the BPP, the percentage of each Producer's total water supply that comes from groundwater pumped from the OC Basin. Groundwater production at or below the BPP is assessed the Replenishment Assessment (RA). While there is no legal limit as to how much an agency pumps from the OC Basin, there is a financial disincentive to pump above the BPP. The BPP is set uniformly for all Producers by OCWD on an annual basis. Agencies that pump above the BPP are charged the RA plus the Basin Equity Assessment (BEA). The BEA is presently calculated so that the cost of groundwater production is equivalent to the cost of importing potable water supplies. This approach serves to discourage, but not eliminate, production above the BPP, and the BEA can be increased to discourage production above the BPP if necessary.

The BPP is set based on groundwater conditions, availability of imported water supplies, and Basin management objectives. The supplies available for recharge must be estimated for a given year. The supplies of recharge water that are estimated are: 1) Santa Ana River stormflow, 2) Natural incidental recharge, 3) Santa Ana River baseflow, 4) GWRS supplies, and 5) other supplies such as imported water and recycled water purchased for the Alamitos Barrier. The BPP is a major factor in determining the cost of groundwater production from the OC Basin for that year. The BPP set for Water Year 2021-22 is 77%.

BPP Adjustments for Basin Management

OCWD has established management guidelines that are used to establish future BPPs, as seen in Table 6-5. Raising or lowering the BPP allows OCWD to manage the amount of pumping from the basin. OCWD has a policy to manage the groundwater basin within a sustainable range to avoid adverse impacts to the basin. OCWD seeks to maintain some available storage space in the basin to maximize surface water recharge when such supplies are available, especially in relatively wet years. By keeping the basin relatively full during wet years, and for as long as possible in years with near-normal recharge, the maximum amount of groundwater could be maintained in storage to support pumping in future drought conditions. During dry hydrologic years when less water would be available for recharge, the BPP could be lowered to maintain groundwater storage levels. A component of OCWD's BPP policy is to manage the groundwater basin so that the BPP will not fluctuate more that 5 percent from year to year.

Based on most recent modeling of water supplies available for groundwater recharge and water demand forecasts, OCWD anticipates being able to sustain the BPP at 85% starting in 2025. The primary reasons for the higher BPP are the expected completion of the GWRS Final Expansion (GWRSFE) in 2023 and the relatively low water demands of approximately 400,000 AFY.

Modeling and forecasts generate estimates based on historical averages. Consequently, forecasts use average hydrologic conditions which smooth the dynamic and unpredictable local hydrology. Variations in local hydrology are the most significant impact to supplies of water available to recharge the groundwater basin. The BPP projection of 85% is provided based upon average annual rainfall weather patterns. If the City were to experience a relatively dry period, the BPP could be reduced to maintain water storage levels, by as much as five percent.

Table 6-5: Management Actions Based on Changes in Groundwater Storage

Available Storage Space (amount below full basin condition, AF)	Considered Basin Management Action
Less than 100,000	Raise BPP
100,000 to 300,000	Maintain and / or raise BPP towards 75% goal
300,000 to 350,000	Seek additional supplies to refill basin and / or lower the BPP
Greater than 350,000	Seek additional supplies to refill basin and lower the BPP

BPP Exemptions

In some cases, OCWD encourages pumping and treating groundwater that does not meet drinking water standards in order to protect water quality. This is achieved by using a financial incentive called the BEA Exemption. A BEA Exemption is used to promote beneficial uses of poor-quality groundwater and reduce or prevent the spread of poor-quality groundwater into non-degraded aquifer zones. OCWD uses a partial or total exemption of the BEA to compensate a qualified participating agency or Producer for the costs of treating poor quality groundwater, which typically include capital, interest and operations and maintenance costs for treatment facilities. When OCWD authorizes a BEA exemption for a project, it is obligated to provide the replenishment water for the production above the BPP and forgo the BEA revenue that OCWD would otherwise receive from the producer (City of La Habra et al., 2017). Similarly, for proactive water quality management, OCWD exempts a portion of the BEA for their Coastal Pumping Transfer Program (CPTP). The CPTP encourages inland groundwater producers to increase pumping and coastal producers to decrease pumping in order to reduce the groundwater basin drawdown at the coast and protect against seawater intrusion. Inland pumpers can pump above the BPP without having to pay the full BEA for the amount pumped above the BPP (OCWD, 2015). Coastal pumpers receive BEA revenue from OCWD to assist in offsetting their additional water supply cost from taking less groundwater.

6.3.4.1 2020 OCWD Groundwater Reliability Plan

In order to adapt to the substantial growth in water demands in OCWD's management area, it is paramount to anticipate and understand future water demands and develop projects to increase future water supplies proactively to match demands. The GRP is a continuation of these planning efforts that estimates the OC Basin's sustainable average annual production and extrapolates water needs of the OC Basin by combining recently completed water demand projections and modeling of Santa Ana River flows available for recharge. These data will be used to evaluate future water supply projects and guide management of the OC Basin. OCWD is currently developing the GRP, and the first public draft is expected to be available May 2021.

Current water demand projections show a relatively slow increase over the 25-year planning horizon, which is generally of similar magnitude as the additional production from the GWRSFE in early 2023. Once complete, the GWRSFE will increase capacity from 100,000 to 134,000 AFY of high-quality recycled water. This locally controlled, drought proof supply of water reduces the region's dependance on imported water.

Historically, the Santa Ana River has served as the primary source of water to recharge the OC Basin. To determine the availability of future Santa Ana River flows, OCWD utilized surface water flow modeling of the upper watershed. Modeling was developed to predict the impacts future stormwater capture and wastewater recycling projects in the upper watershed would have on future Santa Ana River flow rates at Prado Dam. Santa Ana River base flows are expected to decrease as more water recycling projects are built in the upper watershed. OCWD continues to work closely with the US Army Corps of Engineers to temporarily impound and slowly release up to approximately 20,000 AF of stormwater in the Prado Dam Conservation Pool. To some extent, the losses in baseflow are partially offset through the capture of additional stormwater held in the Prado Dam Conservation Pool. When available, OCWD will continue to augment groundwater recharge through the purchase of imported water through MET. OCWD will diligently monitor and evaluate future water supply projects to sustainably manage and protect the OC Basin for future generations.

6.3.4.2 OCWD Engineer's Report

The OCWD Engineer's Report reports on the groundwater conditions and investigates information related to water supply and groundwater basin usage within OCWD's service area.

The overall BPP achieved in the 2019 to 2020 water year within OCWD for non-irrigation use was 75.9%. The achieved pumping was less than the BPP established for the 2019 to 2020 water year primarily due to the water quality impacts of PFAS. As indicated in Section 6.3.4, a BPP of 77% was established for water year 2021-22. Analysis of the groundwater basin's projected accumulated overdraft, the available supplies to the OC Basin (assuming average hydrology) and the projected pumping demands indicate that this level of pumping can be sustained for 2021-22 without detriment to the OC Basin (OCWD, 2021).

In FY 2021-22 additional production of approximately 22,000 AF above the BPP will be undertaken by the City of Tustin, City of Garden Grove, City of Huntington Beach, Mesa Water District, and IRWD. These agencies use the additional pumping allowance in order to accommodate groundwater quality improvement projects. As in prior years, production above the BPP from these projects would be partially or fully exempt from the BEA as a result of the benefit provided to the OC Basin by removing poor-quality groundwater and treating it for beneficial use (OCWD, 2021).

6.3.5 Recharge Management

Recharging water into the OC Basin through natural and artificial means is essential to support pumping from the OC Basin. Active recharge of groundwater began in 1949, in response to increasing drawdown of the OC Basin and, consequently, the threat of seawater intrusion. The OC Basin's primary source of recharge is flow from the Santa Ana River, which is diverted into recharge basins and its main Orange County tributary, Santiago Creek. Other sources of recharge water include natural infiltration, recycled water, and imported water. Natural recharge consists of subsurface inflow from local hills and mountains, infiltration of precipitation and irrigation water, recharge in small flood control channels, and groundwater underflow to and from Los Angeles County and the ocean.

Recycled water for the OC Basin recharge is from two sources. The main source of recycled water is from the GWRS, which is injected into the Talbert Seawater Barrier and recharged in the Kraemer, Miller and Miraloma Basins (City of La Habra et al., 2017). The second source of recycled water is water purified at the Water Replenishment District's Leo J. Vander Lans Treatment Facility, which supplies water to the Alamitos Seawater Barrier (owned and operated by the Los Angeles County Department of Public Works). OCWD's share of the Alamitos Barrier injection total for water year 2018-19 was less than half of the total injection, based on barrier wells located within Orange County. The Water Replenishment District of Southern California (WRD) also works closely with OCWD to ensure that the water demands at the Alamitos Barrier are fulfilled through the use of recycled water as opposed to imported water, however the recycled portion was less than 33% for the last six years due to operational issues and wastewater supply interruptions (OCWD, 2020a). Injection of recycled water into these barriers is an effort by OCWD to control seawater intrusion into the OC Basin. Operation of the injection wells forms a hydraulic barrier to seawater intrusion.

OCWD purchases imported water for recharge from MWDOC. Untreated imported water can be used to recharge the OC Basin through the surface water recharge system in multiple locations, such as Anaheim Lake, Santa Ana River, Irvine Lake, and San Antonio Creek. Treated imported water can be used for in-lieu recharge, as was performed extensively from 1977 to 2007 (City of La Habra et al., 2017). For detailed recharge management efforts from OCWD, refer to OCWD's 2017 "Basin 8-1 Alternative Plan" (Appendix G).

6.3.6 MET Groundwater Replenishment Program

In the past, OCWD, MWDOC, and MET have coordinated water management to increase storage in the OC Basin when imported supplies are available for this purpose. MET's groundwater replenishment program was discontinued on January 1, 2013, and currently MET via MWDOC sells replenishment water to OCWD at the full service untreated MET rate.

MWDOC's imported water sales to OCWD since FY 1990-91 averages approximately 31,200 AF per year. Recently, due to low Santa Ana River flows as a result of low precipitation and increased use along the river, OCWD has needed to purchase more imported replenishment water per year than the average of 31,200 AFY over the last 25 years (this does not include water amounts from MET's Conjunctive Use Program (CUP) or its Cyclic Storage Account). However, with the emergence of PFAS affecting groundwater production, the need to purchase imported water has been temporary suspended. Until PFAS treatment is in place for most groundwater producers in the region, imported replenishment water will be significantly reduced.

6.3.7 MET Conjunctive Use Program / Cyclic Storage Program with OCWD

Since 2004, OCWD, MWDOC, and certain groundwater producers have participated in MET's CUP. This program allows for the storage of MET water in the OC Basin. The existing MET program provides storage up to 66,000 AF of water in the OC Basin to be pumped by participating producers in place of receiving imported supplies during water shortage events in exchange for MET's contribution to improvements in basin management facilities and an annual administrative fee. These improvements include eight new groundwater production wells, improvements to the seawater intrusion barrier, and construction of the Diemer Bypass Pipeline. The water is accounted for via the CUP program administered by the wholesale agencies and is controlled by MET such that it can be withdrawn over a three-year time period (OCWD, 2020). As of 2021, the CUP has not been in use since 2014. The CUP contract ends in 2028.

The Cyclic Storage account is an alternative storage account with MET. However, unlike the CUP program, OCWD controls when the water is used. The Cyclic Water Storage Program allows MET to store water in a local groundwater basin during surplus conditions, where MET has limited space in its regional storage locations. Once the water is stored via direct delivery or In-lieu the groundwater agency has the ability to purchase this water at a future date or over a 5-year period.

6.3.8 Overdraft Conditions

Annual groundwater basin overdraft, as defined in OCWD's Act, is the quantity by which production of groundwater supplies exceeds natural replenishment of groundwater supplies during a water year. This difference between extraction and replenishment can be estimated by determining the change in volume of groundwater in storage that would have occurred had supplemental water not been used for any groundwater recharge purpose, including seawater intrusion protection, advanced water reclamation, and the in-Lieu Program.

The annual analysis of basin storage change and accumulated overdraft for water year 2019-20 has been completed. Based on the three-layer methodology, an accumulated overdraft of 200,000 AF was calculated for the water year ending June 30, 2020. The accumulated overdraft for the water year ending June 30, 2019 was 236,000 AF, which was also calculated using the three-layer storage method. Therefore, an annual increase of 36,000 AF in stored groundwater was calculated as the difference between the June 2019 and June 2020 accumulated overdrafts (OCWD, 2021).

6.3.9 Planned Future Sources

The City plans to build two new future wells, build three new wells at existing sites, and rehabilitate two wells to ensure reliable local groundwater and continued drinking water safety. These well projects are further described in Section 6.9.

On a regional scale, OCWD regularly evaluates potential projects and conducts studies to improve the existing facilities and build new facilities to include in their Long-Term Facilities Plans (LTFP). OCWD's 2014 LTFP evaluated 65 potential projects for water supply, basin management, recharge facilities, operational improvements, and operational efficiency. Some of OCWD's planned water projects that would increase supply are listed below. For a more detailed list of projects, refer to the 2014 LTFP (OCWD).

- **GWRSFE –** The Final Expansion of the GWRS is currently underway and is the third and final phase of the project. When the Final Expansion is completed in early 2023, the plant's treatment capacity will increase from 100 to 130 MGD. To produce 130 MGD, additional treated wastewater from Orange County Sanitation District (OC San)'s Treatment Plant 2 is required. This recycled water represents a high quality, drought-proof source of water to protect and enhance the OC Basin. The Final Expansion project will include expanding the existing GWRS treatment facilities, constructing new conveyance facilities at OC San Plant 2, and rehabilitating an existing pipeline between OC San Plant 2 and the GWRS. Once completed, the GWRS plant will recycle 100% of OC San's reclaimable sources and produce enough water to meet the needs of over one million people.
- **Forecast Informed Reservoir Operations (FIRO) at Prado Dam** – Stormwater represents a significant source of water used by OCWD to recharge the OC Basin. Much of this recharge is made possible by the capture of Santa Ana River stormflows behind Prado Dam in the Conservation Pool. FIRO represents the next generation of operating water reservoirs using the best available technology. Advances in weather and stormwater runoff forecasting hold promise to allow USACE to safety impound more stormwater while maintaining equivalent flood risk management capability behind Prado Dam. Preliminary modeling show that by expanding the Conservation Pool from elevation 505 to 512 ft msl, annual recharge to the groundwater basin could increase by as much as 4,500 to 7,000 AFY.

6.4 Surface Water

6.4.1 Existing Sources

There are, currently, no direct surface water uses in the City's service area.

6.4.2 Planned Future Sources

As of 2021, there are no planned direct uses of surface water in the City's service area.

6.5 Stormwater

6.5.1 Existing Sources

There are, currently, no direct stormwater uses in the City's Service area.

6.5.2 Planned Future Sources

As of 2021, there are no planned stormwater uses in the City's service area.

6.6 Wastewater and Recycled Water

The City is directly involved in wastewater services through its ownership and operation of the wastewater collection system in its service area. However, the City does not own or operate wastewater treatment facilities. The sewer system service area encompasses about 27.2 square miles and includes approximately 390 miles of sewer main. The wastewater system serves about 335,605 residents (Santa Ana's Sewer Master Plan, 2016). For additional details on the City's wastewater services, refer to the 2016 Santa Ana Sewer Master Plan.

Recycled water is wastewater that is treated through primary, secondary, and tertiary processes and is acceptable for most non-potable water purposes such as irrigation, and commercial and industrial process water per Title 22 requirements. Recycled water opportunities have continued to grow in Southern California as public acceptance and the need to expand local water resources continues to be a priority. Recycled water also provides a degree of flexibility and added reliability during drought conditions when imported water supplies are restricted. The City is indirectly involved in recycled water production, through its supply of wastewater for IPR. The following sections expand on the existing agency collaboration involved in these efforts as well as the City's projected recycled water use over the next 25 years.

6.6.1 Agency Coordination

The City does not own or operate wastewater treatment facilities and sends all collected wastewater to Orange County Sanitation District (OC San) for treatment and disposal. OC San provides treated water to OCWD, the manager of the Orange County Groundwater Basin. OCWD strives to maintain and increase the reliability of the Orange County Groundwater Basin through replenishment with imported water, stormwater, and advanced treated wastewater. A full description of the Orange County Groundwater Basin is available in Section 6.3.2. OCWD and OC San have jointly constructed and expanded two water recycling projects to meet this goal including: 1) OCWD GAP, and 2) OCWD GWRS.

6.6.1.1 OCWD Green Acres Project

OCWD owns and operates the GAP, a water recycling system that provides up to 8,400 AFY of recycled water for irrigation and industrial uses. GAP provides an alternate source of water that is mainly delivered to parks, golf courses, greenbelts, cemeteries, and nurseries in the cities of Costa Mesa, Fountain Valley, Newport Beach, and Santa Ana. OCWD produces and distributes GAP water for purchase by the City, which sells and distributes the water to recycled water customers. Approximately 100 sites use

GAP water, current recycled water users include Mile Square Park and Golf Courses in Fountain Valley, Costa Mesa Country Club, Chroma Systems carpet dyeing, Kaiser Permanente, and Caltrans. The City maintains an agreement with OCWD to supply GAP water to customers where available.

6.6.1.2 OCWD Groundwater Replenishment System

OCWD's GWRS allows Southern California to decrease its dependency on imported water and creates a local and reliable source of water. OCWD's GWRS purifies secondary treated wastewater from OC San to levels that meet and exceed all state and federal drinking water standards. The GWRS Phase 1 plant has been operational since January 2008 and uses a three-step advanced treatment process consisting of microfiltration (MF), reverse osmosis (RO), and ultraviolet (UV) light with hydrogen peroxide. A portion of the treated water is injected into the seawater barrier to prevent seawater intrusion into the groundwater basin. The other portion of the water is pumped to ponds where the water percolates into deep aquifers and becomes part of Orange County's water supply. The treatment process described on OCWD's website is provided below (OCWD, GWRS, 2020).

The GWRS first began operating in 2008 producing 70 million gallons of water per day (MGD) and in 2015, it underwent a 30 MGD expansion. Approximately 39,200 AFY of the highly purified water is pumped into the injection wells and 72,900 AFY is pumped to the percolation ponds in the City of Anaheim where the water is naturally filtered through sand and gravel to deep aquifers of the groundwater basin. The Orange County Groundwater Basin provides approximately 72% of the potable water supply for north and central Orange County. The design and construction of the first phase (78,500 AFY) of the GWRS project was jointly funded by OCWD and OC San; Phase 2 expansion (33,600 AFY) was funded solely by OCWD.

The Final Expansion of the GWRS is currently underway and is the third and final phase of the project. When the Final Expansion is completed in 2023, the plant will produce 130 MGD. To produce 130 MGD, additional treated wastewater from OC San is required. This additional water will come from OC San's Treatment Plant 2, which is in the City of Huntington Beach approximately 3.5 miles south of the GWRS. The Final Expansion project will include expanding the existing GWRS treatment facilities, constructing new conveyance facilities at OC San Plant 2 and rehabilitating an existing pipeline between OC San Plant 2 and the GWRS. Once completed, the GWRS plant will recycle 100% of OC San's reclaimable sources and produce enough water to meet the needs of over one million people.

6.6.2 Wastewater Description and Disposal

The City operates and maintains the local sewer system consisting of over 390 miles of pipeline, 7,630 manholes, and two lift stations that connect to OC San's trunk system to convey wastewater to OC San's treatment plants. OC San has an extensive system of gravity flow sewers, pump stations, and pressurized sewers. Collected wastewater is sent to OC San's plants located in the Cities of Huntington Beach and Fountain Valley. OC San's Plant No. 1 in Fountain Valley has a capacity of 320 million gallons per day (MGD) and Plant No. 2 in Huntington Beach has a capacity of 312 MGD. Both plants share a common ocean outfall, but Plant No. 1 currently provides all its secondary treated wastewater to OCWD's GWRS for beneficial reuse. The 120-inch diameter ocean outfall extends 4 miles off the coast of Huntington Beach. A 78-inch diameter emergency outfall also extends 1.3 miles off the coast. Table 6-6 summarizes the wastewater collected by the City and transported to OC San's system in 2020.

Table 6-6: Retail: Wastewater Collected Within Service Area in 2020

DWR Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected from UWMP Service Area 2020	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party? *(optional)*
Add additional rows as needed						
City of Santa Ana	Estimated	21,768	OC San	Plant No. 1 / Plant No. 2	No	No
Total Wastewater Collected from Service Area in 2020:		21,768				
NOTES: Assumed a return rate of 65% (City of Santa Ana, 2015)						

6.6.3 Current Recycled Water Uses

The City provides OCWD GAP recycled water to the southern part of the City. In FY 2019-20, approximately 249 AF of GAP water was used in the City's service area. The current users/uses of recycled water are as follows:

- Centennial Park and Soccer Fields
- Bomo Koral Park
- Flower Street Bike Trail
- McFadden Intermediate School
- Adams Park
- Chroma Systems- Carpet Dyeing
- Chroma Systems- Landscape
- Kaiser Medical Office Landscape
- Chick-fil-A Landscape
- Santa Ana River Trail Landscape
- Godinez High School Landscape
- MacArthur Boulevard Median Landscape
- Bear Street Median Landscape
- Thornton Park
- Harbor Boulevard Median Landscape
- Santa Ana Valley High School Sports Complex Landscape
  Griset Park
  South Coast Park Plaza

For indirect use, the City also benefits from OCWD's GWRS system that provides IPR through replenishment of Orange County Groundwater Basin with water that meets state and federal drinking water standards.

6.6.4 Projected Recycled Water Uses

The City will continue to receive recycled water from GAP and supply it to the various landscape irrigation sites mentioned in Section 9. The City will continue to supply wastewater to support the region's IPR via GWRS. Current and projected recycled water use through 2045 are shown in Table 6-7 and are expected to remain constant. Although the 2015 UWMP acknowledged IPR of wastewater, it did not quantify projections. These projections will be prepared moving forward. The projected 2020 recycled water use from the City's 2015 UWMP are compared to the 2020 actual use in Table 6-8, where the actual use is slightly less than the projected.

Table 6-7: Retail: Recycled Water Direct Beneficial Uses Within Service Area

DWR Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area										
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.									
Name of Supplier Producing (Treating) the Recycled Water:										
Name of Supplier Operating the Recycled Water Distribution System:										
Supplemental Water Added in 2020 (volume) *Include units*										
Source of 2020 Supplemental Water										
Beneficial Use Type	Potential Beneficial Uses of Recycled Water (Describe)	Amount of Potential Uses of Recycled Water (Quantity)	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040	2045 (opt)
Landscape irrigation (excludes golf courses)		249 AF	Parks, street medians, institutional and commercial landscapes	Tertiary	249	249	249	249	249	249
				Total:	249	249	249	249	249	249
**IPR - Indirect Potable Reuse*										
NOTES: Table does not include groundwater recharge (IPR) numbers as they are not separate from OCWD's supply										

Table 6-8: Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual

DWR Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☐	Recycled water was not used in 2015 nor projected for use in 2020. The Supplier will not complete the table below.	
Use Type	**2015 Projection for 2020**	**2020 Actual Use**
Landscape irrigation (excludes golf courses)	320	249
Groundwater recharge (IPR)	N/A	8,528
Total	320	8,777
NOTES: Groundwater recharge (IPR) estimated based on OCWD Groundwater Basin Production x Percent of Total Basin Production for 2020 (33.3%)		

6.6.5 Potential Recycled Water Uses

Potential recycled water users are locations where recycled water could replace potable water use. Since OCWD is limited in GAP plant capacity, additional users do not exist at the time and the City does not expect additional GAP use in the future. However, the City will continue to convey its wastewater to OC San's regional treatment facilities where the wastewater is treated and recycled for IPR.

6.6.6 Optimization Plan

Studies of water recycling opportunities within Southern California provide a context for promoting the development of water recycling plans. It is recognized that broad public acceptance of recycled water requires continued education and public involvement. Currently, most of the recycled water available is being directed toward replenishment of the groundwater basin and improvements in groundwater quality. As a user of groundwater, the City supports the efforts of OCWD and OC San to use recycled water as a primary resource for groundwater recharge in Orange County.

Financial Incentives

The implementation of recycled water projects involves a substantial upfront capital investment for planning studies, Environmental Impact Reports (EIR), engineering design and construction before there is any recycled water to market. In some cases, these capital costs exceed the short-term expense of purchasing additional imported water supplies from MET.

The establishment of new supplemental funding sources through federal, state, and regional programs now provides significant financial incentives for water agencies to develop and make use of recycled water locally. Potential sources of funding include federal, state, and local funding opportunities.
These funding sources include the U.S. Department of Interior Bureau of Reclamation (USBR), California

Proposition 13 Water Bond, Proposition 84 and MET LRP. These funding opportunities may be sought by the City or possibly more appropriately by regional agencies. The City will continue to support seeking funding for regional water recycling projects and programs.

Optimizing Recycled Water Use

In Orange County, recycled water is used for irrigating golf courses, parks, schools, businesses, and communal landscaping, as well as for groundwater recharge. Recycled water users in the City receive their water from OCWD's GAP. Analyses have indicated that present worth costs to expand recycled water within other areas of the City are not cost effective as compared to purchasing imported water from MET or using groundwater. The City will continue to conduct feasibility studies for recycled water and seek out creative solutions such as funding, regulatory requirements, institutional arrangement, and public acceptance for recycled water use with OCWD, MET, and other cooperative agencies.

6.7 Desalination Opportunities

In 2001, MET developed a Seawater Desalination Program (SDP) to provide incentives for developing new seawater desalination projects in MET's service area. In 2014, MET modified the provisions of their LRP to include incentives for locally produced seawater desalination projects that reduce the need for imported supplies. To qualify for the incentive, proposed projects must replace an existing demand or prevent new demand on MET's imported water supplies. In return, MET offers three incentive formulas under the program:

- Sliding scale incentive up to $340 per AF for a 25-year agreement term, depending on the unit cost of seawater produced compared to the cost of MET supplies.
- Sliding scale incentive up to $475 per AF for a 15-year agreement term, depending on the unit cost of seawater produced compared to the cost of MET supplies.
- Fixed incentive up to $305 per AF for a 25-year agreement term.

Developing local supplies within MET's service area is part of their IRP goal of improving water supply reliability in the region. Creating new local supplies reduce pressure on imported supplies from the SWP and Colorado River.

On May 6th, 2015, the SWRCB approved an amendment to the state's Water Quality Control Plan for the Ocean Waters of California (California Ocean Plan) to address effects associated with the construction and operation of seawater desalination facilities (Desalination Amendment). The amendment supports the use of ocean water as a reliable supplement to traditional water supplies while protecting marine life and water quality. The California Ocean Plan now formally acknowledges seawater desalination as a beneficial use of the Pacific Ocean and the Desalination Amendment provides a uniform, consistent process for permitting seawater desalination facilities statewide.

If the following projects are developed, MET's imported water deliveries to Orange County could be reduced. These projects include the Huntington Beach Seawater Desalination Project and the Doheny Desalination Project.

As for City-led initiatives, the City has not investigated seawater desalination as a result of economic and physical impediments.

Brackish groundwater is groundwater with a salinity higher than freshwater, but lower than seawater. Brackish groundwater typically requires treatment using desalters.

6.7.1 Ocean Water Desalination

Huntington Beach Seawater Desalination Project – Poseidon Resources LLC (Poseidon), a private company, is developing the Huntington Beach Seawater Desalination Project to be co-located at the AES Power Plant in the City of Huntington Beach along Pacific Coast Highway and Newland Street. The proposed project would produce up to 50 MGD (56,000 AFY) of drinking water to provide approximately 10% of Orange County's water supply needs.

Over the past several years, Poseidon has been working with OCWD on the general terms and conditions for selling the water to OCWD. OCWD and MWDOC have proposed a few distribution options to agencies in Orange County. The northern option proposes the water be distributed to the northern agencies closer to the plant within OCWD's service area with the possibility of recharging/injecting a portion of the product water into the OC Basin. The southern option builds on the northern option by delivering a portion of the product water through the existing OC-44 pipeline for conveyance to the south Orange County water agencies. A third option is also being explored, which includes all of the product water to be recharged into the OC Basin. Currently, a combination of these options could be pursued.

The Huntington Beach Seawater Desalination project plant capacity of 56,000 AFY would be the single largest source of new, local drinking water available to the region. In addition to offsetting imported demand, water from this project could provide OCWD with management flexibility in the OC Basin by augmenting supplies into the Talbert Seawater Barrier to prevent seawater intrusion.

In May 2015, OCWD and Poseidon entered into a non-binding Term Sheet that provided the overall partner structure in order to advance the project. Based on the initial Term Sheet, which was updated in 2018, Poseidon would be responsible for permitting, financing, design, construction, and operations of the treatment plant while OCWD would purchase the production volume, assuming the product water quality and quantity meet specific contract parameters and criteria. Furthermore, OCWD would then distribute the water in Orange County using one of the proposed distribution options described above.

Currently, the project is in the regulatory permit approval process with the Regional Water Quality Control Board and the California Coastal Commission. Once all of the required permits are approved, Poseidon will then work with OCWD and interested member agencies in developing a plan to distribute the water. Subsequent to the regulatory permit approval process, and agreement with interested parties, Poseidon estimates that the project could be online as early as 2027.

Under guidance provided by DWR, the Huntington Beach Seawater Desalination Plant's projected water supplies are not included in the supply projections due to its current status within the criteria established by State guidelines (DWR, 2020c).

Doheny Desalination Project – South Coast Water District (SCWD) is proposing to develop an ocean water desalination facility in Dana Point. SCWD intends to construct a facility with an initial capacity of up to 5 million gallons per day (MGD). The initial up to 5 MGD capacity would be available for SCWD and potential partnering water agencies to provide a high quality, locally-controlled, drought-proof water supply. The desalination facility would also provide emergency backup water supplies, should an earthquake, system shutdown, or other event disrupt the delivery of imported water to the area. The

Project would consist of a subsurface slant well intake system (constructed within Doheny Beach State Park), raw (sea) water conveyance to the desalination facility site (located on SCWD owned property), a seawater reverse osmosis (SWRO) desalination facility, brine disposal through an existing wastewater ocean outfall, solids handling facilities, storage, and potable water conveyance interties to adjacent local and regional distribution infrastructure.

The Doheny Ocean Desalination Project has been determined as the best water supply option to meet reliability needs of SCWD and south Orange County. SCWD is pursuing the Project to ensure it meets the water use needs of its customers and the region by providing a drought-proof potable water supply, which diversifies SCWD's supply portfolio and protects against long-term imported water emergency outages and supply shortfalls that could have significant impact to our coastal communities, public health, and local economy. Phase I of the Project (aka, the "Local" Project) will provide SCWD and the region with up to 5 MGD of critical potable water supply that, together with recycled water, groundwater, and conservation, will provide the majority of SCWD's water supply through local reliable sources. An up to 15 MGD capacity project has been identified as a potential future "regional" project that could be phased incrementally, depending on regional needs.

On June 27, 2019, SCWD certified the final EIR and approved the Project. The Final EIR included considerable additional information provided at the request of the Coastal Commission and the Regional Board, including an updated coastal hazard analysis, updated brine discharge modeling, and updated groundwater modeling, updated hydrology analysis. The approval of the Project also included a commitment to 100 percent carbon neutrality through a 100 percent offset of emissions through the expansion of Project mitigation and use of renewable energy sources. SCWD is currently in the permitting process and finalizing additional due diligence studies. If implemented, SCWD anticipates an online date of 2025.

Under guidance provided by DWR, the Doheny Seawater Desalination Project's projected water supplies are not included in the supply projections due to its current status within the criteria established by State guidelines (DWR, 2020c).

6.7.2 Groundwater Desalination

There are currently no brackish groundwater opportunities within the City's service area.

6.8 Water Exchanges and Transfers

Interconnections with other agencies result in the ability to share water supplies during short term emergency situations or planned shutdowns of major imported water systems. However, beyond short term outages, transfers can also be involved with longer term water exchanges to deal with droughts or water allocation situations. The following subsections describe the City's existing and planned exchanges and transfers.

6.8.1 Existing Exchanges and Transfers

Interconnections with other agencies result in the ability to share water supplies during short term emergency situations or planned shutdowns of major imported systems. The City maintains seven connections to MET's system and nine emergency connections with surrounding agencies, including the

Cities of Costa Mesa, Fountain Valley, Garden Grove, Orange, Tustin, and Southern California Water Company. These connections can provide a total supply of 60,580 gpm into the City's distribution system. The MET connections are typically operating as constant flow sources.

6.8.2 Planned and Potential Exchanges and Transfers

The City does not currently have plans to introduce new exchanges and transfers. However, MET continues to help its retail agencies develop transfer and exchange opportunities that promote reliability within their systems. Therefore, MET will look to help its retail agencies navigate the operational and administrative issues of transfers within the MET distribution system.

In an indirect regional scale, the Santa Ana River Conservation and Conjunctive Use Project (SARCCUP) is a joint project established by five regional water agencies within the Santa Ana River Watershed (Eastern Municipal Water District, Inland Empire Utilities Agency, Western Municipal Water District, OCWD, and San Bernardino Valley Municipal Water District).

In 2016, SARCCUP was successful in receiving $55 million in grant funds from Proposition 84 through DWR. The overall SARCCUP program awarded by Proposition 84, consists of three main program elements:

- Watershed-Scale Cooperative Water Banking Program
- Water Use Efficiency: Landscape Design and Irrigation Improvements and Water Budget Assistance for Agencies
- Habitat Creation and *Arundo Donax* Removal from the Santa Ana River

The Watershed-Scale Cooperative Water Banking Program is the largest component of SARCCUP and since 2016, Valley, MET, and the four SARCCUP-MWD Member Agencies, with MWDOC representing OCWD, have been discussing terms and conditions for the ability to purchase surplus water from Valley to be stored in the Santa Ana River watershed. With the Valley and MET surplus water purchase agreement due for renewal, it was the desire of Valley to establish a new agreement with MET that allows a portion of its surplus water to be stored within the Santa Ana River watershed.

An agreement between MET and four SARCCUP-MWD Member Agencies was approved earlier this year that gives the SARCCUP agencies the ability to purchase a portion (up to 50%) of the surplus water that San Bernardino Valley Municipal Water District (Valley), a SWP Contractor, sells to MET. Such water will be stored in local groundwater basins throughout the Santa Ana River watershed and extract during dry years to reduce the impacts from multiyear droughts. In Orange County, 36,000 AF can be stored in the OC Basin for use during dry years. More importantly, this stored SARCCUP water can be categorized as “extraordinary supplies”, if used during a MET allocation, and can enhance a participating agencies’ reliability during a drought. Moreover, if excess water is available MWDOC can purchase additional water for its service area.

Further details remain to be developed between OCWD, retail agencies, and MWDOC in how the water will be distributed in Orange County and who participates.

6.9 Summary of Future Water Projects

The City continually reviews practices that will provide its customers with adequate and reliable supplies. Trained staff continue to ensure the water quality is safe and the water supply will meet present and future needs in an environmentally and economically responsible manner.

Although the City has various projects planned to maintain and improve the water system (Section 6.9.1), there are currently no City-specific planned projects that have both a concrete timeline and a quantifiable increase in supply.

6.9.1 City Initiatives

The City anticipates water demand in the City to remain relatively constant over the next 25 years. Any new water sources developed will primarily be to better manage the groundwater basin and replace or upgrade inefficient wells, rather than support population growth and new development. The projects that have been identified by the City to improve the City's water supply reliability and enhance the operations of the City include major well rehabilitation and refurbishment, well casing rehabilitation, minor motor control center refurbishment, pump station rehabilitation, water main replacements, MET connection upgrades, emergency power projects, and miscellaneous improvements such as SCADA improvements. A Capital Improvement Program identified water projects to implement between FY 2017-18 through FY 2039-40. Those related to increasing the water supply are listed below – for a more detailed list of projects, refer to the City's 2017 Water Master Plan (TetraTech, 2017).

New Well Construction – The City has identified projects to build New Wells No. 1 and 2, as well as drill new wells for Wells No. 16, 22, and 24. These new wells will provide the City with further redundancy and allow the City to continue achieving pumping capacity for higher BPP rates.

Major Well Rehabilitation – The City has identified projects for major well rehabilitation for Wells 29 and 32.

6.9.2 Regional Initiatives

Beyond City-specific projects, the City consistently coordinates its long-term water shortage planning with MET and OCWD. MWDOC has identified the following future regional projects, some of which can indirectly benefit the City to further increase local supplies and offset imported supplies (CDM Smith, 2019):

Poseidon Huntington Beach Ocean Desalination Project – Poseidon proposes to construct and operate the Huntington Beach Ocean Desalination Plant on a 12-acre parcel adjacent to the AES Huntington Beach Generating Station. The facility would have a capacity of 50 MGD and 56,000 AFY, with its main components consisting of a water intake system, a desalination facility, a concentrate disposal system, and a product water storage tank. This project would provide both system and supply reliability benefits to the SOC, the OC Basin, and Huntington Beach. The capital cost in the initial year for the plant is $1.22 billion.

Doheny Ocean Desalination Project – SCWD is proposing to construct an ocean water desalination facility in Dana Point at Doheny State Beach. The facility would have an initial up to 5 MGD capacity, with the potential for future expansions up to 15 MGD. The project's main components are a subsurface water intake system, a raw ocean water conveyance pipeline, a desalination facility, a seawater reverse osmosis (SWRO) desalination facility, a brine disposal system, and a product water storage tank.

San Juan Watershed Project – Santa Margarita Water District (SMWD) and other project partners have proposed a multi-phased project within the San Juan Creek Watershed to capture local stormwater and develop, convey, and recharge recycled water into the San Juan Groundwater Basin and treat the water upon pumping it out of the basin. The first phase includes the installation of three rubber dams within San Juan Creek to promote in-stream recharge of the basin, with an anticipated production of 700 AFY on average. The second phase would develop additional surface water and groundwater management practices by using stormwater and introducing recycled water for infiltration into the basin and has an anticipated production of 2,660 to 4,920 AFY. The third phase will introduce recycled water directly into San Juan Creek through live stream recharge, with an anticipated production of up to 2,660 AFY (SMWD, 2021).

Cadiz Water Bank – SMWD and Cadiz, Inc. are developing this project to create a new water supply by conserving groundwater that is currently being lost to evaporation and recovering the conserved water by pumping it out of the Fenner Valley Groundwater Basin to convey to MET's CRA. The project consists of a groundwater pumping component that includes an average of 50 TAFY of groundwater that can be pumped from the basin over a 50-year period, and a water storage component that allows participants to send surplus water supplies to be recharged in spreading basins and held in storage.

South Orange County Emergency Interconnection Expansion – MWDOC has been working with the South Orange County (SOC) agencies on improvements for system reliability primarily due to the risk of earthquakes causing outages of the MET imported water system as well as extended grid outages. Existing regional interconnection agreements between IRWD and SOC agencies provides for the delivery of water through the IRWWD system to participating SOC agencies in times of emergency. MWDOC and IRWD are currently studying an expansion of the program, including the potential East Orange County Feeder No. 2 pipeline and an expanded and scalable emergency groundwater program, with a capital cost of $867,451.

SARCCUP – SARCCUP is a joint project established between MET, MWDOC, Eastern MWD, Western MWD, Inland Empire Utilities Agency, and OCWD that can provide significant benefits in the form of additional supplies during dry years for Orange County. Surplus SWP water from San Bernardino Valley Water District (SBVMWD) can be purchased and stored for use during dry years. This water can even be considered an extraordinary supply under MET allocation Plan, if qualified under MET's extraordinary supply guidelines. OCWD has the ability to store 36,000 AF of SARCCUP water and if excess water is available MWDOC has the ability to purchase additional water. Further details remain to be developed between OCWD, retail agencies, and MWDOC in how the water will be distributed in Orange County and who participates.

Moulton Niquel Water District (MNWD) / OCWD Pilot Storage Program - OCWD entered into an agreement with MNWD to develop a pilot program to explore the opportunity to store water in the OC Basin. The purpose of such a storage account would provide MNWD water during emergencies and/or provide additional water during dry periods. As part of the agreement, OCWD hired consultants to evaluate where and how to extract groundwater from the OC Basin with several options to pump the water to MNWD via the East Orange County Feeder No. 2; as well as a review of existing banking/exchange programs in California to determine what compensation methodologies could OCWD assess for a storage/banking program.

6.10 Energy Intensity

A new requirement for this 2020 UWMP is an energy intensity analysis of the Supplier's water, wastewater, and recycled water systems, where applicable for a 12-month period. The City owns and operates a water distribution system and a wastewater collection system. This section reports the energy intensity for each system using data from CY2019.

Water and energy resources are inextricably connected. Known as the "water-energy nexus", the California Energy Commission estimates the transport and treatment of water, treatment and disposal of wastewater, and the energy used to heat and consume water account for nearly 20% of the total electricity and 30% of non-power plant related natural gas consumed in California. In 2015, California issued new rules requiring 50% of its power to come from renewables, along with a reduction in greenhouse gas (GHG) emissions to 40% below 1990 levels by 2030. Consistent with energy and water conservation, renewable energy production, and GHG mitigation initiatives, the City reports the energy intensity of its water and wastewater operations.

The methodology for calculating water energy intensity outlined in Appendix O of the UWMP Guidebook was adapted from the California Institute for Energy Efficiency exploratory research study titled "Methodology for Analysis of the Energy Intensity of California's Water Systems" (Wilkinson 2000). The study defines water energy intensity as the total amount of energy, calculated on a whole-system basis, required for the use of a given amount of water in a specific location.

UWMP reporting is limited to available energy intensity information associated with water processes occurring within an urban water supplier's direct operational control. Operational control is defined as authority over normal business operations at the operational level. Any energy embedded in water supplies imparted by an upstream water supplier (e.g., water wholesaler) or consequently by a downstream water purveyor (e.g., retail water provider) is not included in the UWMP energy intensity tables. The City's calculations conform to methodologies outlined in the UWMP Guidebook and Wilkinson study.

6.10.1 Water Supply Energy Intensity

In CY 2019, the City consumed 496.9 kWh per AF for water extraction and distribution services (Table 6-9). The basis for calculations is provided in more detail in the following subsections.

Table 6-9: Recommended Energy Intensity – Multiple Water Delivery Products

Urban Water Supplier: *City of Santa Ana*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

dropdown menu

Table O-1A: Recommended Energy Reporting - Water Supply Process Approach

Enter Start Date for Reporting Period: 1/1/2019

End Date: 12/31/2019

Is upstream embedded in the values reported? ☐

		Urban Water Supplier Operational Control						Non-Consequential Hydropower (if applicable)	
		Water Management Process							
	Water Volume Units Used	Extract and Divert	Place into Storage	Convey-ance	Treat-ment	Distrib-ution	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process		*25504.78*	*0*	*0*	*0*	*31784.5*	*31784.5*	*0*	*31784.5*
Energy Consumed (kWh)	*N/A*	*7142733*	*0*	*0*	*0*	*8650011*	*15792744*		*15792744*
Energy Intensity (kWh/vol.)	*N/A*	*280.1*	*0.0*	*0.0*	*0.0*	*272.1*	*496.9*	*0.0*	*496.9*

Quantity of Self-Generated Renewable Energy

0	kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Combination of Estimates and Metered Data	

Data Quality Narrative:

Volume of Water Entering Process: Extraction data based on MWDOC Compiled Water Audits "Volume From Own Sources" and Distribution data based on MWDOC Compiled Water Audits "Authorized Consumption." Non-Revenue Water is not considered in this calculation – the energy efficiency is based on water delivered to customers.
Energy consumption from Southern California Edison electric bills.

Narrative:

The City of Santa Ana relies on imported water and local groundwater to meet their customers' water needs. Operational control is limited to groundwater wells and potable water booster stations. This table does not include upstream embedded energy consumed prior to Santa Ana taking control.

6.10.1.1 Operational Control and Reporting Period

As described throughout the report, the City is a retail agency that relies on groundwater and imported water.

Water supply energy intensity was calculated for the CY 2019. This is a standard for energy and GHG reporting to the Climate Registry, California Air Resources Board and the United States Environmental Protection Agency. Calendar year reporting provides consistency when assessing direct and indirect energy consumption within a larger geographical context, as fiscal year starting dates can vary between utilities and organizations.

6.10.1.2 Volume of Water Entering Processes

According to the City water audits, the City extracted 25,504 AF of groundwater from the OC Basin and distributed 31,785 AF of both groundwater and imported water. Water volume is based on metered data.

6.10.1.3 Energy Consumption and Generation

According to Southern California Edison Electricity Bills, groundwater wells consumed 7,142,733 kilowatt hours (kWh) of electricity and booster pumps and MET Connections along the distribution system consumed 8,650,011 kWh of electricity. Currently, the City does not generate renewable energy. In the process of writing this report, the City discovered that the consumption amounts on SCE meters did not match the consumption amounts listed in SCE bills. The City is in the process of establishing why the meters and bills do not match but for this report, the Energy Consumption listed in the tables reflects the consumption noted in SCE bills that the City receives.

6.10.2 Wastewater and Recycled Water Energy Intensity

In CY 2019, the City consumed 2.8 KWh per AF for wastewater services (Table 6-10). The basis for calculations is provided in more detail in the following subsections.

Table 6-10: Recommended Energy Intensity – Wastewater & Recycled Water

Urban Water Supplier: *City of Santa Ana*

Table O-2: Recommended Energy Reporting - Wastewater & Recycled Water						
Enter Start Date for Reporting Period	1/1/2019	Urban Water Supplier Operational Control				
End Date	12/31/2019					
		Water Management Process				
Is upstream embedded in the values reported?	☐	Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Water Units Used					
Volume of Wastewater Entering Process (volume units selected above)		*21768*	*0*	*0*	*0*
Wastewater Energy Consumed (kWh)		*60245*	*0*	*0*	*60245*
Wastewater Energy Intensity (kWh/volume)		*2.8*	*0.0*	*0.0*	*0.0*
Volume of Recycled Water Entering Process (volume units selected above)		*0*	*0*	*0*	*0*
Recycled Water Energy Consumed (kWh)		*0*	*0*	*0*	*0*
Recycled Water Energy Intensity (kWh/volume)		*0.0*	*0.0*	*0.0*	*0.0*

Quantity of Self-Generated Renewable Energy related to recycled water and wastewater operations

______ kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Combination of Estimates and Metered Data

Data Quality Narrative:

Wastewater volume is an estimate based on water consumption in the service area. Energy is based on billed consumption.

Narrative:

Santa Ana operates the local wastewater collection system but does not operate treatment facilities. Operational control is limited to a wastewater lift station in the local collection system. This table does not include downstream energy consumed to treat the wastewater, after Santa Ana's control.

6.10.2.1 Operational Control and Reporting Period

The City's existing sewer system is made up of a network of gravity sewers. As explained in Section 6.6, the City owns and operates two wastewater lift stations but no treatment facilities. Similar to the water supply energy intensity, wastewater energy intensity was calculated for the 2019 calendar year. This is a standard for energy and GHG reporting.

6.10.2.2 Volume of Wastewater Entering Processes

In CY 2019, the City collected and conveyed 21,768 AF of wastewater to OC San. The City provides water for indirect potable reuse but the City does not have operational control over any part of the recycled water system.

6.10.2.3 Energy Consumption and Generation

According to estimates referencing Southern California Edison Electricity Bills, the City's two wastewater lift stations consumed 60,245 kWh of electricity. There are no other wastewater facilities that are owned and operated by the City. Currently, the City does not generate renewable energy. Energy consumption data was estimated, based on pump hours.

6.10.3 Key Findings and Next Steps

Calculating and disclosing direct operationally-controlled energy intensities is another step towards understanding the water-energy nexus. However, much work is still needed to better understand upstream and downstream (indirect) water-energy impacts. When assessing water supply energy intensities or comparing intensities between providers, it is important to consider reporting boundaries as they do not convey the upstream embedded energy or impacts energy intensity has on downstream users. Engaging one's upstream and downstream supply chain can guide more informed decisions that holistically benefit the environment and are mutually beneficial to engaged parties. Suggestions for further study include:

- Supply-chain engagement – The City relies on a variety of water sources for their customers. While some studies have used life cycle assessment tools to estimate energy intensities, there is a need to confirm this data. The 2020 UWMP requirement for all agencies to calculate energy intensity will help the City and neighboring agencies make more informed decisions that would benefit the region as a whole regarding the energy and water nexus. A similar analysis could be performed with upstream supply chain energy, for example, with State Project Water.
- Internal benchmarking and goal setting – With a focus on energy conservation and a projected increase in water demand despite energy conservation efforts, the City's energy intensities will likely decrease with time. Conceivably, in a case where water demand decreases, energy intensities may rise as the energy required to pump or treat is not always proportional to water delivered. In the course of exploring the water-energy nexus and pursuing renewable energy goals, there is a need to assess whether energy intensity is a meaningful indicator or if it makes

sense to use a different indicator to reflect the City's commitment to energy and water conservation.

- Regional sustainability – Water and energy efficiency are two components of a sustainable future. Efforts to conserve water and energy, however, may impact the social, environmental, and economic livelihood of the region. In addition to the relationship between water and energy, over time, it may also be important to consider and assess the connection these resources have on other aspects of a sustainable future.

7 WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

Building upon the water supply identified and projected in Section 6, this key section of the UWMP examines the City's water supplies, water uses, and the resulting water supply reliability. Water service reliability reflects the City's ability to meet the water needs of its customers under varying conditions. For the UWMP, water supply reliability is evaluated in two assessments: 1) the Water Service Reliability Assessment and 2) the DRA. The Water Service reliability assessment compares projected supply to projected demand in 2025 through 2045 for three hydrological conditions: a normal year, a single dry year, and a drought period lasting five consecutive years. The DRA, a new UWMP requirement, assesses near-term water supply reliability. It compares projected water supply and demand assuming the City' experiences a drought period for the next five consecutive years. Factors affecting reliability, such as climate change and regulatory impacts, are accounted for.

7.1 Water Service Reliability Overview

Every urban water supplier is required to assess the reliability of their water service to their customers under normal, single-dry, and multiple dry water years. The City depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to ensure it has adequate supplies. Development of local supplies augments the reliability of the water system. There are various factors that may impact reliability of supplies such as legal, environmental, water quality and climatic which are discussed below. MET's 2020 UWMP concludes that they can meet full-service demands of their member agencies starting 2025 through 2045 during normal years, single-dry year, and multiple-dry years. Consequently, the City is projected to meet full-service demands through 2045 for the same scenarios, due to diversified supply and conservation measures.

MET's 2020 IRP update describes the core water resources that will be used to meet full-service demands at the retail level under all foreseeable hydrologic conditions from 2025 through 2045. The foundation of MET's resource strategy for achieving regional water supply reliability has been to develop and implement water resources programs and activities through its IRP preferred resource mix. This preferred resource mix includes conservation, local resources such as water recycling and groundwater recovery, Colorado River supplies and transfers, SWP supplies and transfers, in-region surface reservoir storage, in-region groundwater storage, out-of-region banking, treatment, conveyance, and infrastructure improvements.

Table 7-1 shows the basis of water year data used to predict drought supply availability. Per the Demand Forecast TM, the average (normal) hydrologic condition for the Orange County region is represented by FY 2017-18 and FY 2018-19 and the single-dry year hydrologic condition by FY 2013-14. The five consecutive years of FY 2011-12 to FY 2015-16 represent the driest five consecutive year historic sequence for the region. Locally, Orange County rainfall for the five-year period totaled 36 inches, the driest on record.

Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)

DWR Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	Base Year	Available Supplies if Year Type Repeats	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location ___________________________
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year	2018-2019	-	100%
Single-Dry Year	2014	-	106%
Consecutive Dry Years 1st Year	2012	-	106%
Consecutive Dry Years 2nd Year	2013	-	106%
Consecutive Dry Years 3rd Year	2014	-	106%
Consecutive Dry Years 4th Year	2015	-	106%
Consecutive Dry Years 5th Year	2016	-	106%

NOTES:
Assumes an increase of 6% above average year demands in dry and multiple dry years based on the Demand Forecast TM (CDM Smith, 2021). 106% represents the percent of average supply needed to meet demands of a single-dry and multiple-dry years. Since the City is able to meet all of its demand with imported water from MET (on top of local groundwater and recycled water) the percent of average supply value reported is equivalent to the percent of average demand under the corresponding hydrologic condition.

The following sections provide a detailed discussion of the City's water source reliability. Additionally, the following sections compare the City's projected supply and demand under various hydrological conditions, to determine the City's supply reliability for the 25-year planning horizon.

7.2 Factors Affecting Reliability

In order to prepare realistic water supply reliability assessments, various factors affecting reliability were accounted for. These include climate change and environmental requirements, regulatory changes, water quality impacts, and locally applicable criteria.

7.2.1 Climate Change and the Environment

Changing climate patterns are expected to shift precipitation patterns and affect water supply availability. Unpredictable weather patterns will make water supply planning more challenging. Although climate change impacts are associated with exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners (MET, 2021). These areas include:

- A reduction in Sierra Nevada Mountain snowpack.
- Increased intensity and frequency of extreme weather events.
- Prolonged drought periods.
- Water quality issues associated with increase in wildfires.
- Changes in runoff pattern and amount.
- Rising sea levels resulting in:
    - Impacts to coastal groundwater basins due to seawater intrusion.
    - Increased risk of damage from storms, high-tide events, and the erosion of levees.
    - Potential pumping cutbacks to the SWP and CVP.

Other important issues of concern due to global climate change include:

- Effects on local supplies such as groundwater.
- Changes in urban and agricultural demand levels and patterns.
- Increased evapotranspiration from higher temperatures.
- Impacts to human health from water-borne pathogens and water quality degradation.
- Declines in ecosystem health and function.
- Alterations to power generation and pumping regime.
- Increases in ocean algal blooms affected seawater desalination supplies.

The major impact in California is that without additional surface storage, the earlier and heavier runoff (rather than snowpack retaining water in storage in the mountains), will result in more water being lost to the oceans. A heavy emphasis on storage is needed in California.

In addition, the Colorado River Basin supplies have been inconsistent since about the year 2000, with precipitation near normal while runoff has been less than average in two out of every three years. Climate models are predicting a continuation of this pattern whereby hotter and drier weather conditions will result in continuing lower runoff, pushing the system toward a drying trend that is often characterized as long term drought.

Dramatic swings in annual hydrologic conditions have impacted water supplies available from the SWP over the last decade. The declining ecosystem in the Delta has also led to a reduction in water supply deliveries, and operational constraints, which will likely continue until a long-term solution to these problems is identified and implemented (MET, 2021).

Legal, environmental, and water quality issues may have impacts on MET supplies. It is felt, however, that climatic factors would have more of an impact than legal, water quality, and environmental factors. Climatic conditions have been projected based on historical patterns but severe pattern changes are still a possibility in the future (MET, 2021).

7.2.2 Regulatory and Legal

Ongoing regulatory restrictions, such as those imposed by the Biops on the effects of SWP and the federal CVP operations on certain marine life, also contributes to the challenge of determining water delivery reliability. Endangered species protection and conveyance needs in the Delta have resulted in operational constraints that are particularly important because pumping restrictions impact many water resources programs – SWP supplies and additional voluntary transfers, Central Valley storage and transfers, and in-region groundwater and surface water storage. Biops protect special-status species listed as threatened or endangered under the ESAs and imposed substantial constraints on Delta water supply operations through requirements for Delta inflow and outflow and export pumping restrictions.

In addition, the SWRCB has set water quality objectives that must be met by the SWP including minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity level. SWRCB plans to fully implement the new Lower San Joaquin River (LSJR) flow objectives from the Phase 1 Delta Plan amendments through adjudicatory (water rights) and regulatory (water quality) processes by 2022. These LSJR flow objectives are estimated to reduce water available for human consumptive use. New litigation, listings of additional species under the ESAs, or regulatory requirements imposed by the SWRCB could further adversely affect SWP operations in the future by requiring additional export reductions, releases of additional water from storage, or other operational changes impacting water supply operations.

The difficulty and implications of environmental review, documentation, and permitting pose challenges for multi-year transfer agreements, recycled water projects, and seawater desalination plants. The timeline and roadmap for getting a permit for recycled water projects are challenging and inconsistently implemented in different regions of the state. Indirect potable reuse projects face regulatory restraints such as treatment, blend water, retention time, and Basin Plan Objectives, which may limit how much recycled water can feasibly be recharged into the groundwater basins. New regulations and permitting uncertainty are also barriers to seawater desalination supplies, including updated Ocean Plan Regulations, Marine Life Protected Areas, and Once-Through Cooling Regulations (MET, 2021).

7.2.3 Water Quality

The following sub-sections include narratives on water quality issues experienced in various water supplies, if any, and the measures being taken to improve the water quality of these sources.

7.2.3.1 Imported Water

MET is responsible for providing high quality potable water throughout its service area. Over 300,000 water quality tests are performed per year on MET's water to test for regulated contaminants and additional contaminants of concern to ensure the safety of its waters. MET's supplies originate primarily from the CRA and from the SWP. A blend of these two sources, proportional to each year's availability of the source, is then delivered throughout MET's service area.

MET's primary water sources face individual water quality issues of concern. The CRA water source contains higher total dissolved solids (TDS) and the SWP contains higher levels of organic matter, lending to the formation of disinfection byproducts. To remediate the CRA's high level of salinity and the SWP's high level of organic matter, MET blends CRA and SWP supplies and has upgraded all of its treatment facilities to include ozone treatment processes. In addition, MET has been engaged in efforts to protect its Colorado River supplies from threats of uranium, perchlorate, and chromium VI while also investigating the potential water quality impact of the following emerging contaminants: N-nitrosodimethylamine (NDMA), pharmaceuticals and personal care products (PPCP), microplastics, PFAS, and 1,4-dioxane (MET, 2021). While unforeseeable water quality issues could alter reliability, MET's current strategies ensure the delivery of high-quality water.

The presence of quagga mussels in water sources is a water quality concern. Quagga mussels are an invasive species that was first discovered in 2007 at Lake Mead, on the Colorado River. This species of mussels forms massive colonies in short periods of time, disrupting ecosystems and blocking water intakes. They can cause significant disruption and damage to water distribution systems. MET has had success in controlling the spread and impacts of the quagga mussels within the CRA, however the future could require more extensive maintenance and reduced operational flexibility than current operations allow. It also resulted in MET eliminating deliveries of CRA water into Diamond Valley Lake to keep the reservoir free from quagga mussels (MET, 2021).

7.2.3.2 Groundwater

OCWD is responsible for managing the OC Basin. To maintain groundwater quality, OCWD conducts an extensive monitoring program that serves to manage the OC Basin's groundwater production, control groundwater contamination, and comply with all required laws and regulations. A network of nearly 700 wells provides OCWD a source for samples, which are tested for a variety of purposes. OCWD collects samples each month to monitor Basin water quality. The total number of water samples analyzed varies year-to-year due to regulatory requirements, conditions in the basin and applied research and/or special study demands. These samples are collected and tested according to approved federal and state procedures as well as industry-recognized quality assurance and control protocols (City of La Habra et al., 2017).

PFAS are of particular concern for groundwater quality, and since the summer of 2019, DDW requires testing for PFAS compounds in some groundwater production wells in the OCWD area. In February 2020, the DDW lowered its Response Levels (RL) for PFOA and PFOS to 10 and 40 parts per trillion (ppt) respectively. The DDW recommends Producers not serve any water exceeding the RL – effectively making the RL an interim Maximum Contaminant Level (MCL) while DDW undertakes administrative action to set a MCL. In response to DDW's issuance of the revised RL, as of December 2020, approximately 45 wells in the OCWD service area have been temporarily turned off until treatment systems can be constructed. As additional wells are tested, OCWD expects this figure may increase to at least 70 to 80 wells. The state has begun the process of establishing MCLs for PFOA and PFOS and anticipates these MCLs to be in effect by the Fall of 2023. OCWD anticipates the MCLs will be set at or below the RLs.

In April 2020, OCWD as the groundwater basin manager, executed an agreement with the impacted Producers to fund and construct the necessary treatment systems for production wells impacted by PFAS compounds. The PFAS treatment projects includes the design, permitting, construction, and operation of PFAS removal systems for impacted Producer production wells. Each well treatment system will be evaluated for use with either granular activated carbon (GAC) or ion exchange (IX) for the removal of PFAS compounds. These treatment systems utilize vessels in a lead-lag configuration to remove PFOA and PFOS to less than 2 ppt (the current non-detect limit). Use of these PFAS treatment systems are designed to ensure the groundwater supplied by Producer wells can be served in compliance with current and future PFAS regulations. With financial assistance from OCWD, the Producers will operate and maintain the new treatment systems once they are constructed.

To minimize expenses and provide maximum protection to the public water supply, OCWD initiated design, permitting, and construction of the PFAS treatment projects on a schedule that allows rapid deployment of treatment systems. Construction contracts were awarded for treatment systems for production wells in the City of Fullerton and Serrano Water District in Year 2020. Additional construction contracts will likely be awarded in the first and second quarters of 2021. OCWD expects the treatment systems to be constructed for most of the initial 45 wells above the RL within the next 2 to 3 years.

As additional data are collected and new wells experience PFAS detections at or near the current RL, and/or above a future MCL, and are turned off, OCWD will continue to partner with the affected Producers and take action to design and construct necessary treatment systems to bring the impacted wells back online as quickly as possible.

Groundwater production in FY 2019-20 was expected to be approximately 325,000 AF but declined to 286,550 AF primarily due to PFAS impacted wells being turned off around February 2020. OCWD expects groundwater production to be in the area of 245,000 AF in FY 2020-21 due to the currently idled wells and additional wells being impacted by PFAS and turned off. As PFAS treatment systems are constructed, OCWD expects total annual groundwater production to slowly increase back to normal levels (310,000 to 330,000 AF) (OCWD, 2020).

Salinity is a significant water quality problem in many parts of Southern California, including Orange County. Salinity is a measure of the dissolved minerals in water including both TDS and nitrates.

OCWD continuously monitors the levels of TDS in wells throughout the OC Basin. TDS currently has a California Secondary MCL of 500 mg/L. The portions of the OC Basin with the highest levels are generally located in the cities of Irvine, Tustin, Yorba Linda, Anaheim, and Fullerton. There is also a broad area in the central portion of the OC Basin where TDS ranges from 500 to 700 mg/L. Sources of TDS include the water supplies used to recharge the OC Basin and from onsite wastewater treatment systems, also known as septic systems. The TDS concentration in the OC Basin is expected to decrease over time as the TDS concentration of GWRS water used to recharge the OC Basin is approximately 50 mg/L (City of La Habra et al., 2017).

Nitrates are one of the most common and widespread contaminants in groundwater supplies, originating from fertilizer use, animal feedlots, wastewater disposal systems, and other sources. The MCL for nitrate in drinking water is set at 10 mg/L. OCWD regularly monitors nitrate levels in groundwater and works with producers to treat wells that have exceeded safe levels of nitrate concentrations. OCWD manages the nitrate concentration of water recharged by its facilities to reduce nitrate concentrations in groundwater. This includes the operation of the Prado Wetlands, which was designed to remove nitrogen and other pollutants from the Santa Ana River before the water is diverted to be percolated into OCWD's surface water recharge system.

Although water from the Deep Aquifer System is of very high quality, it is amber-colored and contains a sulfuric odor due to buried natural organic material. These negative aesthetic qualities require treatment before use as a source of drinking water. The total volume of the amber-colored groundwater is estimated to be approximately 1 MAF.

There are other potential contaminants that are of concern to and are monitored by OCWD.
These include:

- **Methyl Tertiary Butyl Ether (MTBE) –** MTBE is an additive to gasoline that increases octane ratings but became a widespread contaminant in groundwater supplies. The greatest source of MTBE contamination comes from underground fuel tank releases. The primary MCL for MTBE in drinking water is 13 µg/L.
- **Volatile Organic Compounds (VOC) –** VOCs come from a variety of sources including industrial degreasers, paint thinners, and dry cleaning solvents. Locations of VOC contamination within the OC Basin include the former El Toro marine Corps Air Station, the Shallow Aquifer System, and portions of the Principal Aquifer System in the Cities of Fullerton and Anaheim.
- **NDMA –** NDMA is a compound that can occur in wastewater that contains its precursors and is disinfected via chlorination and/or chloramination. It is also found in food products such as cured meat, fish, beer, milk, and tobacco smoke. The California Notification Level for NDMA is 10 ng/L and the RL is 300 ng/L. In the past, NDMA has been found in groundwater near the Talbert Barrier, which was traced to industrial wastewater dischargers.
- **1,4-Dioxane –** 1,4-Dioxane is a suspected human carcinogen. It is used as a solvent in various industrial processes such as the manufacture of adhesive products and membranes.
- **Perchlorate –** Perchlorate enters groundwater through application of fertilizer containing perchlorate, water imported from the Colorado River, industrial or military sites that have perchlorate, and natural occurrence. Perchlorate was not detected in 84% of the 219 production wells tested between the years 2010 through 2014.
- **Selenium –** Selenium is a naturally occurring micronutrient found in soils and groundwater in the Newport Bay watershed. The bio-accumulation of selenium in the food chain may result in deformities, stunted growth, reduced hatching success, and suppression of immune systems in fish and wildlife. Management of selenium is difficult as there is no off-the-shelf treatment technology available.
- **Constituents of Emerging Concern (CEC) –** CECs are either synthetic or naturally occurring substances that are not currently regulated in water supplies or wastewater discharged but can

be detected using very sensitive analytical techniques. The newest group of CECs include pharmaceuticals, personal care products, and endocrine disruptors. OCWD's laboratory is one of a few in the state of California that continuously develops capabilities to analyze for new compounds (City of La Habra et al., 2017).

7.2.4 Locally Applicable Criteria

Within Orange County, there are no significant local applicable criteria that directly affect reliability. Through the years, the water agencies in Orange County have made tremendous efforts to integrate their systems to provide flexibility to interchange with different sources of supplies. There are emergency agreements in place to ensure all parts of the County have an adequate supply of water. In the northern part of the County, agencies are able to meet a majority of their demands through groundwater with very little limitation, except for the OCWD BPP. For the agencies in southern Orange County, most of their demands are met with imported water where their limitation is based on the capacity of their system, which is very robust.

However, if a major earthquake on the San Andreas Fault occurs, it will be damaging to all three key regional water aqueducts and disrupt imported supplies for up to six months. The region would likely impose a water use reduction ranging from 10-25% until the system is repaired. However, MET has taken proactive steps to handle such disruption, such as constructing DVL, which mitigates potential impacts. DVL, along with other local reservoirs, can store a six to twelve-month supply of emergency water (MET, 2021).

7.3 Water Service Reliability Assessment

This Section assesses the City's reliability to provide water services to its customers under various hydrological conditions. This is completed by comparing the projected long-term water demand (Section 4), to the projected water supply sources available to the City (Section 6), in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years.

7.3.1 Normal Year Reliability

The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3), to project the 25-year demand for Orange County water agencies, also isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The explanatory variables of population, temperature, precipitation, unemployment rate, drought restrictions, and conservation measures were used to create the statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the average condition. The average (normal) demand is represented by the average water demand of FY 2017-18 and FY 2018-19 (CDM Smith, 2021).

The City is 100 percent reliable for normal year demands from 2025 through 2045 (Table 7-2) due to diversified supply and conservation measures. For simplicity, the table shows supply to balance demand in the table. However, based on the purchase agreement the City has with MET (Section 6.2), the City is contractually able to purchase more water from MET, should the need arise. The City has entitlements to receive imported water from MET via connections to MET's regional distribution system. All imported water supplies are assumed available to the City from existing water transmission facilities, as per MET's 2020 UWMP. The demand and supplies listed in Table 7-2 also include local groundwater supplies that are available to the City through OCWD by an assumed BPP of 85%, per Section 6.3.4.

Table 7-2: Retail: Normal Year Supply and Demand Comparison

DWR Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals (AF)	33,882	34,395	34,130	33,838	33,827
Demand totals (AF)	33,882	34,395	34,130	33,838	33,827
Difference (AF)	0	0	0	0	0
NOTES: This table compares the projected demand and supply volumes determined in Sections 4.3.2 and 6.1, respectively.					

7.3.2 Single Dry Year Reliability

A single dry year is defined as a single year of minimal to no rainfall within a period where average precipitation is expected to occur. The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3) isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the normal year condition (average of FY 2017-18 and FY 2018-19). For a single dry year condition (FY 2013-14), the model projects a six percent increase in demand for the OC Basin area where the City's service area is located (CDM Smith, 2021). Detailed information of the model is included in Appendix E.

The City has documented that it is 100 percent reliable for single dry year demands from 2025 through 2045 with a demand increase of 6% from normal demand with significant reserves held by MET, local groundwater supplies, and conservation. A comparison between the supply and the demand in a single dry year is shown in (Table 7-3). For simplicity, the table shows supply to balance the modeled demand in the table. However, based on the purchase agreement the City has with MET (Section 6.2), the City is contractually able to purchase more water from MET, should the need arise.

Table 7-3: Retail: Single Dry Year Supply and Demand Comparison

DWR Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals (AF)	35,915	36,459	36,178	35,868	35,857
Demand totals (AF)	35,915	36,459	36,178	35,868	35,857
Difference (AF)	0	0	0	0	0

NOTES:
It is conservatively assumed that a single dry year demand is 6% greater than each respective year's normally projected total water demand. Groundwater is sustainably managed through the BPP and robust management measures (Section 6.3.4 and Appendix G), direct and indirect recycled water uses provides additional local supply (Section 6.6), and based on MET's UWMP, imported water is available to close any potable water supply gap that local sources cannot meet (Section 7.5.1).

7.3.3 Multiple Dry Year Reliability

Assessing the reliability to meet demand for five consecutive dry years is a new requirement for the 2020 UWMP, as compared to the previous requirement of assessing three or more consecutive dry years. Multiple dry years are defined as five or more consecutive dry years with minimal rainfall within a period of average precipitation. The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3) isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the normal year condition (average of FY 2017-18 and FY 2018-19). For a single dry year condition (FY 2013-14), the model projects a six percent increase in demand for the OC Basin area where the City's service area is located (CDM Smith, 2021). It is conservatively assumed that a five consecutive dry year scenario is a repeat of the single dry year over five consecutive years.

Even with a conservative demand increase of 6% each year for five consecutive years, the City is capable of meeting all customers' demands from 2025 through 2045 (Table 7-4), with significant reserves held by MET and conservation. For simplicity, the table shows supply to balance the modeled demand in the table. However, based on the purchase agreement the City has with MET (Section 6.2), the City is contractually able to purchase more water from MET, should the need arise.

Table 7-4: Retail: Multiple Dry Years Supply and Demand Comparison

DWR Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	35,581	36,024	36,403	36,116	35,866
	Demand totals	35,581	36,024	36,403	36,116	35,866
	Difference	0	0	0	0	0
Second year	Supply totals	35,665	36,133	36,347	36,054	35,864
	Demand totals	35,665	36,133	36,347	36,054	35,864
	Difference	0	0	0	0	0
Third year	Supply totals	35,748	36,241	36,290	35,992	35,861
	Demand totals	35,748	36,241	36,290	35,992	35,861
	Difference	0	0	0	0	0
Fourth year	Supply totals	35,831	36,350	36,234	35,930	35,859
	Demand totals	35,831	36,350	36,234	35,930	35,859
	Difference	0	0	0	0	0
Fifth year	Supply totals	35,915	36,459	36,178	35,868	35,857
	Demand totals	35,915	36,459	36,178	35,868	35,857
	Difference	0	0	0	0	0

NOTES:
It is conservatively assumed that a five consecutive dry year scenario is a repeat of the single dry year (106% of projected normal year values) over five consecutive years. The 2025 column assesses supply and demand for FY 2020-21 through FY 2024-25; the 2030 column assesses FY 2025-26 through FY 2029-30 and so forth, in order to end the water service reliability assessment in FY 2044-45.

Groundwater is sustainably managed through the BPP and robust management measures (Section 6.3.4 and Appendix G), direct and indirect recycled water uses provide additional local supply (Section 6.6), and based on MET's UWMP, imported water is available to close any potable water supply gap that local sources cannot meet (Section 7.5.1).

7.4 Management Tools and Options

Existing and planned water management tools and options for the City, OCWD, and MWDOC's service area that seek to maximize local resources and result in minimizing the need to import water are described below. Although they are a direct MET Member Agency, the City benefits from collaboration between MWDOC and OCWD to maximize local resources.

- **Reduced Delta Reliance:** MET has demonstrated consistency with Reduced Reliance on the Delta Through Improved Regional Water Self-Reliance (Delta Plan policy WR P1) by reporting the expected outcomes for measurable reductions in supplies from the Delta. MET has improved its self-reliance through methods including water use efficiency, water recycling, stormwater capture and reuse, advanced water technologies, conjunctive use projects, local and regional water supply and storage programs, and other programs and projects. In 2020, MET had a 602,000 AF change in supplies contributing to regional-self-reliance, corresponding to a 15.3% change, and this amount is projected to increase through 2045 (MET, 2021). For detailed information on the Delta Plan Policy WR P1, refer to Appendix C.

- **The continued and planned use of groundwater:** The water supply resources within the City's service area are enhanced by the existence of groundwater basins that account for the majority of local supplies available and are used as reservoirs to store water during wet years and draw from storage during dry years, subsequently minimizing the City's reliance on imported water. Groundwater basins are managed within a safe basin operating range so that groundwater wells are only pumped as needed to meet water use. The City supports and partners in recycled water efforts, including groundwater recharge, through its coordination with OCWD and OC San. The City is currently planning for new well construction and major well rehabilitation at seven well sites, described in Section 6.9.

- **Groundwater storage and transfer programs:** MET and OCWD's involvement in SARCCUP includes participation in a CUP that improves water supply resiliency and increases available dry-year yield from local groundwater basins. The groundwater bank has 137,000 AF of storage (OCWD, 2020b). Additionally, MET has numerous groundwater storage and transfer programs in which MET endeavors to increase the reliability of water supplies, including the AVEK Waster Agency Exchange and Storage Program and the High Desert Water Bank Program. The IRWD Strand Ranch Water Banking Program has approximately 23,000 AF stored for IRWD's benefit, and by agreement, the water is defined to be an "Extraordinary Supply" by MET and counts essentially 1:1 during a drought/water shortage condition under MET's Water Supply Allocation Plan. In addition, MET has encouraged storage through its cyclic and conjunctive use programs that allow MET to deliver water into a groundwater basin in advance of agency demands, such as the Cyclic Storage Agreements under the Main San Gabriel Basin Judgement.

- **Water Loss Program:** The water loss audit program reduces MET's dependency on imported water from the Delta by implementing water loss control technologies after assessing audit data and leak detection.

- **Increased use of recycled water:** The City partners with OCWD in recycled water efforts to identify opportunities for the use of recycled water for irrigation purposes, groundwater recharge and some non-irrigation applications. OCWD's GWRS and GAP allow Southern California to decrease its dependency on imported water and create a local and reliable source of water that meet or exceed all federal and state drinking level standards. Expansion of the GWRS is currently underway to increase the plant's production to 130 MGD, and further reduce reliance on imported water.

- **Implementation of demand management measures during dry periods:** During dry periods, water reduction methods to be applied to the public through the retail agencies, will in turn reduce the City's overall demands on MET and reliance on imported water. The City's specific demand management measures are further discussed in Section 9.

7.5 Drought Risk Assessment

Water Code Section 10635(b) requires every urban water supplier include, as part of its UWMP, a DRA for its water service as part of information considered in developing its DMMs and water supply projects and programs. The DRA is a specific planning action that assumes the City is experiencing a drought over the next five years and addresses the City's reliability in the context of presumed drought conditions. Together, the water service reliability assessment (Sections 7.1 through 7.3), DRA, and WSCP (Section 8 and Appendix H) allow the City to have a comprehensive picture of its short-term and long-term water service reliability and to identify the tools to address any perceived or actual shortage conditions.

Water Code Section 10612 requires the DRA to be based on the driest five-year historic sequence of the City's water supply. However, Water Code Section 10635 also requires that the analysis consider plausible changes on projected supplies and demands due to climate change, anticipated regulatory changes, and other locally applicable criteria.

The following sections describe the City's methodology and results of its DRA.

7.5.1 DRA Methodology

The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3 isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the average condition (average of FY 2017-18 and FY 2018-19). For a single dry year condition (FY 2013-14), the model projects a 6% increase in demand for the region encompassing the City's service area (CDM Smith, 2021).

Locally, the five-consecutive years of FY 2011-12 through FY 2015-16 represent the driest five consecutive year historic sequence for the City's water supply. This period that spanned water years 2012 through 2016 included the driest four-year statewide precipitation on record (2012-2015) and the smallest Sierra Cascades snowpack on record (2015, with 5% of average). It was marked by extraordinary heat: 2014, 2015 and 2016 were California's first, second and third warmest year in terms of statewide average temperatures. Locally, Orange County rainfall for the five year period totaled 36 inches, the driest on record.

As explained in Section 6, the City currently relies on, and will continue to rely on, three main water sources: local groundwater, recycled water, and imported water supply from MET. The City maximizes local water groundwater supply use before the purchase of imported water. The difference between total forecasted demands and local supply projections is the demand on MET's imported water supplies from the Colorado River, SWP, and in-region storage. Local groundwater supply for the City comes from the OC Basin and is dictated by the BPP set annually by OCWD. Therefore, the City's DRA focuses on the assessment of imported water from MET, which will be used to close any potable water supply gap local groundwater does not fill.

Water Demand Characterization

Beyond local supplies, the City's water supplies are purchased from MET, regardless of hydrologic conditions. As described in Section 6.2, MET's supplies are from the Colorado River, SWP, and in-region storage. In their 2020 UWMP, MET's DRA concluded that even without activating WSCP actions, MET can reliably provide water to all of their member agencies, including the City, through 2045, assuming a five-year drought from FY 2020-21 through FY 2024-25. Beyond this, MET's DRA indicated a surplus of supplies that would be available to all of its member agencies, including the City, should the need arise. Therefore, any increase in demand that is experienced in the City's service area will be met by MET's water supplies.

Based on the Demand Forecast TM, in a single dry year, demand is expected to increase by 6% above a normal year. The City's DRA conservatively assumes a drought from FY 2020-21 through FY 2024-25 is a repeat of the single dry year over five consecutive years.

The City's demand projections were developed as part of the Demand Forecast TM, led by MWDOC. As part of the study, MWDOC first estimated total retail demands for its service area. This was based on estimated future demands using historical water use trends, future expected water use efficiency measures, additional projected land-use development, and changes in population. The City's projected water use, linearly interpolated per the demand forecast, is presented annually for the next five years in Table 4-2. Next, MWDOC estimated the projections of local supplies derived from current and expected local supply programs from the participating agencies. Finally, the demand model calculated the difference between total forecasted demands and local supply projections. The resulting difference between total demands net of savings from conservation and local supplies is the expected regional demands on MET supply.

Water Supply Characterization

The City's assumptions for its supply capabilities are discussed and presented in 5-year increments under its UWMP water reliability assessment. For the City's DRA, these supply capabilities are further refined and presented annually for the years 2021 to 2025 by assuming a repeat of historic conditions from FY 2011-12 to FY 2015-16. For its DRA, the City assessed the reliability of supplies available from MET using historical supply availability under dry-year conditions. MET's supply sources under the Colorado River, SWP, and in-region supply categories are individually listed and discussed in detail in MET's UWMP. Future supply capabilities for each of these supply sources are also individually tabulated in Appendix 3 of MET's UWMP, with consideration for plausible changes on projected supplies under climate change conditions, anticipated regulatory changes, and other factors. In addition, the City has access to supply augmentation actions through MET. MET may exercise these actions based on regional need, and in accordance with their WSCP, and may include the use of supplies and storage programs within the Colorado River, SWP, and In-Region.

7.5.2 Total Water Supply and Use Comparison

The City's DRA concludes that water supplies meet total water demand, assuming a five-year consecutive drought from FY 2020-21 through FY 2024-25 (Table 7-5). For simplicity, the table shows supply to balance the modeled demand in the table. However, based on the purchase agreement the City has with MET (Section 6.2), the City is contractually able to purchase more water from MET, should the need arise.

Table 7-5: Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b)

DWR Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use	35,581
Total Supplies	35,581
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use	35,665
Total Supplies	35,665
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0

DWR Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use	35,748
Total Supplies	35,748
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use	35,831
Total Supplies	35,831
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use	35,915
Total Supplies	35,915

DWR Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

Note: Groundwater is sustainably managed through the BPP and robust management measures (Section 6.3.4 and Appendix G), direct and indirect recycled water uses provide additional local supply (Section 6.6), and based on MET's UWMP, imported water is available to close any potable water supply gap that local sources cannot meet (Section 7.5.1).

7.5.3 Water Source Reliability

Locally, approximately 77% (BPP for Water Year 2021-22) of the City's total water supply can rely on OC Basin groundwater through FY 2024-25. The BPP is projected to increase to 85% starting in FY 2024-25. Based on various storage thresholds and hydrologic conditions, OCWD, who manages the OC Basin, has numerous management measures that can be taken, such as adjusting the BPP or seeking additional supplies to refill the basin, to ensure the reliability of the Basin. For more information on the OC Basin's management efforts, refer to Section 6.3.

Additionally, the City's use of direct (OCWD GAP) and indirect recycled water (OCWD GWRS) should also be considered. The ability to continue producing water locally greatly improves the City's water reliability. More detail on these programs is available in Section 6.6 .

Furthermore, as discussed in Section 6.2 the City has a 10-year purchase agreement with MET that sets a minimum and maximum volume of water to be purchased from MET annually, and over the 10-year contract term. Currently, the City is not currently purchasing near the maximum levels. As so, the City is contractually able to purchase significantly more MET water should the need arise.

Moreover, although they would not normally be considered part of the City's water portfolio, the emergency interconnections the City has with the surrounding Cities of Costa Mesa, Fountain Valley, Garden Grove, Orange, Tustin, and Southern California Water Company could help mitigate any water supply shortages, though shortages are not expected. Emergency interconnections are described in Section 6.8.

The City's DRA concludes that its water supplies meet total water demand, assuming a five-year consecutive drought from FY 2020-21 through FY 2024-25 (Table 7-5). For simplicity, the table shows supply to balance the modeled demand in the table. However, based on the purchase agreement the City has with MET (Section 6.2), the City is contractually able to purchase more water from MET, should the need arise.

As detailed in Section 8, the City has in place a robust WSCP and comprehensive shortage response planning efforts that include demand reduction measures and supply augmentation actions. However, since the City's DRA shows a balance between water supply and demand, no water service reliability concern is anticipated, and no shortfall mitigation measures are expected to be exercised over the next five years. The City will periodically revisit its representation of the supply sources and of the gross water use estimated for each year and will revise its DRA if needed.

8 WATER SHORTAGE CONTINGENCY PLANNING

8.1 Layperson Description

Water shortage contingency planning is a strategic planning process that the City engages to prepare for and respond to water shortages. A water shortage, when water supply available is insufficient to meet the normally expected customer water use at a given point in time, may occur due to a number of reasons, such as water supply quality changes, climate change, drought, and catastrophic events (e.g., earthquake). The City's WSCP provides real-time water supply availability assessment and structured steps designed to respond to actual conditions. This level of detailed planning and preparation will help maintain reliable supplies and reduce the impacts of supply interruptions.

Water Code Section 10632 requires that every urban water supplier that serves more than 3,000 AFY or have more than 3,000 connections prepared and adopt a standalone WSCP as part of its UWMP. The WSCP is required to plan for a greater than 50% supply shortage. This WSCP due to be updated based on new requirements every five years and will be adopted as a current update for submission to DWR by July 1, 2021.

8.2 Overview of the WSCP

The WSCP serves as the operating manual that the City will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The WSCP contains processes and procedures documented in the WSCP, which are given legal authority through the WSCP Response Ordinance. This way, when shortage conditions arise, the City's governing body, its staff, and the public can easily identify and efficiently implement pre-determined steps to mitigate a water shortage to the level appropriate to the degree of water shortfall anticipated. Figure 8-1 illustrates the interdependent relationship between the three procedural documents related to planning for and responding to water shortages.

Figure 8-1: UWMP Overview

A copy of the City's WSCP is provided in Appendix H and includes the steps to assess if a water shortage is occurring, and what level of shortage drought actions to trigger the best response as appropriate to the water shortage conditions. WSCP has prescriptive elements, including an analysis of water supply reliability; the drought shortage actions for each of the six standard water shortage levels, that correspond to water shortage percentages ranging from 10% to greater than 50%; an estimate of potential to close supply gap for each measure; protocols and procedures to communicate identified actions for any current or predicted water shortage conditions; procedures for an annual water supply and demand assessment; monitoring and reporting requirements to determine customer compliance; reevaluation and improvement procedures for evaluating the WSCP.

8.3 Summary of Water Shortage Response Strategy and Required DWR Tables

This WSCP is organized into three main sections, with Section 3 aligned with the Water Code Section 16032 requirements.

Section 1 Introduction and WSCP Overview gives an overview of the WSCP fundamentals.

Section 2 Background provides a background on the City's water service area.

Section 3.1 Water Supply Reliability Analysis provides a summary of the water supply analysis and water reliability findings from the 2020 UWMP.

Section 3.2 Annual Water Supply and Demand Assessment Procedures provide a description of procedures to conduct and approve the Annual Assessment.

Section 3.3 Six Standard Water Shortage Stages explains the WSCP's six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, 50, and more than 50% shortages.

Section 3.4 Shortage Response Actions describes the WSCP's shortage response actions that align with the defined shortage levels.

Section 3.5 Communication Protocols addresses communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding any current or predicted shortages and any resulting shortage response actions.

Section 3.6 Compliance and Enforcement describes customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions.

Section 3.7 Legal Authorities is a description of the legal authorities that enable the City to implement and enforce its shortage response actions.

Section 3.8 Financial Consequences of the WSCP provides a description of the financial consequences of and responses for drought conditions.

Section 3.9 Monitoring and Reporting describes monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements**.**

Section 3.10 WSCP Refinement Procedures addresses reevaluation and improvement procedures for monitoring and evaluating the functionality of the WSCP.

Section 3.11 Special Water Feature Distinction.

Section 3.12 Plan Adoption, Submittal, and Implementation provides a record of the process the City followed to adopt and implement its WSCP.

The WSCP is based on adequate details of demand reduction and supply augmentation measures that are structured to match varying degrees of shortage will ensure the relevant stakeholders understand what to expect during a water shortage situation. The City has adopted water shortage levels consistent with the requirements identified in Water Code Section 10632 (a)(3)(A) (Table 8-1).

The supply augmentation actions that align with each shortage level are described in DWR Table 8-3 (Appendix B). These augmentations represent short-term management objectives triggered by the WSCP and do not overlap with the long-term new water supply development or supply reliability enhancement projects.

The demand reduction measures that align with each shortage level are described in DWR Table 8-2 (Appendix B). This table also estimates the extent to which that action will reduce the gap between supplies and demands to demonstrate to the that choose suite of shortage response actions can be expected to deliver the expected outcomes necessary to meet the requirements of a given shortage level.

Table 8-1: Water Shortage Contingency Plan Levels

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions**
0	0% (Normal)	A Level 0 Water Supply Shortage – Condition exists when the City notifies its water users that no supply reductions are anticipated in this year. The City proceeds with planned water efficiency best practices to support consumer demand reduction in line with state mandated requirements and local City goals for water supply reliability. Permanent water waste prohibitions are in place as stipulated in the City's Water Shortage Response Ordinance.
1	Up to 10%	A Level 1 Water Supply Shortage – Condition exists when the City notifies its water users that due to drought or other supply reductions, a consumer demand reduction of up to 10% is necessary to make more efficient use of water and respond to existing water conditions. Upon the declaration of a Water Aware condition, the City shall implement the mandatory Level 1 conservation measures identified in this ordinance. The type of event that may prompt the City to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider calls for extraordinary water conservation.
2	11% to 20%	A Level 2 Water Supply Shortage – Condition exists when the City notifies its water users that due to drought or other supply reductions, a consumer demand reduction of up to 20% is necessary to make more efficient use of water and respond to existing water conditions. Upon declaration of a Level 2 Water Supply Shortage condition, the City shall implement the mandatory Level 2 conservation measures identified in this ordinance.
3	21% to 30%	A Level 3 Water Supply Shortage – Condition exists when the City declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that up to 30% consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The City must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
4	31% to 40%	A Level 4 Water Supply Shortage – Condition exists when the City declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that up to 40% consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The City must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
5	41% to 50%	A Level 5 Water Supply Shortage – Condition exists when the City declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that up to 50% or more consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The City must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
6	>50%	A Level 6 Water Supply Shortage – Condition exists when the City declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that greater than 50% or more consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The City must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
NOTES:		

Water shortage contingency planning is a strategic planning process to prepare for and respond to water shortages. Detailed planning and preparation can help maintain reliable supplies and reduce the impacts of supply interruptions. This chapter provides a structured plan for dealing with water shortages, incorporating prescriptive information and standardized action levels, along with implementation actions in the event of a catastrophic supply interruption.

A well-structured WSCP allows real-time water supply availability assessment and structured steps designed to respond to actual conditions, to allow for efficient management of any shortage with predictability and accountability. A water shortage, when water supply available is insufficient to meet the normally expected customer water use at a given point in time, may occur due to a number of reasons, such as population growth, climate change, drought, and catastrophic events. The WSCP is the City's operating manual that is used to prevent catastrophic service disruptions through proactive, rather than reactive, management. This way, if and when shortage conditions arise, the City's governing body, its staff, and the public can easily identify and efficiently implement pre-determined steps to manage a water shortage.

9 DEMAND MANAGEMENT MEASURES

The City, along with other Retail water agencies throughout Orange County, recognizes the need to use existing water supplies efficiently. This ethic of efficient use of water has evolved as a result of the development and implementation of water use efficiency programs that make good economic sense and reflect responsible stewardship of the region's water resources. The City works closely with MET and MWDOC to promote regional efficiency by participating in the MET regional water savings programs. This chapter communicates the City's efforts to promote conservation and to reduce demand on water supplies. A detailed description of demand management measures is available in Appendix J.

9.1 Demand Management Measures for Retail Suppliers

The goal of the Demand Management Measures (DMM) section is to provide a comprehensive description of the water conservation programs that a supplier has implemented, is currently implementing, and plans to implement in order to meet its urban water use reduction targets. The reporting requirements for DMM has been significantly modified and streamlined in 2014 by Assembly Bill 2067. This section of the UWMP will report on the role of the City's programs in meeting new state regulations for complying with the SWRCB's new Conservation Framework. These categories of demand management measures are as follows:

- Water waste prevention ordinances;
- Metering;
- Conservation pricing;
- Public education and outreach;
- Programs to assess and manage distribution system real loss;
- Water conservation program coordination and staffing support;
- Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented;
- Programs to assist retailers with Conservation Framework Compliance

9.1.1 Water Waste Prevention Ordinances

The City Council adopted the Water Conservation and Supply Shortage Program Ordinance No. NS-2877 on May 19, 2015. Ordinance No. NS-2877 establishes permanent water conservation requirements and prohibition against waste that are effective at all times and is not dependent upon a water shortage for implementation, as follows:

- No washing down hard or paved surfaces
- Limit on watering hours
- Re-circulating water required for water fountains and decorative water features
- Drinking water served upon request only

- Limits on washing vehicles
- Commercial lodging establishments must provide guests option to decline daily linen services
- Restaurants required to use water conserving dish wash spray valves
- Obligation to fix leaks, break, or malfunctions
- No installation of single pass cooling systems
- Commercial car wash systems
- No excessive water flow or runoff
- No installation of non-recirculating water systems in commercial car wash and laundry systems
- No watering during or within 48 hours of measurable rainfall
- No irrigation of ornamental turf on public street medians with potable water
- Limit on irrigation with potable water of landscapes outside of new construction

In an event of a water supply shortage, the ordinance further establishes six levels of water supply shortage response actions to be implemented during times of declared water shortage or declared water shortage emergency, with increasing restrictions on water use in response to worsening drought or emergency conditions and decreasing supplies. The provisions and water conservation measures to be implemented in response to each shortage level are described in the Water Shortage Contingency Plan (WSCP) located in Appendix H of this 2020 UWMP. The City's water conservation ordinance is included in Appendix D of the WSCP. The City maintains active water wasting prohibition measures at all times and has the ability to implement additional measures as water conservation needs dictate

The City maintains active water wasting prohibition measures at all times and has the ability to implement additional measures as water conservation needs dictate. In 2015, as a result of the Governor's drought mandates, the City began to track its water wasting prohibition enforcement activities. On June 2, 2015 the City declared a Phase 2 water supply shortage in Resolution No. 2015-025 by formally requiring all water consumers to reduce use by 12% relative to their 2013 consumption. Additionally, on August 4, 2015, a water wasting penalty rate was established by Resolution No. 2015-047. This new penalty rate permits City staff to penalize those users not meeting their water use reduction targets of 12%. The City of Santa Ana as a whole has been meeting its State mandated target; as a result the City has yet to impose any monetary penalties on any of its users. The City has communicated the water wasting prohibitions and water conservation measures via various communication outlets available including messaging on water bills, bill inserts, bill envelopes, the City website, bus shelter advertisements, City newsletters, pole banners across the City, and a water conservation booth at community events. As a result, in 2015 the City received 1,064 water waster complaints: a dramatic increase from prior years. The City intends to continue both its water waste enforcement efforts and water conservation messaging in the future; however, the intensity of both activities will be directly related to the level of water conservation required to meet stated use reductions.

9.1.2 Metering

The City requires individual metering for all new connections and bills by volume-of-use. All existing connections are metered.

The City has a meter replacement and calibration program in place. Over the past 5 years, the program focused on replacing aging meters and those with high use, replacing approximately 500-1,000 meters per year. In 2020, the City Council approved a project proposal to expand the meter replacement and calibration program by implementing and deploying Automated Meter Infrastructure (AMI) and a proactive calibration and testing program focused on periodically testing high use meters. The City will replace all meters to the AMI system over a 42 month period. The City is also upgrading the billing system software and customer portals, etc.

In accordance with the City's municipal code, all new development with over 1,000 square feet of landscape requires the installation of dedicated landscape meters. The City has also adopted a policy requiring individual metering of all users such as individual tenants of commercial plazas, residential condominiums, and apartments.

9.1.3 Conservation Pricing

There are two parts to the City's water service charges: a fixed Basic Service Charge and a variable Commodity Charge. The Basic Service Charge is a fixed amount based on the connection's meter size and is billed bi-monthly. The Commodity Charge is determined by the amount of water served to the property and is measured in hundred cubic feet (HCF). The City also provides private fire water service and recycled water to specific customers and also has a Private Fire Service Charge and a Recycled Water Commodity Charge.

The City's current Commodity Charge rate schedule and Tier Allocation, effective from January 1, 2020, was approved in 2019 and is shown in Table 9-1 and Table 9-2, respectively.

Table 9-1: Water Rates Effective January 1, 2020

	Previous Rate (Per CCF*)	Effective **January 1, 2020**	Effective **July 1, 2020**	Effective **July 1, 2021**	Effective **July 1, 2022**	Effective **July 1, 2023**
TIER 1**	**$3.02**	**$2.03**	**$2.17**	**$2.31**	**$2.36**	**$2.41**
TIER 2***	**$3.59**	**$4.79**	**$5.13**	**$5.46**	**$5.57**	**$5.68**
RECYCLED WATER	**$2.42**	**$2.15**	**$2.30**	**$2.45**	**$2.50**	**$2.55**

*1 CCF=748 Gallons **See tier allocation table.
*** Tier 2 is any amount of water used over the amount allocated in Tier 1

Table 9-2: Water Tier Allocations Effective January 1, 2020

Meter Size	Previous Allocation	Single Family Residential Allocation	Non-Residential Customer Allocation	Multi-Family Customer Allocation
5/8" x 3/4"	0 - 22 CCF	0 - 10.50 CCF	0 - 31 CCF	0 - 8.5 CCF per Dwelling Unit
3/4"	0 - 22 CCF	0 - 16 CCF	0 - 46.5 CCF	
1"	0 - 22 CCF	0 - 26 CCF	0 - 77.5 CCF	
1 1/2"	0 - 22 CCF	0 - 52.5 CCF	0 - 155 CCF	
2"	0 - 22 CCF	0 - 84 CCF	0 - 248 CCF	
3"	0 - 22 CCF	0 - 184 CCF	0 - 542.5 CCF	
4"	0 - 22 CCF	0 - 331 CCF	0 - 976.5 CCF	
6"	0 - 22 CCF	0 - 682.5 CCF	0 - 2,015 CCF	
8"	0 - 22 CCF	0 - 1,260 CCF	0 - 3,720 CCF	

9.1.4 Public Education and Outreach

The City administers its own public education and outreach program and develops, coordinates, and delivers a substantial number of public information, education, and outreach events aimed at elevating consumer awareness and understanding of current water issues as well as efficient wat er use and water-saving practices, sound policy, and water reliability investments that are in the b est interest of the region. These efforts encourage good water stewardship that benefit all City res idents, businesses, and industries across all demographics. The City also collaborates with MWD OC and their educational programming. Several examples are shown in Figures 9-1 to 9-8.

Figure 9-1: Youth Outreach Flyer

Figure 9-2: Outreach and Education Material

Figure 9-3: Outreach Event Photo 1

Figure 9-4: Outreach Event Photo 2

Figure 9-5: Outreach Event Photo 3

Figure 9-6: Outreach Event Photo 4

Figure 9-7: Landscape Transformation Program Outreach Flyer, Page 1

Figure 9-8: Landscape Transformation Program Outreach Flyer, Page 2

Print and Electronic Materials

The City of Santa Ana offers a variety of print and electronic materials that are designed to assist City's water users of all ages in discovering where their water comes from, what the water industry professionals are doing to address water challenges, how to use water most efficiently, and more. Through the City's social media presence, its website, Santa Ana Green newsletter, public service announcements, flyers, brochures, and other outreach materials, The City ensures that its residents are equipped with sufficient information and subject knowledge to assist them in making good behavioral and civic choices that ultimately affect the quality and quantity of the region's water supply.

Public Events

Each year, the City of Santa Ana participates in an array of public events intended to engage and educate a diverse range of water users in water use efficiency and water quality topics. Some of these public events include:

- **Children's Water Education Festival** the largest festival of its kind, takes place every March at the University of California, Irvine.
  The Festival presents a unique opportunity to educate students about local water issues and help them understand how they can protect and preserve water and their environment. Approximately 7,000 third, fourth and fifth grade students attend the event, presented by the Orange County Water District (OCWD), the Disneyland Resort, the National Water Research Institute and the OCWD Groundwater Guardian Team.
  This two-day event brings students and their teachers together to learn about the importance of our natural resources. Students who attend the Festival are presented with a unique opportunity to learn about their local water issues and what they can do in their homes and community to protect and conserve water and the environment. Organizations and public agencies from Orange County and throughout California dedicate their time to help educate these young environmental stewards. Since its inception, more than 135,000 children from schools throughout Orange County have been able to experience the Festival and all it has to offer.
- **City-Sponsored or Private Events** provide opportunities to interact with the City's water users in a fun and friendly way, offer useful water-related information and education to engage them in important discussions about the value of water and how their decisions at home, at work, and as tax- or ratepayers may impact the City's quality and quantity of water for generations to come.

Education Programs and Initiatives

Over the past several years, the City of Santa Ana has amplified its efforts in water education programs and activities throughout its service area. This is accomplished by continuing to grow professional networks and partnerships that consist of education groups, advisories, Communication Linkage Forums and SAUSD teachers' groups for water-centric learning. Several key water education programs and initiatives include:

- **Landscape Training Classes** provide Santa Ana's residents with an opportunity to learn about rainwater capture, gardening practices that build a healthy soil, proper plant selection that are consistent with our local environment. These classes educate City's customers to conserve water in their landscapes through sound practices and water-wise choices.
- **Choice School Programs** The City of Santa Ana collaborates with MWDOC to provide educational programs and activities for the City's youngest water users. Through this collaboration, the City has supplied its K-12 students with water-focused learning experiences for nearly five (5) decades. Interactive, grade-specific lessons invite students to connect with, and learn from, their local ecosystems, guiding them to identify and solve local water-related environmental challenges affecting their communities. Choice School Programs are aligned with state standards, and participation includes a dynamic in-class or virtual presentation, and pre- and post-activities that encourage and support Science, Technology, Engineering, Arts and Mathematics (STEAM)-based learning and good water stewardship.
- **City of Santa Ana's Annual Youth Water Poster Contest** is an annual activity developed to encourage City's K-12 students to investigate and explore their relationship to water, connect the importance of good water stewardship to their daily lives, and express their conclusions creatively through art. Each year, the City of Santa Ana receives hundreds of entries, and 12 winners from across the City are invited to attend a special awards ceremony with their parents and teachers.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

Senate Bill 1420 signed into law in September 2014 requires urban water suppliers that submit UWMPs to calculate annual system water losses using the water audit methodology developed by the AWWA. SB 1420 requires the water loss audit be submitted to DWR every five years as part of the urban water supplier's UWMP. Water auditing is the basis for effective water loss control. DWR's UWMP Guidebook include a water audit manual intended to help water utilities complete the AWWA Water Audit on an annual basis.

A Water Loss Audit was completed for the City which identified areas for improvement and quantified total loss. Based on the data presented, the three priority areas identified were water imported, billed metered, and unauthorized consumption. Multiple criteria are a part of each validity score and a system wide approach will need to be implemented for the City's improvement. The City completes a system water audit to calculate water losses on an annual basis. As part of the AMI project, the City will be adding the customer leak detection and system leak detection sensors system-wide. Expressing water loss audit results in terms of Real Losses per Service Connection per Day allows for standardized comparison across retailer agencies and is a metric consistent with the Water Board's forthcoming economic model. The Real Losses per Service Connection per Day for calendar year 2019 was 19.59 gal/connection/day.

9.1.6 Water Conservation Program Coordination and Staffing Support

The City's Water Service Quality Coordinator, a position created in 1991, acts as the water conservation coordinator. The conservation coordinator is responsible for conservation program activities and acts as a liaison with MWDOC, MET, California Water Efficiency Partnership (CalWEP), and others.

The City's conservation coordinator's duties include the following:

- Administer the contracts that the City has with MET and MWDOC regarding rebate programs.
- Conduct surveys at the request of residential and business customers (or designate a staff member to do so).
- Coordinate with other agencies and public groups' displays on conservation information and provide free water conservation materials to the public.
- Monitor the recycled water program for the City.
- Administer the City's education program using contractors or staff to educate children of City schools or other locations.

The City's water conservation programs are funded by the water ratepayers. The conservation program efforts are factored into the City's existing and future water rates as currently adopted.

9.1.7 Other Demand Management Measures (DMMs)

9.1.7.1 Residential Program

As a direct member of MET, residential DMMs are made available to City water users through the SoCal WaterSmart Program.to increase landscape and indoor water use efficiency for residential customers.

High Efficiency Clothes Washer Rebate Program

The High Efficiency Clothes Washer (HECW) Rebate Program provides residential customers with rebates for purchasing and installing HECWs that. Approximately 15% of home water use goes towards laundry, and HECWs use 35-50% less water than standard washer models, with savings of approximately 10,500 gallons per year, per device. Devices must meet or exceed the Consortium for Energy Efficiency (CEE) Tier 1 Standard, and a listing of qualified products can be found at socalwatersmart.com. There is a maximum of one rebate per home.

Premium High Efficiency Toilet Rebate Program

The largest amount of water used inside a home, 30%, goes toward flushing the toilet. The Premium High Efficiency Toilet (HET) Rebate Program offers incentives to residential customers for replacing their toilets using 1.6 gallons per flush or more. Premium HETs use just 1.1 gallons of water or less per flush, which is 20% less water than WaterSense standard toilets. In addition, Premium HETS save an average of 9 gallons of water per day while maintaining high performance standards.

9.1.7.2 Commercial, Industrial and Institutional (CII) Programs

MET provides a variety of financial incentives to help City businesses, restaurants, institutions, hotels, hospitals, industrial facilities, and public sector sites achieve their efficiency goals. Water users in these sectors have options to choose from a standardized list of water efficient equipment/devices or may complete customized projects through a pay-for-performance where the incentive is proportional to the amount of water saved. Such projects include high efficiency commercial equipment installation and manufacturing process improvements.

Water Savings Incentive Program

The Water Savings Incentive Program (WSIP) is designed for non-residential customers to improve their water efficiency through upgraded equipment or services that do not qualify for standard rebates. WSIP is unique because it provides an incentive based on the amount of water customers actually save. This "pay-for-performance" design lets customers implement custom projects for their sites.

Projects must save at least 10 million gallons of water to qualify for the Program and are offered from $195 to $390 per acre foot of water saved. Examples of successfully projects include but are not limited to changing industrial process system water, capturing condensation and using it to supplement cooling tower supply, and replacing water-using equipment with more efficient products.

On-site Retrofit Program

The On-site Retrofit Program provides another pay-for-performance financial incentive to commercial, industrial and institutional property owners, including Homeowner Associations, who convert potable water irrigation or industrial water systems to recycled water use.

Projects commonly include the conversion of mixed or dedicated irrigation meters using potable water to irrigate with reclaimed water, or convert industrial processes use to recycled water, such as a cooling towers. Financial incentives of up to $1,300 per AF of potable water saved are available for customer-side on the meter retrofits. Funding is provided by MET, USBR, and DWR.

Device Retrofits

The City offers financial incentives under the Socal Water$mart Rebate Program which offers rebates for various water efficient devices to CII customers.

9.1.7.3 Landscape Programs

One of the most active and exciting water use efficiency sectors MET provides services for are those programs that target the reduction of outdoor water use. With close to 60% of water consumed outdoors, this sector has been and will continue to be a focus for MET and the City.

Turf Removal Program

The Orange County Turf Removal Program offers incentives to remove turf grass from residential, commercial, and public properties throughout the County. This program is a partnership between MWDOC, MET, and local retail water agencies. The goals of this program are to increase water use efficiency through sustainable landscaping practices that result in multi-benefit projects across Orange County. Participants replace their turf grass with drought-tolerant, CA Friendly, or CA Native landscaping, and retrofit their irrigation systems to high efficiency equipment, such as drip, or remove it entirely, and are encouraged to utilize smart irrigation timers. Furthermore, projects are required to include a stormwater capture feature, such as a rain garden or dry stream bed, and have a minimum of three plants per 100 square feet to increase plant density and promote healthy soils. These projects save water and also reduce dry and wet weather runoff, increase urban biomass, and sequester more carbon than turf landscapes.

Smart Timer Rebate Program

Smart Timers are irrigation clocks that are either weather-based irrigation controllers (WBICs) or soil moisture sensor systems. WBICs adjust automatically to reflect changes in local weather and site-specific landscape needs, such as soil type, slopes, and plant material. When WBICs are programmed properly, turf and plants receive the proper amount of water throughout the year. During the fall months, when property owners and landscape professionals often overwater, Smart Timers can save significant amounts of water.

Rotating Nozzles Rebate Program

The Rotating Nozzle Rebate Program provides incentives to residential and commercial properties for the replacement of high-precipitation rate spray nozzles with low-precipitation rate multi-stream, multi-trajectory rotating nozzles. The rebate offered through this Program aims to offset the cost of the device and installation.

Socal Water$mart Rebate Program for Landscape

The City also offers financial incentives under the SoCal Water$mart Rebate Program for a variety of water efficient landscape devices, such as Central Computer Irrigation Controllers, large rotary nozzles, and in-stem flow regulators.

Landscape Training Classes

The California Friendly and Native Landscape Training and the Turf Removal and Garden Transformation Workshops provide education to residential homeowners, property managers, and professional landscape contractors on a variety of landscape water efficiency practices that they can employ and use to help design a beautiful garden using California Friendly and native plant landscaping principles.
The California Friendly and Native Landscape Class demonstrates how to: implement storm water capture features in the landscape; create a living soil sponge that holds water; treat rainwater by a resource; select and arrange plants to maximize biodiversity and minimize water use; and control irrigation to minimize water waste, runoff and non-point source pollution.

The Turf Removal and Garden Transformation Workshop teaches participants how to transform thirsty turfgrass into a beautiful, climate-appropriate water efficient garden. This class teaches how to: evaluate the landscape’s potential; plan for garden transformation; identify the type of turfgrass in the yard; remove grass without chemicals; build healthy, living soils; select climate-appropriate plants that minimize water use and maximize beauty and biodiversity; and implement a maintenance schedule to maintain the garden.

9.2 Implementation over the Past Five Years

During the past five years, FY 2015-16 to 2020-21, the City, with the assistance of MET, has continued water use efficiency programs for its residential, CII, and landscape customers as described in Table 9-3. Implementation data is provided in Appendix I. The City will continue to implement all applicable programs in the next five years.

Table 9-3: City of Santa Ana Water Conservation Efficiency Program Participation

Measure	Metric	FY15/16	FY16/17	FY17/18	FY18/19	FY19/20
Central Computer Irrigation Controllers	computer controllers	-	-	-	-	9
Flow Restrictor	restrictors	4	91	-	-	-
HECWs	washers	260	197	151	149	96
HETs	toilets	441	2	-	4	8
Rain Barrels	barrels	177	40	9	3	7
Cisterns	cisterns	-	-	-	-	-
Premium HETs	toilets	1,163	158	582	7	920
Rotating Nozzles	nozzles	208	2,356	-	-	64
CII WBICs	clocks	26	3	-	20	120
Residential WBICs	clocks	22	16	32	25	22
Zero Water Urinals	urinals	-	-	-	-	-
Plumbing Flow Control	valves	-	-	-	-	-

Measure	Metric	FY15/16	FY16/17	FY17/18	FY18/19	FY19/20
Soil Moisture Sensor	controllers	-	-	-	-	-
Ice-Making Machine	machines	-	4	-	-	-
Ultra Low Water Urinal	urinals	-	3	-	-	-
Turf	sf	368,012	197,651	720	1,700	6,775
Spray-to-Drip	sf	Not eligible				
WSIP	projects	1	0	0	0	0
Recycled Water	projects; sf irrigated					
Large Landscape Survey	surveys			1		

9.3 Water Use Objectives (Future Requirements)

To support Orange County retailers with SB 606 and AB 1668 compliance (Conservation Framework), MET provides support to members agencies to ensure they meet the primary goals of the legislation including to Use Water More Wisely and to Eliminate Water Waste. Beginning in 2023, Urban water suppliers are required to calculate and report their annual urban water use objective (WUO), submit validated water audits annually, and to implement and report BMP CII performance measures.

Urban Water Use Objective

An Urban Water Supplier's urban WUO is based on efficient water use of the following:

- Aggregate estimated efficient **indoor residential** water use;
- Aggregate estimated efficient **outdoor residential** water use;
- Aggregate estimated efficient **outdoor** irrigation landscape areas with dedicated irrigation meters or equivalent technology in connection with **CII** water use;
- Aggregate estimated efficient **water losses;**
- Aggregate estimated water use for variances approved the State Water Board;
- Allowable **potable reuse water** bonus incentive adjustments.

Table 9-4 describes MET's programs that will assist the City in meeting their WUO through both direct measures: programs/activities that result in directly quantifiable water savings; and indirectly: programs that provide resources promoting water efficiencies to the public that are impactful but not directly measurable.

Table 9-4: MET Programs to Assist in Meeting WUO

WUO Component	Calculation	Program	Impact
Indoor Residential	Population and GPCD standard	**Direct Impact** • HECW • HET • Multi-Family HET (DAC/ non-DAC)	Direct Impact: Increase of indoor residential efficiencies and reductions of GPCD use
Outdoor Residential	Irrigated/irrigable area measurement and a percent factor of local ETo	**Direct Impact** • Turf Removal • Smart Timer • HEN • Rain Barrels/Cisterns •	Direct Impact: Increase outdoor residential efficiencies and reductions of gallons per ft^2 of irrigated/ irrigable area used
Outdoor Dedicated Irrigation Meters	Irrigated/irrigable area measurement and a percent factor of local ETo	**Direct Impact** • Turf Removal • Smart Timer • HEN	Direct Impact: Increase outdoor residential efficiencies and reductions of gallons

WUO Component	Calculation	Program	Impact
		• Central Computer Irrigation Controllers • Large Rotary Nozzles • In-Stem Flow Regulators •	per ft^2 of irrigated/ irrigable area used <u>Indirect Impact:</u> Provide information, resources, and education to promote efficiencies in the landscape
Water Loss	Following the AWWA M36 Water Audits and Water Loss Control Program, Fourth Edition and AWWA Water Audit Software V5	<u>**Direct Impact**</u> • Water Balance Validation • Customer Meter Accuracy Testing • Distribution System Pressure Surveys • Distribution System Leak Detection • No-Discharge Distribution System Flushing • Water Audit Compilation • Component Analysis	<u>Direct Impact</u>: Identify areas of the distribution system that need repair, replacement or other action

CII Performance Measures

Urban water supplies are expected to report BMPs and more for CII customers. Through MET, the City offers a broad variety of programs and incentives to help CII customers implement BMPs and increase their water efficiencies.

Table 9-5: CII BMP Implementation Programs Offered

Component	Program Offered	Impact
CII Performance Measures	• Water Savings Incentive Program (WSIP) • On-Site Retrofit Program (ORP) • HETs • HE Urinals • Plumbing Flow Control Valves • Connectionless Food Steamers • Air-cooled Ice Machines • Cooling Tower Conductivity controllers • Cooling Tower pH Controllers • Dry Vacuum Pumps • Laminar Flow Restrictors	WSIP incentivizes customized CII water efficiency projects that utilize BMPs. ORP incentivizes the conversion of potable to recycled water, and is applicable to CII dedicated irrigation meters or CII mixed-use meters that may be split to utilize recycled water for irrigation. Additional CII rebates based on BMPS increase the economic feasibility of increasing water efficiencies.

10 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

The Water Code requires the UWMP to be adopted by the Supplier's governing body. Before the adoption of the UWMP, the Supplier has to notify the public and the cities and counties within its service area per the Water Code and hold a public hearing to receive input from the public on the UWMP. Post adoption, the Supplier submits the UWMP to DWR and the other key agencies and makes it available for public review.

This section provides a record of the process the City followed to adopt and implement its UWMP.

10.1 Overview

Recognizing that close coordination among other relevant public agencies is key to the success of its UWMP, the City worked closely with many other entities, including representation from diverse social, cultural, and economic elements of the population within the City's service area, to develop and update this planning document. The City also encouraged public involvement through its public hearing process, which provided residents with an opportunity to learn and ask questions about their water supply management and reliability. Through the public hearing, the public has an opportunity to comment and put forward any suggestions for revisions of the Plan.

Table 10-1 summarizes external coordination and outreach activities carried out by the City and their corresponding dates. The UWMP checklist to confirm compliance with the Water Code is provided in Appendix A.

Table 10-1: External Coordination and Outreach

External Coordination and Outreach	Date	Reference
Notified the cities and counties within the Supplier's service area that Supplier is preparing an updated UWMP (at least 60 days prior to public hearing)	3/8/2021	Appendix K
Public Hearing Notice	5/19/2021 & 5/28/2021	Appendix K
Held Public Hearing	6/1/2021	Appendix K
Adopted UWMP	6/1/2021	Appendix L
Submitted UWMP to DWR (no later than 30 days after adoption)	7/1/2021	-
Submitted UWMP to the California State Library (no later than 30 days after adoption)	7/1/2021	-
Submitted UWMP to the cities and counties within the Supplier's service area (no later than 30 days after adoption)	7/1/2021	-
Made UWMP available for public review (no later than 30 days after filing with DWR)	8/1/2021	-

This UWMP was adopted by the City Council on June 1, 2021. A copy of the adopted resolution is provided in Appendix L.

10.2 Agency Coordination

The Water Code requires the Suppliers preparing UWMPs to notify any city or county within their service area at least 60 days prior to the public hearing. As shown in Table 10-2, the City sent a Letter of Notification to the County of Orange and the City of Orange on March 8, 2021 to state that it was in the process of preparing an updated UWMP (Appendix K).

Table 10-2: Retail: Notification to Cities and Counties

DWR Submittal Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Orange	☑	☑
County Name	60 Day Notice	Notice of Public Hearing
Orange County	☑	☑

The City's water supply planning relates to the policies, rules, and regulations of its regional and local water providers. The City is dependent on imported water from MET, its regional wholesaler. The City is also dependent on groundwater from OCWD, the agency that manages the OC Basin and provides recycled water in partnership with the OC San. As such, the City involved the relevant agencies in this 2020 UWMP at various levels of contribution as described below.

This 2020 UWMP was developed in collaboration with MET's 2020 UWMP to ensure consistency between the two documents. MET provided the information quantifying water availability to meet the City's projected demands for the next 25 years, in five-year increments.

MWDOC provided assistance to the City's 2020 UWMP development by providing much of the data and analysis such as population projections from the California State University at Fullerton CDR and demand projections for the next 25 years. Additionally, MWDOC led the effort to develop a Model Water Shortage Ordinance that its retail agencies as well as the City, Anaheim and Fullerton can adopt as is or customize and adopt as part of developing their WSCPs. The City also takes part in many regional programs administered by MWDOC to assist retail agencies meet various State compliance, such as the OC Regional Alliance for SB x7-7 compliance, regional water loss program for SB555 compliance, and regional water conservation programs.

As a groundwater producer who relies on supplies from the OCWD-managed OC Basin, the City coordinated the preparation of this 2020 UWMP with OCWD. Several OCWD documents, such as the Groundwater Reliability Plan, Engineer's Report, and 2017 Basin 8-1 Alternative were used to retrieve the required relevant information, including the projections of the amount of groundwater the City is allowed to extract in the 25-year planning horizon.

The various planning documents of the key agencies that were used to develop this UWMP are listed in Section 2.2.1.

10.3 Public Participation

The City encouraged community and public interest involvement in the Plan update through a public hearing and inspection of the draft document on June 1, 2021. As part of the public hearing, the City discussed adoption of the UWMP, SBx7-7 baseline values, compliance with the water use targets (Section 5), implementation, and economic impacts of the water use targets (Section 9).

Copies of the draft plan were made available for public inspection at the City Clerk's and Utilities Department offices.

Public hearing notifications were published in local newspapers. A copy of the published Notice of Public Hearing is included in Appendix K.

The hearing was conducted during a regularly scheduled meeting of the City Council.

10.4 UWMP Submittal

The City Council reviewed and approved the 2020 UWMP at its June 1, 2021 meeting after the public hearing. See Appendix L for the resolution approving the Plan.

By July 1, 2021, the City's adopted 2020 UWMP was filed with DWR, California State Library, the County of Orange and the City of Orange. The submission to DWR was done electronically through the online submittal tool – WUE Data Portal. The City will make the Plan available for public review on its website no later than 30 days after filing with DWR.

10.5 Amending the Adopted UWMP or WSCP

Based on DWR's review of the UWMP, the City will make any amendments in its adopted UWMP, as required and directed by DWR and will follow each of the steps for notification, public hearing, adoption, and submittal for the amending the adopted UWMP.

If the City revises its WSCP after UWMP is approved by DWR, then an electronic copy of the revised WSCP will be submitted to DWR within 30 days of its adoption.

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APPENDICES

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