MASTER SEWER PLAN ADDENDUM

Prepared for:

Jurupa
COMMUNITY SERVICES DISTRICT

October, 2007

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

ALBERT A. WEBB ASSOCIATES

3788 McCray Street • Riverside, CA 92506
Phone: 951.686.1070 • Fax: 951.788.1256
www.webbassociates.com

W.O.: 07-0176
File: 1432.1234

October 12, 2007

OFFICE OF THE DISTRICT ENGINEER

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

RE: Master Sewer Plan Addendum

Dear Mr. Horst:

In accordance with the Jurupa Community Services District (District) authorization, we have completed the Master Sewer Plan Addendum for the 2004 Master Sewer Plan. The original Master Sewer Plan provided "build-out" average daily flows for the District, based on District standard waste water generation factors. The purpose of this addendum is to re-evaluate the waste water generation factors based on current District flow records and re-calculate the waste water generation factors using the recorded data. New "build-out" average daily flows are calculated using the new waste water generation factors. These updated flow projections will be used primarily for the purpose of predicting ultimate treatment plant capacity and the resulting amount of plant expansion and/or purchase that will be required. All project costs have been updated to October 2007 from the 2004 Master Sewer Plan and are presented in this addendum. Waste water quality is also presented based on recorded data.

A. WASTE WATER GENERATION FACTORS

Previous Waste Water Generation Factors

The 2004 Master Sewer Plan used various waste water generation factors to project flows for the various tributary areas within the District. Domestic waste water flow was based on equivalent dwelling units (EDU's), and was developed by using the District's standard generation factor and the number of residential EDU's tributary to each treatment plant. Commercial and industrial waste flows were based on land acreages and the District's standard generation factors. Waste flows for schools were based on student population and estimated generation factors from reference publications.

These previously calculated generation factors can be found in Table 3-1 of the 2004 Master Sewer Plan and are referenced in **Table 1**.

Table 1 – Summary of Wastewater Generation Factors from the 2004 Master Sewer Plan(1)

Land Use	Wastewater Generation Factor
Residential Wastewater	280 gpd/edu
Commercial/Industrial	2,000 gpd/acre
Public Uses (excluding schools)	1,000 gpd/acre
Elementary Schools	10 gpd/student
Middle Schools	15 gpd/student
High Schools	25 gpd/student
Infiltration/Inflow (existing development areas)	160 gpd/acre
Infiltration/Inflow (current and future development areas)	50 gpd/acre

(1) From Table 3-1 of JCSD's 2004 Master Sewer Plan.

Existing Waste Water Generation Factors

A review of existing District waste water flow records (within the last five years) were used in developing the new domestic waste water generation factors. The District was divided up into various tributary areas as shown on **Plate 1**. Waste water generation factors were calculated based on actual flows experienced within the tributary areas, and the number of active sewer connections[1]. It should be noted that the tributary areas used in this study are slightly different than those used in the 2004 Master Sewer Plan. While the 2004 Master Sewer Plan used tributary areas based on the Riverside County Integrated Project (RCIP) Jurupa Area Land Use Plan and the RCIP Eastvalc Area Land Use Plan (**Plate 3**), this study was based on areas tributary to the various metering stations, lift stations, and treatment plants throughout the District (**Plate 1**). However, the areas tributary to the City of Riverside WWTP and the Western Riverside County Regional Wastewater Reclamation Facility (WRCRWWRF) are the same in this study as in the 2004 Master Sewer Plan, and thus direct comparisons can be made.

Flow records were obtained for as many of the tributary areas as the District was able to provide. Several of the tributary areas were not metered sufficiently to obtain accurate flow records, however most of the larger areas had flow records for a period of several years. All flow data were provided by the District and spanned some time period between January 2003 and May 2007 (**Appendix A**). It should be noted that the subject

[1] Active account and EDU data were provided by Glenn Reiter of Reiter Lowry Consultants, based on data provided by JCSD.

flow records may in some instances have combined residential, commercial, and industrial flow sources. Metered flow data represented flows from each tributary area as a whole, and could not therefore be separated into residential, commercial, and industrial flows.

Average daily flows for each month were evaluated in conjunction with the number of active EDU's contributing to each flow. It was therefore necessary to obtain a record of active accounts for each month of the same time period between January 2003 and May 2007. This information was provided by Glenn Reiter of Reiter Lowry Consultants. Glenn Reiter provided a list of the active accounts that were served by the sewer system, and the corresponding billing records associated with each account. The billing records were used to determine when the accounts were active. Glenn Reiter also provided the number of EDU's associated with each of the active accounts, and these EDU data were cross checked with the EDU information obtained directly from the District in order to insure an accurate number of EDU's for each account. Finally, each account was grouped into its corresponding tributary area using GIS technology and address information provided by the District. This provided a total number of EDU's per month for each tributary area (**Appendix A**). Residential and non-residential EDU's were determined for the areas pertaining to Plant 1 (City of Riverside WWTP) and Eastvale (WRCRWWRF) (**Appendix D**). However, for each tributary area shown in **Plate 1**, all EDU's were summed together into totals in order that they could be directly compared to the flows.

Plate 2 shows the areas tributary to Plant 1, Plant 2, River Road lift station, and the smaller Clay St. and Van Buren lift stations as of May 2007. Parcels with active accounts are shown within each tributary area and the number of active accounts and EDU's for each tributary area is displayed in the legend. Plate 2 assists in visualizing how the accounts were divided into their respective tributary areas and how many EDU's contributed to the various waste water flows. It should be noted that that Sky Country (RCIP land use area E1) is currently tributary to Plant 1, however for "build-out," Sky Country waste water flow was projected to be tributary to Eastvale (**Table 4**).

Having obtained an average daily flow and total number of EDU's per month for each tributary area, the amount of flow per EDU (gpd/EDU) could then be calculated. These calculations are shown in **Appendix A**. New waste generation factors were developed by comparing the flow per EDU from each of the tributary areas. Unlike the waste generation factors from the 2004 Master Sewer Plan (shown in **Table 1**) which were separated into residential, commercial/industrial, and schools, new waste generation factors represent all categories summed together. **Table 2** provides a summary of the results of the wastewater flow generation factors for each metering station.

Table 2 – Summary of Existing Wastewater Flow Generation Factors

TRIBUTARY AREA[1]	Highest Annual Avg. Flow (gpd/EDU)	Lowest Annual Avg. Flow (gpd/EDU)	Annual Avg. Flow (gpd/EDU)	Comments
PLANT 1	261	242	252	Consistent Average Flows (+/- 4%)
PLANT 2	264	263	263	Consistent Average Flows, however flexibility in operational scenarios (ie Clay St. LS pumps to plant 2 or to regional force main) could affect results
EASTVALE				
RIVER RD. L.S.	205	61	167	Small database (5 mon.); Average flows trending to increase each month
ARCHIBALD M.S.	213	100	157	Low initial average flows; Trend Increasing flows each month
CELEBRATION M.S.	207	70	146	Low initial average flows; Trend Increasing flows each month
CHANDLER L.S.	182	158	167	Low Annual Average Flows
CLEVELAND M.S.	253	170	196	No consistency, flows vary annually up and down
CITRUS L.S.	154	154	154	Small data range; 11 mon.
HAMNER L.S.	371	165	248	Los initial average flows; Trend Increasing flows each month
HARRISON M.S.	177	68	135	No consistency, flows vary annually up and down
EASTVALE AVG. FLOWS	220	118	171	

[1] Refer to Plate 1

Projected Wastewater Generation Factors

As shown on **Table 2**, there is a significant difference in the existing wastewater generation results between the older areas (Plant 1 and Plant 2), and the new development area (Eastvale). While Plant 1 and 2 average daily wastewater generation factors are 10% to 6% respectively below the current District standard (280 gpd/EDU), the Eastvale average is approximately 40% below the current District standard. The Eastvale area has been subject to very dynamic growth, which has produced unreliable results since the monthly EDU totals vary significantly. This has resulted in a wide range of wastewater generation factors. As already illustrated by the Eastvale areas largest tributary area base, the River Road lift station, there is an increasing trend in the average daily waste water generation factor. Additionally, wet weather conditions, for the most part, are not included in the Eastvale Area's data base. As such, we would not recommend using a factor less than 200 gpd/EDU. In fact, pending additional monitoring results at River Road, we believe it would be prudent at this point in time to assume an Eastvale wastewater generation factor of at least 220 gpd/EDU.

Regarding the older area (Plants 1 and 2), due to the flexibility in operational scenarios in the Plant 2 area, as commented on in **Table 2**, we recommend using the more stable data base from the Plant 1 results. Using the 4 year average generation factor of 252 gpd/EDU would be an appropriate factor to use in the older development areas.

B. PROJECTED BUILD-OUT FLOWS

Previously Projected "Build-out" Flows

The "build-out" average daily flows for the District were calculated in the 2004 Master Sewer Plan. These "build-out" flows were based on the RCIP land use plans for Jurupa and Eastvale, and calculated using the previously presented waste generation factors shown in **Table 1**. Table 4-4 of the 2004 Master Sewer Plan provides the flows for ultimate wastewater treatment plant capacity. All flow projections in this study were compared to Table 4-4 of the 2004 Master Sewer Plan, modified in this report as **Table 3**.

Table 3 – Previously Projected "Build-out" Average Daily Flows for Ultimate Wastewater Treatment Plant Capacity [1]

Tributary Drainage Areas[2]	Residential Average Daily Flow (GPD)	Commercial / Industrial[3] Average Daily Flow (GPD)	School Average Daily Flow (GPD)	Total Average Daily Flow (GPD)
JCSD Areas (J1–J15B, J17A & J19 – J23)	4,415,880	675,732 [4]	169,875	5,261,487
Indian Hills Area (J16, J17B & J18)	495,600 [5]	82,305	8,510	586,415
Lower Portion of Tributary Area No. J18	0	38,450	0	38,450
City of Riverside WWTP Subtotal	**4,911,480**	**796,487**	**178,385**	**5,886,352**
CFD Area No. 1 (J24, J26 – J30)	32,200	1,917,350	0	1,949,550
Eastvale Areas (E1 – E50 & J25)				
Western Riverside Co. WWTP Subtotal	**6,254,680**	**478,600**	**203,550**	**6,936,830**
TOTAL	**11,198,360**	**3,192,437**	**381,935**	**14,772,732**

[1] Table 3 is modified from Table 4-4 in the Master Sewer Plan with added subtotals.

[2] Refer to Plate 3

[3] Commercial and industrial wastewater generation factor based on 500 gpd/AC.

[4] Area deduction of approximately 500 acres for commercial and industrial areas located above and some portion of areas below State Highway 60 of areas tributary to Plant 1.

[5] A wastewater generation factor for residential dwelling units of 200 gpd/EDU was utilized for projecting flows for ultimate treatment plant capacity for the Indian Hills Area only (refer to Section 3). A factor of 280 gpd/EDU was utilized for all other residential areas.

New Projected "Build-out" Flows

New "build-out" flows were calculated based on the new wastewater generation factors. Eastvale "build-out" flows (5.7 MGD) are tributary to the Western Riverside County Regional Wastewater Reclamation Facility, and Plant 1 "build-out" flows (4.9 MGD) are tributary to the City of Riverside Wastewater Treatment Plant (**Table 4**). All flows from the various drainage areas were summed together in order to calculate total "build-out" flows for each treatment plant, and the District as a whole. It should be noted that "build-out" flows in **Table 4** reflect average daily dry weather flows, and that wet weather and peak flows will be higher than those in the table. Using the District standard peaking factors and accounting for infiltration, potential peak flows are estimated to be approximately 12.0 mgd for the City of Riverside WWTP and 12.3 mgd for the Western Riverside County WWTP.

Table 4 – New Projected "Build-out" Average Daily Flows for Ultimate Wastewater Treatment Plant Capacity

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

[1] From the 2004 Master Sewer Plan (refer to Appendix L of 2004 Master Sewer Plan)
[2] Includes Land Use areas J1-J18, J19-J23.
[3] Calculated by multiplying the EDU's times the projected wastewater generation factors of 252 gpd/EDU.
[4] 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) and accounted for in the wastewater generation factor of 252 gpd/EDU.
[5] Includes Land Use areas E1-E50, J25.
[6] 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).
[7] 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)
[8] Total wastewater flows do not include wastewater generated in Land Use Areas pertaining to CFD No. 1 (J24, J26-30).

Wastewater Quality

In projecting ultimate wastewater treatment plant capacity it is also important to consider the influent wastewater quality at the plant. Recorded wastewater quality data was obtained from the District for Plant 1 and River Road lift station (**Appendix C**). Plant 1 data shows monthly TSS and BOD levels between January 2006 and June 2007[1], and River Road shows the same data from April to September of 2007[2]. According to the recorded data, average BOD levels are higher for the River Road lift station than Plant 1. This may be a result of lower wastewater flow which tends to concentrate the pollutants.

[1] Average BOD and TSS is 252 mg/L and 250 mg/L respectively.
[2] Average BOD and TSS is 311 mg/L and 274 mg/L respectively.

C. UPDATED PROJECT COSTS

This section of the report serves to update all the project costs from the 2004 Master Sewer Plan. Previous project costs are found in Section 8 of the Master Sewer Plan. As there are numerous tables in the Master Sewer Plan showing the various project costs, it is recommended that the reader refer to those tables in the Master Sewer Plan for comparison of previous versus updated costs. All previous costs were updated using the October 2007 Engineering News Record (ENR) Los Angeles, which has a value of 9,215.

Proposed Trunk Sewer Pipeline Projects

Unit costs from Table 8-1 of the 2004 Sewer Master Plan have been updated and are shown in **Table 5**. The new unit costs were then applied to the proposed capital improvement projects shown in Table 7-18 of the 2004 Master Sewer Plan in order to develop new project cost estimates. These project cost estimates are provided in **Appendix B**. As shown in **Appendix B**, the total estimated project cost for gravity flow pipelines is $26,660,000, which is higher than the $22,770,000 estimated in the 2004 Master Sewer Plan. **Plate 4** shows the locations of the projects.

Table 5 - Estimated Unit Cost of Trunk Sewer Pipelines

Sewer Line Dia. (in.)	Construction Cost	Project Cost[1]
10	$212.00	$297.00
12	$242.00	$338.00
15	$257.00	$360.00
18	$286.00	$401.00
21	$308.00	$432.00
24	$352.00	$493.00
27	$381.00	$534.00
30	$426.00	$596.00
36	$491.00	$688.00
39	$586.00	$821.00
42	$645.00	$903.00
48	$711.00	$995.00

[1]Project cost is 1.4 times construction cost rounded up to nearest $1. Project cost includes: construction cost, 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 New Record (E.N.R.). The Engineering news Record Construction Cost Index for the Los Angeles Areas for October, 2007 (9,215) was utilized. Escalation, financing, interest during construction, legal, land, R.O.W. agent, and environmental impact report costs are not included in project costs. Additionally, not included in the unit cost estimates are extraordinary construction items such as bore casings, dewatering, rock removal etc…

Sewer System Rehabilitation/Replacement Projects

The District is currently reviewing sewer lines which have operational problems. Upon completion of the District review and evaluation of these pipelines, a project list will be completed which will serve as the basis for a pipeline rehabilitation program. Therefore, costs for pipeline rehabilitation/replacement projects are yet to be determined.

In addition to pipeline rehabilitation/replacement projects, there are two lift stations that need replacement, as discussed in the 2004 Master Sewer Plan. The costs for replacing these lift stations have been updated and are shown in **Table 6**. Cost updates are based on estimates done during pre-design for the Florine Lift Station Replacement Project in July of 2006.

Table 6 - Sunnyslope/Florine Lift Station Replacement Project

Item	Quantity	Unit	Unit Price	Construction Cost
10" Dia. VCP Sewer	1,561	LF	$212	$330,932
15" Dia. VCP Sewer	340	LF	$257	$87,380
10" Dia. PVC Force Main	2,550	LF	$90	$229,500
Lift Station	1	LS	$870,000	$870,000
			Total Estimated Construction Cost	$1,517,812
			Total Estimated Project Cost	$2,120,000(1)

(1)Project cost is 1.4 times construction cost rounded up to nearest $10,000. Project cost includes: construction cost, 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 New Record (E.N.R.). The Engineering news Record Construction Cost Index for the Los Angeles Areas for October, 2007 (9,215) was utilized. Escalation, financing, interest during construction, legal, land, R.O.W. agent, and environmental impact report costs are not included in project costs. Additionally, not included in the unit cost estimates are extraordinary construction items such as bore casings, dewatering, rock removal etc…

Regional Wastewater Pump Station Expansion (Plant 1)

As discussed in the 2004 Master Sewer Plan, the Regional Wastewater Pump Station at Plant 1 currently has a capacity of 5.0 mgd. Ultimate peak design flows that could occur at Plant 1 are projected to be 12.0 mgd. Therefore, an additional 7.0 mgd of pumping capacity is required. The 7.0 mgd (4900 gpm ±) expansion is estimated to have a project cost of approximately $6,900,000[1].

[1] Based on bid results of similar projects, and then multiplied by ENR factor of 1.173.

New Regional Force Main to the City of Riverside

A total length of 16,000 LF was used for the 24 inch diameter Regional Force main assumed to run parallel to the existing Regional Force main. It was assumed that 600 feet of the 16,000 feet total length would be HDPE pipe directionally bored under the Santa Anna River yielding 15,400 of conventionally installed 24 inch pipe. Construction cost for the 15,400 of conventionally installed 24 inch pipe was determined to be approximately $200 per foot using current estimates[1]. The HDPE was estimated to have a construction cost of about $469 per foot[2]. The total estimated project cost for the new regional force main is $4,700,000.

City of Riverside Wastewater Treatment Plant Capacity Purchase

The purchase of treatment plant capacity at the City of Riverside wastewater treatment plant was assumed to reflect the current costs to construct a wastewater treatment plant. Costs from the 2004 Master Sewer Plan were updated using the October 2007 ENR, showing a new typical unit project costs range from $10/gallon/day to almost $16/gallon/day. The District currently owns 4 mgd of treatment capacity at the City of Riverside's facility. Using this project cost range and the projected additional ultimate average daily flow of 0.9 mgd (4.9 mgd ultimately required – 4.0 mgd currently owned), the total estimated project cost for treatment could vary from $9,000,000 to $14,400,000.

Western Riverside County Regional Wastewater Authority Treatment Plant Purchase

The purchase of treatment plant capacity at the Western Riverside County Regional Wastewater Authority treatment plant was assumed to reflect the current costs to construct a wastewater treatment plant. The District currently owns 3.25 mgd of treatment capacity at the Western Riverside County facility. Using the same project cost range as was used for the City of Riverside WWTP, and the projected additional ultimate average daily flow of 2.45 mgd (5.7 mgd ultimately required – 3.25 mgd currently owned), the total estimated project cost for treatment could vary from $24,500,000 to $39,200,000.

Summary of Updated Project Costs

A summary of the estimated project costs for the Jurupa sewer system are shown in **Table 7**. As shown on **Table 7**, the total project cost estimate of the updated sewer system improvements range from $73,880,000 to $93,980,000 depending upon ultimate treatment plant capacity purchase costs.

[1] Based on current bid results from similar projects.
[2] Based on cost from 2004 Master Sewer Plan, multiplied by ENR factor of 1.173.

Table 7 – Estimated Project Cost Summary

Master Plan Improvement	Estimated Project Cost
Proposed Gravity Flow Pipelines and Projects	$26,660,000[1,2,3]
Pipeline Rehabilitation/Replacement Projects	TBD
Lift Station Rehabilitation/Replacement Projects	$ 2,120,000
Regional Wastewater Pump Station Expansion (Plant 1)	$ 6,900,000[2,3]
New Regional Force Main to the City of Riverside WWTP	$ 4,700,000[2,3]
City of Riverside Treatment Plant Capacity Purchase	$9,000,000-$14,400,000[3]
Western Riverside County Treatment Plant Capacity Purchase	$24,500,000-$39,200,000[3]
Total Estimated Project Cost	**$73,880,000-$93,980,000**

[1]Refer to Appendix D for a breakdown of cost per project
[2]Total estimated construction cost rounded up to the nearest $10,000.
[(1)]Project cost is 1.4 times construction cost rounded up to nearest $10,000. Project cost includes: construction cost, 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 New Record (E.N.R.). The Engineering news Record Construction Cost Index for the Los Angeles Areas for October, 2007 (9,215) was utilized. Escalation, financing, interest during construction, legal, land, R.O.W. agent, and environmental impact report costs are not included in project costs. Additionally, not included in the unit cost estimates are extraordinary construction items such as bore casings, dewatering, rock removal etc…
TBD – To Be Determined.

All fees, costs, and credits are subject to updates as well as inflationary adjustments by the District depending upon the commencement and completion of the projects. If project scopes change, the subject study is no longer valid and a new study will be required. 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:dc
Encl.