Water Supply Evaluation
City of Hesperia General Plan Evaluation
Hesperia, San Bernardino County, California

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SECTION 1: INTRODUCTION

1.1 - PROJECT LOCATION AND DESCRIPTION

The City of Hesperia (City) is proposing to update its General Plan which includes the expansion of it's City Limits to encompass it's current Sphere of Influence (SOI). The City encompasses an area of 75 square miles according to the current General Plan. The General Plan Update will increase the City Limits to encompass approximately 118 square miles. The expansion of the City Limits will occur primarily to the southwest.

Situated north of the Cajon Pass, the Hesperia Project Area is located in San Bernardino County, east and west of Interstate 15 (I-15) (Exhibit 1) and overlaps portions of the Apple Valley South, Baldy Mesa, Cajon, Hesperia, Lake Arrowhead and Silverwood Lake, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps. The Project Area boundaries for both the City of Hesperia and the SOI area are shown in Exhibit 2 and overlain on an aerial photograph in Exhibit 3.

1.2 - HESPERIA WATER DISTRICT SERVICE AREA

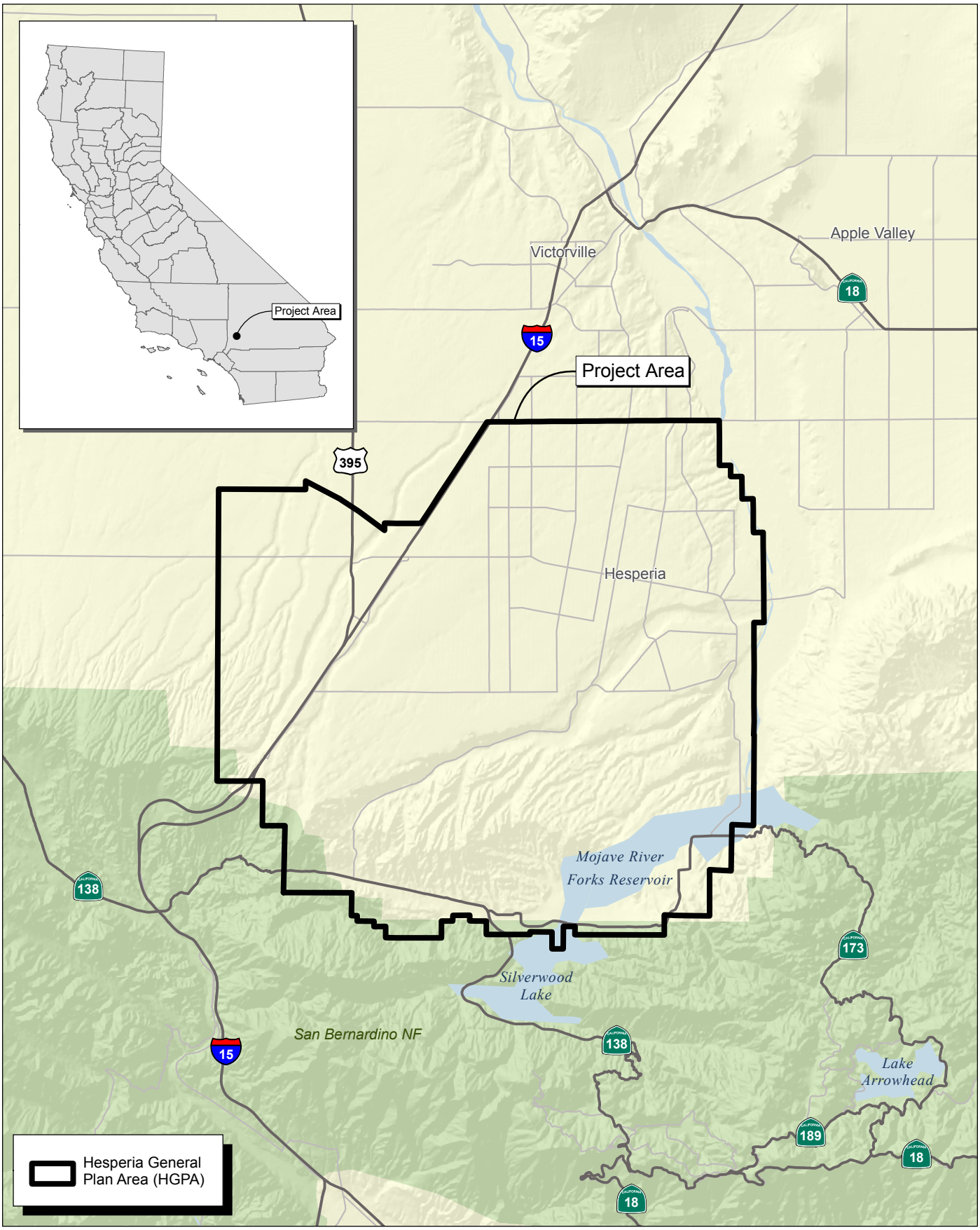
The City of Hesperia (City) is located in the southwestern portion of San Bernardino County, California, and is approximately 90 miles northeast of Los Angeles. The City is north of Lake Arrowhead and lies within the southern Mojave Desert region, encompassing an area of approximately 75 square miles. The Hesperia Water District is the water purveyor for the City. The District is a subsidiary of the City with the City Council serving as its Board of Director's. The District's service area generally coincides with the City boundary which is shown in Exhibit 3.

1.3 - LAND USE

Estimations of future water demands are based on land use and the anticipated rate of development for each planning year. Because the water system's service area falls entirely within the City's Sphere of Influence, information obtained from the City's planning department was used to determine the locations and dates of proposed land use development.

The City is currently in the process of developing an updated Water Master Plan (WMP, draft November 2005). The analyses in the WMP divide the City into planning areas, with a percentage

of the land use type within that planning area estimated. With input from City staff, densities and rates of annual development for these specified planning areas were defined and planning year



Source: Census 2000 Data, The CaSIL, MBA GIS 2009, City of Hesperia 2009.

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Michael Brandman Associates

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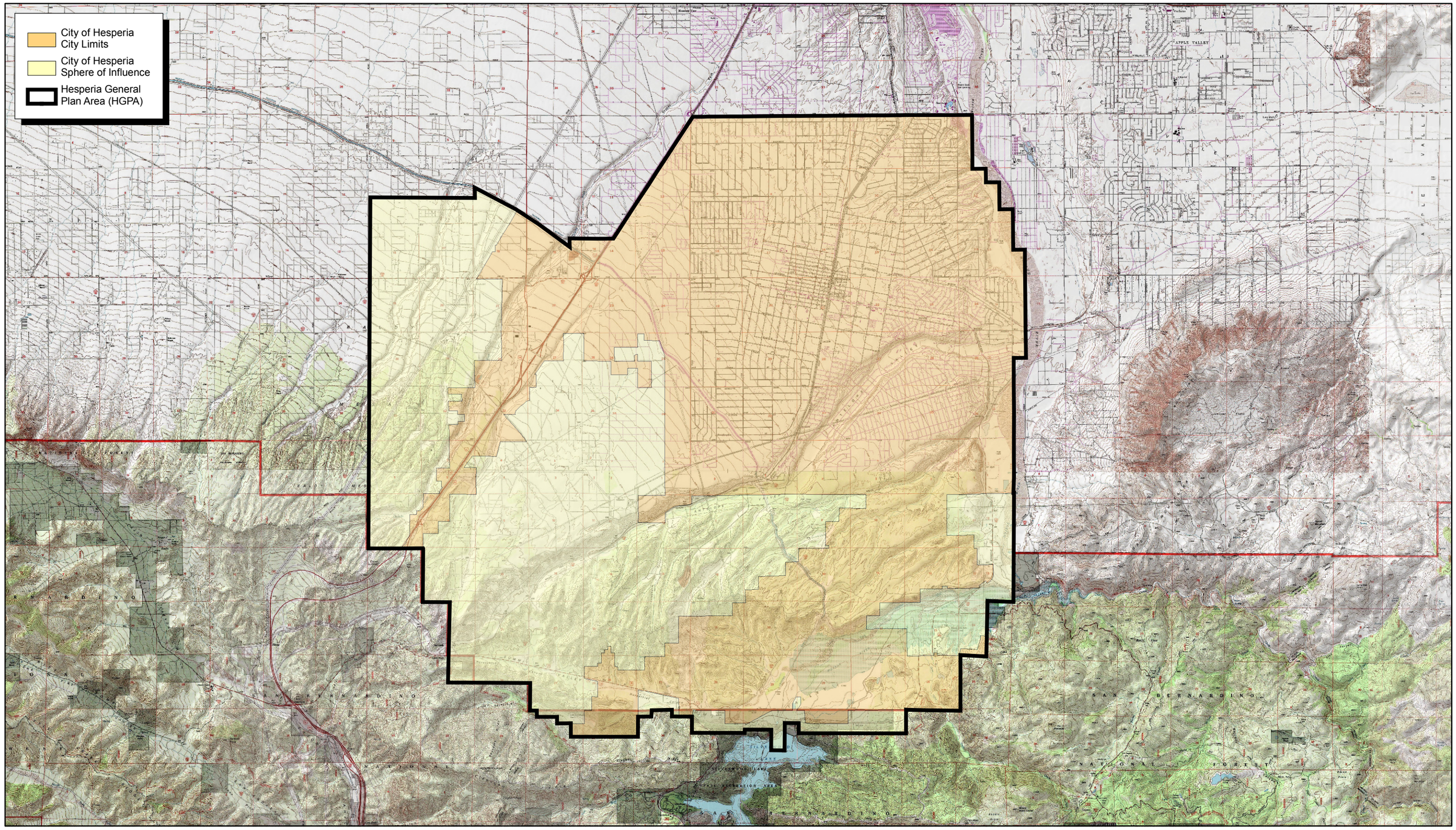
Exhibit 1
Regional Location Map



Source: USGS Baldy Mesa, Hesperia, Apple Valley South, Hesperia, Cajon, Silverwood Lake, Lake Arrowhead, Phelan, Telegraph Park, Fifteenmile Valley, and Butler Peak 7.5' DRG. City of Hesperia (2009).

NORTH

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Feet

Michael Brandman Associates

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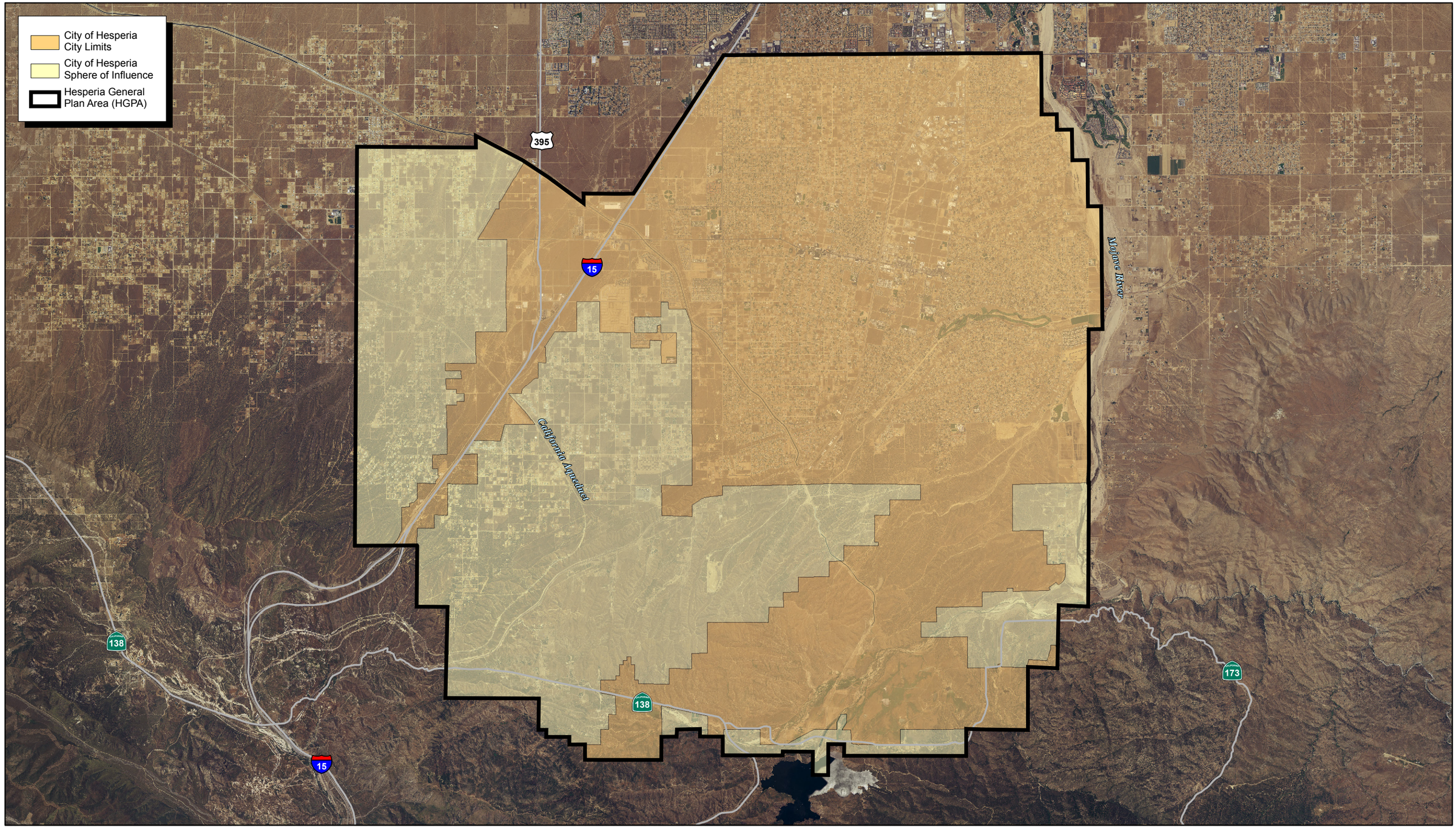
Exhibit 2
Local Vicinity Map
Topographic Base



Source: NAIP for San Bernardino County (2005) & City of Hesperia (2009).

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Michael Brandman Associates

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Exhibit 3
Local Vicinity Aerial Map

water demands determined. The various current land use categories within the City are shown in Table 1.

Table 1: Land Use Categories

Land Use Category	Area (acres)	Percentage of Total
Residential		
Low Density	15,398	32.0
High Density	582	1.2
Commercial	133	0.3
Industrial	727	1.5
Undeveloped	31,218	65.0
Total	**48,058**	**100.0**
Source: City of Hesperia Water Master Plan Update, November 2005 Draft.		

1.4 - PROJECTED POPULATION

With the availability of relatively low priced land to attract residential development and business incentives to attract industrial, manufacturing, and distribution companies, the City was growing at a rapid pace through 2008, when the local and regional economy experienced a significant downturn. The population studies from the Southern California Association of Governments (SCAG) were based on 2003 population trends. To date, the City has seen a much higher growth rate than that projected by SCAG. Therefore, population estimates were calculated based on development projected by the City's planning department. The results from this analysis were compared to the population projections prepared by SCAG. Table 2 summarizes the population growth through 2030.

Table 2: Current and Projected Population

Source	2005	2010	2015	2020	2025	2030
SCAG Estimates [a]	78,494	90,800	117,568	139,049	159,638	179,383
City of Hesperia Estimates [b]	78,539	116,427	136,095	153,802	167,024	175,219
City vs. SCAG (% Difference)	0.1%	21.5%	15.8%	10.6%	4.6%	-2.3%
Annual Increase over 5-Year Period (%/Year)		9.6%	3.4%	2.6%	1.7%	1.0%

[a] Population Projections Source: SCAG.
[b] Population Projections Source: City of Hesperia 2005 Urban Water Management Plan, Appendix C.
Source: City of Hesperia 2005 Urban Water Management Plan.

SECTION 2: GROUNDWATER BASIN

The City of Hesperia lies within the Upper Mojave River Valley Groundwater Basin of the South Lahontan Hydrologic Region. The following basin description is from the California Department of Water Resources Groundwater-Bulletin 118 - Update 2003.

2.1 - BASIN BOUNDARIES AND HYDROLOGY

The Upper Mojave River Valley Groundwater Basin underlies an elongated north-south valley, with the Mojave River flowing (occasionally) through the valley from the San Bernardino Mountains on the south, northward into the Middle Mojave River Valley Groundwater Basin at the town of Helendale. The groundwater basin is bounded on the north by a roughly east-west line from basement rock outcrops near Helendale to those in the Shadow Mountains. The southern boundary is the contact between Quaternary sedimentary deposits and unconsolidated basement rocks of the San Bernardino Mountains. The basin is bounded on the southeast by the Helendale fault and on the east by basement exposures of the mountains surrounding Apple Valley. In the west, the boundary is marked by a surface drainage divide between this basin and El Mirage Valley Basin, and a contact between alluvium and basement rocks that form the Shadow Mountains. Average precipitation varies across the basin from five to 36 inches with the average for the basin near 12 inches (USDA 1999).

2.2 - HYDROGEOLOGIC INFORMATION

2.2.1 - Water Bearing Formations

The two primary water-bearing units within the Mojave River Valley Basin system consist of regional Pliocene and younger alluvial fan deposits (fan unit) and of overlying Pleistocene and younger river channel and floodplain deposits, which have been called the floodplain unit (DWR 1967), or the floodplain aquifer (Lines 1996; Stamos and others 2001). Other potential, but not regionally significant, water-bearing units include older alluvium, old fan deposits, old lake and lakeshore deposits, and dune sand deposits (DWR 1967). Water-bearing deposits in this basin are predominantly unconfined, though some perched water appears near Adelanto. Well yields typically range from 100 to 2000 gpm (Hardt 1969; Lines 1996; Stamos and others 2001) with an average of about 630 gpm for all units.

Pleistocene and Younger Floodplain Unit

The floodplain unit is the more productive and extensively studied of the two units and extends 50 to 200 feet deep in this basin, but is restricted to within about 1 mile of the active Mojave

River channel (Stamos and others 2001). The average thickness is estimated to be about 150 feet through this basin. Specific yield for this unit ranges from 23 to 39 percent (Lines 1996) and the average specific yield for this unit is about 27 percent in this basin (DWR 1967; Lines 1996).

Pliocene and Younger Fan Unit

The regional fan unit is composed of late Tertiary and younger unconsolidated to partially consolidated alluvial fan deposits up to 1,000 feet thick (Stamos and Predmore 1995; Lines 1996). The permeability of these deposits decreases with depth (Stamos and others 2001). Estimated average effective thickness in the Upper Mojave River Valley Groundwater Basin is about 300 feet thick (DWR 1967). Available information indicates that specific yields and well yields are generally less for the fan unit compared to the floodplain unit, but suggest generally higher well yields for younger fan deposits and lower well yields for older fan deposits (DWR 1967). The specific yields for this unit range from 4 percent to 25 percent with an estimated average of 10 percent (DWR 1967).

2.3 - RESTRICTIVE STRUCTURES

This groundwater basin is bounded on the northeast by the Helendale fault zone, which forms a barrier to groundwater flow in the regional fan unit, but does not appear to be a barrier to groundwater flow in the floodplain unit (Stamos and Predmore 1995; Stamos and others 2001). The fault zone causes an eastward lowering of the water table across the southeastern boundary into the Lucerne Valley Basin in the fan unit deposits (Stamos and Predmore 1995; Lines 1996). Stamos and others (2001) also interpret unexposed faults acting as barriers to cause steep groundwater gradients between Victorville and Adelanto.

In the southern portion of the basin, bedrock constriction causes water to rise to the surface of the Mojave River at the Upper and Lower Narrows (Lines 1996; Stamos and others 2001). Historically, such locations have been used for camping and watering spots, such as Lane's Crossing just north of the Lower Narrows (Lines 1996).

2.4 - RECHARGE AREAS

Natural recharge of the basin is from direct precipitation, ephemeral stream flow, infrequent surface flow of the Mojave River, and underflow of the Mojave River into the basin from the southwest (Stamos and Predmore 1995; Lines 1996). Treated wastewater effluent, septic tank effluent, effluent from two fish hatchery operations, and irrigation waters are allowed to percolate into the ground and recharge the groundwater system (Lines 1996). A large, but sporadic contribution to recharge occurs when the Mojave River is flowing, with 40 feet of rise in the

water table observed during 1969 and 16 to 48 feet of rise observed in 1993 (Hardt 1969; Lines 1996). The general groundwater flow is toward the active channel of the Mojave River and then it follows the course of the river through the valley (Stamos and Predmore 1995; Lines 1996). The Helendale fault forms a barrier to groundwater flow in the southeast corner of the basin. This barrier causes groundwater to flow northwestward under a surface drainage divide into the Mojave River drainage instead of northeastward into Lucerne Lake (dry) in the Lucerne Valley Basin. In addition to natural recharge, storm water and storage waters are released on a periodic basis from Silverwood Lake through the Mojave Forks Dam and recharge along the West Fork of the Mojave River (HWD 2005).

2.5 - GROUNDWATER LEVEL TRENDS

Groundwater levels in wells in the floodplain unit near the Mojave River tend to vary in concert with rainfall and runoff rates, whereas groundwater levels in the fan unit do not show significant changes due to local rainfall (MWA 1999). The general trend in this basin is for declining groundwater levels, particularly in the fan unit. Three of the ten highest precipitation years over a 60-year base period occurred during 1991 through 1999 (MWA 1999). Infiltration of the runoff from this relatively abundant precipitation has produced an increase in groundwater level (and groundwater storage) in the floodplain unit near the Mojave River (MWA 1999).

The City of Hesperia 2005 Urban Water Management Plan indicates that water levels declined approximately 30 feet over the 20 year period from 1984 to 2004, although three high precipitation years produced a slight spike between 1991 and 1999 in groundwater levels during (Hesperia, 2005). In addition the MWA 2004 Regional Water Management Plan, which evaluated Mojave Basins water issues and includes a series of actions, programs, improvements and recommendations to address these issues consistent with the Mojave Basin Area Judgment, indicates that groundwater levels have generally been declining for the past 50 years or more (MWA, 2004).

The MWA has been recharging the groundwater basin since 1991 and has put over 100,000 acre feet of water back into the basin. In 2004 MWA began a project called Regional Recharge and Recovery (R-Cubed), which is anticipated to be in operation in 2010 that will replenish groundwater supplies throughout the Victor Valley at an estimated cost of $69 million.

According to the City of Hesperia in their memorandum of January 29, 2010 (Hesperia 2010) the MWA has indicated that, due to the efforts of MWA and the Cities within the Basin to acquire and import water rights into the basin “the overdraft of the Basin has been arrested”. The City

also notes in their memo that MWA's 15th annual report states that "further rampdown of the Alto sub-basin is not warranted at this time." The City also cites the fact that the City's Free Production Allowance of 8,153 acre feet has not changed in the past four years. The City has also indicated that hydrograph records show that water levels have stabilized in seven of the Hesperia Water District's 18 water wells in the last two years, and further indicate that the MWA acknowledges that this trend is basin-wide.

2.6 - GROUNDWATER STORAGE

2.6.1 - Groundwater Storage Capacity

Published total storage capacity for the Upper Mojave River Valley Groundwater Basin varies. The boundaries of the Upper Mojave River Valley Groundwater Basin of this report correspond closely to the Upper Mojave River Basin and Fifteen Mile storage units discussed by DWR (1967). DWR (1967) calculated the total storage capacity for these storage units using the base of water-bearing materials, an average of about 300 feet. The total storage for the Upper Mojave River Basin and Fifteen Mile storage units is 27,839,000 acre-feet (DWR 1967). The Upper Mojave River Valley Groundwater Basin also roughly underlies the Alto subarea and about one-third of the Este sub-area under the administration of the Mojave Water Agency (MWA 1999). The MWA uses an economic pumping depth of 100 feet as a limit for effective basin depth, and calculates a total effective storage capacity of 2,086,000 acre-feet (af) for the Alto subarea and 530,000 af for the Este sub-area (BEE, 1994). Using an overlying area of about 413,000 acres, an average thickness of about 300 feet, and an average specific yield of about 10.5 percent indicates a total storage capacity of about 13,000,000 af.

2.6.2 - Groundwater in Storage

MWA (1999) calculated the available stored groundwater underlying the Alto subarea at the end of 1998 was 960,000 af and the available storage space was 1,126,000 af. MWA (1999) calculated the available stored groundwater in the Este sub-area at the end of 1998 was 420,000 af and the available storage space was 110,000 af. The basin is considered effectively full when 1930 water level elevations are reached (BEE, 1994). Assuming an overlying area of about 413,000 acres, a saturated thickness of about 250 feet, and a specific yield of 10.5 percent indicates about 10,800,000 af of stored groundwater at the end of 1998. This amount indicates that about 2,200,000 af of additional storage space was available.

As previously mentioned under Section 2.5 above in reference to a memo from the City, hydrograph records show that water levels have stabilized in seven of the Hesperia Water District's 18 water wells in the last two years, and that the MWA acknowledges that this trend is basin-wide.

2.7 - GROUNDWATER BUDGET (TYPE A)

The Type A Groundwater Budget indicates one of the following: (1) a groundwater budget exists for the basin or enough components from separate studies could be combined to give a general indication of the basin's groundwater budget, (2) a groundwater model exists for the basin that can be used to calculate a groundwater budget, or (3) actual groundwater extraction data exist for the basin.

While not enough data exists to compile a detailed groundwater budget for the basin, MWA monitors groundwater extraction and reports extractions of 58,300 af for urban uses, 7,800 af for agriculture, and 11,900 af for industrial and recreational uses in the 1997-1998 water year (MWA 1999). In addition to the extraction data, several other components of the water budget have been reported. For the 1997-1998 water year, MWA (1999) estimated natural recharge at 105,000 af, artificial recharge at 16,350 af, and applied water recharge at 3,900 af. Subsurface inflow and outflow averages are estimated by DWR (1967) at 950 af inflow and 2,000 af outflow. Bookman-Edmonston Engineering (1994) set the average inflow at about 1,000 af and the average outflow at 2,000 af. Stamos and others (2001) estimated that 5,000 to 6,000 afa flows through the floodplain unit into the Middle Mojave River Valley Groundwater Basin near the Helendale fault.

Finally, the MWA reports that for the 2009-2010 water year, Free Production Allowance (currently at 60% of Base Annual Production) exceeds Production Safe Yield by 4.1% of BAP indicating that further Rampdown is not warranted in the Alto sub-basin at this time. Other considerations that could result in a continuation of Rampdown in Alto include increasing water production, falling water levels and water quality problems. Water Production in Alto declined by 10,260 acre feet in 2007-08 from 2006-07. The importation of supplemental water is expected to be sufficient to offset overproduction within two years. In 2008, the Watermaster purchased 27,661 acre-feet for Replacement Obligations incurred in 2007. The MWA further reports that under conditions existing in 2007-08 and assuming long-term water supply, there is a small surplus in Alto.

2.8 - GROUNDWATER EXTRACTIONS

A summary of recent groundwater amounts pumped by Hesperia Water District as provided in the City's Urban Water Management Plan is shown below in Table 3.

Table 3: Hesperia Water District Groundwater Extractions 1999 to 2005

Groundwater	Acre Feet Annually (afa)						
	1999	2000	2001	2002	2003	2004	2005
Average Production	14,922	15,474	14,606	15,284	14,649	16,644	16,804
Source: City of Hesperia 2005 Urban Water Management Plan.							

In addition, according to the City of Hesperia, water production for the year 2008 totaled approximately 16,955 acre feet.

2.9 - GROUNDWATER QUALITY

2.9.1 - Characterization

Calcium bicarbonate character waters are found near the San Bernardino Mountains and near the Mojave River Channel. Sodium bicarbonate water is found near Victorville. Sodium bicarbonate-sulfate water is found near Adelanto. Sodium-calcium sulfate water occurs west of Victorville. Sodium chloride water is found in Apple Valley. Small areas of calcium-sodium sulfate and calcium-sodium bicarbonate also occur in this basin (DWR 1967). Total dissolved solids content typically is less than 500 mg/L (BEE 1994), but concentrations up to 1,105 mg/L were found near Apple Valley (DWR 1967). Electrical Conductivity readings range as high as 1,529 µmhos near Adelanto (DWR 1967).

2.9.2 - Mojave Basin Impairments

According to the City of Hesperia 2005 Urban Water Management Plan, the water from City water supply and distribution do not exceed the Maximum Contaminant Levels (MCL's) allowed in drinking water per state regulations. There were no sampled wells with a concentration above an MCL for radiological constituents, inorganic chemicals, or secondary standards between the years 2002 and 2004. In addition, the Hesperia Water District recently received an award for its water quality.

Although the District's wells provide high quality water, within the Mojave River basin high nitrate concentrations occur in the southern portion of the basin and high iron and manganese concentrations are found near Oro Grande. Groundwater has been contaminated with trichloroethane (TCE) at the former George Air Force Base, now a federal Superfund site (BEE 1994). Leaking underground storage tanks in and around Victorville have introduced fuel constituents benzene, toluene, ethylbenzene, xylene, and the additive methyl tertiary butyl ether (MTBE) into groundwater (BEE 1994; MWA 1999).

Table 4 shows the water quality of public supply wells in the basin. Water quality may be a potential concern for the groundwater basin overall. Maximum Contaminant Levels (MCLs) were exceeded in several public supply wells for primary inorganics, secondary inorganics, radiological constituents, and nitrates. Although it should be noted that none of the Hesperia Water District wells exceed any of the MCLs..

Table 4: Water Quality in Public Supply Wells Within the Mojave Basin[1]

Constituent Group	Number of Wells Sampled	Number of Wells with a Concentration above an MCL
Inorganics – primary	122	9
Inorganics – secondary	122	11
Radiological	115	2
Nitrates	125	2
Pesticides	117	0
VOCs and SVOCs	120	0

Note: Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

[1] None of the wells exceeding MCL;s are Hesperia Water District wells.

Source: City of Hesperia 2005 Urban Water Management Plan.

SECTION 3:
HESPERIA WATER DISTRICT

The information contained in this section is based on the City of Hesperia's 2005 Urban Water Management Plan.

3.1 - WATER SUPPLY

The City of Hesperia currently uses local groundwater as its sole supply source. The City's municipal water system extracts all of its water supply from the underground aquifers through 18 active groundwater wells located throughout the City.

The pumping capacities of the City wells are shown in Table 5. Seven of the thirteen active wells each have a pumping capacity that exceeds 1,500 gpm. The wells have a total supply capacity of 32.7 mgd or 22,736 gpm (over 36,600 acre-feet annually). The City's firm production capacity, which is defined as the total capacity with the single largest well out of service, is approximately 20,126 gpm (29.0 mgd).

All of the wells are continuously disinfected with sodium hypochlorite at each well site. Disinfected water is pumped directly into the distribution system and/or a storage reservoir. The City currently maintains 11 storage reservoirs within the distribution system with a total capacity of 49.5 million gallons.

Table 5: Existing Active Water Supply Wells

City Well Number	Capacity (gpm)
3A	2,336
4A	2,400
5A	2,610
14A	2,398
14B	2,200
15A	1,410

Table 5: Existing Active Water Supply Wells (Cont)

City Well Number	Capacity (gpm)
17	1,235
18	1,377
21	809
22	1,866
24	2,000
25	888
26	1,207
Total	**22,736**

gpm = gallons per minute.
Source: Water Master Plan Update, Draft November 2005. Capacities obtained from Pump Check Hydraulic Test Reports.

Since 2005 the District has put an additional 5 wells into operation. The average production in gallons per minute (GPM) for these wells in 2009 is:

Well	**2009 Average GPM**
19A	809
20	1006
29	3224
31	1333
32	1687

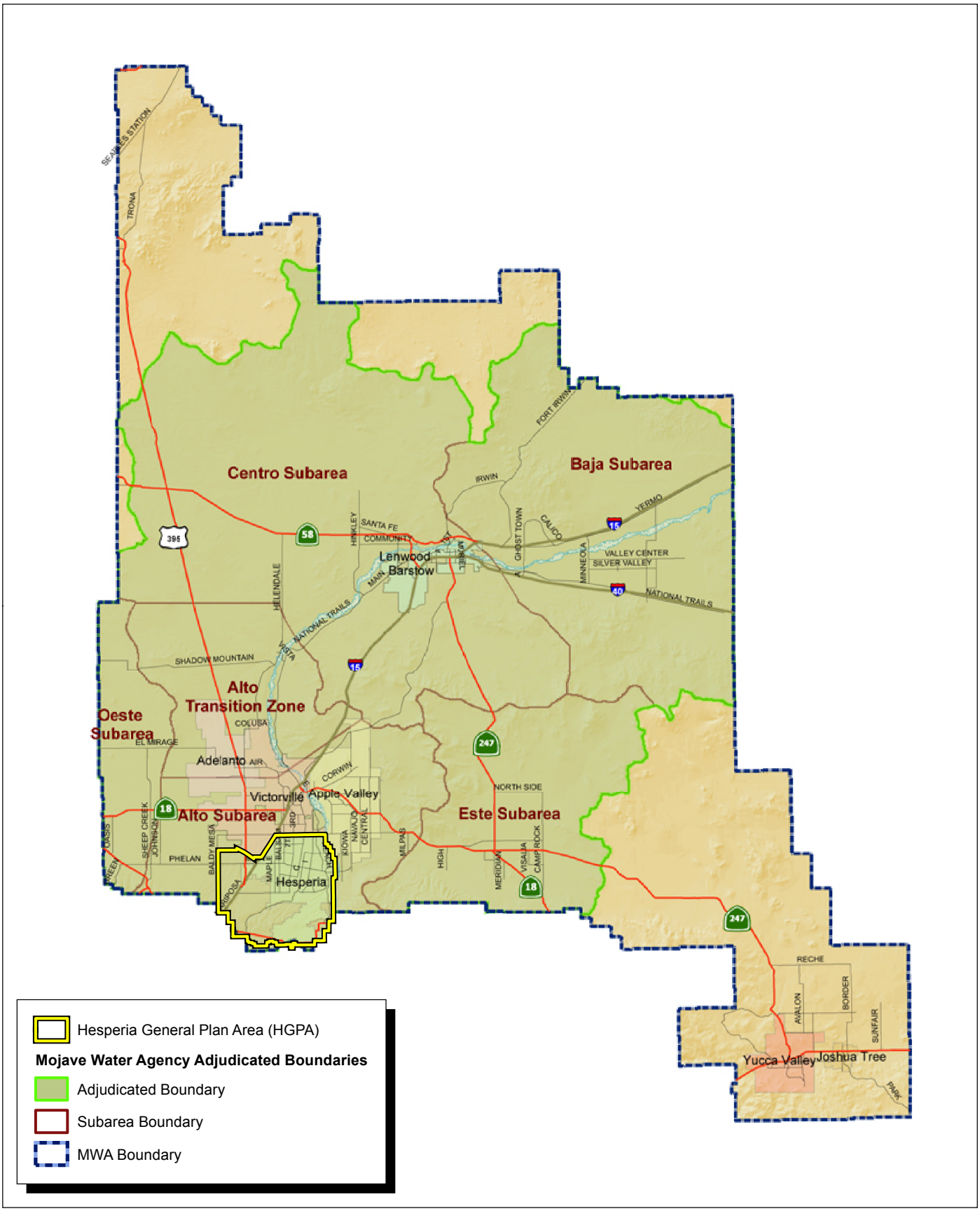
In addition to local wells, the City could choose to utilize surface water imported from the State Water Project (SWP) through the California Aqueduct. The State is currently developing a Delta

Conservation Plan that will help ensure reliable delivery of SWP supplies to Southern California, including the Project area.

3.1.1 - Basin Boundaries

There have been many different and conflicting references to the subbasins within the Mojave River Groundwater Basin. This report looks at the classifications and boundaries as set by the Mojave Basin Area Judgment and California's Groundwater Bulletin 118, published by the Department of Water Resources.

For management purposes under the Mojave Basin Area Judgment, the Mojave Water Agency (MWA) split the basin into five separate subbasins, as shown in Exhibit 4. The Mojave River Groundwater Basin subarea classifications are Este, Alto, Oeste, Centro, and Baja. The subarea boundaries are based on hydrologic divisions, including geologic, engineering, and political considerations. The Alto subarea is located in the south portion of the Mojave River Groundwater Basin and encompasses the City of Hesperia, as well as nearby Victorville and Apple Valley. In contrast, DWR Bulletin 118 defines 11 groundwater basins within the Mojave River Groundwater Basin, including the Upper Mojave River Valley Groundwater Basin, which encompasses 645 square miles and includes parts of the Transition zone, Alto and Este subareas.



Source: Mojave Water Agency, "Mojave Water Agency Adjudicated Boundaries" (2009).

Michael Brandman Associates

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Exhibit 4
Mojave Groundwater Basins

The City of Hesperia is located within MWA's Alto subarea (Exhibit 5) and DWR's Upper Mojave River Valley Groundwater Basin.

3.1.2 - Adjudication

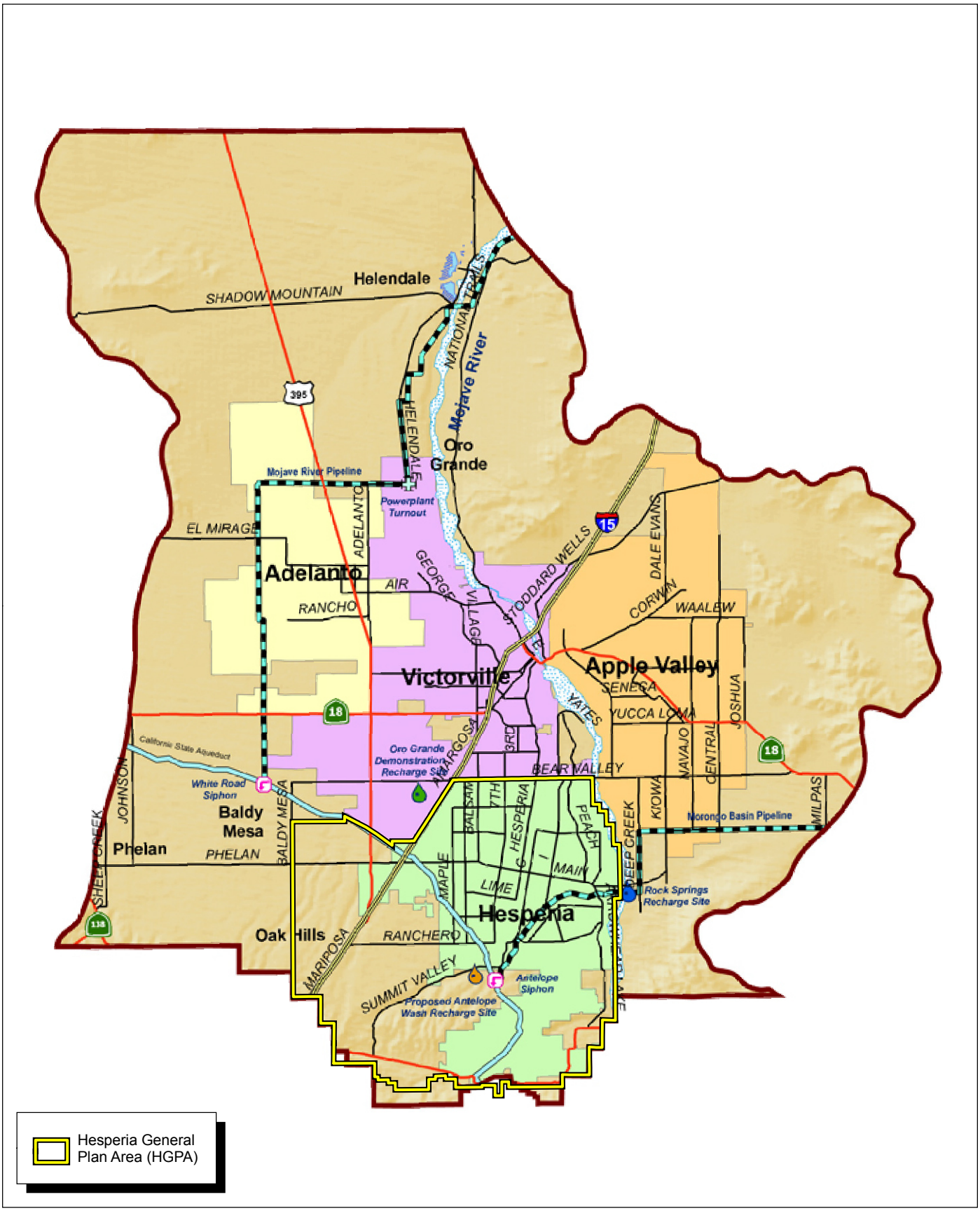
Continuous and high growth rates in the Mojave River Basin area in the 1950s through the 1980s caused water demands to exceed local supplies. The imbalance between supply and demand has led to overdraft of the basin. Continued groundwater level declines led to an adjudication process that was initiated in the mid-1960s. In 1990, the City of Barstow and the Southern California Water Company filed a complaint against upstream water users claiming that the increased withdrawals and lowering of groundwater levels reduced the amount of natural water available to downstream users. About a year later, the Mojave Water Agency filed a cross-complaint, which declared that the native waters of the Mojave River and underlying groundwater were insufficient to meet the current and future demands made upon them. The cross-complaint asked the court to determine the water rights of all surface water and groundwater users within the Mojave Basin Area. During the following two years, negotiations resulted in a proposed Stipulated Judgment. The purpose of the stipulated judgment was to:

- Create incentives to conserve local water
- Guarantee that downstream producers will not be adversely affected by upstream production
- Assess producers to obtain funding for the purchase of imported water

The Mojave Basin Judgment assigned a Base Annual Production (BAP) quota to each producer that uses 10 acre-feet annually or more. Groundwater pumpers were also assigned a variable Free Production Allowance (FPA), which is a uniform percentage of the BAP set for each sub-basin. This percentage is reduced over time until the FPA comes into balance with the available supplies. To implement the Stipulated Judgement, the court assigned the Board of Directors of the Mojave Water Agency (MWA) as the basin Watermaster to review local water supply conditions (e.g., historical and past year rainfall, natural and man-made recharge, etc.) on an annual basis and recommend an appropriate FPA based on those conditions. Any producer that pumps more than their assigned FPA must purchase replenishment water from the MWA to equal the amount of production in excess of their FPA or lease unused FPA from another stipulator. The Watermaster's annual report for 2003-2004 recommended an FPA of 60 percent for municipal and industrial users within the Alto sub-basin, and this is the City's current FPA level. For additional information on the adjudication, see section 4.2.

3.1.3 - Groundwater Levels

Water levels from local wells indicate that groundwater has declined approximately 30 feet over the last 20 years. Three high precipitation years occurred between 1991 and 1999, which



Source: Mojave Water Agency, "Alto Subarea" (2009).

NORTH

5 2.5 0 5 Miles

Michael Brandman Associates

Exhibit 5
Alto Sub-Basin

produced a slight increase in groundwater levels. Historical groundwater levels in the Alto sub-area have fluctuated between 400 and 500 feet below ground surface over the past 20 years in areas away from the Mojave River, while groundwater levels have fluctuated from 200 to 300 feet bgs in areas closer to the Mojave River over the same time period (MWA 2005) (USGS 2008). According to the USGS, "the long term hydrographs for the Mojave River groundwater basin show that water levels have declined more than 80 feet in the Alto sub-area since the mid 1940s (wells 5N/5W-22E1, -22E2, and -22E6)" (USGA 2008).

However, as mentioned above, the MWA has been recharging the groundwater basin since 1991 and has put over 100,000 acre feet of water back into the basin. In 2004 MWA began a project called Regional Recharge and Recovery (R-Cubed), which is anticipated to be in operation in 2010 that will replenish groundwater supplies throughout the Victor Valley at an estimated cost of $69 million. The 2010 Urban Water management Plan, (currently under preparation) should document the City's and MWA's continuing efforts.

3.1.4 - Groundwater Production Capacity

To establish the adequacy of the water supply facilities, the source(s) must be large enough to meet the varying water demand conditions, as well as provide sufficient water during drought conditions and potential emergencies, such as power outages and natural disasters.

Normal Production Capacity

In accordance with industry standard practices and the California Department of Health Services (DHS) criteria for "Adequate Source Capacity" on water supply, the source should be sized to serve the maximum day demand (MDD). On the day of maximum demand, it is desirable to maintain a water supply rate equal to the MDD rate. Water required for peak hour demands (PHD) or for fire flows would come from storage.

Standby Production Capacity

Standby production capacity is required for system reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be placed out of service during MDD conditions due to equipment malfunction, servicing, or water quality concerns. The DHS criterion for standby production capacity recommends considering the capacity of the largest well being out of service. The City's current MDD is approximately 25.6 mgd, and City staff indicates that their production capacity is currently 32.7 mgd.

Future Supply Capacity

With a firm production capacity that continues to meet the MDD, the City's groundwater wells provide an adequate source of supply for the City. The UWMP included a review of the City's supply requirements through the year 2030 planning horizon. These projections are summarized in Table 6, which lists the projected water supply, in 5-year increments, through the 2030 planning horizon.

Table 6: Current and Projected Water Supply

	2005	2010	2015	2020	2025	2030
Supply (afa)	36,624	54,428	71,000	85,567	92,741	99,325

afa = acre-feet annually
Source: City of Hesperia 2005 Urban Water Management Plan.

3.1.5 - Water Recycling

The Victor Valley Wastewater Reclamation Authority (VVWRA) is a Joint Powers Authority that provides treatment and distribution of reclaimed water for its member entities, which include Apple Valley, Hesperia, Victorville, Victorville Water District, Oro Grande, and Spring Valley Lake. The VVWRA operates and maintains a 12.5 million gallons per day (mgd) wastewater treatment plant. There are plans in progress to expand the plant to 18 mgd. It is the long-term goal of the VVWRA to capture and reclaim all wastewater flows within its service area, but no target date has been set to achieve this goal.

The VVWRA is currently preparing a Water Reuse Master Plan to optimize the use of recycled water within the City limits for potential customers. During the peak demand months, recycled water would be used to offset potable water demands. In low demand months, the recycled water would be used to recharge the groundwater basin.

3.2 - WATER DEMAND

3.2.1 - Past, Current, and Projected Water Demand

The City of Hesperia customers include residential, commercial, industrial, and institutional groups. Currently, the City maintains approximately 22,414 water meters. These meters are classified into the following categories: 21,483 residential, 736 commercial, 96 industrial, 20 landscape irrigation, and approximately 70 "other" customer types.

Past Water Use

According to the City's Urban Water Management Plan (2005) in 2004, the City produced 5.4 billion gallons of water (16,646 acre-feet), which is equivalent to 14.9 mgd of water servicing a population of approximately 76,114. Table 7 lists the recent annual water production amounts from 1999 to 2004. While annual production rates varied from year to year, decreasing in some years from the previous, overall production increased by 11.5 percent.

Table 7: Annual Water Production

Year	Total Annual (afa)
1999	14,924
2000	15,476
2001	14,608
2002	15,286
2003	14,651
2004	16,646

afa = acre-feet annually
Source: City of Hesperia 2005 Urban Water Management Plan.

Since the preparation of the 2005 UWMP the City has put 5 additional wells into operation. According to the Hesperia Water District, annual water production for the years 2005 to 2008 averaged 17,206 AF/Y**.**

Projected Water Use

The historical per capita consumption rate is frequently used with population projections to estimate future water requirements, evaluate the adequacy of existing supply sources, and determine storage needs. However, due to the recent increases in growth in this region, the UWMP uses higher population projections, based on projected development, land use, and estimated densities, to determine future water demands for specific planning years. This methodology was thought to be more accurate as well as more conservative.

Projected water demands were determined from recent population growth trends combined with land use projections based on current land uses (see Table 1). Using an occupancy rate of 3.3 persons per single-family dwelling unit, 2.7 persons per multi-family dwelling unit, and a water demand factor of 160 gallons per capita per day (gpcd), the residential water demands were calculated. The water demand factors for commercial and industrial land uses were 2,000 gallons per day per acre (gpd/acre) and 3,000 gpd/acre, respectively. Table 8 shows the acreage and number of dwelling units by land use for each planning year along with the resulting water demands.

Table 8: Water Demand by Land Use Type

Year	Land Use Type	Area (acre)	DUs	Water Demand Factors				Water Demand
				Occupancy (people/du)	Residential (gpcd)	Commercial (gpd/acre)	Industrial (gpd/acre)	Acre-feet annually
2005	LDR		20,689	3.3	160			12,236
	HDR		3,802	2.7	160			1,840
	COM	129				2,000		288
	IND	727					3,000	2,442
							Total	**16,806**
2010	LDR		35,565	3.3	160			21,626
	HDR		5,995	2.7	160			2,901
	COM	444				2,000		995
	IND	1,095					3,000	3,679
							Total	**29,201**
2015	LDR		47,156	3.3	160			27,991
	HDR		7,899	2.7	160			3,822
	COM	898				2,000		2,012
	IND	1,521					3,000	5,112
							Total	**38,837**
2020	LDR		55,066	3.3	160			32,568
	HDR		10,193	2.7	160			4,932
	COM	1,455				2,000		3,260
	IND	1,948					3,000	6,546
							Total	**47,306**
2025	LDR		57,666	3.3	160			34,106
	HDR		11,912	2.7	160			5,764
	COM	1,795				2,000		4,021
	IND	2,258					3,000	7,587
							Total	**51,478**
2030	LDR		59,888	3.3	160			35,420
	HDR		13,312	2.7	160			6,442
	COM	2,063				2,000		4,621
	IND	2,626					3,000	8,824
							Total	**55,307**

LDR = Low Density Residential, HDR = High Density Residential, COM = Commercial, IND = Industrial.
du = dwelling unit.
gpd = gallons per day.
gpcd = gallons per capita per day.
Source: City of Hesperia 2005 Urban Water Management Plan.

Maximum Day Demand

One of the water demand conditions of particular significance is the maximum day demand (MDD). This is the highest water demand during a 24-hour period of the year. The MDD peaking factor is expressed as a multiplier applied to the average day demand (ADD). Water system supply sources are typically sized to meet the anticipated MDD with the largest supply source out of service.

The Water Master Plan established that the City's ADD is 10,336 gpm (16,646 afa). A peaking factor of 1.72 was used for the MDD analysis of future water demands. Table 9 shows the maximum day demands for past, current, and projected water use.

Table 9: Historic and Current Water Use

Year	Population	Average Production (acre-feet annually)	Maximum Day Demands (acre-feet annually)
1999	62,091	14,924	25,651
2000	62,582	15,476	26,547
2001	64,200	14,608	25,091
2002	65,589	15,286	26,211
2003	67,843	14,651	25,203
2004	76,114	16,646	28,564
2005	78,494	16,806	28,900
2010	122,560	29,201	50,182
2015	144,784	38,837	66,761
2020	165,660	47,306	81,322
2025	179,404	51,478	88,491
2030	186,824	55,307	95,100

Note: Historical Population Source: Department of Water Resources Public Water System Statistics, as submitted by the Hesperia Water District.
Note: Populations Projections Source: Population estimates were calculated using project development projects, land use, and densities based on information provided by the City's planning department.
Source: City of Hesperia 2005 Urban Water Management Plan.

3.2.2 - Supply and Demand Comparison

A comparison of water supply and demand for an average water year, single dry water year, and multiple dry water years is presented from 2005 to 2030 in five-year increments. According to the City of Hesperia's 2005 Urban Water Management Plan, the City currently has the water supply capabilities to meet maximum day demands (MDD) while also providing adequate standby production capacity to provide reliable service.

Comparisons of projected supplies and demands are shown in Table 10 and indicate that the City's supply capacity will consistently meet the demand requirements for all of the planning years through 2030. For the year 2030, a total demand of approximately 55,300 acre-feet annually is projected, compared with a projected supply capability for that same year of 99,325 acre-feet annually.

Table 10: Supply and Demand Comparison

Year/Condition	Demand (acre-feet annually)	Available Supply (acre-feet annually)	Supply Deficit (acre-feet annually)
2005:			
Normal	16,804	36,624	None
Single Dry Year	16,804	36,624	None
Multiple Dry Year:			
Year 1	16,804	36,624	None
Year 2	16,804	36,624	None
Year 3	16,804	36,624	None
2010:			
Normal	29,197	54,428	None
Single Dry Year	29,197	54,428	None
Multiple Dry Year:			
Year 1	29,197	54,428	None
Year 2	29,197	54,428	None
Year 3	29,197	54,428	None
2015:			
Normal	38,832	71,000	None
Single Dry Year	38,832	71,000	None
Multiple Dry Year:			
Year 1	38,832	71,000	None
Year 2	38,832	71,000	None
Year 3	38,832	71,000	None

Table 10: Supply and Demand Comparison (Cont)

Year/Condition	Demand (acre-feet annually)	Available Supply (acre-feet annually)	Supply Deficit (acre-feet annually)
2020:			
Normal	47,301	85,567	None
Single Dry Year	47,301	85,567	None
Multiple Dry Year:			
Year 1	47,301	85,567	None
Year 2	47,301	85,567	None
Year 3	47,301	85,567	None
2025:			
Normal	51,472	92,471	None
Single Dry Year	51,472	92,471	None
Multiple Dry Year:			
Year 1	51,472	92,471	None
Year 2	51,472	92,471	None
Year 3	51,472	92,471	None
2030:			
Normal	55,300	99,325	None
Single Dry Year	55,300	99,325	None
Multiple Dry Year:			
Year 1	55,300	99,325	None
Year 2	55,300	99,325	None
Year 3	55,300	99,325	None

Note: The projected supply values are calculated based on the criterion that the City must be able to meet MDD with the largest well out of service. These values represent the City's MDD with the addition of the capacity of the largest well. This pumping rate would occur only during MDD and is not representative of the City's average day demand pumping rate.
Source: City of Hesperia 2005 Urban Water Management Plan.

3.3 - WATER SUPPLY RELIABILITY

This section considers the City of Hesperia's water supply reliability during three water scenarios: normal water year, single dry water year, and multiple dry water years. These scenarios are defined as follows:

- **Normal Year**: The normal year is a year in the historical sequence that most closely represents median runoff levels and patterns. The supply quantities for this condition are derived from historical average yields.
- **Single Dry Year**: This is defined as the year with the minimum useable supply. The supply quantities for this condition are derived from the minimum historical annual yield.
- **Multiple Dry Years**: This is defined as the three consecutive years with the minimum useable supply. Water systems are more vulnerable to these droughts of long duration, because they deplete water storage reserves in local and state reservoirs and in groundwater basins. The supply quantities for this condition are derived from the minimum historical three consecutive years' annual yields.

3.3.1 - Available Future Water Supplies

Table 11 shows the water supply projections through the planning year 2030, acquired through additional well capacity. For the future planning years, these projections are based on the minimum production capacity needed to meet MDD with the City's largest well out of service.

Table 11: Water Supply Projections

				Multiple Dry Water Years		
Planning Year	**Added Well Capacity (gpm) [a]**	**Average (Normal) Year (afa)**	**Single Dry Water Year (afa)**	**Year 1 (afa)**	**Year 2 (afa)**	**Year 3 (afa)**
Existing [b]	None	36,624	36,624	36,624	36,624	36,624
2010	11,056	54,428	54,428	54,428	54,428	54,428
2015	21,348	71,000	71,000	71,000	71,000	71,000
2020	30,393	85,567	85,567	85,567	85,567	85,567
2025	34,849	92,741	92,741	92,741	92,741	92,741
2030	38,937	99,325	99,325	99,325	99,325	99,325

[a] Future well production capacity includes the addition of new wells to meet MDD with the largest well out of service. [b] Existing production shown includes all existing wells that are in service. Note: An update to the City's Water Mater Plan is currently in progress. Recommended supply improvements will be developed to meet future maximum day demands.

Note: The projected supply values are calculated based on the criterion that the City must be able to meet MDD with the largest well out of service. These values represent the City's MDD with the addition of the capacity of the largest well. This pumping rate would occur only during MDD and is not representative of the City's average day demand pumping rate. afa = acre-feet annually

Source: City of Hesperia 2005 Urban Water Management Plan.

3.3.2 - Estimate of Three Year Minimum Supply

The District relies on groundwater to meet its water needs, so its water supply availability is not immediately impacted by annual variations in hydrologic conditions. The groundwater supply is adequate to meet water needs for a three-year period.

3.4 - WATER SHORTAGE CONTINGENCY PLAN

3.4.1 - Stages of Action

Water Shortage Stages and Reduction Objectives

Water agencies relying solely on groundwater are much less likely to experience water shortages than those agencies relying primarily on surface water. Nevertheless, it is still important for groundwater agencies to reduce production during drought years to avoid excessive overdraft of the groundwater basin.

The City has developed a three-stage rationing plan that will be invoked during declared water shortages. Each stage includes a water reduction objective expressed as a percentage of normal demands. The rationing plan is dependant on the cause, severity, and anticipated duration of the water supply shortage.

Water Reduction Stage Triggering Mechanisms

Table 12 outlines the stages of action to be undertaken for water use reduction programs under normal conditions, threatened water supply shortage, and water shortage emergency. Mandatory measures are enacted during Stage 3 and excessive use penalties include fines, imprisonment, or both.

Table 12: Water Reduction Stage Triggering Mechanisms

Stage	Description	Actions
1	Normal Conditions	Voluntary wise use practices
		Mandatory timed irrigation systems and drought-tolerant plants for new developments
2	Threatened Water Supply Shortage (Reduction Goal: 25%)	Irrigation of parks, golf courses, and school grounds only between the hours of 11:00 p.m. and 5:00 a.m.
		Prohibit runoff from irrigated landscapes

Table 12: Water Reduction Stage Triggering Mechanisms (Cont)

Stage	Description	Actions
		Use of most efficient agricultural practices
		Development of conservation plans for commercial facilities
		Require covers for swimming pools
		Prohibit washing driveways, sidewalks, and other hard surfaces
		Restaurants shall not serve drinking water to patrons unless requested
3	Water Shortage Emergency (Reduction Goal: 50%)	Prohibit irrigation of parks, school grounds, golf courses, lawns, and landscapes, as well as at commercial nurseries
		Prohibit washing driveways, sidewalks, and other hard surfaces
		Prohibit filling of swimming pools, wading pools, spas, ornamental ponds, fountains, and artificial lakes
		Suspension of issuance of new construction meter permits
		All existing construction meters shall be removed and/or locked
		Prohibit washing of vehicles, except when done at a commercial car wash using reclaimed or recycled water
		Restaurants shall not serve drinking water to patrons unless requested

Source: City of Hesperia 2005 Urban Water Management Plan.

3.5 - WATER DEMAND MANAGEMENT MEASURES

Demand management as applied to water conservation, refers to the use of measures, practices, or incentives implemented by water utilities to permanently reduce the level or change the pattern of demand. The following demand management measures (DMMs) have been adopted into the California Water Code §10631(f)(1).

- DMM 1. Water survey programs for single-family residential and multifamily residential customers.
- DMM 2. Residential plumbing retrofit.
- DMM 3. System water audits, leak detection, and repair.
- DMM 4. Metering with commodity rates for all new connections and retrofit of existing connections.
- DMM 5. Large landscape conservation programs and incentives.

- DMM 6. High-efficiency washing machine rebate programs.
- DMM 7. Public information programs.
- DMM 8. School education programs.
- DMM 9. Conservation programs for commercial, industrial, and institutional accounts.
- DMM 10. Wholesale agency programs.
- DMM 11. Conservation pricing.
- DMM 12. Water conservation coordinator.
- DMM 13. Water waste prohibition.
- DMM 14. Residential ultra-low-flush toilet replacement programs.

In 1991, a Memorandum of Understanding (MOU) regarding Urban Water Conservation in California formed the California Urban Water Conservation Council (CUWCC). Council members can submit their most recent Demand Management Measures (DMM) Report with their Urban Water Management Plan (UWMP) to address the urban water conservation issues in the Urban Water Management Planning Act (UWMPA).

However, the City of Hesperia is not currently a signatory of the MOU and is therefore not a member of CUWCC. The City realizes the importance of DMMs to ensure a reliable future water supply and is committed to implementing water conservation and water recycling programs to maximize sustainability in meeting future water needs for its customers. However, at this time, the City has not implemented DMM 1, 3, 5, 6, 10, or 14. The City plans to implement DMM 3, 5, and 14 in the next five years, DMM 1 in the next ten years, and DMM 6 in the next 20 years. DMM 10 is not applicable to the City, as they are not classified as a wholesale agency.

SECTION 4:
MOJAVE WATER AGENCY

The information in the following section is based on the Mojave Water Agency's 2004 Regional Water Management Plan (RWMP) and the Mojave Water Agency's 2004-2005 Twelfth Annual Report. The RWMP serves as an Integrated Regional Water Management Plan, a Groundwater Management Plan, and an Urban Water Management Plan. Hesperia Water District and the City of Hesperia are both considered stakeholders to the Regional Water Management Plan.

4.1 - INTRODUCTION

The Mojave Water Agency (MWA) was formed in 1959 by an act of the California Legislature and was activated by a vote of the residents in 1960 to manage declining groundwater levels in the Mojave Basin Area, Lucerne Valley and El Mirage Basin. The Morongo Basin and Johnson Valley areas were annexed in 1965. MWA covers over 4,900 square miles, a hydrologically diverse region that has a unique set of water management issues. Over the last decade, much has been accomplished toward the development and implementation of a comprehensive water resources plan to address these issues. Key accomplishments and events of recent years include:

- The 1993 Stipulated Judgment, 1996 Judgment After Trial and several court decisions that have followed
- Adoption of the 1994 Regional Water Management Plan
- Construction of a number of key facilities including the Morongo Basin Pipeline, Rock Springs Outlet, Hi-Desert Water District recharge facilities, Mojave River Pipeline and the Hodge, Lenwood and Dagget recharge facilities
- Purchase of an additional 25,000 acre-feet of supply from the State Water Project
- Completion of several studies by USGS including the report entitled "Simulation of Ground-Water Flow in the Mojave River Basin"

Essentially all water supplies within MWA are pumped from the local groundwater basins and groundwater levels generally have been declining for the past 50 years or more. Adjudication proceedings were initiated due to concerns that rapid population growth would lead to further overdraft. The resulting Warren Valley Basin Judgment and the Mojave Basin Area Judgment both require that additional surface water be imported to help balance the basins.

The overdraft that has occurred over the years has reduced groundwater stored in the region by nearly two million acre-feet. The enabling act authorizes MWA to do "any and every act

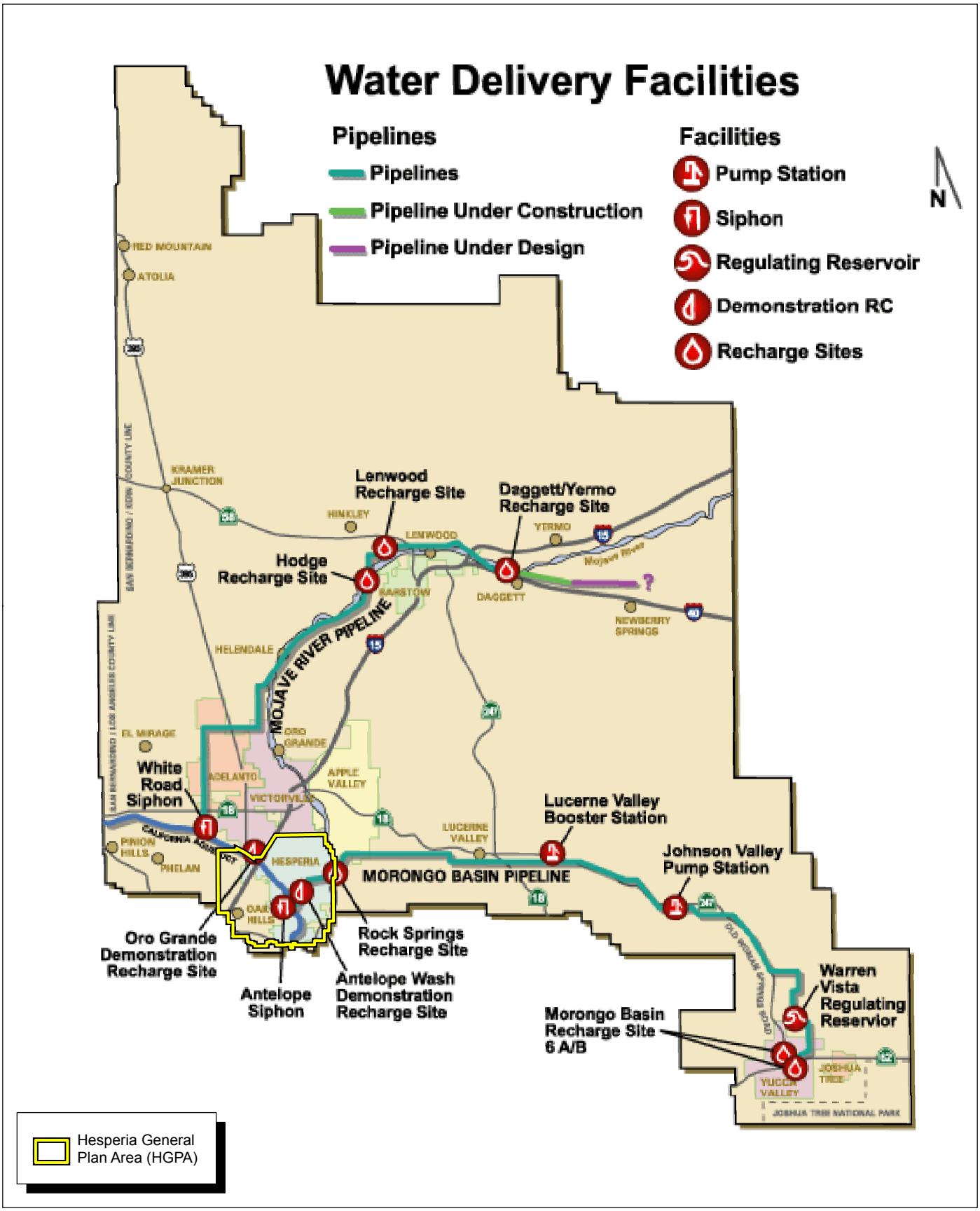
necessary, so that sufficient water may be available for any present or future beneficial use of the lands and inhabitants within MWA's jurisdiction." Clearly, MWA needed to find ways to assure a long-term, reliable water supply and where possible, reverse the overdraft of the groundwater basin.

The first step MWA took to reduce the water shortage within its jurisdiction was to become a SWP contractor, which entitled it to 50,800 acre-feet per year of water delivered via the California Aqueduct. Later, MWA purchased an additional 25,000 acre-feet of entitlement from Berrenda Mesa Water District to bring its total annual entitlement to 75,800 acre-feet. Due to variability in deliveries of SWP water, the average annual supply available to MWA is currently estimated to be 58,400 acre-feet. In order to balance the basin by the year 2020, it will be necessary for MWA to utilize its full SWP supply. Construction of projects by MWA within its service area is necessary to build, operate, maintain and replace the State Water Project facilities to which MWA is contractually obligated. These projects are necessary to fulfill MWA's contractual obligations with the State of California and to insure water availability to all of its residents.

To distribute the water to the points of need, MWA has taken a central role in designing and constructing the Morongo Basin and Mojave River pipelines, which extend from the California Aqueduct. The Morongo Basin Pipeline was completed in 1994 and deliveries began in 1995 to the Hi-Desert Water District. Water flowing through the pipeline is diverted to recharge ponds in an effort to reduce overdraft in the Warren Valley Basin. The MWA also financed and constructed the oversize of reach 1 of the Morongo Basin Pipeline to facilitate artificial recharge of the Alto Sub-area along the Mojave River near Hesperia and Apple Valley. The Mojave River pipeline is being built in phases. Facilities have been constructed from the California Aqueduct to the vicinity of Barstow. The Hodge and Lenwood Recharge Sites, located west of Barstow, have also been constructed and received a total of 3,842 acre-feet of water during 1999-2000. The Daggett Recharge Site, east of Barstow, was completed in 2001. Investigations are underway to site additional recharge basins in the Baja Subarea. Exhibit 6 shows the locations of MWA's current and future conveyance and recharge features.

MWA first prepared a Regional Water Management Plan (RWMP) in 1994 (Bookman-Edmonston Engineering, Inc. 1994). Since that time, several developments have prompted MWA to prepare a plan update. These developments include advancements in the basin adjudication process, a more refined understanding of the hydrology and hydrogeology of the service area, population increases, shifts in agricultural and urban water demands, and the growing realization

that the Mojave region can be a strategic element in the long-term management of California's water supplies. The Mojave Groundwater Basin is located along the California Aqueduct and has



Source: Mojave Water Agency, "Water Delivery Facilities" (2009).

Exhibit 6
Mojave Water Agency
Existing and Future Facilities

Michael Brandman Associates

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nearly two million acre-feet of available storage, which could make the region a strategic player in solving state-wide water storage and conjunctive use problems while addressing its internal water resources needs. Recent additions to California law promote development of integrated water resource management plans and groundwater management plans by providing preference to agencies with such plans for funding through state grant programs. The RWMP serves as an Integrated Regional Water Management Plan, Groundwater Management Plan and Urban Water Management Plan.

The RWMP was supported through a March 22, 2001 Memorandum of Understanding (MOU) with the DWR Integrated Storage Investigation which requires a "Basin Advisory Panel" of local civic and technical leaders and other stakeholders. This update was prepared in three phases with input from a Technical Advisory Committee (TAC) convened as the advisory panel. Objectives were: 1) to review and revise, as necessary, previous estimates of water supply and demand, 2) identify and solicit input from stakeholders with interest in long-term reliable water supplies for the region, and 3) identify a suite of preliminary alternatives that will help MWA achieve its goals in water supply management for the next two decades. Proposed projects and management actions are tailored to address at least one key water management issue in the basin. The following six key water management issues emerged as a result of this process:

- Current demand exceeds supply; future demand will also exceed supply unless corrective actions are taken
- Naturally occurring water quality problems affect drinking water supplies
- Many of the groundwater basins are in overdraft
- All but two of the subareas have riparian ecosystem maintenance issues
- Wastewater infrastructure issues affect the two subareas with the largest water demands
- Many subareas within MWA are impacted by activities in other subareas

The fundamental objectives established with the input of the TAC are to balance future water demands with available supplies and maximize the overall beneficial use of water throughout MWA.

4.2 - ADJUDICATION

Fearing uncontrolled overdraft of the Mojave Basin, adjudication proceedings were initiated in the mid-1960s, but were never finalized. Triggered by the rapid growth within the Mojave Water Agency service area, particularly in the Victor Valley area, the City of Barstow and the Southern California Water Company filed a complaint in 1990 against upstream water users claiming that the increased withdrawals and lowering of groundwater levels reduced the amount of natural

water available to downstream users. The complaint requested that 30,000 acre-feet of water be made available to the Barstow area annually and that MWA obtain supplemental water for use in other areas of MWA's service area.

About a year later, the Mojave Water Agency filed a cross-complaint that declared the native waters of the Mojave River and underlying groundwater were insufficient to meet the current and future demands made upon them. The cross-complaint asked the court to determine the water rights of all surface water and groundwater users within the Mojave Basin Area and the Lucerne and El Mirage Basins. During the following two years, negotiations resulted in a proposed Stipulated Judgment that: 1) formed a minimal class of producers using 10 acre-feet or less per year who were dismissed from the litigation, and 2) offered a physical solution for water production by the remaining producers. The Superior Court bound the stipulating parties to the Stipulated Judgment in September 1993. The Court further bound the non-stipulating parties to the terms of the Stipulated Judgment in January 1996 following trial. The text of the Stipulated Judgment can be found in Appendix A.

Some of the non-stipulating parties appealed the Judgment of the Superior Court and the Appellate Court issued a final decision in June 1998. The final decision of the Appellate Court held the stipulating parties to the terms of the Stipulated Judgment, but excluded the appealing parties, with the exception of one appellant who sought a revised water production right under the Judgment. MWA requested the California Supreme Court to review the Appellate Court's decision in July 1998. The Supreme Court affirmed the Appellate Court's decision in August 2000 regarding the Stipulated Judgment and the exclusion of the appealing parties from the Judgment, but over-turned the decision of the Appeals Court as to the one party seeking additional production rights.

The Mojave Basin Judgment assigned Base Annual Production (BAP) quotas to each producer using 10 acre-feet per year or more, based on historical production. Users are assigned a variable Free Production Allowance (FPA), which is a uniform percentage of BAP set for each subarea. This percentage is reduced, or "ramped-down" over time until total FPA comes into balance with available supplies. This percentage was set at 70 percent for most sub-areas as of June 2003 but Watermaster's annual report for 2003-2004 recommended an FPA of 60 percent for municipal and industrial users within the Alto sub-basin, and this is the City's current FPA level. Any water user that pumps more than their FPA is compelled to purchase replenishment water from MWA equal to the amount of production in excess of the FPA.

4.2.1 - DWR Documentation of Overdraft Conditions

The Department of Water Resources' Bulletin 118 series documents conditions in California's groundwater basins. The 1980 edition of Bulletin 118 states that there is evidence of overdraft in the following basins: Lower Mojave River Valley, Middle Mojave River Valley, Upper Mojave River Valley, Harper Valley, Warren Valley, and Lucerne Valley. The 2003 edition of Bulletin 118 did not include an evaluation of individual groundwater basins to determine if they were in overdraft.

4.2.2 - Efforts to Eliminate Overdraft

Each of the groundwater basins that are identified as being in overdraft in Bulletin 118 has been subjected to adjudication. The Lucerne Valley and Upper, Middle, and Lower Mojave River Valley basins are included in the Mojave Basin Area Judgment. The Warren Valley Basin is adjudicated by the Warren Valley Basin Judgment. The Mojave Basin Area and Warren Valley adjudications mandate that the groundwater extractions from each basin do not exceed the estimated annual supplies, and empower the Watermasters of each basin to enforce pumping limits to ensure that the groundwater basins are not overdrafted. One of the fundamental objectives of this Plan is to "balance future water demands with available supplies recognizing the need to stabilize the groundwater basin storage balance over long-term hydrologic cycles."

4.3 - WATER SUPPLY FOR HESPERIA WATER DISTRICT

Through the process of adjudication, Base Annual Production (BAP) rights were established for each producer in the basin that uses 10 acre-feet annually or more. Pumpers were also assigned a variable Free Production Allowance (FPA), which is a uniform percentage of the BAP set for each sub-basin. This percentage is reduced over time until the FPA comes into balance with the available supplies. Any producer that pumps more than their assigned FPA must purchase replenishment water from the Mojave Water Agency or transfer unused production rights within that subarea from another stipulator.

Currently, the Watermaster recommends an FPA of 60 percent for municipal uses within the Alto subbasin, which includes the Hesperia Water District. Including permanent transfers of Base Annual Production right from October 1, 1993 to September 30, 2005, Hesperia Water District has a BAP of 13,588 acre-feet annually. With an FPA of 60 percent, Hesperia Water District has the right to pump 8,153 acre-feet annually without having any replacement or makeup water obligations. Any water use greater than 8,153 acre-feet annually must be replaced. Replacement can occur either by paying the Mojave Basin Area Watermaster to purchase supplemental water from MWA or by transferring unused production rights from another party subject to the Mojave Basin Area Judgment.

In the 2004-2005 Twelfth Annual Report published report by Mojave Water Agency, Hesperia Water District had a verified production of 16,576 acre-feet for water year 2003-2004. This is the most recent published information and includes a Base Free Production Allowance of 9,512 acre-feet. In 2003, the FPA approved by the Watermaster was 70 percent of BAP for municipal and industrial users in the Alto subbasin), carryover from the previous year of 6,611 acre-feet, and transfers of carryovers from the previous year from other stipulators of 4,535 acre-feet. Total Free Production Allowance (equal to the sum of Base Free Production Allowance, carryover, and transfers) was 20,658 acre-feet, although verified production was 16,576 acre-feet. This leaves 4,071 acre-feet remaining as unused FPA, which may be used as carryover during the following water year.

The Hesperia Water District is not limited to its Free Production Allowance. Water can be transferred from other stipulators and carryover water, if present, can be used to enhance local water supplies. For example, the City may choose to purchase excess water from the State Water Project delivered through the California Aqueduct to use for annual supply or groundwater recharge. Permanent transfers have increased the Base Annual Production for the Hesperia Water District from 12,213 (October 1, 1993) to 13,588 acre-feet annually (September 30, 2005). Currently, this is the Base Annual Production that is used to calculate the Free Production Allowance. Other transfers (totaling 4,435 acre-feet in water year 2003-2004) are not permanent or guaranteed. However, Hesperia Water District is currently only guaranteed 8,153 acre-feet annually. Until additional permanent transfers are purchased or supplemental water sources are acquired, the City should consider its total water supply to be limited to the Free Production Allowance of 8,153 acre-feet annually, in addition to any temporary transfers or carryover water that the City can secure.

SECTION 5:
CONCLUSIONS

Based on a review of information contained in the City of Hesperia's 2005 Urban Water Management Plan and the Mojave Water Agency's 2004 Regional Water Management Plan, meeting future water needs, while, at the same time, complying with the terms and requirements of the Mojave Basin Judgment to avoid future overdraft situations is a primary goal over the long term for Hesperia and the Mojave Basin. In order to address this challenge MWA, Hesperia and the other stakeholder agencies will need to continue to work cooperatively to assure adequate water availability. These efforts would likely involve purchase of SWP water and possibly obtaining other sources of imported water, maximizing water conservation efforts, use of reclaimed water, and the continuation and expansion of regional groundwater recharge and storage strategies. In addition the MWA, Hesperia and other stakeholder members should continue to support efforts at the state level to provide facilities to increase potential SWP supplies... The three following points are of critical importance

- The City of Hesperia's 2005 UWMP, indicates from a water system standpoint, that the City has the capability to meet projected water demand through 2030. State law requires 5 year updates of UWMP's and the City must continue to carefully phase and provide for the finance of water system improvements to meet needs created by new growth. At the same time they must pursue all available strategies to ensure that water will be available at the time it will be needed to accommodate projected growth.
- According to the 2009-2010 Fifteenth Annual Report published by Mojave Water Agency, Hesperia Water District has a guaranteed water allocation from the adjudicated basin of 8,153 acre-feet annually. Current demands exceed supply amounts allowed under the adjudication and the balance of water is currently being provided through the purchase of transferred and carryover water. Ultimately in the long term SWP water and potentially other water sources will need to be tapped to maintain the basin in balance.
- The total water supply available in the future to the City will depend on the degree to which current stable water allocations can be augmented by the State Water Project and delivered via the California Aqueduct, and the continued implementation of water conservation and wastewater reclamation programs.

5.1 - POTENTIAL CONCERNS

- A key concern is the fact that the groundwater basin has been adjudicated and Hesperia Water District has an allotted Base Annual Production (BAP) right of 13,588 acre-feet annually and a Free Production Allowance (FPA) of 8,153 acre-feet annually as of water

year 2009-2010 (60 percent of BAP). Water sources beyond these amounts will eventually need to come from other sources in the long term. Future FPA values are unknown at this time, but are not expected to increase. The key objective of the Watermaster is to reduce Free Production Allowances over time until the basin comes into balance, at which time reductions in Free Production Allowances will cease. If the Watermaster is unsuccessful in this effort, water supplies needed to support new development could be threatened.

- Water used in excess of the Free Production Allowance may be transferred from other stipulators or purchased from Mojave Water Agency (MWA), which uses State Water Project (SWP) water to recharge the groundwater basin in the amount used in excess of the Free Production Allowance. MWA has an annual contract for up to 75,800 acre-feet of water from the State Water Project although due to variability in deliveries of SWP water, the average annual supply available to MWA is currently estimated to be 58,400 acre-feet. In order to balance the basin by the year 2020, it will be necessary for MWA to utilize its full SWP supply. This implies that in the long term Hesperia and other stakeholder agencies in the Mojave Basin will have to reduce their reliance on native groundwater sources.
- Finally, although the City of Hesperia 2005 UWMP shows water supply in step with future demands, the City will need to develop additional strategies to ensure that reliable sources of water will be available when needed. SWP water will be available for purchase as well as other sources from other water agencies in the state. Long term efforts to develop recycled water systems and increased water conservation efforts will also provide for increased potable water availability.

SECTION 6: REFERENCES

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Appendix A: Mojave Basin Area Adjudication: City of Barstow, et al. v. City of Adelanto, et al., Riverside County Superior Court Case No. 208568

Filed 8/21/00

IN THE SUPREME COURT OF CALIFORNIA

CITY OF BARSTOW et al., Plaintiffs and Respondents, v. MOJAVE WATER AGENCY et al., Defendants, Cross-complainants and Respondents; JESS RANCH WATER COMPANY, Cross-defendant and Appellant.	S071728 Ct.App. 4/2 E017881, E018923 Riverside County Super. Ct. No. 208568
MOJAVE WATER AGENCY et al., Cross-complainants and Respondents, v. MANUEL CARDOZO et al., Cross-defendants and Appellants.	E018023, E018681

I. INTRODUCTION

We granted review to determine whether a trial court may definitively resolve water right priorities in an overdrafted basin with a "physical solution" that relies on the equitable apportionment doctrine but does not consider the affected

owners' legal water rights in the basin.[1] We conclude it may not, and affirm the Court of Appeal judgment in that respect. In the second part of this opinion, we address whether the Court of Appeal erred in concluding that the trial court abused its discretion when it determined that a water producer who desired to stipulate to the physical solution was fairly apportioned its share of water. We conclude the Court of Appeal erred on this point. We therefore affirm in part and reverse in part the Court of Appeal judgment.[2]

II. BACKGROUND

The Mojave River originates in the San Bernardino Mountains, where rain and snow runoff give rise to the West Fork of the Mojave River and Deep Creek. These tributaries join at the mountain foothills in an area called The Forks to form the Mojave River. From The Forks, the Mojave River flows approximately 90 miles north to Victorville and Helendale, northeast to Barstow, east to Afton, and finally to its terminus in Soda Lake.

The Mojave River Basin area extends approximately 3,600 square miles and encompasses several cities, including Victorville, Hesperia, Apple Valley, Adelanto, and Barstow.[3] The Mojave River Basin is divided into five hydrologic subareas: The Helendale Fault separates the Alto and Centro Basin subareas; the Waterman Fault separates the Centro and Baja Basin subareas; the Oeste Basin subarea is west of the Alto Basin subarea; and the Este Basin subarea is east of the

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[1] The trial court used the phrase "physical solution" to refer to its equitable distribution of water use in relation to the many parties who stipulated to it.

[2] Our decision in no way limits the administrative authority of the State Water Resources Control Board, nor does it affect the state board's authority over surface waters.

[3] A basin is defined as "[t]he tract of country drained by a river and its tributaries." (1 Oxford English Dict. (2d ed. 1989) p. 985, col. 1.)

Alto Basin subarea and south of the Centro Basin subarea. Because these basins are interconnected, some of the surface in-flow to one basin is out-flow from another. The ground and surface water within the entire Mojave River Basin constitute a single interrelated source.

The Mojave River, cyclically replenished from rainfall in the San Bernardino Mountains, is the main water source for the Mojave River Basin. The river's flow in the downstream area, however, has decreased in recent years. Groundwater extractions in the Alto Basin have lowered the water table, increasing the Alto Basin's storm flow absorption. As more water is absorbed in the Alto Basin, less water reaches the downstream area.

Before the 1950's, the Mojave River Basin economy primarily relied on transportation, mining, military, and agriculture. The economy and investment in the area soon grew and, by the mid-1950's, demand for water in the basin exceeded the natural supply, resulting in an overdraft condition. Development continued, particularly during the 1970's and 1980's. By 1990, the basin's population was approximately 235,000, more than 10 times the population in 1950. The largest increase in overdraft in the basin occurred between 1970 and 1980. During that time, well levels and water quality experienced a steady and significant decline. If overdraft conditions continue, the basin's water supply will experience significant depletion.

III. FACTS AND PROCEDURE

In 1990, the City of Barstow and the Southern California Water Company (plaintiffs) filed this action against the City of Adelanto, the Mojave Water Agency

(MWA),[4] and other upstream water producers, claiming that their groundwater production was adversely impacting plaintiffs' water supply, and that they contributed to the entire Mojave River Basin overdraft.[5] Plaintiffs sought an average annual flow of 30,000 acre-feet of water to the Barstow area and a writ of mandate to compel the MWA to import supplemental water from the State Water Project.

In 1991, the MWA served over 1,000 persons with an amended cross-complaint that joined substantially all water producers within the Mojave River Basin, except for certain small producers. The cross-complaint requested a declaration that the available native water supply was inadequate to meet producer demands within the Mojave River Basin and asked the court to apportion water rights among the various water producers.

The trial court stayed the litigation while a committee, composed of attorneys and engineers representing numerous water producers throughout the Mojave River Basin, met to negotiate settlement terms and to develop a physical solution to the water shortage problem. After negotiating for two years, the committee submitted a draft physical solution to the trial court.

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[4] The MWA has statutory authority to maintain a sufficient water supply. "The agency may do any and every act necessary to be done so that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants of the agency, including, without limiting the generality of the foregoing, irrigation, domestic, fire protection, municipal, commercial, industrial, and recreational uses." (Stats. 1959, ch. 2146, § 15, p. 5134, 72A West's Ann. Wat.—Appen. (1999 ed.) § 97-15, subd. (a), p. 208.)

[5] The term "water producers" is interchangeable with the term "water users," and refers to entities who use water for any purpose, including, but not limited to, agricultural, aquacultural, domestic, recreational, industrial, and commercial uses.

The physical solution's stated purposes are (1) to ensure that downstream producers are not adversely affected by upstream use, (2) to raise money to purchase supplemental water for the area, and (3) to encourage local water conservation.

Regionally, the physical solution requires each subarea within the basin to provide a specific quantity of water to the adjoining downstream subarea. The solution places no limits on the amount of water a party can withdraw. Instead, each party is allotted a certain quantity of water—a "free production allowance" based on its prior use—which it can use at no cost. When a party uses water in excess of its free production allowance, it is charged a fee to purchase "replacement" water for that subarea.

The physical solution also sets a "base annual production" amount for each party, determined by the producer's maximum annual production for the five-year period from 1986 to 1990. The solution defines a producer's base annual production right as "the relative right of each producer to the free production allowance within a given subarea, as a percentage of the aggregate of all producers' base annual production in the subarea." The higher the base annual production right, the more water a producer can sell under transfer provisions and produce free of a replacement assessment.

Significantly, the physical solution did not apportion production rights on the basis of preexisting legal water rights. The drafters of the physical solution believed such apportionment would lead to inequitable water allocation. In fact, the trial court expressly held that the parties were "estopped and barred from asserting special priorities or preferences." The court further concluded that allocating water based on asserted legal priorities would be "extremely difficult, if not impossible."

The trial court ordered all parties either to stipulate to the physical solution, file an answer to the cross-complaint, or suffer default. Over 200 parties stipulated to the physical solution. Minimal producers within the Mojave River Basin—those who produced 10 acre-feet of water or less annually—were exempt from the physical solution's terms, and instead were subject to administration under the MWA. The trial court entered an interlocutory judgment imposing the physical solution on the stipulating parties. It then held a trial to adjudicate the individual rights of the nonstipulating parties, including the City of Adelanto, the Cardozo appellants, who were generally described as alfalfa and dairy farmers with legal water rights, and appellants Jess Ranch Water Company (Jess Ranch), property owners who raised trout and engaged in some agricultural pursuits. In contrast to the Cardozo appellants, Jess Ranch wanted to participate in the physical solution and interlocutory judgment. Jess Ranch challenged only the judgment's allocation of acre-feet of water to it, not the physical solution's legality.

The trial court identified the following issues for determination during the nonstipulating parties' trial: (1) characterization of water rights; (2) priority, if any; (3) uses of the water; (4) whether those uses were reasonable; and (5) the amount of reasonable and beneficial use. Other trial issues included identification of the subareas, whether the physical solution created an equitable apportionment of water, and whether it satisfied the requirements of article X, section 2 of the California Constitution, which mandates that water be put to reasonable and beneficial use.[6]

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[6] Article X, section 2 of the California Constitution was originally adopted in 1928 as former article XIV, section 3. As adopted in 1976, it states, "It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest

(*Footnote continued on next page*.)

Trial was lengthy, with numerous witnesses testifying. The stipulating parties presented evidence of the Mojave River Basin's hydrogeology and established that the overdraft existed. The stipulating parties also presented evidence regarding the Mojave River Basin's economic development during the overdraft period.

The Cardozo appellants demonstrated they owned land in the basin and that they had been pumping water from wells on that land. Although the Cardozo appellants initially claimed that they held riparian water rights, they did not produce evidence in their properties' chain of title to support that claim. Therefore, they relied on their overlying rights based on the groundwater underneath their property.[7]

(*Footnote continued from previous page*.)

extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water. Riparian rights in a stream or water course attach to [*sic*], but to no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses; provided, however, that nothing herein contained shall be construed as depriving any riparian owner of the reasonable use of water of the stream to which the owner's land is riparian under reasonable methods of diversion and use, or as depriving any appropriator of water to which the appropriator is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained." (Cal. Const., art. X, § 2.)

[7] Riparian rights are special rights to make use of water in a waterway adjoining the owner's property. Overlying rights are special rights to use groundwater under the owner's property. (*California Water Service Co. v. Edward*

(*Footnote continued on next page*.)

In its statement of decision, the trial court recited the case's procedural history and the facts in detail. The court concluded that the constitutional mandate of reasonable and beneficial use dictates an equitable apportionment of all water rights when a river basin is in overdraft. The court found it unnecessary to adjudicate individual legal water rights and instead concluded that the proposed physical solution, incorporating a free production allowance without regard to overlying and riparian water rights holders, would be fair and equitable to nonstipulating farmers and would best satisfy the use policy set forth in Water Code section 106 (domestic use has highest priority, followed by irrigation).

Several factors influenced the trial court's decision to enforce the physical solution. For example, the court noted the overdraft had existed for several years, the parties disputed the asserted water rights priorities, and a mechanical allocation of legal water rights could lead to an inequitable apportionment and impose undue hardship on many parties. For these reasons and more, the trial court enjoined all parties from asserting special priorities or preferences.

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Sidebotham & Son (1964) 224 Cal.App.2d 715, 725 (*California Water Service Co.*).) Both riparian and overlying water rights are usufructuary only, and while conferring the legal right to use the water that is superior to all other users, confer no right of private ownership in public waters. (See *People v. Shirokow* (1980) 26 Cal.3d 301, 307 (*Shirokow*).) The state's interest in the public groundwater and surface waters is to make water policy that preserves and regulates it. The state does not have the right to possess and use the water to the exclusion of others and has only such riparian, overlying, or appropriative rights as it may obtain by law; its interest is therefore not an ownership interest, but rather a nonproprietary, regulatory one. (See *State of California v. Superior Court* (2000) 78 Cal.App.4th 1019, 1027; *Shirokow, supra,* 26 Cal.3d at p. 309.)

The trial court concluded that in the face of severe overdraft of an inter-related water source, all use was unreasonable, whether or not a user held riparian or overlying rights. The court reasoned that several factors justified the water right allotment on a nonpriority basis, including the climate, the impact of overdraft on interrelated surface and groundwater basins, and the importance of protecting the economy. The court concluded that the doctrine of reasonable and beneficial use, as established by article X, section 2 of the California Constitution, required an equitable apportionment of all rights when a basin is in overdraft. The City of Adelanto stipulated to the judgment following trial.

The Cardozo appellants[8] appealed the trial court judgment. They argued that the physical solution was invalid because it failed to recognize their preexisting and paramount legal water rights under California water law and therefore amounted to a taking without due process. Specifically, they attacked the physical solution on grounds that: "(1) it fails to recognize and protect their water rights; (2) it imposes a burdensome expense on them, with the intention to reduce or eliminate agricultural uses; (3) it encourages waste of water; (4) it encourages unlawful transfer of water; (5) it fails to bind all producers in the basin; (6) it has other harmful and inequitable effects."

The City of Barstow, the MWA, and other parties to the stipulation responded that the Cardozo appellants had failed to prove they had any water rights that the judgment adversely affected. They further argued that any water rights the Cardozo appellants did possess were limited by the principle of reasonable and beneficial use under article X, section 2 of the California Constitution, which, they

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[8] Manuel and Maria Cardozo, Niel DeVries, Virgil Gorman, Richard and Geneva Leyerly, Jerry Osterkamp, David and Elizabeth Daily, Richard and Elaine Fitzwater, Cornelis J. Groen, Robert T. and Barbara T. Older, and Steve Older.

argued, required the court to apportion water equitably among users in the overdrafted area. They also asserted that the trial court had properly considered the relevant factors before imposing a physical solution.

The Court of Appeal disagreed with these arguments and reversed the trial court judgment against the Cardozo appellants, directing the trial court to enter its order excluding them from its judgment and granting them injunctive relief to protect their water rights. The court concluded that the trial court erred in failing to consider the farmers' potential riparian or overlying water rights when adjudicating water allocation in the overdrafted basin. The court held that it was not required to reverse the entire judgment or in any way to disturb the physical solution as to the stipulating parties, despite the trial court's error. As the Court of Appeal correctly observed, "We see no reason why the parties cannot stipulate to a judgment incorporating the physical solution, nor do we see any reason why a stipulated [solution] entered into by a large number of water producers in the Mojave Basin should be totally reversed when the rights of the Cardozo Appellants can be fully protected by appropriate trial court orders on remand. [Citations.] . . . [¶] Thus, we protect the rights of the Cardozo Appellants while also respecting the rights of the stipulating parties to agree to a [solution that] waives or alters their water rights in a manner which they believe to be in their best interest." (Fn. omitted.)

The Jess Ranch matter presents different issues. At trial, Jess Ranch introduced evidence to show it pumped over 18,000 acre-feet of water per year from 1986-1990 to support its trout-raising operation and ancillary agricultural properties. The stipulating parties contested the amount of water Jess Ranch put to beneficial use. The trial court found that Jess Ranch failed to establish that its substantial use of water was reasonable and beneficial. The court therefore calculated Jess Ranch's base annual production at a lesser quantity. The court

concluded that for purposes of Jess Ranch's joining the stipulated physical solution, it would calculate the amount used annually at 7,480 acre-feet, an amount Jess Ranch challenged.

On appeal, Jess Ranch argued that its water allocation should be increased, because its annual production rights were not calculated on the same basis as those of other producers. The Court of Appeal agreed and reversed the judgment as it applied to Jess Ranch. The court found that Jess Ranch was not given a base annual production amount based on its actual production. The court further stated that the doctrine of reasonable and beneficial use did not justify treating Jess Ranch differently from other producers.

We granted petitions for review filed by the City of Barstow, the Southern California Water Company, the MWA, and other participants in the physical solution and judgment (collectively respondents).[9] The principal question we

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[9] Other defendants and/or cross-defendants to this action are the City of Hesperia and Hesperia Water District, Apple Valley Ranchos Water Company, Victor Valley Water District, Rancho Las Flores Limited Partnership, Baldy Mesa Water District, City of Victorville, Lake Arrowhead Community Services District, Jean C. DeBlasis as trustee of the Kemper Campbell Ranch Trust, Southdown, Inc., Mitsubishi Cement Corporation, Silver Lakes Association, Alfredo Arguelles, Richard F. Barak, Charles Bell, Lillian Borgogno, John Thomas Carter, Marshall Chuang, George Ronald Dahlquist, Alan DeJong, Frank T. Duran, Trinidad L. Gaeta, Wayne D. Gesiriech, S. Harold Gold, Ciril Gomez Living Trust, Daniel C. Gray, Karen Gray, Nick Grill, Merlin Gulbranson Excavating, Scott Hert, Melvin Hill, John Hosking, Jean Hosking, Larry Johnson, Hoon Ho Kim, H. Leslie Levin, J. Peter Lounsbury, Ken Luth, The 160 Newberry Ranch Limited Partnership, Meadowbrook Dairy, Newberry Ranch, George Parker, Ruth Parker, Trinidad Perez, Daniel Pettigrew, Howard Pettigrew, John S. Pettis, Joan C. Randolph, Bill Resseque, Charles Short, Robert A. Smith, Wayne A. Soppeland, Stanley Stewart, Patricia Stewart, Edward W. Stringer, Thomas Taylor, Carole Taylor, Dale Thomas, Ronald Thomas, James A. Thompson, Cornelius Van Diest, Van Leuwen Family Trust, Albert H. Vogler, Ykema Trust, Ykema Harmsen Dairy, Keith Young, and Margie Young.

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address is whether the trial court could disregard legal water rights in order to apportion on an equitable basis water rights to all producers in an overdrafted groundwater basin. We also address respondents' contention that the Court of Appeal erred in concluding the trial court treated Jess Ranch inequitably in its water allocation under the proposed solution and judgment.

IV. DISCUSSION

A. Principles and Policies of California Water Law

1. Water Rights

Courts typically classify water rights in an underground basin as overlying, appropriative, and prescriptive. (*California Water Service Co., supra,* 224 Cal.App.2d at p. 725.)[10] An overlying right, "analogous to that of the riparian

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A number of amicus curiae briefs have been filed with this court. The California Water Association filed in support of the City of Barstow; the Santa Clara Valley Water District filed in support of the MWA; Gary A. Ledford filed in support of Jess Ranch and the Cardozo appellants; the Pacific Legal Foundation, the Northern California Water Association, the Cities of Fairfield, Vacaville, and Vallejo, the City and County of San Francisco, the San Joaquin Tributaries Association, the San Joaquin River Exchange Contractors Water Authority, and the Westlands Water District filed in support of the Cardozo appellants. Additionally, the Main San Gabriel Basin Watermaster and the Raymond Basin Management Board filed an amicus curiae brief asking this court to reverse the Court of Appeal decision, and the California Farm Bureau Federation et al. (the Western Growers Association, the Agricultural Council of California, the California Cattlemen's Association, the Nisei Farmers League, the California Association of Winegrape Growers, the Grower-Shipper Vegetable Association, and the Rice Producers of California) and the Imperial Irrigation District filed in favor of affirming the Court of Appeal decision. Wayne K. Lemieux also filed an amicus curiae brief.

[10] For an extensive discussion of California's water law, from its adoption of the English common law riparian rights doctrine to the reasonable use limitation, see Attwater & Markle, *Overview of California Water Rights and Water Quality*

(*Footnote continued on next page*.)

owner in a surface stream, is the owner's right to take water from the ground underneath for use on his land within the basin or watershed; it is based on the ownership of the land and is appurtenant thereto." (*California Water Service Co., supra,* 224 Cal.App.2d at p. 725.) One with overlying rights has rights superior to that of other persons who lack legal priority, but is nonetheless restricted to a reasonable beneficial use. Thus, after first considering this priority, courts may limit it to present and prospective reasonable beneficial uses, consonant with article X, section 2 of the California Constitution. (*Jordan v. City of Santa Barbara* (1996) 46 Cal.App.4th 1245, 1268.)

In contrast to owners' legal priorities, we observe that "[t]he right of an appropriator . . . depends upon the actual taking of water. Where the taking is wrongful, it may ripen into a prescriptive right. Any person having a legal right to surface or ground water may take only such amount as he reasonably needs for beneficial purposes . . . . Any water not needed for the reasonable beneficial use of those having prior rights is excess or surplus water and may rightly be appropriated on privately owned land for non-overlying use, such as devotion to public use or exportation beyond the basin or watershed [citation]. When there is a surplus, the holder of prior rights may not enjoin its appropriation [citation]. Proper overlying use, however, is paramount and the rights of an appropriator, being limited to the amount of the surplus [citation], must yield to that of the overlying owner in the event of a shortage, unless the appropriator has gained prescriptive rights through the [adverse, open and hostile] taking of nonsurplus waters. As between overlying

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Law (1988) 19 Pacific L.J. 957, and Shaw, *The Development of the Law of Waters in the West* (1922) 10 Cal. L.Rev. 443.

owners, the rights, like those of riparians, are correlative; [i.e.,] each may use only his reasonable share when water is insufficient to meet the needs of all [citation]. As between appropriators, however, the one first in time is the first in right, and a prior appropriator is entitled to all the water he needs, up to the amount he has taken in the past, before a subsequent appropriator may take any [citation].

"Prescriptive rights are not acquired by the taking of surplus or excess water. [But] [a]n appropriative taking of water which is not surplus is wrongful and may ripen into a prescriptive right where the use is actual, open and notorious, hostile and adverse to the original owner, continuous and uninterrupted for the statutory period of five years, and under claim of right." (*California Water Service Co., supra*, 224 Cal.App.2d at pp. 725-726.) Even these acquired rights, however, may be interrupted without resort to the legal process if the owners engage in self-help and retain their rights by continuing to pump nonsurplus waters. (See *Hi-Desert County Water Dist. v. Blue Skies Country Club, Inc.* (1994) 23 Cal.App.4th 1723, 1731 (*Hi-Desert County Water Dist.*).) In the present action it is important to note that no parties have claimed prescriptive rights, and the parties who stipulated to the physical solution did not seek findings under the prescriptive rights doctrine.

2. 1928 Constitutional Amendment

Article X, section 2 was added to the California Constitution in 1928 as former article XIV, section 3. The provision limits water rights to reasonable and beneficial uses. (Cal. Const., art. X, § 2.) "[T]he rule of reasonable use as enjoined by . . . the Constitution applies to all water rights enjoyed or asserted in this state, whether the same be grounded on the riparian right or the right, analogous to the riparian right, of the overlying land owner, or the percolating water right, or the appropriative right." (*Peabody v. City of Vallejo* (1935) 2 Cal.2d 351, 383 (*Peabody*).) "Under this new doctrine, it is clear that when a riparian or overlying

owner brings an action against an appropriator, it is no longer sufficient to find that the plaintiffs in such action are riparian or overlying owners, and, on the basis of such finding, issue the injunction. It is now necessary for the trial court to determine whether such owners, considering all the needs of those in the particular water field, are putting the waters to any reasonable beneficial uses, giving consideration to all factors involved, including reasonable methods of use and reasonable methods of diversion. From a consideration of such uses, the trial court must then determine whether there is a surplus in the water field subject to appropriation." (*Tulare Dist. v. Lindsay-Strathmore Dist.* (1935) 3 Cal.2d 489, 524-525 (*Tulare*).) We reiterated these principles in subsequent cases, observing that although "what is a reasonable use of water depends on the circumstances of each case, such an inquiry cannot be resolved *in vacuo* isolated from statewide considerations of transcendent importance. Paramount among these we see the ever increasing need for the conservation of water in this state, an inescapable reality of life quite apart from its express recognition in the 1928 amendment." (*Joslin v. Marin Mun. Water Dist.* (1967) 67 Cal.2d 132, 140, fn. omitted.)

The constitutional amendment therefore dictates the basic principles defining water rights: that no one can have a protectible interest in the unreasonable use of water, and that holders of water rights must use water reasonably and beneficially. Crucial to our own determination here is the fact that the amendment carefully preserves riparian and overlying rights, while abolishing "that aspect of the common law doctrine which entitled a riparian, as against an upstream appropriator, to enforce his right to the entire natural flow of a stream even if his use of the water was wasteful or unreasonable." (*Pleasant Valley Canal Co. v. Borror* (1998) 61 Cal.App.4th 742, 754 (*Pleasant Valley*); see also *Gin S. Chow v. City of Santa Barbara* (1933) 217 Cal. 673, 699-700.)

B. Equitable Apportionment

1. Past Cases

In previous cases resolving regional water uses, courts allocated water according to preexisting legal rights and relationships. For example, in *Fleming v. Bennett* (1941) 18 Cal.2d 518, 520, over 200 parties asserted rights to the Susan River's waters. The trial court referred the matter to the State Water Commission, which prepared a comprehensive report with individual findings regarding 259 claimed rights of users affecting the watershed. (*Id.* at pp. 525, 527.) We affirmed the trial court's decree, based on the report and additional evidence introduced at an open court hearing. (*Id.* at pp. 526-527, 530.)

As noted *ante*, at pages 14-15, in *Tulare*, we outlined a water allocation method in a case in which plaintiffs' water rights had different priorities. We also observed that "[t]he trial court . . . must fix the quantity required by each [right holder] for his actual reasonable beneficial uses, the same as it would do in the case of an appropriator." (*Tulare, supra,* 3 Cal.2d at p. 525.) This court determined that "[w]hat is a beneficial use at one time may, because of changed conditions, become a waste of water at a later time." (*Id.* at p. 567.) Because the court cannot fix or absolutely ascertain the quantity of water required for future use at any given time, a trial court should declare prospective uses paramount to the appropriator's rights, so the appropriator cannot gain prescriptive rights in the use. Until the paramount right holder needs it, the appropriator may continue to take water. (*Ibid.*)

Thus, water right priority has long been the central principle in California water law. The corollary of this rule is that an equitable physical solution must preserve water right priorities to the extent those priorities do not lead to unreasonable use. In the case of an overdraft, riparian and overlying use is paramount, and the rights of the appropriator must yield to the rights of the riparian

or overlying owner. (*Burr v. Maclay Rancho Water Co.* (1908) 154 Cal. 428, 435; *Katz v. Walkinshaw* (1903) 141 Cal. 116, 135.)

2. Equitable Apportionment in Cases Involving Correlative Rights or Rights Established by Mutual Prescription

Respondents rely on two cases to support their contention that article X, section 2 of the California Constitution requires the courts to apportion all water rights equitably, regardless of preexisting priorities: *City of Pasadena v. City of Alhambra* (1949) 33 Cal.2d 908 (*City of Pasadena*), and *City of Los Angeles v. City of San Fernando* (1975) 14 Cal.3d 199 (*City of San Fernando*). We conclude these cases support the Cardozo appellants' position.

In *City of Pasadena,* extractors had been taking nonsurplus groundwater for over 30 years, creating an overdraft condition in the basin on which Pasadena relied as a water source. (*City of Pasadena, supra,* 33 Cal.2d at pp. 921-922.) Even after the overdraft occurred, all parties continued to pump the groundwater, creating a greater overdraft and interfering with everyone's ability to pump in the future. (*Id.* at p. 922.)

The plaintiff city and its chief water producer sued to determine the ground water rights in the area and to enjoin the alleged overdraft to prevent the water supply's depletion. (*City of Pasadena, supra,* 33 Cal.2d at p. 916.) The trial court referred the action to the state Division of Water Resources of the Department of Public Works, which produced a report on area-wide water rights. (*Ibid.*) All parties except the defendant water company, a public utility, stipulated to a judgment that allocated water and restricted total production to achieve safe yield in the basin. Because the stipulation was not binding on the utility, the issue in this court was how to determine its rights in relation to the stipulating producers in the same manner as if there had been no agreement. (*Id.* at pp. 916, 924.)

Without mentioning equitable apportionment, Chief Justice Gibson's majority opinion affirmed the trial court's judgment, enforcing the stipulation's terms against all parties, including the utility. (*City of Pasadena, supra,* 33 Cal.2d at pp. 916, 933.) This court discussed the nature of prescriptive groundwater rights in which adverse users do not completely overtake owners' rights. It concluded that the pumpers had established prescriptive rights in part of the water supply. The court observed "that such rights were acquired against both overlying owners and prior appropriators, [and] that the overlying owners and prior appropriators also obtained, or preserved, rights by reason of the water which they pumped . . . ." (*Id.* at p. 933.) Applying the mutual prescription doctrine, this court concluded that all claimants had equal priority and agreed the trial court had appropriately reduced each party's production to achieve safe yield. (*Ibid.*)

In reaching its conclusion, *City of Pasadena* observed: "Although the law at one time was otherwise, it is now clear that an overlying owner or any other person having a legal right to surface or ground water may take only such amount as he reasonably needs for beneficial purposes. [Citations.] Public interest requires that there be the greatest number of beneficial uses which the supply can yield, and water may be appropriated for beneficial uses subject to the rights of those who have a lawful priority. [Citation.] Any water not needed for the reasonable beneficial uses of those having prior rights is excess or surplus water. In California surplus water may rightfully be appropriated on privately owned land for nonoverlying uses, such as devotion to a public use or exportation beyond the basin or watershed. [Citations.]

"It is the policy of the state to foster the beneficial use of water and discourage waste, and when there is a surplus, whether of surface or ground water, the holder of prior rights may not enjoin its appropriation. [Citations.] Proper

overlying use, however, is paramount, and the right of an appropriator, being limited to the amount of the surplus, must yield to that of the overlying owner in the event of a shortage, unless the appropriator has gained prescriptive rights through the taking of nonsurplus waters." (*City of Pasadena, supra,* 33 Cal.2d at pp. 925-926.)

Several decades later, Los Angeles sued to establish a prior right to groundwater in the upper Los Angeles River area in *City of San Fernando, supra,* 14 Cal.3d at page 207. The plaintiff city relied on its historic pueblo water rights,[11] while the defendants argued that *City of Pasadena* supported their mutual prescriptive rights claim to a proportionate share of the groundwater supply. (*City of San Fernando, supra,* 14 Cal.3d at pp. 210-211, 214.) This court upheld the plaintiff's pueblo rights and overturned the trial court's award of prescriptive rights against the plaintiff. This court held that Civil Code section 1007 precluded the defendants from obtaining prescriptive water rights against the plaintiff. (*City of San Fernando, supra,* 14 Cal.3d at pp. 274-277.)

This court reasoned: "The pueblo right gives the city holding it a paramount claim to particular waters only to the extent that they are required for satisfying its municipal needs and those of its inhabitants. 'It thus insures a water supply for an expanding city [citation] with a minimum of waste by leaving the water accessible to others *until such time as the city needs it*.' [Citation.]" (*City of San Fernando, supra,* 14 Cal.3d at p. 252, italics added by *City of San Fernando*.)

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[11] Pueblo water rights, along with riparian (including overlying) and appropriative rights, were the original species of water rights recognized in early California law. (*Pleasant Valley, supra,* 61 Cal.App.4th at p. 751.) Pueblo water rights apply to the municipal successors of the Spanish and Mexican pueblos. They are not implicated in the present matter.

This court rejected the defendants' contention that the mutual prescription doctrine developed in *City of Pasadena* was a "beneficent instrument for conservation and equitable apportionment of water in ground basins which are subjected to extractions in excess of the replenishment supply." (*City of San Fernando, supra,* 14 Cal.3d at p. 265.) In so doing, this court stated: "[T]he allocation of water in accordance with prescriptive rights mechanically based on the amounts beneficially used by each party for a continuous five-year period after commencement of the prescriptive period and before the filing of the complaint, does not necessarily result in the most equitable apportionment of water according to need. A true equitable apportionment would take into account many more factors." (*Ibid.*) In a footnote accompanying this sentence, this court observed: "The principles by which the United States Supreme Court equitably apportions water among states are illustrated in *Nebraska v. Wyoming* (1945) 325 U.S. 589, 618 [89 L.Ed. 1815, 1831-1832, 65 S.Ct. 1332].[12] After observing that apportionment between states whose laws base water rights on priority of appropriation should primarily accord with that principle, the court said: 'But if an allocation between appropriation States is to be just and equitable, strict adherence to the priority rule may not be possible. For example, the economy of a region may

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12 Although it allocated priorities between states, the Supreme Court did not adjudicate the relative rights of appropriators *qua* appropriators: "The standard of an equitable apportionment requires an adaptation of the formula to the necessities of the particular situation. We may assume that the rights of the appropriators *inter se* may not be adjudicated in their absence. But any allocation between Wyoming and Nebraska, if it is to be fair and just, must reflect the priorities of appropriators in the two states." (*Nebraska v. Wyoming, supra,* 325 U.S. 589, 627.) As amici curiae Cities of Fairfield, Vacaville, and Vallejo observe, no California court has ever applied the doctrine of equitable apportionment to resolve an intrastate water conflict. The Supreme Court developed the doctrine to fill the void of authority governing relative priority *between* states to preserve interstate comity.

have been established on the basis of junior appropriations. So far as possible those established uses should be protected, though strict application of the priority rule might jeopardize them. Apportionment calls for the exercise of an informed judgment on a consideration of many factors. Priority of appropriation is the guiding principle. But physical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses on downstream areas, the damage to upstream areas as compared to the benefits to downstream areas if a limitation is imposed on the former—these are all relevant factors. They are merely illustrative, not an exhaustive catalogue. They indicate the nature of the problem of apportionment and the delicate adjustment of interests which must be made.' " (*City of San Fernando, supra,* 14 Cal.3d at pp. 265-266, fn. 61.)

Respondents claim this footnote provides the basis for the trial court's use of equitable apportionment to allocate water in an overdraft basin without regard to the owners' water priorities. (See *Hi-Desert County Water Dist., supra,* 23 Cal.App.4th at p. 1734, fn. 11; *Wright v. Goleta Water Dist.* (1985) 174 Cal.App.3d 74, 93 (*Wright*).) Respondents further assert that by ignoring equitable considerations, the Court of Appeal's opinion conflicts with *City of San Fernando,* and that it leads to an unjust result by which the Cardozo appellants are free to produce any amount of water on a priority basis, while all others pay to import water to protect the resource.

We find no conflict. *City of San Fernando* distinguished *City of Pasadena, supra,* 33 Cal.2d 908, where a "restriction to safe yield on a strict priority basis might have deprived parties who had been using substantial quantities of ground water for many years of all further access to such water." (*City of San Fernando,*

supra, 14 Cal.3d at p. 266.) By contrast, *City of San Fernando* correctly found that the same condition was not present in the Los Angeles River basin, and "the effect of the trial court's judgment in the present case was to eliminate [the] plaintiff's priorities based not on the timing of its appropriations but on its importation of . . . water and on its pueblo right." (*Id.* at p. 267.) In other words, in *City of San Fernando,* applying the mutual prescription doctrine would still have led to completely eliminating appropriative rights stemming from recent uses in favor of earlier uses, because the defendants began pumping while there was still a surplus. (*Id.* at pp. 266-267.) In contrast, appropriative rights were protected through the doctrine's application in *City of Pasadena*.

As the *City of San Fernando* court itself observed, "[P]rinciples governing appropriative and prescriptive water rights will be relevant to the determination on remand of the conflicting interests of the parties in the water of the [overdrafted] Sylmar basin." (*City of San Fernando, supra,* 14 Cal.3d at p. 278.) This court then observed that because the defendants' rights were subordinate to the plaintiff's rights, the plaintiff was "entitled to have the private defendants' extractions enjoined insofar as they would constitute an overdraft on the basin supply." (*Id.* at p. 291.) This court also noted that on remand the private defendants could show "overlying rights to native ground water for reasonable beneficial uses on their overlying land, subject to any prescriptive rights of another party." (*Id.* at p. 293.) This court reiterated: "Overlying rights take priority over appropriative rights in that if the amounts of water devoted to overlying uses were to consume all the basin's native supply, the overlying rights would supersede any appropriative claims by any party to the basin's native ground water [citation] except insofar as the appropriative claims ripened into prescriptive rights [citation]. Such prescriptive rights would not necessarily impair the private defendants' rights to

ground water for *new* overlying uses for which the need had not yet come into existence during the prescriptive period. [Citation.]" (*Id.* at p. 293, fn. 100.) Accordingly, overlying defendants "should be awarded the full amount of their overlying rights, less any amounts of such rights lost by prescription, from the part of the supply shown to constitute native ground water." (*Id.* at p. 294.)

Thus, one could read footnote 61 in *City of San Fernando* to suggest that if prioritization of rights results in denying recent appropriative users the right to produce water, some type of equitable appropriation may be implemented in intrastate water matters. But the case is not precedent for wholly disregarding the priorities of existing water rights in favor of equitable apportionment in this state, where water allocation has been based on an initial consideration of owners' legal water rights. Case law simply does not support applying an equitable apportionment to water use claims unless all claimants have correlative rights; for example, when parties establish mutual prescription. Otherwise, cases like *City of San Fernando* require that courts making water allocations adequately consider and reflect the priority of water rights in the basin. (*City of San Fernando, supra,* 14 Cal.3d at p. 293, fn. 100.) The Court of Appeal's reasoning is consistent with this principle. As the Court of Appeal aptly observed, we have never endorsed a pure equitable apportionment that completely disregards overlying owners' existing legal rights. Thus, to the extent footnote 61 in *City of San Fernando* could be understood to allow a court to completely disregard California landowners' water priorities, we disapprove it.

3. Equitable Apportionment After City of San Fernando

Respondents claim that after *City of San Fernando, supra,* 14 Cal.3d 199, and relying on the dicta stated in footnote 61 of that case, courts approved the use of

equitable apportionment as the basis to allocate water among users in an overdraft basin. But the cases on which respondents rely do not support the contention.

For example, in *Hi-Desert County Water Dist.*, the Court of Appeal stated: "Left unresolved in [*City of*] *Pasadena,* however, was whether by continuing to pump, an overlying user *in an overdrafted basin* retained its original overlying rights or obtained new ones by prescription. [Citations.] In 1975, in its most comprehensive statement of water law, our Supreme Court in [*City of San Fernando, supra,* 14 Cal.3d 199] finally clarified the proposition that overlying owners '*retain their rights* [to nonsurplus water without judicial assistance] *by using them.*' [Citation.]" (*Hi-Desert County Water Dist., supra,* 23 Cal.App.4th at p. 1731.) As against potential appropriators, the court noted that the five-year period for establishing prescriptive rights to nonsurplus water may be interrupted by the overlying owners' pumping of their nonsurplus water. (*Ibid.*) The court also observed that *City of San Fernando* rejected a mechanical application of the mutual prescription doctrine after noting it often fails to lead to an equitable water apportionment according to need. (*Hi-Desert County Water Dist., supra,* 23 Cal.App.4th at p. 1734.) As *Hi-Desert County Water Dist.* observed, *City of San Fernando* required courts to consider many more factors than the amount the parties pumped during the prescriptive period in order to make a truly equitable apportionment. (*Hi-Desert County Water Dist., supra,* 23 Cal.App.4th at p. 1734, fn. 11.)

In *Wright,* overlying owners in a groundwater basin sued to determine relative water rights in that basin. The Court of Appeal found the trial court erred in holding that a water district's appropriative rights had a higher priority than the overlying owners' unexercised rights. (*Wright, supra*, 174 Cal.App.3d at pp. 78, 82.) The court also held that the trial court could not define or otherwise limit an

overlying owner's future unexercised groundwater rights, in contrast to this court's limitation of unexercised riparian rights. (*In re Waters of Long Valley Creek Stream System* (1979) 25 Cal.3d 339, 358-359 (*Long Valley*).[13] (The *Wright* court remanded the matter for reconsideration in light of *Tulare,* which held that former article XIV, section 3 [now article X, section 2] of the California Constitution protected the reasonable beneficial uses of the riparian or overlying owner, whose water could be used by an appropriator only when that owner elected not to use it. [*Tulare, supra*, 3 Cal.2d at p. 525].) Contrary to respondents' contention, no appellate court has endorsed an equitable apportionment solution that disregards overlying owners' existing rights.

C. The Physical Solution

Respondents argue that article X, section 2 of the California Constitution mandates that we accept the trial court's proposed physical solution. The trial court found as follows: "Having found that all rights are correlative, a just and fair result is achieved by establishing a physical solution which limits each user to a

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[13] The *Wright* court refused to apply *Long Valley, supra,* 25 Cal.3d at page 350, to limit the scope of an overlying owner's future unexercised groundwater right to a present appropriative use because the comprehensive legislative scheme applicable to the adjudication of surface water rights and riparian rights is not applicable to groundwater. (*Wright, supra,* 174 Cal.App.3d at pp. 87-89.) Although we do not address the question here, *Wright* does suggest that, in theory at least, a trial court could apply the *Long Valley* riparian right principles to reduce a landowner's future overlying water right use below a current but unreasonable or wasteful usage, as long as the trial court provided the owners with the same notice or due process protections afforded the riparian owners under the Water Code. (See Wat. Code, § 1200 et seq.; *Wright, supra*, 174 Cal.App.3d at pp. 87-89.) If Californians expect to harmonize water shortages with a fair allocation of future use, courts should have some discretion to limit the future groundwater use of an overlying owner who has exercised the water right, and reduce to a reasonable level the amount the overlying user takes from an overdrafted basin.

proportionate equitable share of the total amount available." The court estopped all parties from asserting special priorities or preferences. It concluded it had "the authority to draft and impose a physical solution which requires all users to share equitably in the cost and reduction of use, to safe yield."

We agree that, within limits, a trial court may use its equitable powers to implement a physical solution. (See, e.g., *Peabody, supra,* 2 Cal.2d at pp. 383-384 [court has power to make reasonable regulations for water use, provided they protect the one enjoying paramount rights].) In *City of Lodi v. East Bay Mun. Utility Dist.* (1936) 7 Cal.2d 316, 341, this court recognized a trial court's power to enforce an equitable solution even if all parties do not agree to it, but cautioned against unreasonably burdening any party. The court observed that a physical solution is generally a practical remedy that does not affect vested rights. "Under such circumstances the 1928 constitutional amendment, as applied by this court in the cases cited, compels the trial court, before issuing a decree entailing such waste of water, to ascertain whether there exists a physical solution of the problem presented that will avoid the waste, and that will at the same time not unreasonably and adversely affect the prior appropriator's vested property right. In attempting to work out such a solution the policy which is now part of the fundamental law of the state must be adhered to." (*Id.* at pp. 339-340.) In other words, "a prior appropriator . . . cannot be compelled to incur any material expense in order to accommodate the subsequent appropriator." (*Id.* at p. 341.)

Other cases hold that a physical solution may not violate the constitutional principle that requires water to be put to beneficial use to the fullest extent possible. (*Hillside Water Co. v. Los Angeles* (1938) 10 Cal.2d 677, 685-686.) In *Rancho Santa Margarita v. Vail* (1938) 11 Cal.2d 501, 561 (*Vail*), this court held that a trial court may not demand that any one party spend large sums of money in order to

satisfy a physical solution. (See *Allen v. California Water & Tel. Co.* (1946) 29 Cal.2d 466, 483-484 [rejecting proposed physical solution and finding overlying owners entitled to make reasonable use of water without incurring substantial costs].)

Thus, although it is clear that a trial court may impose a physical solution to achieve a practical allocation of water to competing interests, the solution's general purpose cannot simply ignore the priority rights of the parties asserting them. (See *City of San Fernando, supra,* 14 Cal.3d at p. 290.) In ordering a physical solution, therefore, a court may neither change priorities among the water rights holders nor eliminate vested rights in applying the solution without first considering them in relation to the reasonable use doctrine. (See 1 Rogers & Nichols, Water for California (1967) § 404, p. 549, and cases cited.)

Respondents unpersuasively argue for imposition of an equitable physical solution that disregards prior legal water rights. They cite the principle that the Constitution requires the greatest number of beneficial users that the water supply can support, but they omit the requirement that this use be subject to the rights of those with lawful priority to the water. In addition, respondents rely on *Vail* to support their contention that a physical solution should be based on the trial court's broad equitable powers. But *Vail* concerned a conflict between riparian right holders, not a situation where one party's rights were paramount to the other's. (*Vail, supra,* 11 Cal.2d at p. 508.)

Respondents also rely on *Imperial Irrigation Dist. v. State Wat. Resources Control Bd.* (1990) 225 Cal.App.3d 548, 572. But in that case the court had to decide whether an unconstitutional misuse of water occurred, and did not adjudicate rights among competing water users, as here. Respondents simply fail to produce

compelling authority for their argument that courts can avoid prioritizing water rights and instead allocate water based entirely on "equitable" principles.

D. Appellants' Water Rights

In the trial court, respondents contended that neither the Cardozo appellants nor Jess Ranch sustained their burden of proving they possessed *any* water rights. The trial court agreed as to the Cardozo appellants. The court acknowledged that Jess Ranch testified as to its riparian, overlying, and appropriative rights, and, as the Court of Appeal observed, the evidence showed overlying rights, but the trial court found it unnecessary to determine the effect of those rights on its decision. The Court of Appeal concluded that Jess Ranch need not rely on those rights in order to participate in the physical solution and judgment.

1. Cardozo Appellants

After concluding that several Cardozo deeds had not reserved riparian rights on behalf of the Cardozo appellants, the Court of Appeal nevertheless disputed the trial court's finding that they had no overlying rights. Here, the Court of Appeal reasoned, "overlying rights are a property right appurtenant to the land, and are based on ownership. [Citations.] Although limited to the amount needed for beneficial use, irrigation for agriculture is clearly such a use, and respondents did not claim otherwise. [Citations.]"

After pointing out that overlying rights are dependent on land ownership over groundwater, and are exercised by extracting and using that water, the Court of Appeal concluded: "Having shown ownership, extraction and beneficial use of the underground water here, the Cardozo Appellants established overlying rights, and the contrary finding of the trial court is without evidentiary or legal support. [¶] . . . [¶] We repeat the guiding principle: 'Under California law, "[p]roper overlying use, . . . is paramount, and the right of an appropriator, being limited to the amount

of the surplus, must yield to that of the overlying owner in the event of a shortage *unless the appropriator has gained prescriptive rights through the taking of nonsurplus waters*." [Citation.]' (*Hi-Desert County Water Dist. v. Blue Skies Country Club, Inc., supra,* 23 Cal.App.4th 1723, 1730-1731, original italics omitted.) Thus, while the rights of all overlying owners in a groundwater basin are correlative, and subject to cutbacks when the basin is overdrafted, overlying rights are superior to appropriative rights. Here, the trial court did not attempt to determine the priority of water rights, and merely allocated pumping rights based on prior production. This approach elevates the rights of appropriators and those producing without any claim of right to the same status as the rights of riparians and overlying owners. The trial court erred in doing so."

Although the Court of Appeal agreed with the Cardozo appellants in doubting the legal propriety of some aspects of the physical solution, the court did not agree that it should reverse the entire judgment without regard to the rights of the stipulating parties. The Court of Appeal explained, "While we share the Cardozo Appellants' doubts as to the legal propriety of various aspects of the trial court's physical solution, such as allowing transfer of water produced in accordance with riparian or overlying rights to nonriparian or nonoverlying lands, we do not need to consider those aspects of the physical solution. We see no reason why the parties cannot stipulate to a judgment incorporating the physical solution, nor do we see any reason why a stipulated judgment entered into by a large number of water producers in the Mojave Basin should be totally reversed when the rights of the Cardozo Appellants can be fully protected by appropriate trial court orders on remand. [Citations.] . . . [¶] Thus, we protect the rights of the Cardozo Appellants while also respecting the rights of the stipulating parties to agree to a judgment

which waives or alters their water rights in a manner which they believe to be in their best interest." (Fns. omitted.)

Accordingly, the Court of Appeal reversed the trial court judgment against the Cardozo appellants, concluding that the trial court could not ignore their preexisting legal water rights. The court did recognize, however, that the stipulating parties could agree to be bound by the physical solution regardless of any water rights they may have had. At the same time, the Court of Appeal concluded: "[A]ny person or entity that produced more than a minimal amount of water in the 1986-1990 period was allowed to stipulate to the judgment, regardless of whether they had any provable water rights. Essentially, they could waive their existing water rights and agree to be bound by the terms of the stipulated judgment, so long as the rights of the nonstipulating parties were respected. [Citation.]" The Court of Appeal directed the trial court to exclude the Cardozo appellants from the judgment and to grant them injunctive relief protecting their overlying water rights to the current and prospective reasonable and beneficial need for water on their respective properties.

The Court of Appeal also reversed the trial court's May 6, 1996, award of costs to the respondents as the prevailing parties against the Cardozo appellants. The court reasoned that because the Cardozo appellants should have been excluded from the judgment, respondents are no longer prevailing parties. It also directed the trial court to order a refund of any assessments the Cardozo appellants paid under the judgment pending appeal.[14] In all other respects, the court affirmed the trial court judgment as to those appellants.

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[14] The Court of Appeal did not find the trial court abused its discretion in requiring the Cardozo appellants to post an undertaking to guarantee the payment of the water assessments for which the judgment provided. It simply found that

(*Footnote continued on next page*.)

Respondents principally disagree with the Court of Appeal's conclusion that the trial court erred in ignoring the Cardozo appellants' legal water rights in its equitable physical solution and judgment. They initially contend that the Court of Appeal's resolution of the Cardozo appellants' appeal gives those parties the right to extract an unlimited amount of water from the basin. We disagree. When the water is insufficient, overlying owners are limited to their "proportionate fair share of the total amount available based upon [their] reasonable need[s]." (*Tehachapi-Cummings County Water Dist. v. Armstrong* (1975) 49 Cal.App.3d 992, 1001.)

Respondents also argue that overlying pumpers in an overdrafted basin should be required to file an action to adjudicate groundwater rights at the first indication of substantial growth in the area. However, overlying pumpers are not under an affirmative duty to adjudicate their groundwater rights, because they retain them by pumping. (*City of San Fernando, supra,* 14 Cal.3d at p. 293, fn. 100; *Hi-Desert County Water Dist., supra,* 23 Cal.App.4th at pp. 1731-1732.)

As overlying owners, the Cardozo appellants have the right to pump water from the ground underneath their respective lands for use on their lands. The overlying right is correlative and is therefore defined in relation to other overlying water right holders in the basin. In the event of water supply shortage, overlying users have priority over appropriative users. (*City of Pasadena, supra,* 33 Cal.2d at p. 926.) The Court of Appeal properly recognized that the Cardozo appellants

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(*Footnote continued from previous page*.)

because the Cardozo appellants were not subject to the judgment, the trial court should order a refund of any assessments they had paid to date. We leave the resolution of any remaining issues involving the assessment question for the courts on remand.

retained their overlying rights by pumping, and that no claim of prescription had been asserted to reduce those retained overlying rights.

Likewise, no precedent exists for requiring an overlying user to file an action to protect its right to pump groundwater. The laches doctrine did not bar a plaintiff's action, for example, even where defendant cities increased their pumping of an overdrafted water supply long before the action commenced, and development relied on the new water production in the interval. (*Orange County Water District v. City of Riverside* (1959) 173 Cal.App.2d 137, 219-220.)

2. Jess Ranch

Although the Court of Appeal was careful not to endorse the physical solution or trial court judgment, it considered whether Jess Ranch had the right to be included in the physical solution on the same terms as some other stipulating parties. The trial court judgment specified free production allowances for the basin's water producers. For most, this value was set at the producer's maximum production during the years 1986-1990. Jess Ranch's free production allowance was calculated differently, and it appealed, contending that it should be allowed to participate in the stipulated judgment on the same terms offered to other producers. Thus, the Jess Ranch appeal presents different issues than does that of the Cardozo appellants. Jess Ranch wishes to participate in the physical solution, but contends it has been prevented from doing so on the same terms offered the other water producers in the Mojave Basin.[15] The Court of Appeal agreed with Jess Ranch, and respondents seek reversal of that judgment.

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[15] Prior to oral argument, we granted Jess Ranch's motion to take judicial notice of the Fourth Annual Report of the Mojave Basin Area Watermaster, Water Year 1996-1997 (Apr. 1, 1998), the most recent annual report the Mojave Water Agency was required to file with the trial court in its capacity as a watermaster.

(*Footnote continued on next page*.)

Specifically, the trial court examined Jess Ranch's water use and concluded it failed to establish that the use was reasonable and beneficial. During the period for which water production was reviewed, Jess Ranch had been involved in aquaculture (trout production). Aquaculture requires recirculating water through fishponds, and there is little consumptive use or surface evaporation. Leftover water flows out the other end of the ponds and is applied to irrigation. From a gross annual production of 18,625 acre-feet, the trial court estimated Jess Ranch's total consumptive use at 7,480 acre-feet. The court used this value to set Jess Ranch's free production allowance. The judgment allowed Jess Ranch to continue to produce recirculated water for aquaculture, but required it to discharge the water directly to the Mojave River after this use.

In our view, the trial court's estimate of Jess Ranch's free production allowance was based on reasonable assumptions. Although Jess Ranch practiced agriculture and aquaculture during the period used for calculating free production allowances, it is in the process of changing its property use to commercial and residential. The trial court estimated its future consumptive use at 1,300 acre-feet per year. It concluded that evidence did not establish the amount of land Jess Ranch

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(*Footnote continued from previous page*.)

(See *City of Sacramento v. State Water Resources Control Bd.* (1992) 2 Cal.App.4th 960, 967, fn. 2.)

As to other pending matters, we rule as follows: (1) deny Jess Ranch's motion for immediate issuance of the remittitur to the superior court, for failure to show good cause under California Rules of Court, rule 25(b); and (2) deny amicus curiae Pacific Legal Foundation's motion to strike footnote 21 of respondents' consolidated answer to amici curiae briefs, page 24, for containing an inaccurate characterization of Pacific's amicus curiae brief, and instead disregard the defect and consider the brief without it. (Cal. Rules of Court, rule 18(3).)

had in agriculture. On the basis of expert testimony, the court multiplied an upward estimate, 600 acres, by 10 acre-feet per acre, with the product representing the agricultural water use. This product was added to the estimated amount of water lost from lake evaporation and the amounts needed for home use and greenbelt irrigation. The sum is Jess Ranch's consumptive use. The court used this value as its free production allowance.

Jess Ranch was not the only party whose free production allowance was set equal to its estimated consumptive use. Twenty-five other parties, including the California Department of Fish and Game, maintained fish hatcheries or recreational lakes; their free production allowances were also set at the level of their consumptive use (total production less recirculated water).[16] Some other recreational lakes were given base production rights based on actual production, with the contingency that if they ever ceased production, they could only transfer their consumptive use portion of those rights.[17]

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[16] Jess Ranch has highlighted a number of parties that reused water without having their free production allowances adjusted. For example, the Silver Lakes Association reused water on a golf course. These producers are distinguishable from the subgroup of hatcheries and recreational lakes discussed above. With the possible exception of the Hesperia Water District, the trial court assumed that the latter group recirculated unused water to the basin. The Hesperia Water District (Hesperia) maintained an aquaculture operation using 700 acre-feet per year, about 6 percent of its production allowance. It is not clear from the judgment or amended statement of decision why the trial court did not reduce Hesperia's production allowance to reflect this usage. Certainly aquaculture represents a far smaller percent of Hesperia's total water use (less than 6 percent) than is the case with Jess Ranch (over 60 percent). This possible exception does not disturb the conclusion that Jess Ranch was treated like the majority of other hatcheries and recreational lakes that recirculated water. This subgroup all returned well over 50 percent of the water they produced to the basin.

[17] Jess Ranch also argues that if we reverse the Court of Appeal judgment in its favor, we must on remand require the trial court to consider its water priorities in

(*Footnote continued on next page*.)

The trial court exercised its equitable powers in approving the proposed physical solution and entering the judgment, and the Court of Appeal properly reviewed the judgment under the abuse of discretion standard of review. (*In re Marriage of Doud* (1986) 181 Cal.App.3d 510, 524-525.) But where the Court of Appeal found an abuse of discretion as to Jess Ranch, we do not. Equity demands that similarly situated parties be treated similarly. Jess Ranch was one of 26 producers that recirculated water. It seems reasonable to differentiate these users from others who did not recirculate water, but who put their full gross production amount to use. It is difficult to fathom what reasonable, beneficial purpose is served by allowing Jess Ranch to retain both the amount of water used and the amount recirculated.

(*Footnote continued from previous page*.)

determining its prior allocation under the physical solution and trial court judgment. But like the Court of Appeal, we find it unnecessary for the trial court to establish Jess Ranch's water rights on remand as long as Jess Ranch seeks to participate in the physical solution. As the Court of Appeal observed, the physical solution "establishes a system of water regulation for the stipulating parties that is independent of their water rights, if any, under traditional application of riparian, overlying or appropriative priorities. Since Jess Ranch seeks to participate in the system established by the [physical solution], it must waive its existing water rights in order to do so. Thus, the question of whether it has existing rights is irrelevant for this purpose. If Jess Ranch desires to participate in the [physical solution], it must, for this purpose, refrain from asserting its existing water rights and it must accept all of the terms of the [physical solution] judgment that are applicable to all stipulating parties."

V. DISPOSITION

We affirm the Court of Appeal judgment in all respects except that we reverse its judgment as to the Jess Ranch appeal. We therefore remand the matter to the Court of Appeal for further proceedings consistent with this conclusion.

CHIN, J.

WE CONCUR:

GEORGE, C.J.
MOSK, J.
KENNARD, J.
BAXTER, J.
BROWN, J.
JOHNSON, J.*

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* Hon. Earl Johnson, Jr., Associate Justice, Court of Appeal, Second District, Division 7, assigned by the Chief Justice pursuant to article VI, section 6, of the California Constitution.

See page 4 for addresses and telephone numbers for counsel who argued in Supreme Court.

Name of Opinion City of Barstow v. Mojave Water Agency

Unpublished Opinion
Original Appeal
Original Proceeding
Review Granted XXX 64 Cal.App.4th 737
Rehearing Granted

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County: Riverside
Judge: Erik Michael Kaiser

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