

**DRAFT**

306606P

W.O.: 09-64

September 8, 2009

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

RE: Master Sewer Plan Addendum No. 2

Dear Mr. Horst:

In accordance with the Jurupa Community Services District's (District) authorization, we have completed the second addendum for the 2004 Master Sewer Plan. The purpose of the second addendum is to address significant planned infrastructure changes that have occurred since the 2004 document was published.

#### Introduction

The September, 2004 Master Sewer Plan was an update to the December, 1983 Wastewater Management Plan for the District. In October of 2007, the first addendum to the 2004 Master Sewer Plan was completed. The purpose of the first addendum was to re-evaluate the wastewater generation factors based upon current District flow records and re-calculate the factors using recorded data. New "build out" average daily flows were calculated using the new wastewater generation factors. The updated flow projections were used primarily for the purpose of predicting ultimate treatment plant capacity and estimating the project cost of adding and/or purchasing treatment plant capacity. Also, the first addendum reviewed the District's wastewater influent quality and updated the project cost of the Master Plan Improvement to an Engineering News Record and Construction Cost Index for Los Angeles (October, 2007).

Since the publication of the 2004 Master Sewer Plan and subsequent October, 2007 Addendum, significant changes concerning the District's sewer system has occurred. These changes include the following:

1. The District's concept of delivering flows to the City of Riverside's Water Quality Control Plant (WQCP) has changed (i.e. crossing the Santa Ana River at a new Van Buren Bridge). The infrastructure required to deliver the flows to the bridge crossing and from the bridge crossing to the City's WQCP need to be determined.

2. With the change indicated in Item 1, re-evaluation of delivering wastewater flows from the area east of Van Buren, south of Limonite, and the Indian Hills area to the City of Riverside.
3. A factor affecting Item 2 is the possible reconstruction of the Indian Hills Wastewater Treatment Plant (WWTP) which would also affect JCSD's need to purchase additional capacity at the City of Riverside's WQCP.
4. The concept of accommodating increased flows in JCSD's Plant 1 Tributary Area (Plate 1) (shown in light yellow) includes an evaluation of a subregional lift station in the vicinity of Felspar and Limonite (separate study).
5. A possible alternative or subalternative to Item 4 is the construction of a new forcemain in Limonite from the Regional Wastewater Pump Station to the Van Buren bridge crossing the Santa Ana River.
6. In view of Items 4 and 5, an evaluation of the planned expansion of the storage ponds at Plant 1 requires additional analysis including review of overall need and/or sizing.
7. JCSD's Master Sewer Plan Addendum (October, 2007) was primarily commissioned for predicting ultimate treatment plant capacity and the resulting amount of plant expansion and/or purchase that will be required. The study concluded that two different generation factors should be used; 220 gpd/EDU in Eastvale and 252 gpd/EDU in the Plant 1 Tributary area. The September, 2004 Master Sewer Plan (MSP) utilized a wastewater generation factor of 280 gpd/EDU that is the current District Standard. The affects of these reduced generation factors on existing and proposed sewage infrastructure were not evaluated and should be used to verify proposed improvements identified in the 2004 MSP.
8. Since the September, 2004 MSP was published, land use changes have occurred within JCSD.

Pursuant to our February 25, 2009 meeting, it is our understanding the District does not wish at this time to pursue any affects to the sewer system as discussed in Items 7 and 8. Therefore, the Scope of Work for Addendum No. 2 includes Items 1-6 as described above.

Additionally, the District requested estimated implementation time frames (i.e. "trigger points") whereby the new identified infrastructure would be required.

### Analysis

#### Plant 1 Wastewater Pump Station and Forcemains

As previously indicated, one of the major changes to the proposed District sewer system is the methodology of conveying wastewater flows across the Santa Ana River to the City of Riverside for treatment. Currently, flows are conveyed under the Santa Ana River to the City via inverted siphons. The new methodology is to convey the wastewater flows across the river via the new Van Buren Bridge. Currently, the Regional Wastewater Pump Station's capacity at Plant 1 is 5 mgd and potential peak "buildout" flows are estimated to be in excess of 12 mgd. As such, one of the primary decisions to be made is to determine how to accommodate ultimate buildout flows in the Plant 1 Tributary Drainage Area (Plate 1).

A separate study to evaluate the most cost effective method to provide sufficient pumping capacity in the Plant 1 area is nearing completion. The District commissioned Webb Associates to prepare a report entitled the "Feasibility and Planning Study for the Felspar Lift Station Site and Forcemain Alignment". This study reviewed alternatives of providing additional pumping capacity in the Plant 1 Tributary Area. One of the alternatives was the construction of a "subregional" lift station at the corner of Felspar Street and Limonite Avenue. Without addressing the details of this study, the report concluded that the Felspar Lift Station was not the most cost effective alternative and the construction of the additional capacity for the Plant 1 Tributary Area would be best suited at Plant 1 by either constructing an additional pump station for the flows exceeding the existing stations capacity or the construction of a new pump station to accommodate all of the buildout design flows. The analysis of which of the two Plant 1 alternatives should be selected, is beyond the scope of this report and should be determined by a separate, more detailed, evaluation. However, common to both of the additional Plant 1 pumping alternatives is the construction of a new 24" diameter force main from Plant 1 to the new Van Buren Bridge (Plate 2). The 24" diameter force main will carry flows in addition to the existing 18" diameter force main thus creating an equivalent pipe diameter of approximately 28 inches.

#### Plant 1 Wastewater Storage Ponds

With the construction of a new 24" diameter Regional Force Main, the District's current plans of expanding the wastewater storage ponds at Plant 1 needs to be re-evaluated. As a brief background, the existing storage ponds at Plant 1 (5 MG<sup>±</sup>) were required by the California Regional Water Quality Control Board for two primary reasons. First, wet weather peak flows to the Regional Wastewater Pump Station exceeded it's capacity. Therefore, there was a need to equalize the flows by storing the quantity of wastewater that exceeded the pump station's capacity and slowly release the wastewater back to the station as the peak flows dissipated. The second primary reason was with a single force main from Plant 1 to the City of Riverside's WQCP there was no method to take the forcemain out of service for inspection purposes or repair.

With the construction of a second forcemain, a certain amount of pipeline redundancy is obtained and additional pumping capacity is achieved. Pumping the flows from the station directly to the treatment plant is the preferred scenario. This would eliminate the additional step of temporarily storing the wastewater and then waiting to pump until the peak flows subside. As such, it is our recommendation, contingent upon concurrence of the Regional Board, that the District not pursue the storage pond expansion project and utilize the allocated funds for the additional Regional Force Main and Pump Station Expansion project at the Plant 1 site.

#### Indian Hills Area Wastewater Pump Stations and Forcemains

With the plan of pumping the wastewater across the new Van Buren Bridge, facilities must be proposed to transport Indian Hills Area flows (Plate 1 Tributary Areas J16, J17 and J18) to the crossing. Plate 3 illustrates the existing Indian Hills Area Backbone Sewer System. Currently, the majority of the Indian Hills Area flows enter the existing 18" Regional Forcemain by (1) a 10" dia. Clay Street pressurized gravity main (2) Clay Street Lift Station and (3) Clay & Van Buren Lift Station. The proposed Indian Hills Area Backbone System is shown on Plate 4.

The proposed system would still utilize the Clay Street and Clay & Van Buren Lift Stations, modified for new pumping conditions, however they will now pump into a proposed 12" dia. forcemain that would traverse from the existing Clay Street Lift Station site and parallel the existing Regional Forcemain to General Drive. The proposed forcemain would then traverse along General Drive, to Clay Street and connect into the proposed 24" dia. forcemain that transitions into two 24" HDPE pipelines in a bridge crossing the Santa Ana River (Plate 2). It should be noted that due to an upcoming Clay Street/Railroad crossing grade separation project, currently in the early design phase and

scheduled for construction in 2012, the future disposition (i.e. whether the station requires a new site or is not affected) of the Clay Street Lift Station is unknown.

It is recommended, if feasible, that the existing 18" Regional forcemain, southeasterly of General Drive, and inverted siphons crossing under the Santa Ana River remain in place as an emergency bypass to the City of Riverside's WQCP.

#### Wastewater Treatment Capacity

As determined in the October, 2007 Addendum to the District's Master Sewer Plan, the Plant 1 and Indian Hills Tributary Drainage Areas at ultimate buildout will require approximately 1 mgd additional treatment plant capacity. The additional treatment capacity can be obtained by two alternatives. The first alternative is to purchase additional capacity at the City of Riverside's Regional Treatment Plant. The second alternative is to reconstruct the Indian Hills Wastewater Treatment Plant. As will be discussed in the cost section of this addendum, preliminary project costs indicate both alternatives are approximately the same with regards to capital costs. Even though the cost of acquiring 1 mgd of additional treatment plant capacity at either Indian Hills or at the City of Riverside facility is comparable, there is a benefit of having a source of tertiary reclaimed water within JCSD's service area which can be used for irrigation purposes.

As will be discussed in a subsequent section, the decision concerning which alternative of obtaining additional capacity is not an immediate need and further evaluation of the overall costs and benefits can be made.

It should be noted that if the Indian Hills alternative become the most viable method of obtaining additional treatment capacity, the pumping capacities of the Clay Street Lift Station could be configured to pump either to the Indian Hills Plant or the 24" dia. forcemain in Van Buren Blvd.

#### Wastewater Pump Station and Forcemain Sizing

In order to size the proposed facilities, updated estimated design flows were developed based upon the new flow projections from the October, 2007 Master Sewer Plan Addendum. Table 1 shows the flow projections from the referenced 2007 Addendum. Using the flows tributary to the City of Riverside's WQCP shown on Table 1, flows were allocated to each facility as shown on Table 2.

**Table 1 – New Projected “Build-out” Average Daily**

**Flows for Ultimate Wastewater Treatment Plant Capacity**

<b>TRIBUTARY WASTEWATER TREATMENT PLANT</b>	<b>Res. EDU's<sup>(1)</sup></b>	<b><u>Residential</u> Flows (gpd)</b>	<b><u>Comm./Ind.</u> Flows (gpd)</b>	<b><u>Schools</u> Flows (gpd)</b>	<b>"Build-out" Flows (gpd)</b>
City of Riverside WCQP <sup>(2)</sup>	18,249	4,598,748 <sup>(3)</sup>	265,230 <sup>(4)</sup>	59,402 <sup>(4)</sup>	4,923,380
Western Riverside Co. WWTP <sup>(5)</sup>	22,338	4,979,544 <sup>(6)</sup>	478,600 <sup>(7)</sup>	203,550 <sup>(7)</sup>	5,661,694
Total <sup>(8)</sup>	- -	40,587	9,578,292	743,830	262,952
					10,585,074

<sup>(1)</sup> From the 2004 Master Sewer Plan (refer to Appendix L of 2004 Master Sewer Plan)

<sup>(2)</sup> Includes Land Use areas J1-J18, J19-J23.

<sup>(3)</sup> Calculated by multiplying the EDU's times the projected wastewater generation factors of 252 gpd/EDU.

<sup>(4)</sup> 1/3 of the projected "buildout" flows from the 2004 Master Sewer Plan. 2/3 of non-residential EDU's have already been built (Appendix D of 2007 Addendum) and accounted for in the wastewater generation factor of 252 gpd/EDU.

<sup>(5)</sup> Includes Land Use areas E1-E50, J25.

<sup>(6)</sup> Calculated by multiplying the EDU's times the projected wastewater generation factors, 220 gpd/EDU for Eastvale and 252 gpd/EDU for Sky Country (Land Use Area E1).

<sup>(7)</sup> From the 2004 Master Sewer Plan (refer to Appendix L of 2004 Master Sewer Plan). Flows added because the vast majority of the buildout non-residential EDU's have not yet been constructed (Appendix D of 2007 Addendum)

<sup>(8)</sup> Total wastewater flows do not include wastewater generated in Land Use Areas pertaining to CFD No. 1 (J24, J26-30).

TABLE 2  
WASTEWATER PUMPING FACILITY  
ESTIMATED DESIGN FLOWS<sup>1</sup>

Facility Name	Approximate Service Area (AC)	No. of Residential EDU's	Residential $Q_{Res}$ (mgd) <sup>5</sup>	Non-Residential $Q_{Non}$ (mgd) <sup>6</sup>	Total $Q_{Tot}$ (mgd)	$Q_{W}$ (dry) (mgd) <sup>8</sup>	Infiltration/Inflow Allowance (mgd) <sup>9</sup>	$Q_{W}$ (wet) (mgd)	$Q_{W}$ (wet) (gpm)	Assumed $Q_{Design}$ (gpm)	Required Force Main Diameter (in.) <sup>10</sup>
Regional Wastewater Pump Station (Plant 1)	8,956.7 <sup>2</sup>	15,771	3,974	0.281	4,255	9,338	1,433	10,771	7,480	7,500	24
Clay Lift Station	1,284.1 <sup>3</sup>	2,478	0.624	0.013	0.637	1,658	0.205	1,863	1,294	1,300	12
Clay & Van Buren Lift Station	76.9 <sup>4</sup>	0	0	0.038 <sup>7</sup>	0.038	0.128	0.012	0.140	97	100	4
<b>TOTALS</b>	<b>10,317.7</b>	<b>18,249</b>	<b>4,598</b>	<b>0.332</b>	<b>4,930</b>	<b>11,124</b>	<b>1,650</b>	<b>12,774</b>	<b>8,871</b>	<b>8,900</b>	<b>N/A</b>

<sup>1</sup>Tributary to the City of Riverside WQCP (assumes Sky Country Area (Tributary Areas E1 & J25 flows are treated at the Western Riverside County Regional Wastewater Authority's plant) in accordance with the District's September, 2004 Master Sewer Plan (MSP).

<sup>2</sup>MSP Areas J1-J15B, J17A, J19-J23.

<sup>3</sup>MSP Areas J16, J17B, J18.

<sup>4</sup>MSP Area J18 (Lower).

<sup>5</sup>(No. EDU's x 252 gpd/EDU) ± 1,000,000.

<sup>6</sup>Total non-residential City of Riverside tributary wastewater flows (Table 1) allocated based upon percentage of non-residential flow ratios from MSP within each service area.

<sup>7</sup>Based upon 500 gpd/AC x 76.9 AC.

<sup>8</sup> $Q_{W} = 2.5 [Q_{Non}]^{0.33}$  District Standard Peaking Equation.

<sup>9</sup>Based upon 160 gpd/AC per 2004 MSP.

<sup>10</sup>Based upon peak velocities between 2.5 - 5.0 fps.

Preliminary Design Reports (PDR's) should be prepared to refine and detail each wastewater pump station's design. Especially important is the analysis of the three wastewater pump stations having the capability of pumping into a common forcemain at the same time. Due to the "flat nature" of sewage pump curves, pump control and pump control valves will be an important element of this analysis.

Concerning the PDR for the Clay Street Lift Station, an analysis should be made to determine if a low head pressurized gravity pipeline traversing from a point in the vicinity of the existing station, southerly on Clay Street across the proposed grade separation to the 24" dia. forcemain in Van Buren is feasible. Without additional hydraulic study and the specific details of the grade separation, it is difficult to determine if this alternative is feasible. However, based upon a conceptual analysis, it does not appear this alternative is feasible due to the elevation of the hydraulic grade line on the 24" dia. forcemain at Van Buren and Clay Street.

#### City of Riverside Connection

As indicated on Plate 2, the terminus of the 30" dia. force main is currently planned to occur at the City of Riverside's DeAnza Trunk Sewer. However the exact location of the point of connection to the City's system requires discussions with City staff. For the purposes of this addendum, the City's DeAnza Trunk Sewer is the assumed connection point.

It is our understanding that the City is planning to construct a new DeAnza trunk sewer and therefore additional upsizing maybe required in this pipeline to accommodate the District's flows. Further, it is currently anticipated that a new headworks including a mag meter to measure the flows entering the City's pipeline and facility to analyze wastewater quality will also be required.

It should be emphasized that coordination with the City of Riverside needs to occur immediately so that all design parameters and agreement terms can be established now for future service. Pursuant to a meeting that occurred at the District on August 10, 2009, it is our understanding that District staff will coordinate with City staff to obtain an agreement to connect to the City's system. Webb Associates is ready to assist the District in any manner concerning obtaining an agreement with the City of Riverside.



### Cost Estimates

The estimated project costs for each of the proposed facilities are shown on Table 3.

### Estimated Implementation Schedule

Implementation of the facilities described in Table 3 are governed by three primary factors (1) construction completion of the new Van Buren Bridge, (2) construction completion of the new City of Riverside's WQCP and associated DeAnza Trunk Sewer, and (3) expected growth within the Plant 1 Tributary Area. Currently, construction of the new Van Buren Bridge is expected to be complete in late 2011. Construction of the City's WQCP and associated ~~DeAnza Trunk~~ Sewer is expected to be complete in 2012.

Regarding growth within the District, for the purposes of this Addendum, the current water supply growth assumption is used which is 1100 EDU's/Year for 10 years. The 1100 EDU/Year assumption is District wide, therefore adjustment must be made for the Plant 1 area only. Since the Eastvale and CFD No. 1 areas of the District have been the major growth areas within the last several years, these areas are expected to continue to grow faster because there are larger parcels of land to develop and the newer development areas tend to attract new projects. The Plant 1 area tends to have much smaller parcels for development and as such, is expected to be more of an "infill" type of development (i.e. smaller number of units constructed in pocket vacant areas). Therefore for the purposes of this addendum, it is assumed two thirds of the District's growth will occur in the Eastvale and CFD No. 1 areas and one third in the Plant 1 area. One third of 1100 EDU's/Yr. is approximately 367 EDU's/Yr. In terms of average daily wastewater flow increase, the 367 EDU's translate to approximately 92,500 gpd.

Therefore, with the Plant 1 area having a current average daily flow of approximately 3.4 mgd, it would take about 6.5 years for the area to reach it's current City of Riverside Treatment Plant capacity alignment of 4 mgd. However, as the Plant 1 area's average daily flow increases, peak flows will increase accordingly meaning the chances of using the existing storage ponds on a regular basis will increase.

**Table 3 - Estimated Project Costs**

Facility	Estimated Project Cost <sup>(1)(2)</sup>
Regional Wastewater Pump Station Capacity Increase (Plant 1)	\$12,600,000 <sup>3</sup>
Regional Forcemain	
13,500 LF 24" dia. Forcemain	\$2,700,000
1220 LF 24" dia. HDPE Forcemains (dual) Across New Van Buren Bridge	\$910,000 <sup>4</sup>
1800 LF 30" dia. Forcemain	\$430,000
Headworks Connection to City of Riverside's Sewer System	\$2,000,000 <sup>5</sup>
Clay Street Lift Station	\$2,300,000 <sup>6</sup>
Clay Street Lift Station's Forcemain – 3500 LF 12" dia.	\$350,000
Van Buren Lift Station & Forcemain & 100 LF 4" dia.	\$200,000 <sup>7</sup>
1 MGD Wastewater Treatment Plant Capacity	\$10,600,000 <sup>8</sup>
18" Plug Valve Installations on Existing Regional Forcemain	\$50,000
<b>TOTAL</b>	<b>\$32,140,000</b>

<sup>1</sup>Refer to Plate 2 for locations.

<sup>2</sup>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) Construction Cost Index Los Angeles, August 2009 (ENR = 9.766.19). **Escalation, financing, interest during construction, legal, land ROW agent, and environmental impact report costs are not included.**

<sup>3</sup>Although requiring additional study for the purposes of this Addendum, it is assumed a new Regional Pump Station capable of pumping the total ultimate build out flows will be constructed.

<sup>4</sup>Cost based upon Van Buren Bridge bid item prices increased to project costs.

<sup>5</sup>Allowance for automated screen, grinder, headworks structure, flow measurement, and water quality sampling facility.

<sup>6</sup>Although requiring additional study for the purposes of this Addendum, it is assumed a new pump station capable of pumping ultimate build out flows will be constructed.

<sup>7</sup>Assumes renovation of existing facility including pump replacements and addition of a standby generator.

<sup>8</sup>Based upon a "Non-Potable Water Study" May, 2009 by Albert A. Webb Associates.

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Implementation times for the Plant 1 Area improvements could be extended a number of years by changing the treatment location for the Sky Country Area (Areas E1 and J25 of Plate 1) from the City of Riverside to the WRCRWA Plant in accordance with the 2004 Master Sewer Plan. However, construction of additional trunk sewers in Eastvale and additional treatment plant capacity purchase/construction would be required. Therefore, the assumption of this addendum is implementation of the improvements described in Table 3 will be required in about 5 years.

It is expected that the planning, design, and construction period to obtain operating facilities will take 2-3 years. Therefore, it is our recommendation the District consider immediate action on authorizing the previously discussed preliminary design reports for the required improvements.

If you have any questions, please feel free to telephone me at (951) 686-1070.

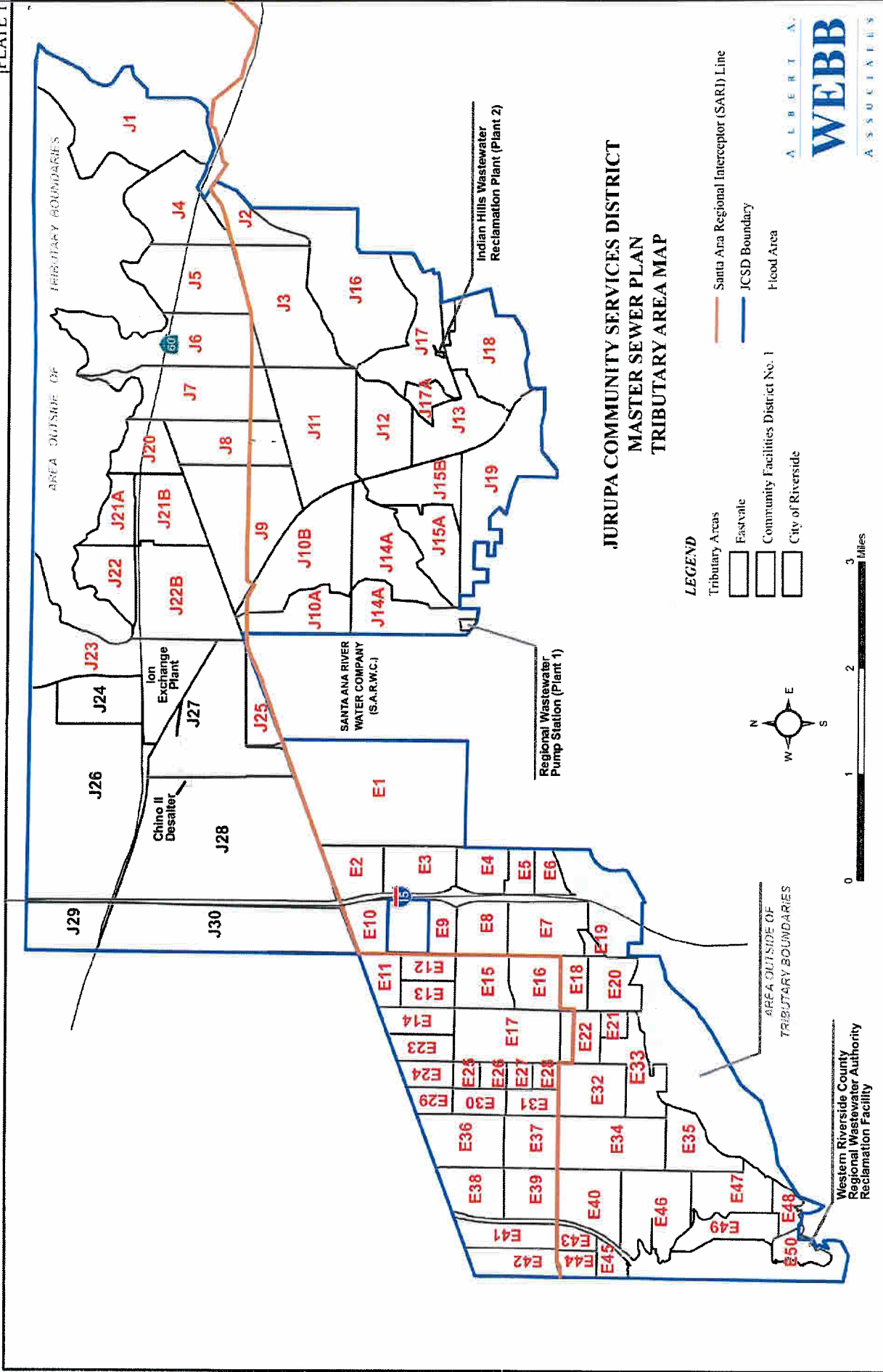
Sincerely,

ALBERT A. WEBB ASSOCIATES

Wally Franz, P.E.  
Vice President

WF:at

cc: Robert Tock, JCSD  
Don Cutler, JCSD  
Todd Minten, JCSD  
Dan DuCasse, JCSD  
Umesh Shah, JCSD  
Sam Gershon, Webb Associates  
Bill Malone, Webb Associates



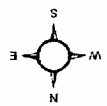




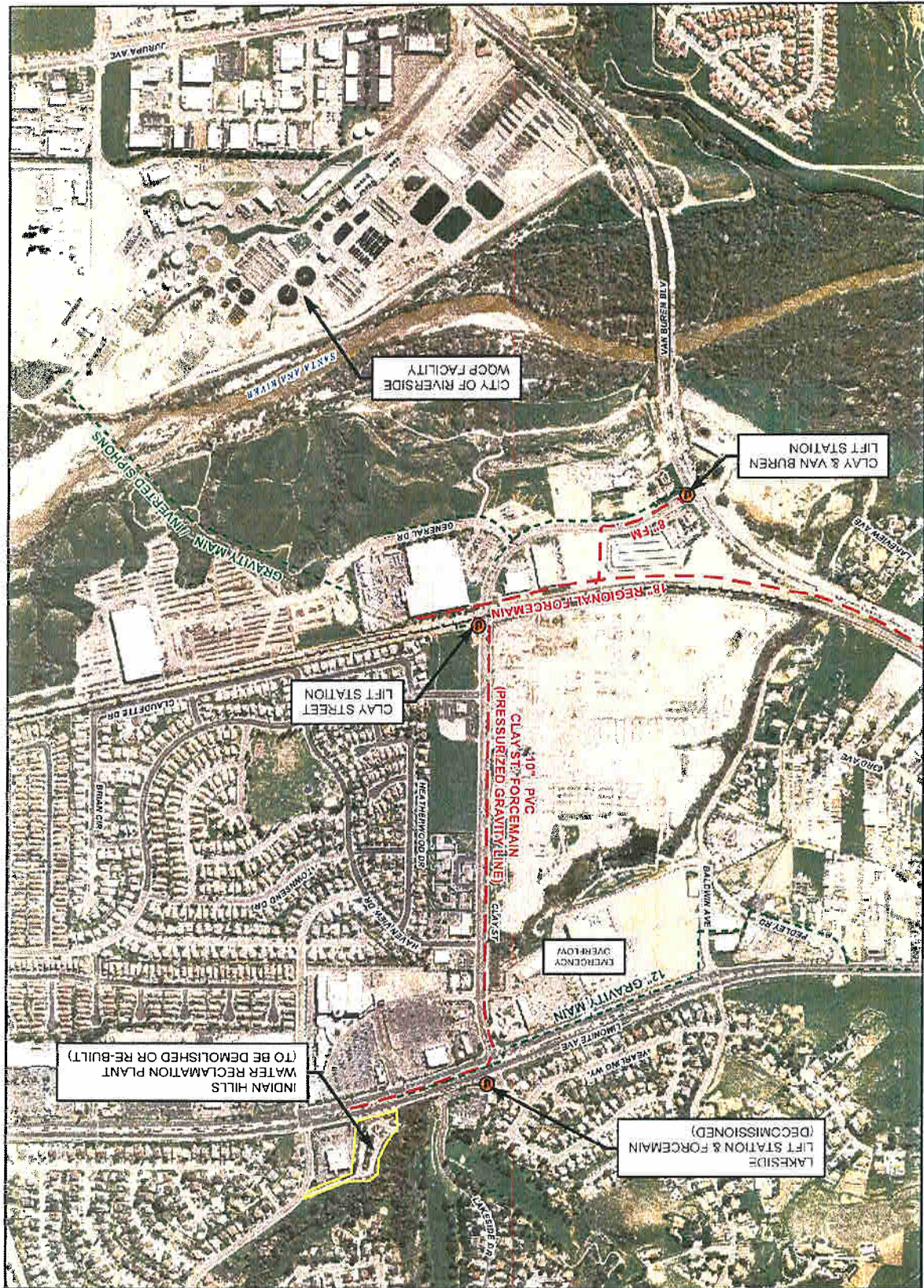


Existing Indian Hills Area  
Backbone Sewer System

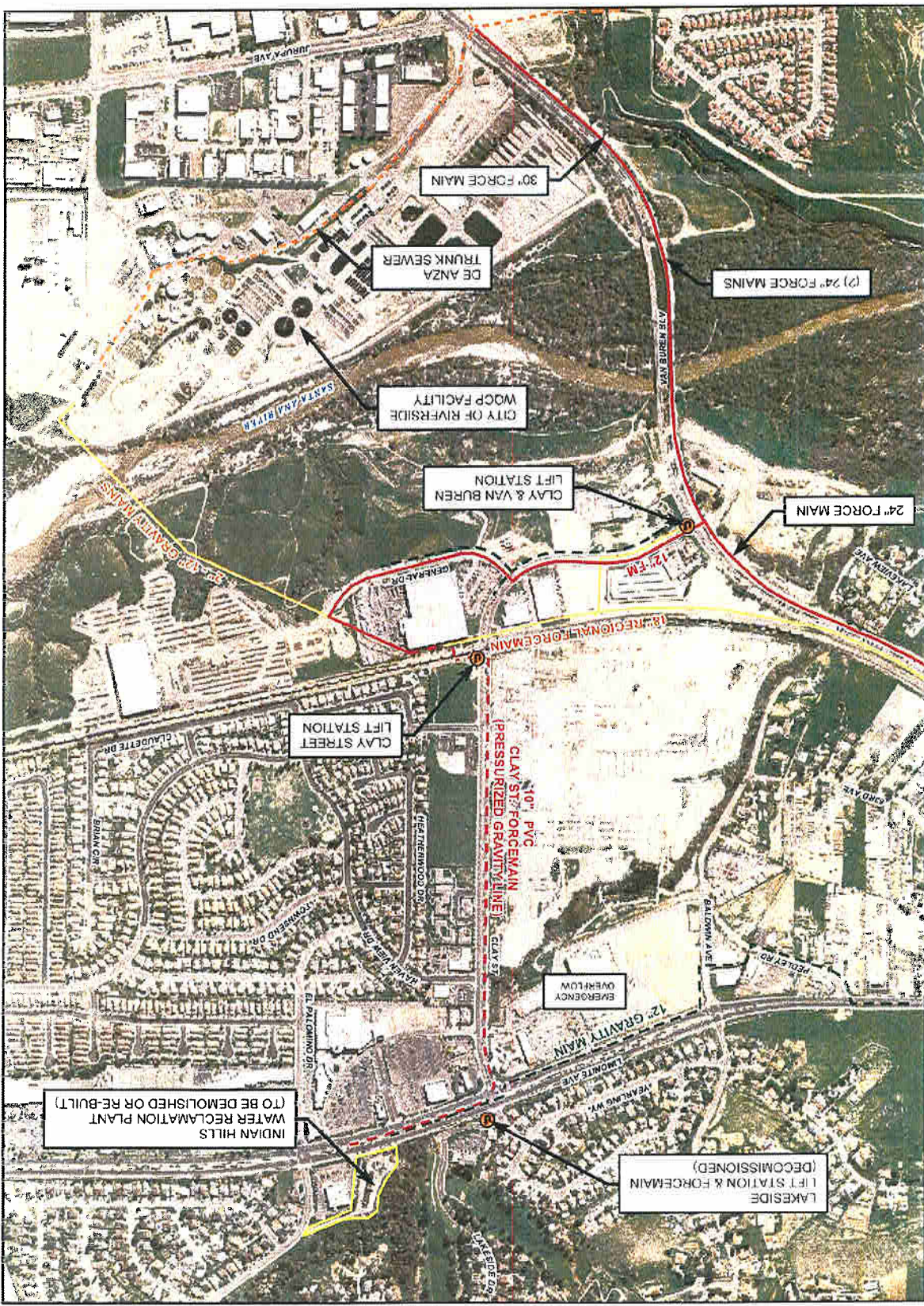
- Legend**
- Gravity Main
  - Force Main
  - Lift Station



**WEBB**  
ASSOCIATES  
March 2008  
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Image: Digital Globe

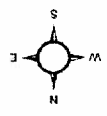






**Proposed Indian Hills Area  
Backbone Sewer System**

- Legend**
- Lift Station
  - Existing Force Main
  - - - Existing Gravity Line
  - Future Force Main
  - - - Future Gravity Line
  - Not in Use



**WEBB**  
ARCHITECTS  
March 2008  
Scale: 1" = 600'  
Image: Digital Globe