DRAFT

# Non-Potable Water Master Plan

PREPARED FOR:

JURUPA COMMUNITY SERVICES DISTRICT

January 2008


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**Office of the District Engineer**

January 28, 2008

Mr. Eldon Horst
General Manager
Jurupa Community Services District
11201 Harrel Street
Mira Loma, California 91752

RE: Draft Non-Potable Water Master Plan

Dear Mr. Horst:

Pursuant to Jurupa Community Services District's authorization, transmitted herewith is a draft copy of the District's "Non-Potable Water Master Plan". Based on the findings described herein, we recommend that the District implement Alternative 1A which utilizes non-potable wells to supply irrigation water for the major consumers within the District, specifically the parks and schools. The estimated ultimate irrigation demand within the District's boundary is 4,227 ac-ft/yr. Currently the District and other entities use approximately 1,770 ac-ft/yr of non-potable water for irrigation purposes. By implementing the proposed improvements provided in Alternative 1A, the District could increase the use of non-potable water by about 907 acre-feet/year for the irrigation of more parks and schools within the District's boundaries. We recommend that the District actively pursue government grants to help fund proposed capital facilities.

If you have any questions, please call me at (951) 686-1070.

Sincerely,

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE
Senior Vice President

Enclosure

cc: Mr. Robert Tock, P.E., Director of Engineering & Operations
Jurupa Community Services District

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## APPENDICES

# SECTION 1 - INTRODUCTION

The following document is a Non-Potable Water Master Plan for the Jurupa Community Services District (District) which is located in Western Riverside County (Figure 1-1 and Figure 1-2). For purposes of definition for this master plan, non-potable water includes treated wastewater (reclaimed water) and non-potable groundwater. Currently, the District encompasses approximately 26,000 acres. The two general areas within the District which are being studied for potential non-potable water irrigation are the Eastvale and Jurupa areas (Figure 1-2).

Located in the southwest portion of the District, the Eastvale Area is generally bounded by Wineville Road to the east, Bellegrave Avenue to the north, Hellman Avenue to the west, and the Santa Ana River to the south. For the purposes of this study, the area between Wineville Road and Etiwanda Avenue south of Bellegrave Avenue was also included in the Eastvale Area as well as Service Area "B" Service Area "B" is located between Galena Street to the north, Bellegrave Avenue to the south, and Hamner Avenue to the west as shown on Figure 1-2. The potential sources of non-potable water in this area are future or existing wells, The Inland Empire Utility Agency (IEUA), and the Western Riverside County Regional Wastewater Reclamation Authority's (WRCRWA) wastewater treatment plant. The Eastvale Area as described herein encompasses about 9,800 acres.

Located in the central and easterly portion of the District's service area, the Jurupa Area is generally bounded by Serendipity Road on the west, the Jurupa Mountains on the north, the Santa Ana River on the south, and the District boundary on the east as shown in (Figure 1-2). The potential sources of non-potable water in this area are future or existing wells, and the City of Riverside's Wastewater Reclamation Facility. The Jurupa Area as described herein encompasses about 9,750 acres.

The objectives of this Non-Potable Master Plan are to quantify the existing and potential demands for non-potable irrigation water within these specific planning areas, identify viable sources of non-potable water supply, and layout backbone infrastructure capable of distributing non-potable water throughout the Eastvale and Jurupa Areas.

## SCOPE OF REPORT

To accomplish the objectives of this report, the scope of the study includes the following:

1. Identify the existing and potential non-potable water demands throughout the study areas;
2. Determine the non-potable water supply sources available, including non-potable wells and reclaimed wastewater;
3. Prepare backbone facility layouts for the proposed non-potable distribution system; and
4. Generate cost estimates for the various sources and distribution system alternatives.

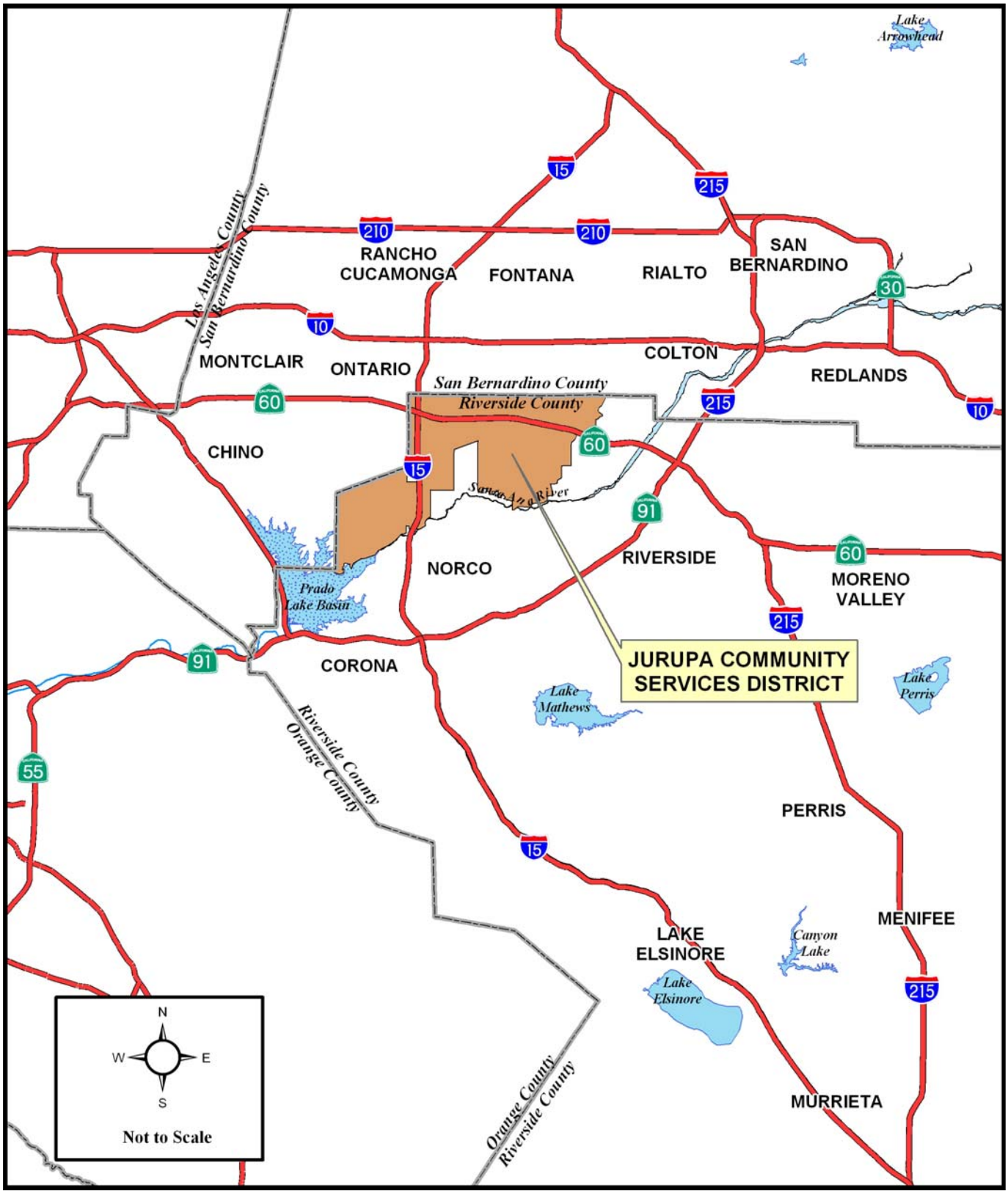



**Figure 1-1 Regional Location Map**

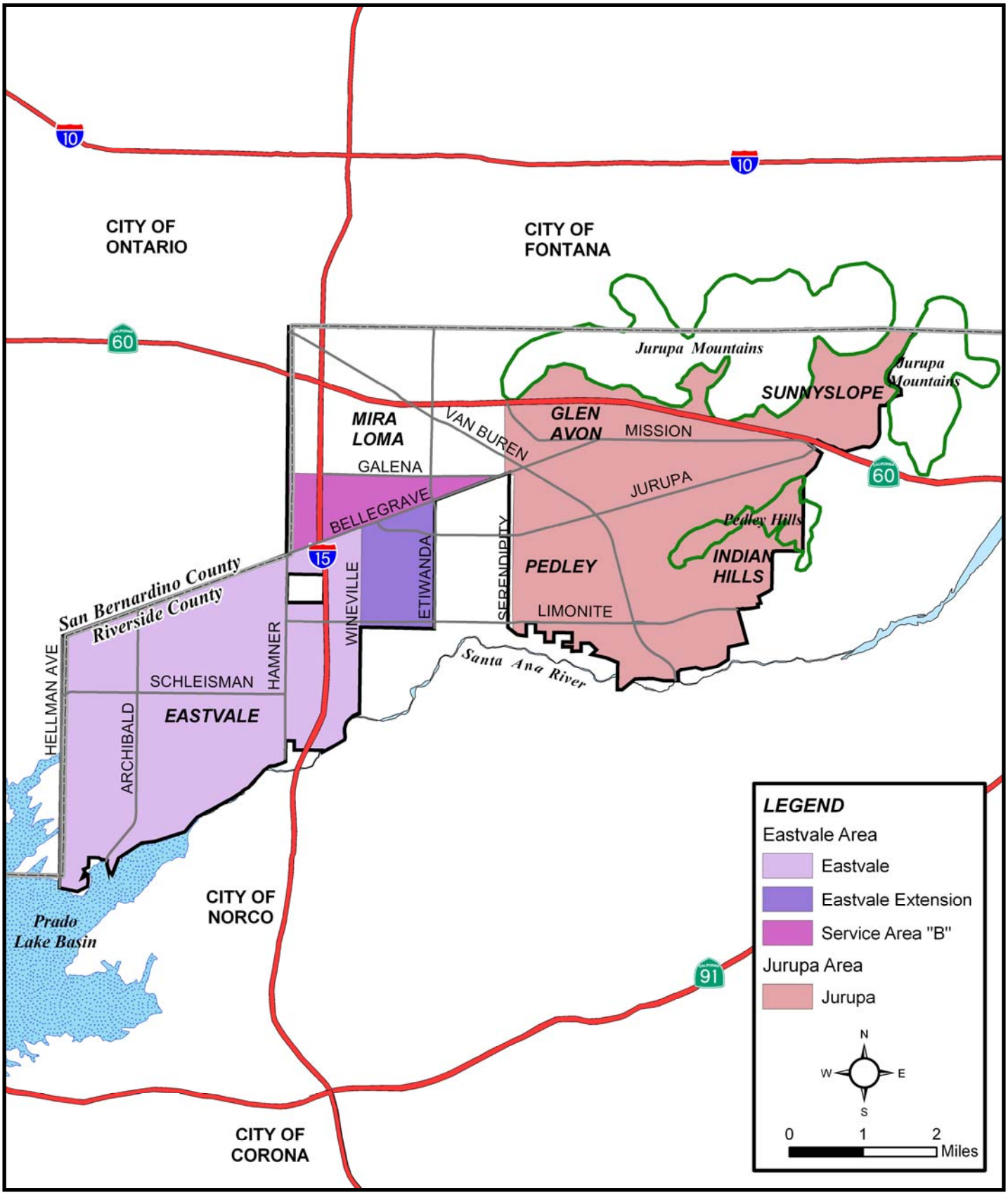



**Figure 1-2 JCSD Boundary Map**

## RECYCLED WATER REGULATIONS

The use of recycled water to offset potable water supply is promoted and regulated by the California Code of Regulations (CCR). An abridgment of Title 17 and 22 of the CCR statutes are compiled in the California Laws related to Recycled Water, also referred to as "The Purple Book." As discussed in Section 2, the water demand of the District will increase as development continues, which will create a need to either develop additional potable water supply or supplement the District's potable supply with non-potable sources for irrigation purposes. This report focuses mainly on using reclaimed water strictly for irrigation, however according to Title 22, tertiary-treated recycled water could also be used for the following purposes:

- Irrigation of golf courses, cemeteries, residential landscaping, parks, and playgrounds
- Watering ornamental nursery stock, and non-edible and edible vegetation
- Recreational lakes and ponds, and water bodies for wildlife habitat
- Cooling towers, air conditioners, and evaporative condensers
- Flushing toilets, decorative fountains, commercial laundries, commercial car washes
- Industrial boiler and other process feed
- Washing down roads and sidewalks
- Fire fighting

According to the California Water Code (Section 13550) the use of potable domestic water for non-potable uses (those listed above), "is a waste or an unreasonable use of the water" if recycled water meeting the quality requirements specified by the code is available and can be furnished at a reasonable cost to the user. Recycled water can be used if it is not detrimental to public health and will not adversely affect downstream water rights, degrade water quality, and is not injurious to plant life, fish, and wildlife. The California Department of Public Health (CDPH) provides the water utilities with the requirements for treatment, water quality and reliability of the recycled water before public use.

# SECTION 2 - WATER DEMANDS

This section describes the criteria used to identify existing and potential non-potable irrigation demands. As a result of this demand analysis, the size of the pipelines, pumping facilities, storage and wells will be determined based on the demand outlined in this section. Potential non-potable irrigation areas for this study were considered to be parks, schools, reverse frontage areas, golf courses, freeway right of way, and trails. A visual representation of the existing and potential irrigation areas within the District is depicted in Plate 1 (detailed irrigation demand is provided in Appendix A). Table 2-1 is a summary of the existing and potential irrigation water demand for the Eastvale and Jurupa areas.

## Table 2-1 Estimated Existing and Potential Irrigation Demands

| Irrigation Area Type | Eastvale Demand [1] (ac-ft/yr) | Jurupa Demand [1] (ac-ft/yr) | Total Demand (ac-ft/yr) |
|---|---|---|---|
| Existing Non-Potable Irrigation | | | |
| Parks [2] | 240 | - | 240 |
| Schools [3] | 118 | 128 | 245 |
| Reverse Frontage [4] | 55 | - | 55 |
| Golf Courses[5] | - | 1,229 | 1,229 |
| Total Existing | 413 | 1,357 | 1,770 |
| Potential Non-Potable Irrigation | | | |
| Parks [2] | 889 | 343 | 1,232 |
| Schools [3] | 338 | 362 | 700 |
| Reverse Frontage [4] | 353 | 38 | 391 |
| Freeway | 40 | 65 | 105 |
| Trail | 29 | - | 29 |
| Total Potential | 1,650 | 808 | 2,457 |
| Total Existing and Potential Demand | 2,063 | 2,164 | 4,227 |

[1] Assumed 4 ac-ft/ac/year based on discussions with District staff (Ric Welch) on 6-14-07 and demand analysis of Cedar Park and some surrounding reverse frontage areas.
[2] Assumed 80% of total park acreage will be irrigated based on land use analysis of Harada and Providence Park
[3] Assumed 50% of total school acreage will be irrigated based on land use analysis of existing schools
[4] Assumed 75% of medians would be irrigated and all of the parkway minus the sidewalk, based on Community Works Design Group's recommendation
[5] Includes Oak Quarry, Indian Hills, and Paradise Knolls

## PARK DEMANDS

The demands for park irrigation were based on the assumption that 80% of the total park area would be irrigated. This assumption was based on area calculations using aerial photos and CAD software to calculate total vegetated area verses hardscape area for Harada and Providence Ranch Parks. Annual use for water consumption was based on four acre feet per year (4 acre-ft/yr).

To validate the annual water consumption, the District provided landscape area calculations and metered flow data for the District's Cedar Park and some reverse frontage areas. However, when the water demands per irrigation area were analyzed, the results were inconsistent. The annual demands ranged from 3.2 to 6.6 ac-ft/ac/yr. Note that this range is excessive. It is recommended that the District further investigate the operations of existing irrigation system to insure that irrigation areas of similar nature are receiving the same amount of water and that over watering is avoided. Through discussions with District staff, an assumed 4 ac-ft/ac/yr was determined to be a conservative factor and was therefore utilized for this Master Plan. For a summary of the estimated irrigation demand for each park shown on Plate 1 refer to Table 1 of Appendix A.

Table 2-2 was provided by one of the District's approved landscape architects (Community Works Design Group) and was utilized to determine peak flow rates. The Peak Irrigation Flow Rate table is based on the assumption that the park would be irrigated during an 8 hour watering window, 5 days a week (1 day for maintenance and 1 day for play).

### Table 2-2 Peak Irrigation Flow Rate

| Area (Acre) | Flow Rate (GPM) |
|---|---|
| 5 | 125 |
| 8 | 200 |
| 10 | 250 |
| 12 | 300 |
| 15 | 375 |
| 20 | 500 |
| 25 | 625 |
| 32 | 800 |

## SCHOOL DEMANDS

In order to adequately estimate the percentage of landscaped area for the schools throughout the study area, Jurupa Valley High, Sky Country Elementary, and Mira Loma Middle schools were analyzed using aerial photos and CAD software to determine the average landscaped area versus hardscape and buildings. It was found that 50% of the total school area would be irrigated. Table 2-2 was also utilized for estimating peak flow rates. Just as with the Park Demands, 4 ac-ft/ac/yr was used for annual irrigation demand calculations for each school. Note that Nueva

Vista Continuation High School is currently connected to non-potable well water as shown on Plate 1, however the school is not currently utilizing the connection. It was assumed that the school will be using non-potable water for irrigation in the near future and was therefore considered as an existing (rather than a potential) non-potable irrigation demand in Table 2-1. Provided in Table 2 of Appendix A is the estimated irrigation demand for each school.

## REVERSE FRONTAGE

Reverse frontage irrigation area for this study is defined as the irrigated right-of-way property where the back side of a lot fronts a major street. Irrigated median areas were also included in the area calculations for reverse frontage. Areas were calculated from street plans where available and where plans for street sections where not readily available, assumptions were made on irrigated area based on adjacent sections of the street or aerial photos. It was assumed that 75% of the median would be vegetated and the remaining 25% would be hardscape, based on Community Design Works recommendation. Flow rates and annual consumptions were based on the same assumptions specified for parks, namely 25 gpm/ac (Table 2-2) and 4 ac-ft/ac/yr respectively. The estimated irrigation demand for each reverse frontage area shown on Plate 1 is provided in Table 3 of Appendix A.

# SECTION 3 - WATER SUPPLY

## NON-POTABLE WELLS

The District currently has five non-potable wells used to irrigate nearby parks, schools, reverse frontage areas, and a golf course. These wells and the areas served are as follows.

### Well 40 – McCune Park

Well 40 shown in Figure 3-1 is located in McCune Park and currently is used to irrigate the park, Barton Elementary School to the south, and some of the nearby reverse frontage areas as shown on Plate 2. The current pumping capacity of the well is 499 gpm with a discharge pressure of 80.5 psi. Well 40 is classified as non-potable due to high nitrate levels and was not constructed per the District's potable water standards.

**Figure 3-1 Well 40 at McCune Park**

### Well 41 – Providence Ranch Park

Well 41 shown in Figure 3-2 is located in Providence Park and currently irrigates the park and some of the surrounding reverse frontage areas as shown on Plate 2. The current pumping capacity of the well is 513 gpm with a discharge pressure of 80 psi. Well 41 is classified as non-potable due to high nitrate levels and was not constructed per the District's potable water standards.

**Figure 3-2 Well 41 at Providence Ranch Park**

### Chino II - Well 1

Chino II Well 1 has an allowable pumping capacity to the District of 400 gpm which is more than what the park currently uses. The District has a contractual relationship with the Chino Desalters Authority to use a portion (400 gpm) of the total capacity of this well to irrigate Orchard Park.

### High School Well

The High School Well currently provides non-potable water to Jurupa Valley High School and the Field of Dreams Park. The well pump provides 600 gpm of water with a discharge pressure of 74 psi. This well is classified as non-potable due to high nitrate levels and was not constructed per the District's potable water standards.

### Well 21 – Oak Quarry Golf Course

Well 21 supplies non-potable water to irrigate the Oak Quarry Golf Course, Nueva Vista School (currently not utilizing non-potable water supply), and a small ranch to the southeast of the golf course as shown on Plate 1. The design flow for the well is 1,240 gpm with a discharge pressure of 100 psi. Well 21 is classified as non-potable due to high nitrate levels.

## INLAND EMPIRE UTILITY AGENCY (IEUA)

IEUA is located north and west of the District and encompasses the Cities of Ontario, Chino, and Chino Hills and other cities and water districts within the Chino groundwater basins (see map of IEUA's service area in Appendix B). Sewer service is provided by IEUA to over 700,000 people

who generate over 70,000 ac-ft/yr[6] of wastewater. IEUA currently operates four (4) water reclamation facilities which treat approximately 50,000 ac-ft of water each year to recycling standards. As of November 2007, the total utilization of IEUA's recycled water was approximately 5,800 ac-ft/yr. According to IEUA's manager of recycled water (Gary Hackney), IEUA's "effluent receives tertiary treatment meeting full body contact recreation standards. Total dissolved solids concentrations are in the neighborhood of 500 mg/l.[7]"

The District is not a member agency of IEUA and is not entitled to all of the benefits afforded to the member agencies, including the lowest cost for purchasing recycled water. Despite not being a member agency, IEUA has indicated in meetings with the District that recycled water is available for the District to purchase and that distribution facilities currently exist to deliver water within 6,300 feet of the District's northerly boundary in the Eastvale Area. The closest point of connection from IEUA's recycled water distribution system on Carpenter Avenue. Distribution facilities do not currently exist which could deliver water to the District's Jurupa Area. IEUA's current recycled water master plan contemplates delivering a total of 1,850 ac-ft of reclaimed water to the District each year. Included in Appendix B is a copy of IEUA's "Recycled Water Capital Projects", which describes the existing and proposed recycled water distribution and storage system.

## WESTERN RIVERSIDE COUNTY REGIONAL WASTEWATER AUTHORITY'S (WRCRWA) RECLAMATION FACILITY

The WRCRWA plant was brought on line in 1998 and was designed to treat 8 million gallons of wastewater per day (MGD). As of November 2007, the plant was treating approximately 5.5 MGD. It is unclear whether the plant, as currently constituted, is capable of actually treating 8 MGD. According to information published by WRCRWA, this plant is upgradeable to treat 32 MGD[8]. The District currently supplies the plant with an average daily flow of 2.1 MGD. Ultimately the estimated flow rate from the District to the plant is 5.7 MGD.[9] The District has the right to receive recycled water equal to the quantity of wastewater delivered to the plant. Through phone conversations and meetings with WRCRWA's plant supervisor Bill Beam, the plant provides tertiary treatment and can meet all Title 22 requirements for producing recyclable water. The plant does not currently provide any water for recycling purposes.

## CITY OF RIVERSIDE WASTEWATER RECLAMATION FACILITY

A meeting was arranged with the City of Riverside staff to discuss the feasibility of utilizing reclaimed water from the Riverside's wastewater reclamation facility. At the time of the meeting (September 2007) the treatment plant expansion/upgrade was under design. The new design will include a pump station and force main from the treatment plant to deliver reclaimed water to the City of Riverside's power plant. The feasibility of tying into this proposed system is a viable

[6] IEUA web page May 16, 2007, www.ieua.org
[7] Letter from IEUA dated April 17, 2007, see Appendix B
[8] WRCRWA web page January 2008, www.wmwd.com/treatmentplants.htm
[9] Master Sewer Plan Addendum (October 2007), prepared by Albert A. Webb Associates for Jurupa Community Services District

alternative but a decision will need to be made in an expeditious manner to avoid major rework to the plans currently being designed. The owner of the Indian Hills Golf Course has expressed interest in purchasing reclaimed water from the District in lieu of the non-potable groundwater he is using to irrigate his golf course. Reclaimed water could also be utilized to irrigate some reverse frontage areas along Limonite Avenue and Park 30 as shown on Plate 1. The City of Riverside reclaimed water cost for a golf course and urban forest (within the City of Riverside) was $280 per acre foot during fiscal year 2006-2007.[10]

[10] From Technical Advisory Committee Agenda, November 2007

# SECTION 4 - ALTERNATIVE DEVELOPMENT

## DESIGN CRITERIA

To establish pipeline diameters, we utilized the following design criteria. Pipeline velocities were limited to a maximum of 5 feet per second. A Hazen-Williams roughness coefficient "C" of 120 was utilized for all pipes. Irrigation sprinkler heads can require approximately 70 psi pressure and the head loss through the piping between the street connection and the sprinkler head is typically between 15–20 psi. Therefore, a minimum pressure at the street of 90 psi was set as the standard for design purposes.

## MODEL DEVELOPMENT

To develop and analyze the alternative irrigation systems a hydraulic model was prepared using H2ONet V6 (developed by MWH Soft Inc.). This modeling software has the capabilities to analyze the system as a whole and to provide an efficient means of calculating complex hydraulics that is attributed to water systems of this magnitude. The county parcel layer was used as the background or base upon which the pipeline alignments could be mapped to scale. Elevations were assigned to all model attributes with the use of an advanced drafting program which used U.S. Geological Survey (USGS) 10 meter three dimensional data points to generate a surface that all model attributes could be projected to. The calculated demands described in Section 2 were manually assigned to the nearest modeled junction.

## DESCRIPTION OF ALTERNATIVES

Several alternatives were analyzed in the preparations of this study however only the top four will be discussed in this report. A similar version of Alternatives 2 and 3 were presented earlier to the District when only the Eastvale area was being studied. Since that time, the District has decided to expand the scope of this study to include the Jurupa Area.

### Alternative 1A

Two versions of Alternative 1 have been provided in this study. Alternative 1A utilizes non-potable wells to irrigate the majority of the District's remaining schools and parks that are not currently on non-potable water. A total of nine proposed wells were added to the five existing wells for this alternative as shown on Plate 2. Note that Well 6 is a privately owned existing well. It was assumed that the ownership of this well will be transferred to the District based on discussions with District staff. Well 6 may not be upgradeable to handle the irrigation demands of School 6 shown on Plate 2. Therefore, to be conservative in this section and in cost estimates the estimated irrigation demands for School 6, supplied from Well 6, have been treated as if a new well will have to be drilled on the existing Well 6 site. With the proposed facilities for this

alternative the District would be able to meet approximately 61% of the irrigation demands within the Eastvale area with non-potable water and 63% of the irrigation demands District wide. Table 4-1 is a summary of the estimated capacity of the nine proposed wells for this alternative and Table 4-2 is a represents the proposed pipeline length by diameter.

**Table 4-1 Alternative 1A Proposed Well Capacity**

| Well # | Flow (gpm) |
|---|---|
| 2 | 415 |
| 3 | 265 |
| 4 | 1,030 |
| 6[1] | 235 |
| 7 | 1,200 |
| 10 | 785 |
| 11 | 460 |
| 13 | 310 |
| 15 | 965 |
| Total | 5,665 |

**Table 4-2 Alternative 1A Proposed Pipeline by Length and Diameter**

| Pipe Dia. (inch) | Quantity (LF) |
|---|---|
| 6 | 12,815 |
| 8 | 5,090 |
| 10 | 1,891 |
| 12 | 4,588 |
| 16 | 718 |
| **Total:** | **25,102** |

Note that no wells are proposed in the Jurupa area near the Stringfellow plume shown on Plate 2. The plume is from a disposal site that was closed in the early 1970's. "The predominant compounds now found at the site include para-chlorobenzenesulfonic acid (pCBSA),

[1] Assumed the ownership of this well will be transferred to the District, the flow rate shown in this table is the additional flow required to supply the estimated non-potable irrigation demands for School 6 shown on Plate 2.

trichloroethylene (TCE), heavy metals, sulfate, chloroform, chlorobenzene, and perclorate."[*] The Department of Toxic Substances Control has confirmed that well site 13 will not have an effect on the plume because they are not hydraulically connected.

### Alternative 1B

Alternative 1B is essentially equal to Alternative 1A with additional pipeline extensions to supply non-potable water to adjacent irrigation areas. As shown on Plate 3, Alternative 1B utilizes five of the District's non-potable wells, nine new wells to irrigate areas throughout the District. Approximately 75% of the ultimate irrigation demands in the Eastvale area can be satisfied with the existing and proposed facilities in this alternative and 71% of the demands District wide. Although this alternative leaves approximately 29% of the existing and potential irrigation demands on the potable water system, it provides the District independence from other public agencies as a source of non-potable water.

The estimated flow rate each well would need to be capable of pumping for Alternative 1B can be found Table 4-3. Well site locations can be found on Plate 3 and Table 4-4 is a summary of the estimated proposed pipeline length by diameter.

**Table 4-3 Alternative 1B Proposed Well Capacity**

| Well # | Estimated Peak Flow (gpm) |
|---|---|
| 2 | 415 |
| 3 | 310 |
| 4 | 1,980 |
| 6[1] | 235 |
| 7 | 1,380 |
| 10 | 785 |
| 11 | 550 |
| 13 | 645 |
| 15 | 1,425 |
| **Total** | **7,725** |

[1] Assumed the ownership of this well will be transferred to the District, the flow rate shown in this table is the additional flow required to supply the estimated non-potable irrigation demands for School 6 shown on Plate 3.

[*] Department of Toxic Substances Control's web page (July 2007)
http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=33490001

## Table 4-4 Alternative 1B Proposed Pipeline by Length and Diameter

| Pipe Dia. (inch) | Quantity (LF) |
|---|---|
| 4 | 39,378 |
| 6 | 34,774 |
| 8 | 11,158 |
| 10 | 6,250 |
| 12 | 6,248 |
| 16 | 3,313 |
| **Total** | **101,122** |

Three of the existing wells were used in this alternative to irrigate additional demands of surrounding reverse frontage areas. The estimated additional demands for each of the three wells are provided in Table 4-5 and are shown on Plate 3. To meet the additional irrigation demands, it was assumed that the wells would need to be re-equipped with new motors.

## Table 4-5 Estimated Additive Demands for Existing Wells

| Well # | Estimated Additional Peak Flow Demands (gpm) |
|---|---|
| 1 (Well 40) | 70 |
| 5 (Chino II) | 60 |
| 8 (Field of Dreams) | 100 |
| Total | 230 |

### Alternative 2

Alternative 2 utilizes water from IEUA as the main supply source of water to irrigate the Eastvale area as shown on Plate 4. IEUA has an existing 30-inch diameter line at the corner of Remington Avenue and Carpenter Avenue. Based on conversations with IEUA the District's projected annual demand (1,650 ac-ft/yr) can be met through a connection to IEUA's recycled water distribution system in this area. However, to meet the estimated peak hour demands (10,000 gpm) from the District, additional storage will be required. A 5 MG reservoir would have enough storage volume to allow utilization of IEUA's reclaimed water.

Provided on Plate 4 are the proposed pipeline alignments and required pipe sizes to meet the estimated demands. It should be noted that the pressure in the north east portion of the Eastvale

area are less than the recommended 90 psi. Additional provisions will be required during the design of irrigation systems in this area such as low pressure sprinkler heads or a small onsite booster pump. Table 4-6 is a summary of the proposed pipe lengths by diameter.

**Table 4-6 Alternative 2 Proposed Pipelines by Length and Diameter**

| Pipe Dia. (inch) | Quantity (LF) |
|---|---|
| 4 | 2,754 |
| 6 | 53,331 |
| 8 | 48,073 |
| 10 | 28,970 |
| 12 | 30,511 |
| 16 | 20,588 |
| 18 | 12,518 |
| 24 | 5,314 |
| 30 | 14,886 |
| **Total:** | **216,944** |

Approximately 98% of the future irrigation demands in the Eastvale area can be satisfied with the existing and proposed facilities in this alternative and 80% of the District wide irrigation demand.

### Alternative 3

The supply source for this alternative is Western Riverside County Wastewater Reclamation Authority's (WRCWRA) WWTP. Alternative 3 utilizes the pipeline alignments established for Alternative 2 with different pipe diameters (as shown on Plate 5) based on the hydraulics of the system. This facility is located at one of the lowest elevations in District in the southwest corner and would require storage and pumping facilities to supply recycled water for irrigation demand. A booster station capable of pumping 10,000 gpm with approximately 1,250 hp will be needed to meet the projected irrigation demand of the system in the Eastvale Area.

The WRCWRA treatment plant currently has no available storage for treated effluent. Since the peak influent flows to the plant are in the morning and late afternoon and the irrigation demands are at night, an estimated 5 MG tank for operational storage will be required to meet the daily irrigation demand. WRCWRA currently has a large enough footprint to house a storage tank and booster station and treats enough wastewater to meet the District's estimated irrigation demand in the Eastvale area. A breakdown of proposed pipelines by size is provided in Table 4-7 below.

## Table 4-7 Alternative 3 Proposed Pipelines by Length and Diameter

| Pipe Dia. (inch) | Quantity (LF) |
|---|---|
| 4 | 10,596 |
| 6 | 35,185 |
| 8 | 40,375 |
| 10 | 27,670 |
| 12 | 30,363 |
| 16 | 19,336 |
| 18 | 944 |
| 20 | 23,953 |
| 24 | 20,270 |
| 30 | 2,159 |
| **Total:** | **210,850** |

Table 4-8 provides is a summary of the each alternative and the irrigation water demand that they serve in the Eastvale and Jurupa areas.

## Table 4-8 Demands Served by Alternatives

| Irrigation Area Type | Eastvale Demand | | Jurupa Demand | | Total Demand | |
|---|---|---|---|---|---|---|
| | (ac-ft/year) | (gpm) | (ac-ft/year) | (gpm) | (ac-ft/year) | (gpm) |
| Existing Non-Potable Irrigation [1] | 413 | 2,581 | 1,357 | 8,481 | 1,770 | 11,062 |
| Potential Non-Potable Irrigation | 1,655 | 10,344 | 808 | 5,047 | 2,463 | 15,391 |
| Total Non-Potable Demand | 2,068 | 12,925 | 2,164 | 13,528 | 4,232 | 26,453 |
| *Demands Served by Proposed Alternatives* [2] | | | | | | |
| Alternative 1A | 857 | 5,355 | 50 | 310 | 907 | 5,665 |
| Alternative 1B | 1,133 | 7,080 | 103 | 645 | 1,236 | 7,725 |
| Alternative 2 | 1,616 | 10,100 | - | - | 1,616 | 10,100 |
| Alternative 3 | 1,616 | 10,100 | - | - | 1,616 | 10,100 |
| *Percentage of Total Ultimate Demand Served* | | | | | | |
| Alternative 1A | 61% | | 65% | | 63% | |
| Alternative 1B | 75% | | 67% | | 71% | |
| Alternative 2 | 98% | | 63% | | 80% | |
| Alternative 3 | 98% | | 63% | | 80% | |

[1] Demands served by existing non-potable wells
[2] Demands in addition to non-potable irrigation demands being served by existing wells

Should the owner of the Indian Hill Golf course decide to utilize reclaimed water from The City of Riverside, an additional irrigation demand of about 36 ac-ft/yr can be served in the Jurupa area if Park 30 and the reverse frontage area along Limonite Avenue are converted from potable to non-potable uses as well. The Indian Hills Golf Course would still be utilizing non-potable water whether the water comes from existing well or is pumped from The City of Riverside Plant.

The required facilities to supply non-potable water to the Indian Hills Golf course and other neighboring irrigation areas from the Riverside plant were also determined. The distances between The City of Riverside Plant and the existing pump station on the south end of the Indian Hills Golf Course is approximately 6,800 ft. Currently the District has a third barrel crossing the Santa Ana River that could be used for a 10 inch diameter force main between The City of Riverside Plant and the District's unused Indian Hills Plant. It is likely that a separate pump station will be required at the Riverside WWTP to pump to the Indian Hills pump station. According the owner of the Indian Hills Golf Course a pumping capacity of 500 gpm would be sufficient. Based on the difference in elevation between the two plants and the frictional head losses in the force main, the required head for a proposed pump station would be about 135 ft.

# SECTION 5 - PROJECT COST

Proper and consistent cost estimation is essential in determining the feasibility of a proposed project. Construction cost for all plans are based upon preliminary layouts of proposed facilities. For estimating purposes, the prices of comparative work were obtained from a variety of available sources of current information such as recent project bid date, literature publications, telephone and personal contacts with manufactures and suppliers of equipment. It should be noted that the unit prices applied to non-potable pipelines in the estimates takes into account the cost of A.C. pavement removal, disposal, replacement, and cap where these lines occur in paved roads and clearing, grubbing in 12 ft wide access road, construction costs were these pipelines occur outside the paved streets.

In reviewing the cost estimates presented herein for the proposed projects, it is essential to realize that changes in the estimates during final design will alter the totals to some degree. Furthermore, future changes in the cost of material, labor, and equipment certainly will cause comparable changes in the cost summarized herein. Some the specific cost estimating factors are discussed in the following subsections. The cost data presented are comprised of two primary components: (1) estimated construction costs, and (2) estimated project cost (incidental costs).

According to the "Purple Book" section 116815, "All pipes installed above or below the ground, on and after June 1, 1993, that are designed to carry recycled water, shall be colored purple or distinctively wrapped with purple tape." According to District staff, all recent installations of District irrigations lines have been installed according to recycled water standards. For cost estimating purposes, it was assumed that all parks and reverse frontage areas have been installed according to recycled water standards and there will be minimal expense to convert irrigation systems from potable to non-potable water use. The estimated project cost for the facilities in each alternative is provided in Table 5-1.

**Table 5-1 Estimated Project Cost**
(In Millions)

| Proposed Facilities | Alternative 1A | Alternative 1B | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Pipeline Cost | $1.5 | $5.1 | $18.3 | $18.3 |
| Non-Potable Wells | $3.6 | $3.9 | - | - |
| Pump Station | - | - | - | $3.5 |
| Storage | - | - | $2.3 | $2.3 |
| Construction Cost | $5.1 | $9.0 | $20.6 | $24.1 |
| Project Cost[11] | $7.2 | $12.6 | $28.8 | $33.7 |

[11] Project cost is 1.4 times construction cost rounded to nearest $100,000. Project cost includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Costs are based on Engineering News Record (ENR). The ENR value for January 2008 was 9,183.42. Escalation, financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

As the cost of water is dependent on the source of supply and various supply sources are available, the cost of the system over time must be evaluated to determine the preferred alternative. Alternative 1A and 1B utilize well water which has a pumping replenishment tax of about $271/acre-ft (assessment year 2006-2007). There will also be a cost associated with operation and maintenance (O&M). It was assumed that the O&M costs would be approximately $80/acre-ft.

Alternative 2 would have little O&M cost because the recycled water from IEUA can flow by gravity without the help of pumping facilities. IEUA is willing to provide recycled water to the District during off peak hours at a rate of 25% more than their charge for members. Currently this charge would be $78.75/acre-ft ($63/acre-ft x 1.25). Should the District need supply on demand a cost per acre foot would have to be negotiated between the District and IEUA.

Alternative 3 utilizes recycled water from WRCWA's treatment plant which the District currently pays to have treated. The District is entitled to receive treated effluent equal to what the District is contributing to the plant influent. Therefore, the cost to purchase recycled water from WRCWA will be zero. The O&M costs for this alternative attributable to operations of the pumping facility, which would be located at or near the WRCWA treatment plant. Table 5-2 is a summary of the annual O&M cost associated with each alternative.

## Table 5-2 Annual Operation and Maintenance Cost

| | **Alternative 1A** | | **Alternative 1B** | | **Alternative 2** | | **Alternative 3** | |
|---|---|---|---|---|---|---|---|---|
| **Item** | **Volume (acre-ft/yr)** | | **Volume (acre-ft/yr)** | | **Volume (acre-ft/yr)** | | **Volume (acre-ft/yr)** | |
| Demand Served w/ Recycled | - | | - | | 1,616 | | 1,616 | |
| Demand Served w/ Well Water | 907 | | 1,236 | | - | | - | |
| ***Annual Cost*** | ***Unit Cost*** | ***Total Cost*** | ***Unit Cost*** | **Total Cost** | **Unit Cost** | **Total Cost** | **Unit Cost** | **Total Cost** |
| Pumping Replenishment Tax (per acre-ft) | $271[1] | $245,797 | $271[1] | $334,956 | - | - | - | - |
| Operation Cost | $130[2] | $117,910 | $130[2] | $160,680 | - | - | $120[3] | $193,920 |
| Cost of Non-Potable Water | - | - | - | - | $78.75 | $127,260 | - | - |
| **Annual Cost** | **-** | **$363,707** | **-** | **$495,636** | **-** | **$127,260** | **-** | **$193,920** |

[1] Based on 2006-2007 fiscal year.
[2] Based on a total dynamic head of 431 ft, a design flow rate of 750 gpm, a cost of $0.10 /kW-hr, and the irrigation durations established in Section 2.
[3] Based on a horsepower of 1,250 hp, a cost of $0.10/kW-hr, and the irrigation duration established in Section 2.

# SECTION 6 - ECONOMIC ANALYSIS

The purpose of this chapter is to determine the unit cost of water of the four alternatives studied herein compared to the cost of continuing to irrigate the parks and landscape areas with potable water. To evaluate these alternatives, we used a present worth analysis using a discount rate of 6 percent and a 25 year life for the project. Table 6-1 shows the present worth of the four alternatives and the cost of irrigated water.

## Table 6-1 Unit Cost of Non-Potable Water for Each Alternative

| | Alternative 1A | Alternative 1B | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Initial Capital Investment [1] | $7,200,000 | $12,600,000 | $28,800,000 | $33,700,000 |
| P.W. of Annual Disbursements = Annual Cost [2] (pwf'-6% -25 yr) = Annual Cost (12.783) | $4,649,267 | $6,335,715 | $1,626,765 | $2,478,879 |
| Total P.W. of Capital & O&M Cost | $11,849,227 | $18,935,715 | $30,426,765 | $36,178,879 |
| Total P.W. of Annual Water Supply = Annual Supply[2] (pwf'-6% -25 yr) | 11,594 ac-ft | 15,800 ac-ft | 20,657 ac-ft | 20,657 ac-ft |
| Cost per acre-foot | $1,022/ac-ft | $1,198/ac-ft | $1,473/ac-ft | $1,751/ac-ft |

The purpose of this analysis is to determine which of the four irrigation plans had the lowest unit cost of water during the assumed 25 year life of the project. In addition, the unit cost of non-potable water for each alternative was evaluated and compared it to the cost of potable water. It has been assumed that cost of potable water was equal to the cost of purchasing it from the Chino Desalter Authority, which is $780/ac-ft. Table 6-1 shows the unit cost of using non-potable groundwater or reclaimed water to irrigate the parks and landscape areas for the four alternatives.

The unit cost of water varied from $1,022/ac-ft for Alternative 1A to $1,751/ac-ft for Alternative 3. Not reflected in the above cost is the impact a government grant would have on the unit cost of water. At the current time, the District's highest marginal cost of water is it's Chino Desalter water which is $780 per ac-ft before The Metropolitan Water District of Southern California projected rebate of $250 per ac-ft.

[1] From Table 5-1
[2] From Table 5-2

Using the District's highest marginal cost of potable water, $780 per ac-ft, and comparing it with the cost of non-potable water it is more economical to use the existing potable supply along as that potable source exists. The reason for the significant difference between the cost of developing the non-potable system for irrigation purposes and using the potable system is a result of the need to construct a separate non-potable pipeline distribution system while the potable system has already been constructed by the District and/or developers.

The same approach used to conduct an economic analysis for the four alternatives was also used to analysis the feasibility of supplying the Indian Hills Golf course and neighboring irrigation areas with non-potable water form the Riverside plant. Table 6-2 is a summary of the unit cost.

**Table 6-2 Unit Cost for New Non-Potable Water Supply Source for the Indian Hills Golf Course**

| | Indian Hill Golf Course |
|---|---|
| Initial Capital Investment [1] | $1,090,000 |
| P.W. of Annual Disbursements<br>= Annual Cost [2] (pwf'-6% -25 yr)<br>= Annual Cost (12.783) | $1,527,620 |
| Total P.W. of Capital & O&M Cost | $2,617,620 |
| Total P.W. of Annual Water Supply<br>= Annual Supply[3] (pwf'-6% -25 yr) | 4,960 ac-ft |
| Cost per acre-foot | $528/ac-ft |

[1] Estimated project costs of $670,000 for the pipeline and $420,000 for the pump station, based on recent bids on similar projects.
[2] Assumed $28 ac-ft for operation cost (based on $0.14/kW-hr, a 25 horsepower pump for the proposed pump station), $280 /ac-ft of water for purchase from the City of Riverside (based on 2006-2007 fiscal year), and 388 ac-ft/yr
[3] Based on 388 ac-ft/yr, which includes irrigation demands for the Indian Hill Golf Course, Park 30, and reverse frontage area 90 shown on Plate 1.

# SECTION 7 - FINDINGS, CONCLUSION, & RECOMMENDATIONS

## FINDINGS

The objectives of this Non-Potable Master Plan are to quantify the existing and potential demands for non-potable irrigation water within specific planning areas, identify viable sources of non-potable water supply, and layout backbone infrastructure capable of distributing non-potable water throughout the Eastvale and Jurupa Areas. The use of recycled water is regulated by the California Code of Regulations which specifies that recycled water can be used for a variety of applications including the irrigation of parks, schools, reverse frontage areas, and golf courses which this study focused on. Currently, the District and other entities irrigate approximately 42 percent of their total existing and projected future irrigation demands with non-potable well water. The estimated total non-potable irrigation demands were determined to be as follows (Table 2-1):

- Eastvale Area = 2,063 ac-ft/yr
- Jurupa Area = 2,164 ac-ft/yr
- Total = 4,227 ac-ft/yr

Four non-potable supply sources were identified in this study; these sources are non-potable wells, IEUA, WRCRWA reclamation plant, and the City of Riverside Wastewater Reclamation Plant. Four alternatives were analyzed to evaluate the feasibility of using more non-potable water to irrigate additional landscaped areas within the Eastvale and Jurupa areas. Alternative 1A and 1B utilized non-potable wells to irrigate the majority of the District's remaining schools and parks. Alternative 2 and 3 were focused on irrigating a greater percentage of the parks, schools, and reverse frontage areas in the Eastvale Area through the implementation of a pipeline distribution network. Alternative 2 and 3 would be supplied by IEUA and WRCRWA, respectively. The estimated non-potable irrigation demands met by each alternative are provided below (Table 4-8):

- Alternative 1A 907 ac-ft/yr
- Alternative 1B 1,236 ac-ft/yr
- Alternative 2 1,616 ac-ft/yr
- Alternative 3 1,616 ac-ft/yr

The project cost for each alternative was determined as well as the cost benefit ratio for comparison purposes (Table 6-1). The results are as follows:

| Alternative | Project Cost | Unit Cost of Water |
|---|---|---|
| 1A | $7.2 M | $1,022 /ac-ft |
| 1B | $12.6 M | $1,198 /ac-ft |
| 2 | $28.8 M | $1,473 /ac-ft |
| 3 | $33.7 M | $1,751 /ac-ft |

## CONCLUSIONS

The District's highest marginal cost of potable water is from the Chino Desalter Authority which is currently $780 per ac-ft. Alternative 1A, as shown in Table 6-1, has the lowest cost per acre-foot ratio of the four alternatives analyzed and is estimated to be $1,022 /ac-ft. Therefore, it is currently more economical for the District to remain on the potable system for irrigation purposes assuming that the District's potable water supply sources can also meet future irrigation demands. However, it is expected that the demand for potable water will increase as well as the cost to produce it. By implementing one of the previously mentioned alternatives, the District could free up between an estimated 907 ac-ft/yr to 1,616 ac-ft/yr of future potable water demand.

It would cost approximately $528 /ac-ft to supply the Indian Hills Golf Course and neighboring irrigations areas with non-potable water from the City of Riverside, based on the economic analysis provided in Table 6-2. Note that this cost represents the cost associated with transferring water between The City of Riverside Plant and the pump station on the south end of the golf course and does not include the cost to pump the water from the Indian Hills pump station to the golf course reservoirs. This scenario does not seem advantageous considering the production cost for the non-potable water currently supplying the golf course irrigation demand is approximately $26.14 /ac-ft.[**]

## RECOMMENDATIONS

As the population within the District boundaries increases so will the need for potable and non-potable water. Alternative 1A is the most economical means studied in this report to both utilize available non-potable water for irrigation and at the same time reduce potential potable water demand. The estimated project cost for Alternative 1A is $7.2 million. Currently the District and others irrigate approximately 42 percent of the total existing and future irrigation demands with non-potable well water (Table 2-1). By implementing Alternative 1A, the District would increase this percentage to an estimated 63 percent. Although the other alternatives provide means to supply more of the District's estimated irrigation demands they are cost prohibitive to the District unless another funding source becomes available such as government grants. The District is encouraged to actively pursue grant funds to reduce the financing cost of using non-potable water.

[**] Non-Potable Water Feasibility Study for the Jurupa and Rubidoux Area, June 2006, prepared by Albert A. Webb Associates for Jurupa Community Services District.

# Appendix A
## Estimated Irrigation Demands

# TABLE 1 PARK
# NON-POTABLE IRRIGATION
# DEMANDS

| | Area | | Annual Demand | Design Flow Rate |
|---|---|---|---|---|
| Park ID | Property Area (AC) | Irrigated Area[1] (AC) | AF/Y [2] | Flow (gpm)[3] |
| Meadowside | 9.23 | 7.38 | 29.54 | 184.60 |
| Ooster | 15.75 | 12.60 | 50.39 | 314.96 |
| Riverwalk | 20.42 | 16.33 | 65.34 | 408.36 |
| Willow Ranch | 7.87 | 6.29 | 25.18 | 157.35 |
| McCune [4] | 11.86 | 9.49 | 37.96 | 237.22 |
| Park 6 | 43.53 | 34.83 | 139.31 | 870.66 |
| Park 7 | 2.77 | 2.21 | 8.9 | 55.3 |
| Park 8 | 0.91 | 0.72 | 2.9 | 18.1 |
| Providence Ranch [4] | 12.83 | 10.26 | 41.1 | 256.6 |
| Park 10 | 1.92 | 1.53 | 6.1 | 38.4 |
| Deer Creek | 9.30 | 7.44 | 29.8 | 185.9 |
| Parkview Meadows | 20.73 | 16.58 | 66.3 | 414.6 |
| Cedar Creek | 9.54 | 7.63 | 30.5 | 190.7 |
| Harada | 31.10 | 24.88 | 99.5 | 621.9 |
| Huber | 13.20 | 10.56 | 42.2 | 264.0 |
| Orchard [4] | 9.98 | 7.98 | 31.9 | 199.5 |
| Park 17 | 0.59 | 0.47 | 1.9 | 11.8 |
| Park 18 | 0.54 | 0.43 | 1.7 | 10.7 |
| Park 19 | 3.52 | 2.82 | 11.3 | 70.5 |
| Park 20 | 15.68 | 12.54 | 50.2 | 313.5 |
| Park 21 | 4.78 | 3.83 | 15.3 | 95.7 |
| Park 22 | 59.83 | 47.87 | 191.5 | 1196.7 |
| Park 23 | 1.79 | 1.43 | 5.7 | 35.8 |
| Park 24 | 4.92 | 3.94 | 15.7 | 98.4 |
| Park 25 | 6.38 | 5.10 | 20.4 | 127.6 |
| Park 26 | 2.78 | 2.23 | 8.9 | 55.7 |
| Park 27 | 5.53 | 4.42 | 17.7 | 110.6 |
| Park 28 | 9.33 | 7.46 | 29.8 | 186.6 |
| Park 29 | 13.48 | 10.79 | 43.1 | 269.6 |
| Park 30 | 6.47 | 5.18 | 20.7 | 129.5 |
| Park 31 [4] | 26.36 | 21.09 | 84.4 | 527.3 |
| Park 32 | 0.33 | 0.27 | 1.1 | 6.7 |
| Park 33 | 40.31 | 32.25 | 129.0 | 806.3 |
| Park 34 | 36.43 | 29.14 | 116.6 | 728.6 |
| **Total:** | 459.98 | 367.99 | 1471.9 | 9,199.7 |

[1]Assumed 80% of total park acreage will be irrigated

[2]Assumed use per irrigated area 4 ac-ft/ac

[3]Based on Community Design Works flow rate estimate of 25 gpm/ac for an 8 hour watering window, 5 days a week (1 day maintenance and 1 day for play).

[4]Park is currently on well water and was not included in total.

# TABLE 2 SCHOOL NON-POTABLE IRRIGATION DEMANDS

| | Area | | Annual Demand | Design Flow Rate |
|---|---|---|---|---|
| School ID | Property Area (AC) | Irrigated Area[1] (AC) | AF/Y [2] | Flow (gpm)[3] |
| Barton Elementary | 7.92 | 3.96 | 15.84 | 99.01 |
| Eastvale Elementary | 86.68 | 43.34 | 173.36 | 1,083.5 |
| River Heights Intermediate | - | - | - | - |
| Roosevelt High School | - | - | - | - |
| School 3 | 25.52 | 12.76 | 51.03 | 319.0 |
| School 4 | 11.27 | 5.63 | 22.53 | 140.8 |
| Harada Elementary | 9.68 | 4.84 | 19.36 | 121.0 |
| School 6 | 18.53 | 9.27 | 37.06 | 231.6 |
| Sky County Elementary | 11.09 | 5.55 | 22.19 | 138.7 |
| School 8 | 6.12 | 3.06 | 12.25 | 76.5 |
| Jurupa Valley High | 50.88 | 25.44 | 101.75 | 636.0 |
| School 10 | 11.62 | 5.81 | 23.23 | 145.2 |
| Indian Elementary | 11.69 | 5.84 | 23.37 | 146.1 |
| Pedley Elementary | 19.17 | 9.59 | 38.34 | 239.6 |
| School 13 | 9.70 | 4.85 | 19.39 | 121.2 |
| Rio Vista Continuation | 5.66 | 2.83 | 11.32 | 70.8 |
| Jurupa Middle School | 27.73 | 13.86 | 55.46 | 346.6 |
| Van Buren Elementary | 11.50 | 5.75 | 23.01 | 143.8 |
| Mira Loma Middle | 24.75 | 12.38 | 49.50 | 309.4 |
| Camino Real Elementary[4] | 9.91 | 4.95 | 19.82 | 123.9 |
| Rubidoux High[4] | 52.72 | 26.36 | 105.43 | 659.0 |
| Glen Avon Elementary | 9.73 | 4.86 | 19.46 | 121.6 |
| School 21[4] | 2.74 | 1.37 | 5.48 | 34.2 |
| Sunneyslope Elementary | 13.08 | 6.54 | 26.17 | 163.5 |
| Mission Bell Elementary | 10.92 | 5.46 | 21.84 | 136.5 |
| Granite Hill Elementary | 12.74 | 6.37 | 25.48 | 159.2 |
| Nueva Vista Continuation | 11.12 | 5.56 | 22.25 | 139.0 |
| Total: | 472.46 | 236.23 | 944.92 | 5,905.7 |

[1] Assumed 50% of total school acreage will be irrigated.
[2] Assumed 4 ac-ft/ac based on District direction
[3] Based on Community Design Works flow rate estimate of 25 gpm/ac for an 8 hour watering window, 5 days a week (1 day maintenance and 1 day for play).
[4] School will be supplied by another system

## TABLE 3 REVERSE FRONTAGE
## NON-POTABLE IRRIGATION
## DEMANDS

| | Area | Annual Demand | Design Flow Rate |
|---|---|---|---|
| Rev. Frontage ID | Irrigated Area[1] (AC) | AF/Y [2] | Flow (gpm)[3] |
| 1 | 1.53 | 6.11 | 38.2 |
| 2 | 1.20 | 4.81 | 30.1 |
| 3 | 1.13 | 4.54 | 28.4 |
| 4 | 5.00 | 20.00 | 125.0 |
| 5 | 2.31 | 9.23 | 57.7 |
| 6 | 1.75 | 7.02 | 43.9 |
| 7 | 1.49 | 5.96 | 37.3 |
| 8 | 0.32 | 1.28 | 8.0 |
| 9 | 0.58 | 2.32 | 14.5 |
| 10 | 0.57 | 2.28 | 14.2 |
| 11 | 0.17 | 0.67 | 4.2 |
| 12 | 0.43 | 1.71 | 10.7 |
| 13 | 0.54 | 2.14 | 13.4 |
| 14 | 3.14 | 12.57 | 78.6 |
| 15 | 0.32 | 1.27 | 7.9 |
| 16 | 1.27 | 5.07 | 31.7 |
| 17 | 1.23 | 4.92 | 30.7 |
| 18 | 0.18 | 0.70 | 4.4 |
| 19 | 1.19 | 4.78 | 29.9 |
| 20 | 0.64 | 2.54 | 15.9 |
| 21 | 1.26 | 5.04 | 31.5 |
| 22 | 1.55 | 6.20 | 38.7 |
| 23 | 0.78 | 3.13 | 19.6 |
| 24 | 1.75 | 7.00 | 43.7 |
| 25 | 3.16 | 12.63 | 78.9 |
| 26 | 1.93 | 7.71 | 48.2 |
| 27 | 0.35 | 1.38 | 8.6 |
| 28 | 0.19 | 0.75 | 4.7 |
| 29 | 1.56 | 6.23 | 39.0 |
| 30 | 1.49 | 5.96 | 37.3 |
| 31 | 0.62 | 2.48 | 15.5 |
| 32 | 0.54 | 2.17 | 13.6 |
| 33 | 0.28 | 1.13 | 7.1 |
| 34 | 1.51 | 6.04 | 37.7 |
| 35 | 0.37 | 1.50 | 9.4 |
| 36 | 0.99 | 3.98 | 24.9 |
| 37 | 0.95 | 3.78 | 23.6 |
| 38 | 1.37 | 5.47 | 34.2 |
| 39 | 0.22 | 0.89 | 5.6 |
| 40 | 0.76 | 3.02 | 18.9 |
| 41 | 0.97 | 3.88 | 24.3 |
| 42 | 1.58 | 6.33 | 39.6 |
| 43 | 1.94 | 7.77 | 48.6 |
| 44 | 0.92 | 3.66 | 22.9 |
| 45 | 0.55 | 2.22 | 13.9 |
| 46 | 0.97 | 3.90 | 24.4 |
| 47 | 0.59 | 2.35 | 14.7 |
| 48 | 0.57 | 2.29 | 14.3 |
| 49 | 1.27 | 5.07 | 31.7 |
| 50 | 0.38 | 1.50 | 9.4 |
| 51 | 1.15 | 4.60 | 28.7 |
| 52 | 0.91 | 3.64 | 22.7 |
| 53 | 1.10 | 4.40 | 27.5 |
| 54 | 1.27 | 5.08 | 31.7 |
| 55 | 0.84 | 3.36 | 21.0 |
| 56 | 0.47 | 1.89 | 11.8 |
| 57 | 0.60 | 2.39 | 14.9 |
| 58 | 0.63 | 2.51 | 15.7 |
| 59 | 0.45 | 1.81 | 11.3 |

## TABLE 3 REVERSE FRONTAGE
## NON-POTABLE IRRIGATION
## DEMANDS

| | Area | Annual Demand | Design Flow Rate |
|---|---|---|---|
| Rev. Frontage ID | Irrigated Area[1] (AC) | AF/Y [2] | Flow (gpm)[3] |
| 60 | 0.60 | 2.39 | 14.9 |
| 61 | 0.29 | 1.17 | 7.3 |
| 62 | 0.73 | 2.94 | 18.4 |
| 63 | 1.79 | 7.16 | 44.8 |
| 64 | 0.88 | 3.53 | 22.1 |
| 65 | 0.63 | 2.51 | 15.7 |
| 66 | 1.58 | 6.33 | 39.5 |
| 67 | 0.76 | 3.03 | 18.9 |
| 68 | 1.24 | 4.95 | 30.9 |
| 69 | 1.69 | 6.76 | 42.2 |
| 70 | 2.41 | 9.64 | 60.3 |
| 71 | 0.57 | 2.30 | 14.3 |
| 72 | 0.98 | 3.94 | 24.6 |
| 73 | 0.82 | 3.29 | 20.6 |
| 74 | 0.35 | 1.41 | 8.8 |
| 75 | 1.49 | 5.96 | 37.2 |
| 76 | 0.72 | 2.87 | 17.9 |
| 77 | 3.12 | 12.47 | 77.9 |
| 78 | 0.62 | 2.46 | 15.4 |
| 79 | 1.11 | 4.44 | 27.7 |
| 80 | 0.72 | 2.89 | 18.1 |
| 81 | 2.18 | 8.73 | 54.5 |
| 82 | 0.76 | 3.04 | 19.0 |
| 83 | 1.48 | 5.92 | 37.0 |
| 84 | 0.50 | 2.01 | 12.6 |
| 85 | 0.95 | 3.82 | 23.9 |
| 86 | 0.76 | 3.04 | 19.0 |
| 87 | Number Not Used | | |
| 88 | Number Not Used | | |
| 89 | 0.28 | 1.14 | 7.1 |
| 90 | 3.43 | 13.72 | 85.7 |
| 91 | 0.58 | 2.32 | 14.5 |
| 92 | 0.59 | 2.34 | 14.6 |
| 93 | 1.19 | 4.76 | 29.7 |
| 94 | 0.40 | 1.62 | 10.1 |
| 95 | 0.33 | 1.32 | 8.2 |
| 96 | 0.41 | 1.64 | 10.3 |
| 97 | 2.46 | 9.85 | 61.6 |
| 98 | 3.08 | 12.31 | 77.0 |
| 99 | Number Not Used | | |
| 100 | 2.38 | 9.53 | 59.5 |
| 101 | 1.64 | 6.55 | 41.0 |
| 102 | 0.63 | 2.53 | 15.8 |
| 103 | 0.73 | 2.92 | 18.3 |
| 104 | 0.75 | 3.02 | 18.9 |
| 105 | 0.53 | 2.11 | 13.2 |
| Total: | 112.93 | 451.71 | 2,823.2 |

[1] Assumed 75% of Medians would be irrigated, see Appendix _ for a breakdown of the areas

[2] Assumed use per irrigated area 4 ft/acre

[3] Based on Community Design Works flow rate estimate of 25 gpm/ac for an 8 hour watering window, 5 days a week (1 day maintenance and 1 day for play).

# TABLE 4 MISCELLANEOUS NON-POTABLE IRRIGATION DEMANDS

| | Area | Annual Demand | Design Flow Rate |
|---|---|---|---|
| **Irrigation Area Type** | **Irrigated Area (AC)** | **AF/Y [1]** | **Flow (gpm)[2]** |
| Trail | 7.35 | 29.38 | 183.7 |
| 60 Freeway | 16.30 | 65.20 | 407.5 |
| I-15 Area B | 4.34 | 17.37 | 108.6 |
| I-15 Eastvale | 5.67 | 22.70 | 141.9 |
| Golf Course[3] | 307.31 | 1229.24 | 7,682.7 |
| Total: | 340.97 | 1363.89 | 8,524.3 |

[1]Assumed use per irrigated area 4 ac-ft/ac

[2]Based on Community Design Works flow rate estimate of 25 gpm/ac for an 8 hour watering window, 5 days a week

[3]Currently being irrigated with non-potable water, assumed 80% of total area is irrigated

# Appendix B
## Inland Empire Utility Agency
## Reference Material

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

6075 ...nball Ave, • Chino, CA 91708
P.O. Box 9020 • Chino, Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 597-8875
www.ieua.org

Route to (PM Name)_____ Project Code_____
Phase Code_____ Task Code_____ WA or WC (circle one)
Sub or Exp (circle one) Rev or Hold (circle one)

REC'D APR 1 8 2007

Rec. PM_____ Date_____
App. AM_____ Date_____ (over $5,000)
☐ Input to WEMS ☐ PAID

April 17, 2007

Mr. Kris Danielson
Albert A. Webb Associates
3788 McCray Street
Riverside, California 92506

Subject: Available IEUA Reclaimed Water for Jurupa Community Service District

Dear Mr. Danielson,

Thank you for your inquiry about recycled water use in the Jurupa Community Service (JCSD) District. IEUA is interested in selling recycled water outside of its boundaries subject to contracting Member Agency approval.

Currently, IEUA sells recycled water to member contracting agencies for $63 per acre foot. Sales outside of our boundaries would be at a higher rate. The rate will depend on whether storage is provided by JCSD (constant flow) or by IEUA (JCSD peaking allowed). General information on recycled water quality and the level of treatment provided by our agency is on our website at www.IEUA.org.

Overall our effluent receives tertiary treatment meeting full body contact recreation standards. Total dissolved solids concentrations are in the neighborhood of 500 mg/L.

Please contact us if you would like to meet and discuss our recycled water program further.

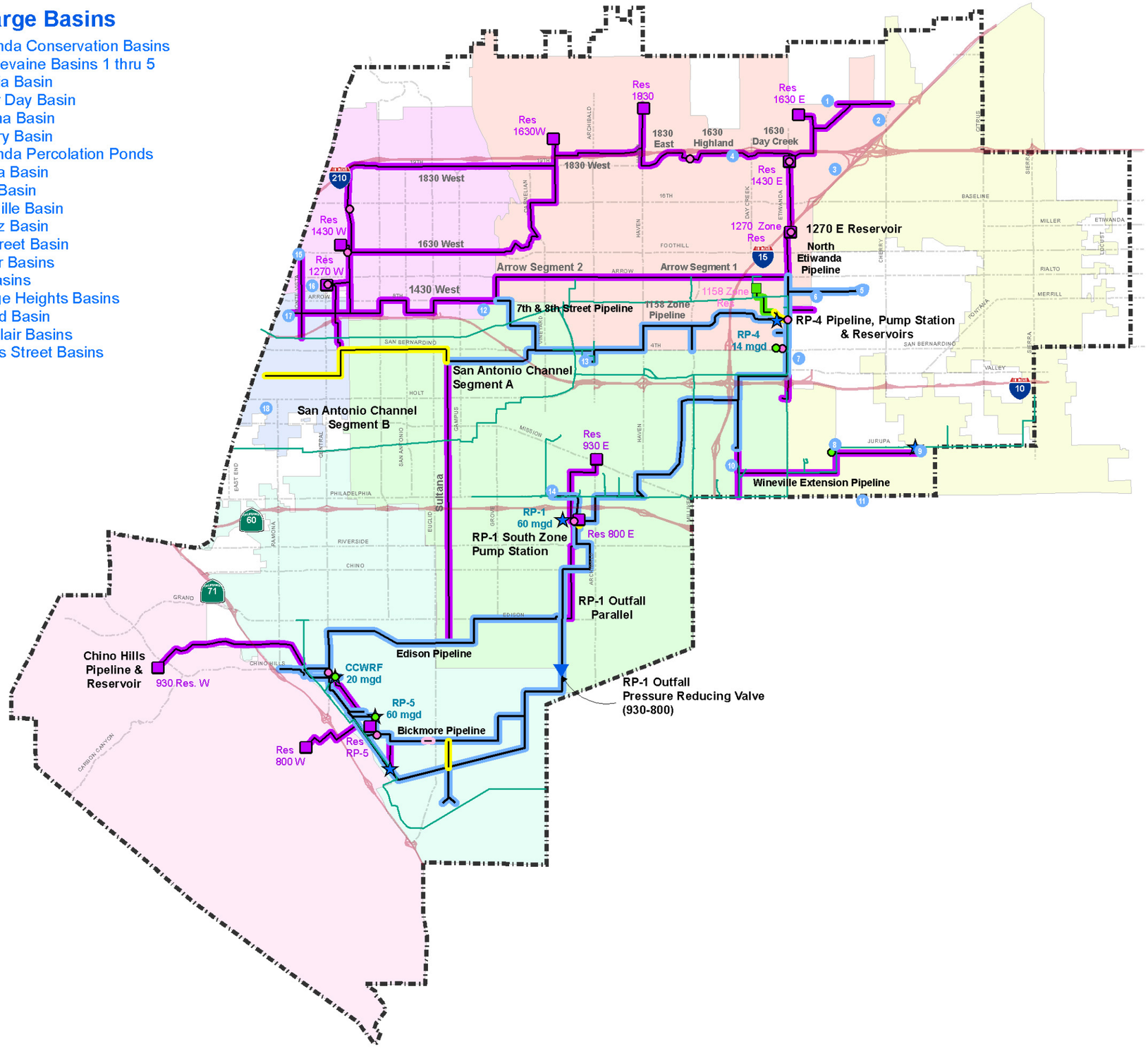
If you have any questions please call me at 909-993-1720.

Sincerely,

Gary E. Hackney
Manager of Recycled Water
C: Tom Love

## Recharge Basins

1. Etiwanda Conservation Basins
2. San Sevaine Basins 1 thru 5
3. Victoria Basin
4. Lower Day Basin
5. Banana Basin
6. Hickory Basin
7. Etiwanda Percolation Ponds
8. Jurupa Basin
9. RP-3 Basin
10. Wineville Basin
11. Declez Basin
12. 8th Street Basin
13. Turner Basins
14. Ely Basins
15. College Heights Basins
16. Upland Basin
17. Montclair Basins
18. Brooks Street Basins




## Legend

- Future Booster Stations
- Existing Booster Stations
- Operating Pressure Reducing Valve
- Bid Regional Reservoirs
- Planned Regional Reservoirs
- Operating Regional Reservoirs
- Regional Plants
- NRW Gravity Mains
- IEUA Service Boundary

**Cities**

- Chino
- Chino Hills
- Fontana
- Montclair
- Ontario
- Rancho Cucamonga
- Upland

**Recycled Water Pipes Status**

- Bid
- Design
- Construction
- Operating
- Ultimate Planned/ Future

N W E S

0 2.5 5 Miles

# Recycled Water Capital Projects Status

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

J:\IM\02\epartments\Dept_ENRW\Demand\MAD\NRWCapital Projects Status Map

# Appendix C
## Cost Estimates of Alternatives

# Alternative 1A

Pipelines for Additional
Non-Potable Wells

| Pipe Dia. (inch) | Quantity (LF) | Unit Price[1] | Construction Cost | Project Cost [2] |
|---|---|---|---|---|
| 6 | 12,815 | $50.00 | $640,735 | |
| 8 | 5,090 | $60.00 | $305,416 | |
| 10 | 1,891 | $70.00 | $132,392 | |
| 12 | 4,588 | $85.00 | $389,980 | |
| 16 | 718 | $110.00 | $78,928 | |
| Total: | 25,102 | | 1,547,451 | **$2,170,000** |

[1] Includes material cost for pipes, fittings, and contractors 15% markup as wells as the installation costs for pipes, fittings, and paving.

[2] Project cost is 1.4 times construction cost rounded to nearest $10,000. Project cost includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Costs are based on Engineering News Record (ENR) Escalation (January 2008, 9183.42), financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

# Alternative 1A

Proposed Non-Potable Wells Cost Estimate

| Well ID | Estimated Peak Design Flow (gpm) | Construction Cost[1] | Project Cost [2] |
|---|---|---|---|
| 2 | 415 | $371,000 | |
| 3 | 265 | $346,000 | |
| 4 | 1,030 | $458,000 | |
| 6 | 235 | $340,000 | |
| 7 | 1,200 | $478,000 | |
| 10 | 785 | $426,000 | |
| 11 | 460 | $378,000 | |
| 13 | 310 | $353,000 | |
| 15 | 965 | $450,000 | |
| Total: | 5,665 | $3,600,000 | **$5,040,000** |

[1] Includes drilling, equipping, and site improvements. Based on a cost per gallon curve generated from data provided by SoCal Pump & Well Drilling and engineering judgment.

[2] Project cost is 1.4 times construction cost rounded to nearest $10,000. Project cost includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Costs are based on Engineering News Record (ENR) Escalation (January 2008, 9183.42), financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

# Alternative 1B

Pipelines for Additional
Non-Potable Wells

| Pipe Dia. (inch) | Quantity (LF) | Unit Price[1] | Construction Cost | Project Cost [2] |
|---|---|---|---|---|
| 4 | 39,378 | $35.00 | $1,378,215 | |
| 6 | 34,774 | $50.00 | $1,738,709 | |
| 8 | 11,158 | $60.00 | $669,507 | |
| 10 | 6,250 | $70.00 | $437,515 | |
| 12 | 6,248 | $85.00 | $531,117 | |
| 16 | 3,313 | $110.00 | $364,481 | |
| Total: | 101,122 | | 5,119,543 | **$7,170,000** |

[1] Includes material cost for pipes, fittings, and contractors 15% markup as wells as the installation costs for pipes, fittings, and paving.

[2] Project cost is 1.4 times construction cost rounded to nearest $10,000. Project cost includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Costs are based on Engineering News Record (ENR) Escalation (January 2008, 9183.42), financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

# Alternative 1B

Proposed Non-Potable Wells Cost Estimate

| Well ID | Estimated Peak Design Flow (gpm) | Construction Cost[1] | Project Cost [2] |
|---|---|---|---|
| 2 | 415 | $371,000 | |
| 3 | 310 | $353,000 | |
| 4 | 1,980 | $545,000 | |
| 6 | 235 | $340,000 | |
| 7 | 1,380 | $497,000 | |
| 10 | 785 | $426,000 | |
| 11 | 550 | $392,000 | |
| 13 | 645 | $406,000 | |
| 15 | 1,425 | $502,000 | |
| Total: | 7,725 | $3,832,000 | **$5,360,000** |

## Estimated Cost for Existing Well Upgrade

| Well ID | Estimated Additional Peak Flow (gpm) | Construction Cost[1] | Project Cost [2] |
|---|---|---|---|
| 1 | 70 | $15,000 | |
| 5 | 60 | $13,000 | |
| 8 | 100 | $22,000 | |
| Total: | 230 | $50,000 | **$70,000** |
| Grand Total: | | $3,882,000 | **$5,430,000** |

[1] Includes drilling, equipping, and site improvements. Based on a cost per gallon curve generated from data provided by *SoCal Pump & Well Drilling* and engineering judgment.

[2] Project cost is 1.4 times construction cost rounded to nearest $10,000. Project cost includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Costs are based on Engineering News Record (ENR) Escalation (January 2008, 9183.42), financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

# ALTERNATIVE 2

Estimated Project Cost of Proposed
Reclaimed Water System JCSD's Eastvale Area
(Pipes Sized Based on IEUA HGL of 930')

| Pipe Dia. (inch) | Quantity (LF) | Unit Price[1] | Construction Cost | Project Cost [2] |
|---|---|---|---|---|
| 4 | 2,754 | $35.00 | $96,395 | |
| 6 | 53,331 | $50.00 | $2,666,555 | |
| 8 | 48,073 | $60.00 | $2,884,391 | |
| 10 | 28,970 | $70.00 | $2,027,883 | |
| 12 | 30,511 | $85.00 | $2,593,466 | |
| 16 | 20,588 | $110.00 | $2,264,634 | |
| 18 | 12,518 | $125.00 | $1,564,688 | |
| 24 | 5,314 | $155.00 | $823,602 | |
| 30 | 14,886 | $225.00 | $3,349,418 | |
| Total: | 216,944 | | $18,271,030 | **$25,580,000** |

[1] Includes material cost for pipes, fittings, and contractors 15% markup as wells as the installation costs for pipes, fittings, and paving.

[2] Project cost is 1.4 times construction cost rounded to nearest $10,000. Project cost includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Costs are based on Engineering News Record (ENR) Escalation (January 2008, 9183.42), financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

# ALTERNATIVE 3

Estimated Project Cost of Proposed
Reclaimed Water System JCSD's Eastvale Area
(Pipes Sized Based on WRCRWA HGL of 935')

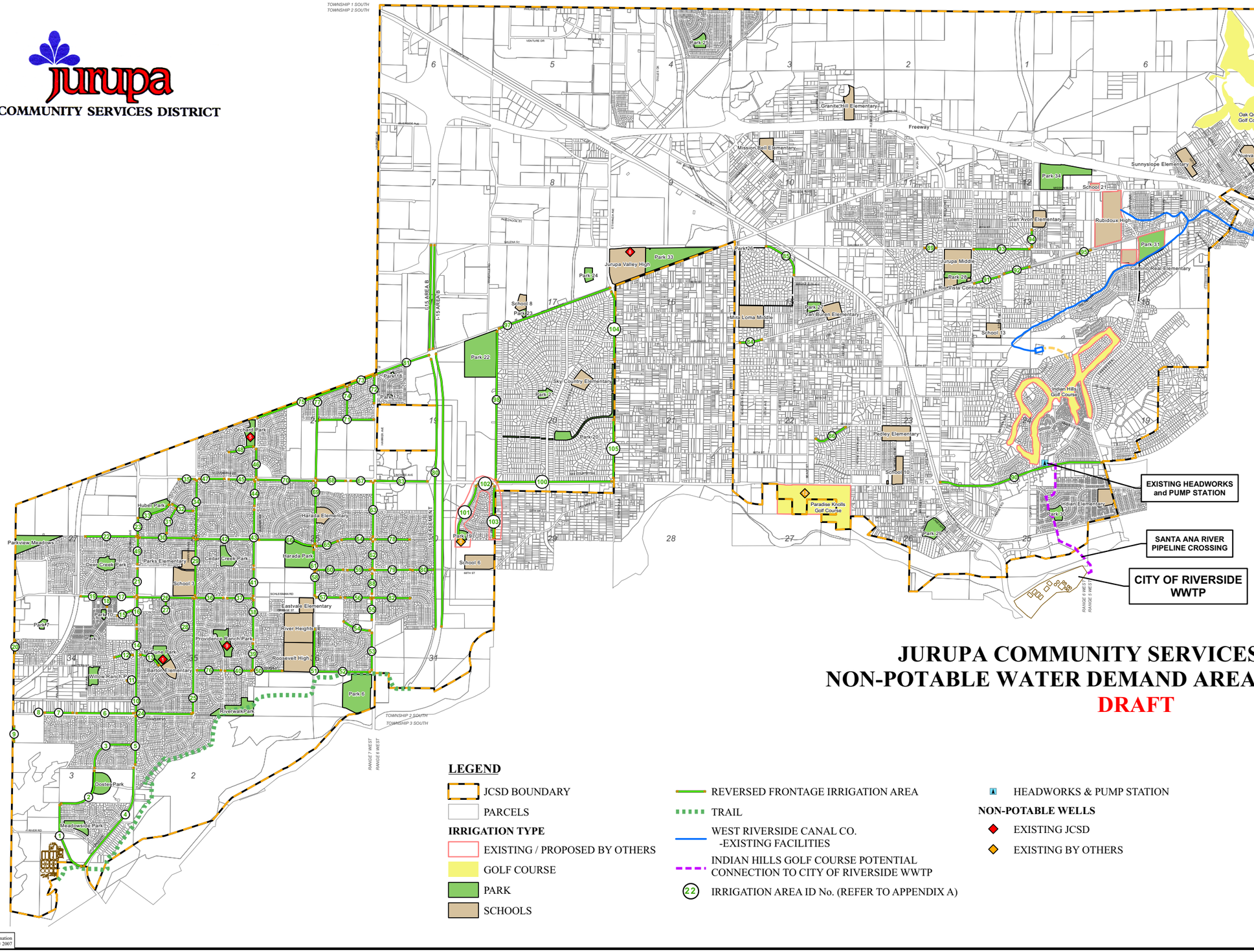
| Pipe Dia. (inch) | Quantity (LF) | Unit Price[1] | Construction Cost | Project Cost [2] |
|---|---|---|---|---|
| 4 | 10,596 | $35.00 | $370,868 | |
| 6 | 35,185 | $50.00 | $1,759,246 | |
| 8 | 40,375 | $60.00 | $2,422,513 | |
| 10 | 27,670 | $70.00 | $1,936,902 | |
| 12 | 30,363 | $85.00 | $2,580,836 | |
| 16 | 19,336 | $110.00 | $2,126,916 | |
| 18 | 944 | $125.00 | $117,958 | |
| 20 | 23,953 | $140.00 | $3,353,402 | |
| 24 | 20,270 | $155.00 | $3,141,844 | |
| 30 | 2,159 | $225.00 | $485,822 | |
| Total: | 210,850 | | $18,296,307 | **$25,610,000** |

[1] Includes material cost for pipes, fittings, and contractors 15% markup as wells as the installation costs for pipes, fittings, and paving.

[2] Project cost is 1.4 times construction cost rounded to nearest $10,000. Project cost includes: construction costs, construction contingencies, design engineering including plans and specifications; design and construction surveying and mapping; geotechnical evaluation and report; engineering contract administration; field inspection and basic environmental documentation. Costs are based on Engineering News Record (ENR) Escalation (January 2008, 9183.42), financing, interest during construction, legal, land, R-O-W agent, and environmental impact report costs are not included.

**PLATE 1**

jurupa
COMMUNITY SERVICES DISTRICT




# JURUPA COMMUNITY SERVICES DISTRICT
# NON-POTABLE WATER DEMAND AREAS and FACILITIES
# DRAFT

**LEGEND**

- JCSD BOUNDARY
- PARCELS

**IRRIGATION TYPE**

- EXISTING / PROPOSED BY OTHERS
- GOLF COURSE
- PARK
- SCHOOLS
- REVERSED FRONTAGE IRRIGATION AREA
- TRAIL
- WEST RIVERSIDE CANAL CO. -EXISTING FACILITIES
- INDIAN HILLS GOLF COURSE POTENTIAL CONNECTION TO CITY OF RIVERSIDE WWTP
- (22) IRRIGATION AREA ID No. (REFER TO APPENDIX A)
- HEADWORKS & PUMP STATION

**NON-POTABLE WELLS**

- EXISTING JCSD
- EXISTING BY OTHERS

ALBERT A. WEBB ASSOCIATES

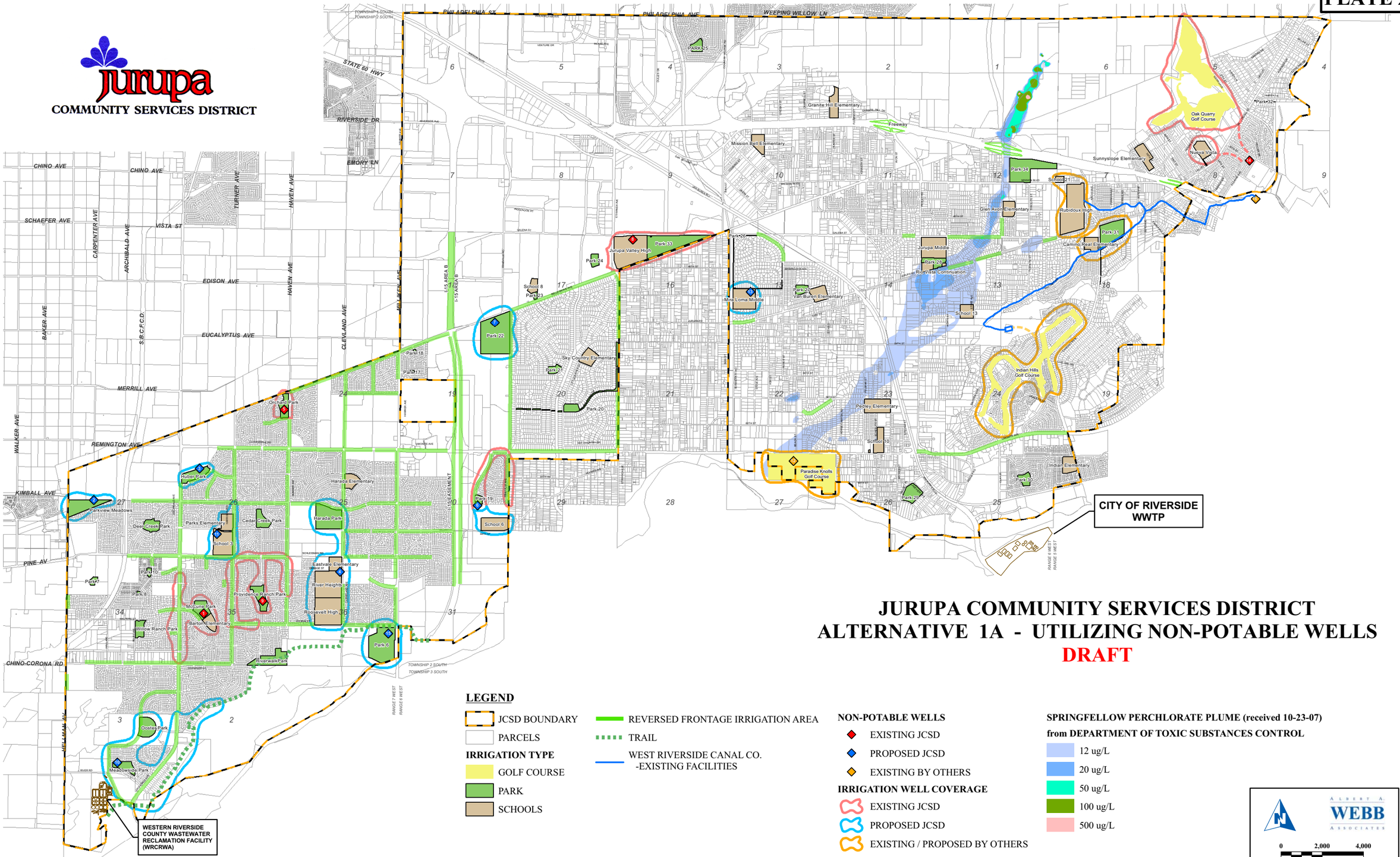
0 2,000 4,000
Feet



Map revised January 25, 2008. G:\2006\06-0406\Gis\reuse.mxd

**PLATE 2**

jurupa
COMMUNITY SERVICES DISTRICT




# JURUPA COMMUNITY SERVICES DISTRICT
# ALTERNATIVE 1A - UTILIZING NON-POTABLE WELLS
# DRAFT

**LEGEND**

- JCSD BOUNDARY
- PARCELS

**IRRIGATION TYPE**

- GOLF COURSE
- PARK
- SCHOOLS
- REVERSED FRONTAGE IRRIGATION AREA
- TRAIL
- WEST RIVERSIDE CANAL CO. -EXISTING FACILITIES

**NON-POTABLE WELLS**

- EXISTING JCSD
- PROPOSED JCSD
- EXISTING BY OTHERS

**IRRIGATION WELL COVERAGE**

- EXISTING JCSD
- PROPOSED JCSD
- EXISTING / PROPOSED BY OTHERS

**SPRINGFELLOW PERCHLORATE PLUME (received 10-23-07) from DEPARTMENT OF TOXIC SUBSTANCES CONTROL**

- 12 ug/L
- 20 ug/L
- 50 ug/L
- 100 ug/L
- 500 ug/L

ALBERT A. WEBB ASSOCIATES

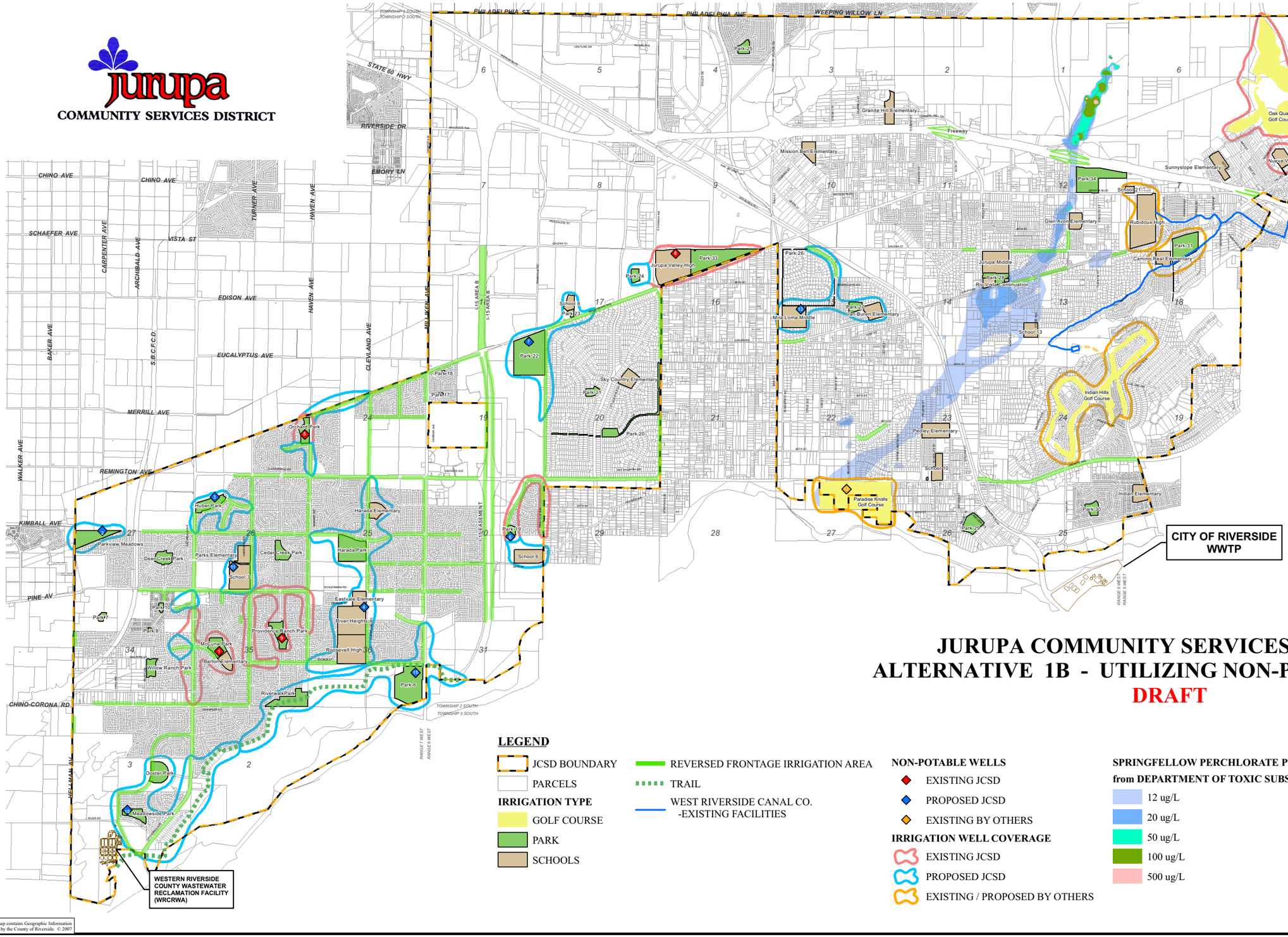
0 2,000 4,000
Feet



Map revised January 24, 2008. G:\2006\06-0406\Gis\alt_1A.mxd

**PLATE 3**

jurupa
COMMUNITY SERVICES DISTRICT




# JURUPA COMMUNITY SERVICES DISTRICT
# ALTERNATIVE 1B - UTILIZING NON-POTABLE WELLS
# DRAFT

**LEGEND**

- JCSD BOUNDARY
- PARCELS

**IRRIGATION TYPE**

- GOLF COURSE
- PARK
- SCHOOLS
- REVERSED FRONTAGE IRRIGATION AREA
- TRAIL
- WEST RIVERSIDE CANAL CO. -EXISTING FACILITIES

**NON-POTABLE WELLS**

- EXISTING JCSD
- PROPOSED JCSD
- EXISTING BY OTHERS

**IRRIGATION WELL COVERAGE**

- EXISTING JCSD
- PROPOSED JCSD
- EXISTING / PROPOSED BY OTHERS

**SPRINGFELLOW PERCHLORATE PLUME (received 10-23-07) from DEPARTMENT OF TOXIC SUBSTANCES CONTROL**

- 12 ug/L
- 20 ug/L
- 50 ug/L
- 100 ug/L
- 500 ug/L

ALBERT A. WEBB ASSOCIATES

0 2,000 4,000
Feet



Map revised January 24, 2008 G:\2006\06-0406\Gis\alt_1B.mxd

**PLATE 4**

jurupa
COMMUNITY SERVICES DISTRICT

# JURUPA COMMUNITY SERVICES DISTRICT
# ALTERNATIVE 2 UTILIZING RECYCLED WATER FROM IEUA
# DRAFT

**LEGEND**

- JCSD BOUNDARY
- PARCELS

**IRRIGATION TYPE**

- EXISTING / PROPOSED BY OTHERS
- GOLF COURSE
- PARK
- SCHOOLS
- REVERSED FRONTAGE IRRIGATION AREA
- TRAIL
- WEST RIVERSIDE CANAL CO. -EXISTING FACILITIES
- 12 NON-POTABLE WATER SUPPLY LINE PROPOSED (DIAMETER (in.) as SHOWN)

**IEUA PIPE**

- EXISTING
- ULTIMATE

INLAND EMPIRE UTILITIES AGENCY (IEUA)

WESTERN RIVERSIDE COUNTY WASTEWATER RECLAMATION FACILITY (WRCRWA)

ALBERT A. WEBB ASSOCIATES

0 2,000 4,000 Feet



Map revised January 24, 2008 G:\2006\06-0406\Gis\alt_2.mxd

**PLATE 5**

jurupa
COMMUNITY SERVICES DISTRICT

# JURUPA COMMUNITY SERVICES DISTRICT
# ALTERNATIVE 3 UTILIZING RECYCLED WATER FROM WRCWRA TREATMENT PLANT
# DRAFT

**LEGEND**

- JCSD BOUNDARY
- PARCELS

**IRRIGATION TYPE**

- EXISTING / PROPOSED BY OTHERS
- GOLF COURSE
- PARK
- SCHOOLS
- REVERSED FRONTAGE IRRIGATION AREA
- TRAIL
- WEST RIVERSIDE CANAL CO. -EXISTING FACILITIES
- 12 NON-POTABLE WATER SUPPLY LINE PROPOSED (DIAMETER (in.) as SHOWN)

WESTERN RIVERSIDE COUNTY WASTEWATER RECLAMATION FACILITY (WRCRWA)

ALBERT A. WEBB ASSOCIATES

0 2,000 4,000
Feet



Map revised January 24, 2008 G:\2006\06-0406\Gis\alt_3.mxd