SEWER ANALYSIS
ARANTINE HILLS

PREPARED FOR:

41 CORPORATE PARK, SUITE 380
IRVINE, CA 92606
(949) 475-4110 · FAX (949) 475-4115

PREPARED BY:

AEI CASC CONSULTING

937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324
(909) 783-0101 • FAX (909) 783-0108

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EXHIBITS

I. INTRODUCTION

i. PURPOSE

The purpose of this Sewer Analysis and Flow Study is to determine the future demand which will be created by the Arantine Hills Specific Plan (Project). The analysis is intended to show the proposed flows and their impact as the Project joins the City of Corona (City) existing system.

ii. OBJECTIVE AND SCOPE

The objective of this Sewer Analysis is to evaluate the anticipated flows that will be generated from the proposed Arantine Hills Project. These flows will be added to the existing flows that have been identified within the 2005 Sewer Master Plan Report (Master Plan, see Exhibit 8) and December 27, 2007 Technical Memorandum (Memo) which are conveyed to Water Reclamation Facility Number 3 (WRF3, see Exhibit 9). A determination will be provided as to if existing facility upgrades will be required with the inclusion of the generated flows from the Project.

II. STUDY AREA

The proposed Project area known as Arantine Hills is located in the southeast corner of the City of Corona (see Vicinity Map in Exhibit 1). The site consists of nineteen (19) Planning Areas comprised of Residential, Commercial, Mixed-Use, Park, and Open Space Areas. A copy of the Land Use Plan is provided (see Exhibit 2). The flows generated by the Project will be conveyed to Water Reclamation Facility Number 3 (WRF3). This Sewer Analysis models each Planning Area according to the criteria provided in the Master Plan provided by the City of Corona.

III. DESIGN CRITERIA

For the proposed Project, the unit flow factors for average day sewer generation were determined from Table 4-2 of the 2005 Sewer Master Plan Report (see Exhibit 3). The peaking factor for this study is the same factor utilized in the Master Plan. The following equation was used to determine the dry peak flows:

$Q_{peak(cfs)} = 1.95 \times Q_{ave(cfs)}^{0.92}$

$Q_{ave(cfs)}$ = Average Dry Weather Flow

In order to take into account inflow and infiltration, Peak Wet Weather Flow (PWWF) was also calculated based on the larger of the following equations:

1. $PWWF = 2.6 \times Q_{ave}$, where
   PWWF = Peak Wet Weather Flow
   Q_{ave} = Average Dry Weather Flows
2. $PWWF = 1.265 \times Q_{PDry}$, where
   PWWF = Peak Wet Weather Flow
   Q_{PDry} = Peak Dry Weather Flows

The calculated Average Day Flows, Peak Dry Weather Flows, and Peak Wet Weather Flows for the Project per planning area and phase have been calculated (see the Arantine Hills Sewer Generation Flow Data in Exhibit 4).

Existing and future flows which will be treated at WRF3 were evaluated as part of the analysis. The flows from the Eagle Glen Development, El Cerrito Area, Crossings, Dos Lagos, Weirick Road, Arantine Hills, and offsite flows south of the Arantine Hills Project were analyzed.

- Eagle Glen Development:

  The existing average day flow for the area sewering to WRF3 from the Eagle Glen Development Area at MH43 is 0.7452 CFS. The peak dry weather flow is 1.49 CFS (see Appendix 2 from the Sewer Master Plan in Exhibit 8). Equation 1 generated the larger PWWF of 1.94 CFS.

- Dos Lagos and Weirick

  The future average daily flows from area development sewering to WRF3 from the south at MH41 are as follows:

  Dos Lagos = 0.3813 CFS

  Weirick Road = 0.1485 CFS

  See Table 6-1 and Figure 6-3 from the Sewer Master Plan, and Table 5 from the 2007 Technical Memorandum in Exhibit 9, and Average Flow Exhibit 11.

  The total flows at MH41 are Q_{ave} = 0.5298 CFS, Q_{pdry} = 1.14 CFS and Q_{pwet} = 1.44 CFS.

- El Cerrito Area and Crossings

  The average day future flows from area development sewering to WRF3 are as follows:

  El Cerrito = 0.144 CFS

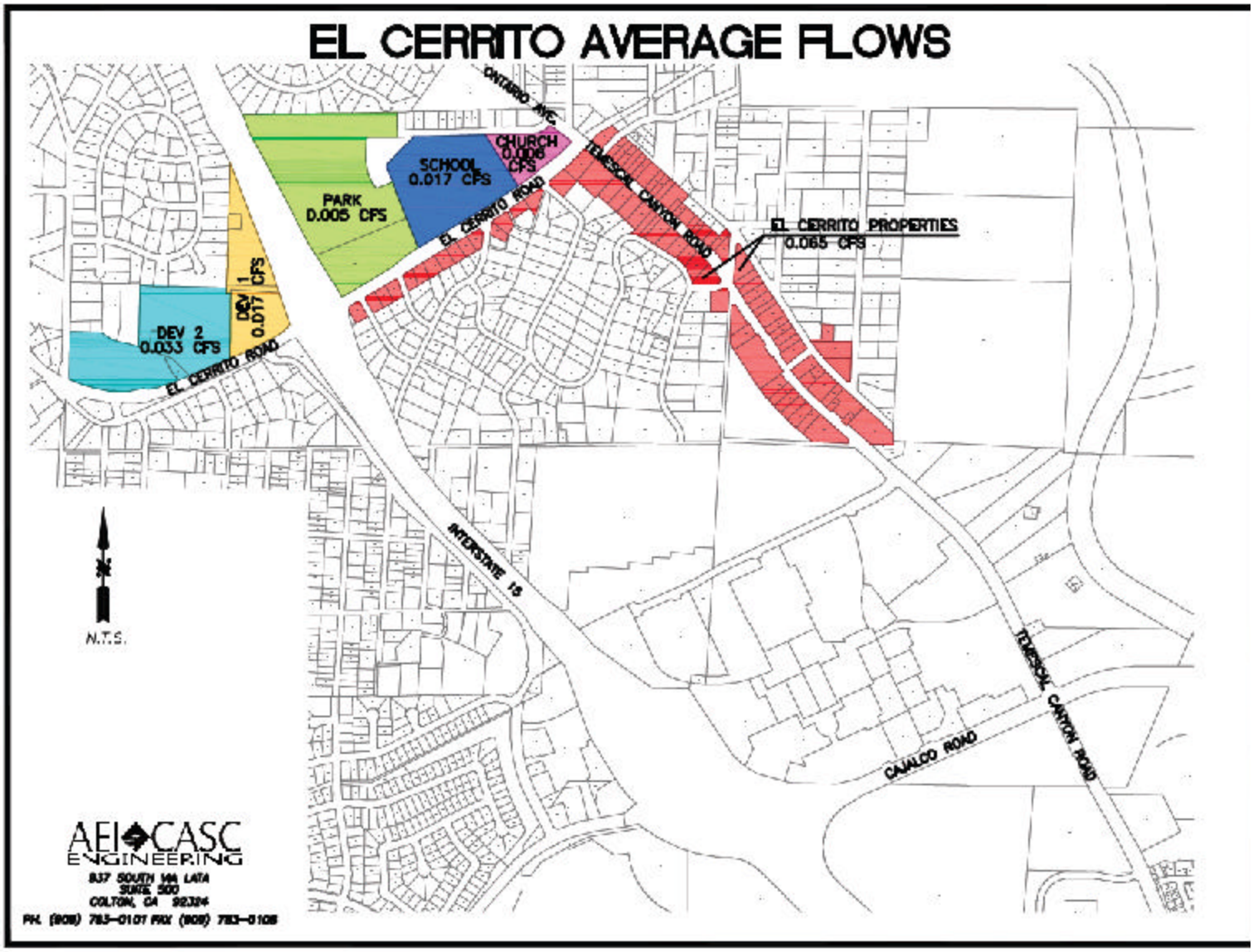
  Crossings (Parcel Map 29503) = 0.6574 CFS

  These numbers are based on sewer projections from existing studies and a city staff evaluation of entitled projects and areas in El Cerrito adjacent to existing sewer pipelines that are likely to develop prior to or during the period in which Arantine Hills is developed.

  Table 6-1 and Figures 6-1 and 6-3 from Corona's Sewer Master Plan and Table 5 from the City of Corona Wastewater Treatment Plants Capacity Requirements (AKM, December 27, 2007) are included in Exhibit 9 of this report. That report proposed sewer flows for El Cerrito in the area north of Cajalco Road to be 0.861 CFS or 0.556 MGD. A portion of those lands may be tributary to Corona's WRF2 to the north, some are not expected to connect until El Cerrito and Riverside County develop a community service plan to be implemented as existing septic systems fail and the study may not fully reflect flows generated from the current land use designations in the Crossings. After evaluating these issues, City staff proposed that a flow of 0.144 CFS be used for

the El Cerrito Area (see table following this section). The Crossings flows are taken from the sewer routing study prepared for Parcel Map 29503.

The city is currently re-evaluating its ultimate sewer capacity resulting from land use changes for the WRF3 services area and the service area of its water reclamation facilities. While that study may recommend changes in flows to WRF3, they are not expected to be significant. The city will address those changes as conditions of development occurring after Arantine Hills Project. The following development areas have been included for the El Cerrito area sewer flows:



El Cerrito Development Flows

Description	Area of Dev. (Ac)	Land Use	Sewer Flow Factor (gpd/Ac)	Sewer Flow (gpd) (1)	Sewer Flow (cfs) (1)	Peak Dry Sewer Flow (CFS)(2)	Peak Wet Weather Flow (CFS)(3)	Peak Wet Weather Flow (CFS)(4)
El Cerrito Sports Park	27	Open space recreational	130	3510	0.005	0.015	0.013	0.019
El Cerrito School	14	School	800	11200	0.017	0.0459	0.0442	0.0581
Future Development 1	9	Low/Medium density residential	1200	10800	0.017	0.0459	0.0442	0.0581
Future Development 2	18	Low medium density residential	1200	21600	0.033	0.0845	0.0858	0.1069
Olive Branch Church	4	General Community Commercial	1000	4000	0.006	0.0176	0.0156	0.0223
El Cerrito Residential	35	Low medium density residential	1200	42000	0.065	0.1577	0.169	0.1995
				Total	**0.144**	**0.3666**	**0.3718**	**0.4639**

(1) Average Day Flow (Q_A)

(2) $Q_{pdry} = 1.95 \times Q_A^{(0.92)}$

(3) Peak Wet Weather Flow=$2.6 \times Q_A$

(4) Peak Wet Weather Flow=$1.265 \times QP_{dry}$

A portion of the average daily flow for El Cerrito of 0.144 CFS as calculated above, and separate flow of 0.6574 CFS for the Crossings (per the Sewer Routing Study of Parcel Map No. 29503), have been included in the analysis. The City anticipates the flows from El Cerrito East, Eagle Valley, and Eagle Valley East will have a separate connection to WRF3 and will not tie into the existing sewer line in Temescal Canyon Road. Therefore, these areas were not included as part of the analysis.

The total flows for El Cerrito are Q_{ave} = 0.144 CFS, Q_{pdry} = 0.3666 CFS, and Q_{pwet} = 0.4639 CFS were input into the model at MH27.

The Crossings (PM29503) Development was divided into two (2) areas. It was estimated that half of the flows entered the system at MH43 and MH27 in Cajalco Road. The split flow for the crossings Q_{ave} = 0.3287 CFS, Q_{pdry} = 0.7006 CFS, and Q_{pwet} = 0.8863 CFS.

The total flows from El Cerrito and The Crossings at MH27 are Q_{ave} = 0.4727 CFS, Q_{pdry} = 1.0672 CFS and Q_{pwet} = 1.3502 CFS.

The total flows from the Eagle Glen Development and Crossings at MH43 are Q_{ave} = 1.0739 CFS, Q_{pdry} = 2.1906 CFS, and Q_{pwet} = 2.8263 CFS.

Flows from future Tract 33583 westerly of Eagle Glen Golf Course have not been included in the analysis. Per discussions with the City, no formal application for this tract has been submitted so there is no indication that the project is moving forward.

- Arantine Hills and Southerly Offsite area

  The future average daily flows from the Arantine Hills Project including APN 282-040-003, a 160 acre property south easterly of the Project, are as follows:

  Arantine Hills = 0.657 CFS (See Exhibit 4)

  Off Site Area = 0.297 CFS (The offsite flows were calculated based on an area of 160 acres and an ultimate flow factor of 1200 gpd/acre).

  The total flows from the Project are Q_{ave} = 0.954 CFS, Q_{pdry} = 2.24 CFS and Q_{pwet} = 2.83 CFS.

  A flow diagram has been provided showing how the flows enter the system for evaluation of WRF3 (See average day flow diagram Exhibit 10).

Flows from future Tract 33583 westerly of Eagle Glen Golf Course have not been included in the analysis. Per discussions with the City, no formal application for this tract has been submitted so there is no indication that the project is moving forward.

Using the sewer design criteria established by the Master Plan Report, a sewer hydraulic analysis was conducted for average day flows for the proposed Project.

Proposed manholes and sewer pipes were set along the backbone roads of the development (see Exhibit 5). Generated flows based on land use were used to run the hydraulic analyses for average day flows. A minimum of 8" diameter pipes were utilized for the Project (see Exhibit 6).

In addition, the system was analyzed for peak Dry Weather flows and Wet Weather flows using the peaking equations as previously described. By utilizing the peak flows, the system was analyzed to ensure it has the ability to convey the generated flows (see Exhibit 7).
The design capacity of the proposed sewer pipelines is based on Mannings equation:

$$Q = \frac{1.486\ AR^{2/3}\ S^{1/2}}{n}$$

A friction factor of 0.013 was utilized per the DWP Design Policy.

The criteria for the depth to diameter ratio (d/D) for pipes is as follows:

- Ex. 12" pipe diameter and smaller: d/D ratio of 0.64 or less at peak dry weather flow
- New 12" pipe diameter and smaller: d/D ratio of 0.50 or less at peak dry weather flow
- Ex. 15" pipe diameter and larger: d/D ratio of 0.67 or less at peak dry weather flow
- New 15" pipe diameter and larger: d/D ratio of 0.67 or less at peak dry weather flow

- New 8" pipe diameter and larger: d/D ratio of less than 0.82 at peak wet weather flows

By limiting the full flow capacity of the pipe, it allows for the possibility of the flows being greater than anticipated during peak flow times and during rain events if inflow occurs.

The City's design criteria for minimum sewer pipe slope is 0.004 feet per foot (0.40%) for 8" pipe. The City recommends the velocity of flow should be at least 2 feet per second to allow for cleaning velocity of the pipe. This will help prevent solids from being deposited in the pipes. If the velocity of 2 feet per second cannot be achieved, a minimum 1 percent pipe slope will be required.

As a general guideline based on pipes flowing half full (0.5) for 12" diameter and smaller and two thirds full (0.67) for 15" diameter and larger, minimum slopes used to determine the feasibility of the system are as follows:

Pipe Diameter (inches)	Minimum Slope (ft/ft)
8	0.0040
10	0.0025
12	0.0020
15	0.0012
18	0.0010
21	0.008
24	0.0007

Due to the natural terrain of the site and location of the Bedford Canyon Wash, a lift station will be required to serve Planning Area 16. Options to gravity sewer under the wash and tie into proposed sewer in PA 15 are undesirable due to the excessive depth that would be required (up to 75 feet). Another option would be a sewer bridge across the wash from PA 16 to PA 15. About 80 feet of the span would be at a 2:1 slope in order to daylight on PA 15. This also would be an undesirable option. A third option providing an alternative route for the sewer out of PA 16 would include crossing the I-15 freeway and tying into the existing sewer system in Lakeshore Drive within the Dos Lagos development. The City determined there is no additional capacity in the existing tributary sewer so this option will not be pursued.

It is anticipated that the lift station will consist of a wet well with two (2) sliderail submersible pumps. The pumps are rated at 175 GPM at 76 TDH. The force main from the pumps to the upstream manhole is 4" in diameter. The flows will be pumped to the proposed sewer line in Street "E" where they will enter the gravity flow system.

IV. RESULTS

Hydraulic analyses were provided for three (3) scenarios using the flow data described above. The first scenario was the average day flows. This provided the base that included the existing flows including average day flows for proposed and future development.

The second scenario was the dry weather peak flows. The Project flows were peaked according to the design criteria provided.

The third scenario was the wet weather peak flows. The Project flows were peaked according to the design criteria provided (see Average and Peak Flow in Exhibit 11).

The hydraulic analyses indicate various sizes of sewer pipe ranging from 8" to 21" diameter will be required to convey generated sewer flows to WRF3. The pipes were sized to meet the required d/D ratio, minimum pipe slopes and minimum velocity requirements.

The d/D ratio varied depending on the scenario run. The peak dry and peak wet weather scenarios were compared and the scenario requiring the larger pipe sizes was used in determining future pipe sizes (see Existing And Proposed Sewer Pipe Line Exhibit in Exhibit 12).

The analyses also show a decrease in flows in some of the pipes. These minor losses are due to attenuation as the flows move down stream.

The average day sewer generation for the Project is 0.95 CFS (this includes the off-site sewer from APN 282-020-012), the peak dry flow is 2.24 CFS, and the worst case wet peak flow is 2.83 CFS (see Exhibit 4).

The average day sewer generation to WRF3 is 2.88 CFS, the peak dry flow is 6.30 CFS, and the peak wet flow is 8.04 CFS (see Pipe Reports in Exhibit 6 and 7).

V. PHASING

The Project consists of four phases of development. A copy of the proposed phasing is provided (see Exhibit 13). Phase 1 development consists of PA's 6 through 14 and 17 through 19.

The hydraulic analysis scenario for Phase 1 was run using same size pipes for the Arnatine peak wet flow analysis with the exception of holding the existing pipe sizes for the lines in Cajalco Road and Temescal Canyon Road and eliminating pipes not required for Phase 1. The analysis indicated that the pipes in Cajalco road and Temescal Canyon Road did not have enough capacity.

The hydraulic analysis scenario was re-run upsizing the pipes in Cajalco Road and Temescal Canyon Road as needed for the wet peak flow analysis. The total flow at WRF3 is 6.9 CFS (4.5 MGD). See Exhibit 14.

Phase 1 development will require the construction of proposed 8" sewer lines in Street "B" east of PA 4 and 5 easterly to Street "A", 8" sewer line east to the northern Project boundary, 8" sewer through PA 7,10,11,13, and 15, 12" sewer through PA 15, and the offsite sewer north easterly to Cajalco Road, upsized 18" sewer to Temescal Canyon Road, and upsized 21" sewer to WRF3. The upgrades to WRF3 and existing pipe lines to meet the sewer demands are required as part of Phase 1 construction. See Exhibit 13. No additional improvements required to WRF3.

Phase 2 development consists of the addition of PA 15 flows to the analysis. The analysis is the same as Phase 1 with the addition of peak wet flows for PA 15 (0.20 CFS). The total flow with the addition of PA 15 at WRF3 is 7.09 CFS (4.5 MGD). See Exhibit 14. Phase 2

development does not require the construction of additional back bone sewer. The required sewer will be constructed with Phase 1. No additional improvements to WRF3 are required.

Phase 3 development consists of the addition of PA 1 through 5 and the off-site flows from the southerly parcels. The hydraulic analysis scenario was run using the same analysis as the Project wet weather peak flows with the elimination of the lift station in PA 16. The total flow at WRF3 is 8.03 CFS (5.2 MGD) See Exhibit 14. Phase 3 development will require the construction of 8" sewer from the end of the cul-de-sac in Street "B" east to connect to the sewer built with Phase 1 at the boundary of PA 4 and 5, and additional improvements to WRF3 are required.

Phase 4 development consists of the addition of PA 16. The hydraulic analysis is the same as the Project dry weather peak flow analysis. The total flow at WRF3 is 8.04 CFS (5.2 MGD). See Exhibit 7. Phase 4 development will require the construction of a lift station with 2 pumps.

WRF3 currently treats approximately 0.54 MGD and the capacity is 1.0 MGD per the December 27, 2007 technical memorandum.

The Arantine Hills project will be adding an average daily flow of 0.62 MGD. Phase 1 will add approximately 0.229 MGD, Phase 2 which includes Phase 1, will add approximately 0.269 MGD, Phase 3, which includes Phase 1 and 2, will add approximately 0.522 MGD and Phase 4 which includes all phases of the project will add approximately 0.62 MGD. When analyzing the project flow contributions only, Phase 1 and Phase 2 would add approximately 0.269 MGD to the current 0.54 MGD for a total of 0.81 MGD.

This is less than the 1.0 MGD capacity of WRF3. Once Phase 3 is completed, approximately 0.522 MGD would be added to the current flows of 0.54 MGD for a total of 1.06 MGD at WRF3. This exceeds the current capacity of 1.0 MGD at WRF3. Therefore, upgrades to WRF3 will be required prior to construction of Phase 3.

VI. CONCLUSION

The sewer analyses for Arantine Hills Project provides detail as to the amount of sewer being generated for average and peak flows, existing and future flow routing through proposed projects and downstream sewers, recommendations for project sewer design parameters (pipe size, slope and area served by lift station), paralleling existing sewers where required and an estimate of cumulative flows at Water Reclamation Facility No. 3.

Development of the project will generate average daily flows of 0.62 MGD. Sewer pipelines within Arantine Hills will range between 8 and 12 inch to meet the City of Corona's design criteria. A lift station will be required to serve the southeasterly portion of the project along the I-15, referred to as PA 16. Average day flows from the project along with the existing flows from Eagle Glen, Crossings, El Cerrito, Dos Lagos and Weirick total approximately 1.93 MGD. As a result, portions of the existing 15 inch diameter pipelines in Cajalco Road and Temescal Canyon Road would need to be paralleled with 18 inch and 21 inch pipelines, respectively. During final engineering and as development occurs, additional sewer studies may be provided that finalize the size and location of potential parallel pipelines in Cajalco Road and Temescal Canyon Road. If the existing sewer lines remain in use, the proposed sizes identified in this report may be able to be downsized.

Water Reclamation Facility No. 3 has a rated capacity of 1.0 MGD. Average day sewer flows considered by this report that are tributary to WRF3 which will total approximately 1.93 MGD, will require the plant be expanded by 1.0 MGD to a capacity of 2.0 MGD in the future.

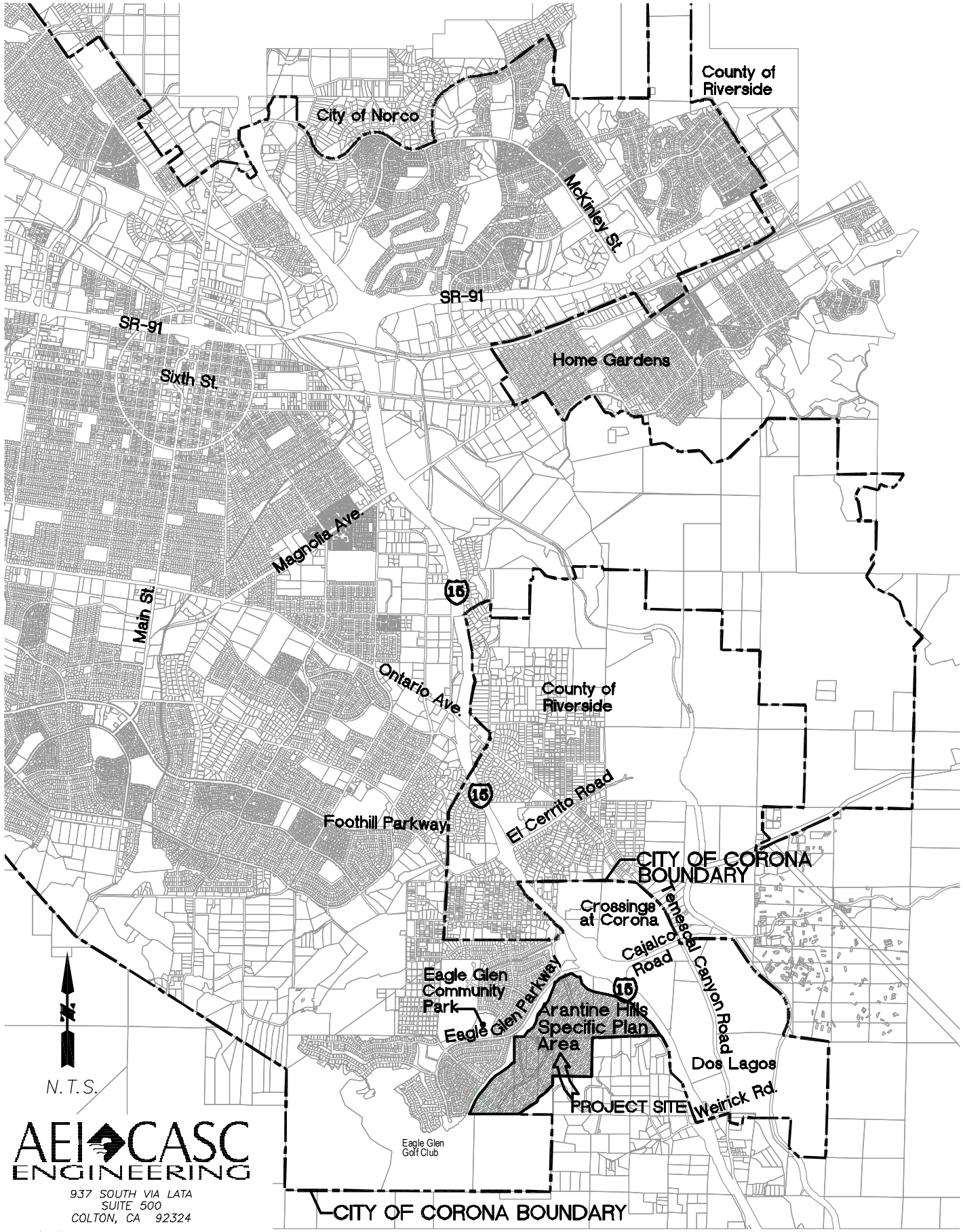
VII. REFERENCES

1. City of Corona Sewer Master Plan (September 2005)
2. City of Corona Wastewater Treatment Plants Capacity Requirements Technical Memorandum (December 27, 2007)
3. Revised Sewer Routing Study of Parcel Map 29503 Phases I-IX (July 29, 2002)

EXHIBITS

EXHIBIT 1: VICINITY MAP

Vicinity Map



AEI CASC ENGINEERING

937 SOUTH VIA LATA
SUITE 500
COLTON, CA 92324

PH. (909) 783-0101 FAX (909) 783-0108

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EXHIBIT 2: ARANTINE HILLS SEWER ANALYSIS – LAND USE PLAN

BLUESTONE COMMUNITIES

EXHIBIT 2: LAND USE PLAN

Land Use	Acreage	Dwelling Units
General Commercial (GC)	38.3	-
Mixed Use I (MU-I, Comm./Res.)	19.9	451
Mixed Use II (MU-II, Indus./Comm.)	18.6	-
High Density Residential (HDR)	34.5	621
Medium Density Residential (MDR)	65.9	461
Low Density Residential (LDR)	29.2	88
Parks (P)	15.0	-
Open Space (OS)	36.9	-
Master Planned Roadways	16.5	-
TOTAL:	274.8	1,621*

* If Planning Area 16 is developed with age-qualified units at up to 25 du/ac, the total number of dwelling units would increase to 1,806.

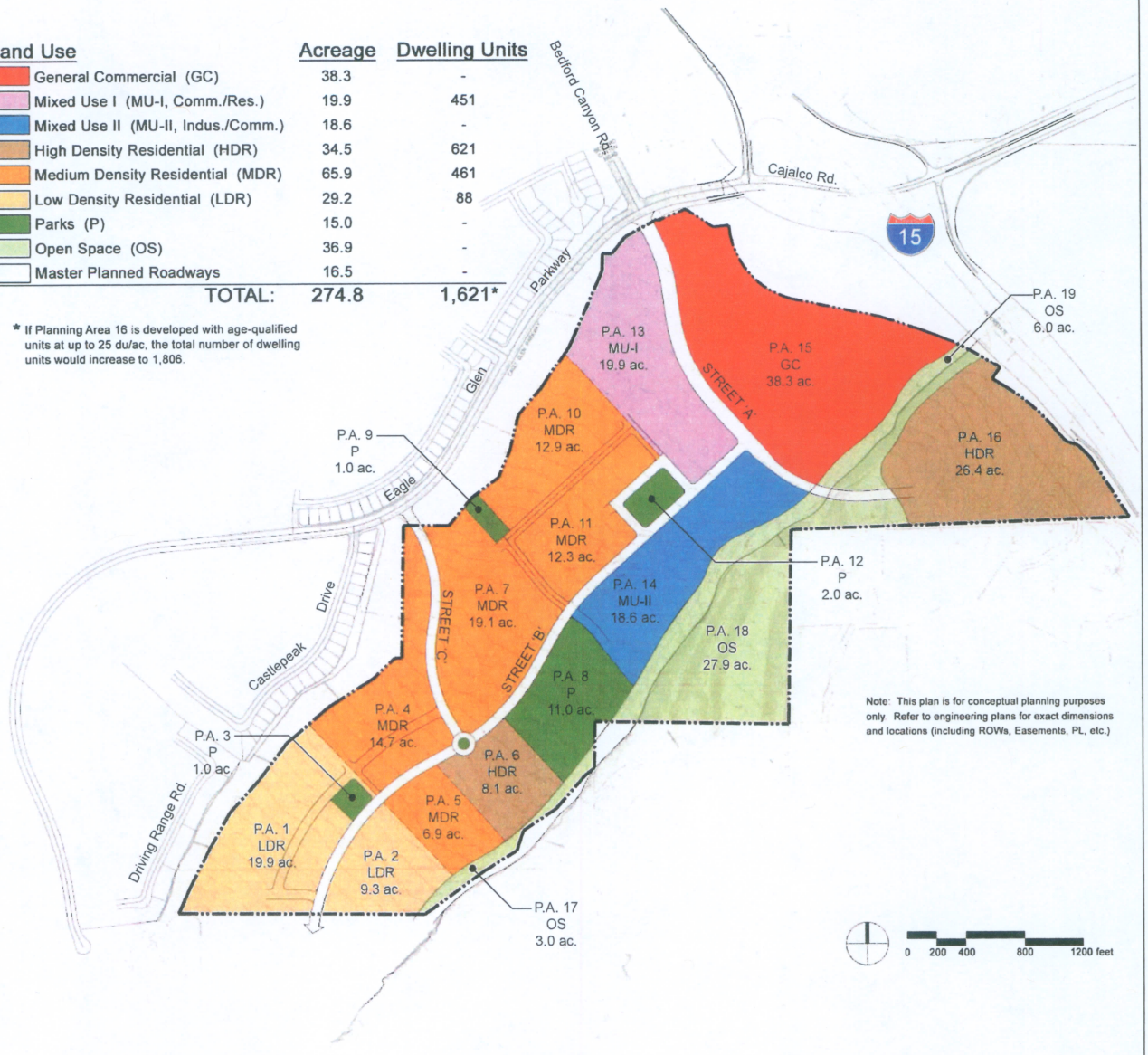


EXHIBIT 3: UNIT FLOW FACTORS

Table 4-2
Unit Flow Factors

Land Use		*Existing Unit Flow Factor (gpd/ac)	*Ultimate Unit Flow Factor (gpd/ac)	Residential Flow Factors (gpd/du)
RR1	Rural Residential 1 (0.2 to 0.5 du/ac)	150	150	300
RR2	Rural Residential 2 (1 du/ac)	300	300	300
E	Residential Estate (1-3 du/ac)	500	500	300
LDR	Residential Low Density (3-6 du/ac)	1,000	1,000	270
LMDR	Low Medium Density (6-8 du/ac)	1,200	1,200	270
MDR	Medium Density (6-15 du/ac)	1,700	1,700	240
HDR	High Density (15-36 du/ac)	2,000	2,000	200
CBD	Commercial Business District	1,000	1,050	-
C or GCC	General Community Commercial	1,000	1,050	-
CP or OP	Office Professional	1,200	1,260	-
GI	General Industrial	1,100	1,155	-
LI	Light Industrial	800	840	-
I or School	Institutional	800	800	-
OS-R or OS-P	Open Space Recreational	130	130	-
QP or MU	Quasi-Public / Mixed Use	700	700	-

**Unit flow factors based on gross acres*

4-4 Peaking Factors

The wastewater unit flow factors discussed in Sub-section 4-3 are used to generate average dry weather flows (ADWF) entering the collection system. However, the adequacy of a sewage collection system is based upon its ability to convey the peak flows. At any individual point in the system, peak dry weather flow (PDWF) is estimated by converting the total average flow upstream of the point in question to peak dry weather flow by an empirical peak-to-average relationship.

The peaking formula commonly used in sewerage studies is of the following form:

$Q_{peak} = a\ Q_{ave}^{\ b}$

where Q_{peak} = Peak Dry Weather Flow
Q_{ave} = Average Dry Weather Flow
a, b = Peaking Formula Coefficients

The temporary flow monitoring data was reviewed to develop peaking relationships at each site. As expected, these relationships varied from site to site depending upon the makeup and size of the tributary land use. Several diurnal curves were developed for each of the (11) flow monitoring sites. Average hourly flows for each hour of the day at each of the sites were used to produce diurnal curves for each day of the week as well as composite diurnal curves for the weekend and weekday. Figures 4-2, 4-3 and 4-4 illustrate the citywide flow monitoring site and composite weekday, weekend, and overall diurnal curves. These figures all indicate the expected peaks and epitomize a typical diurnal curve. The highest peak occurs during the morning hours with another peak occurring in the evening. While peaking factors at the different sites ranged from 1.5 to 2.2 the overall composite factors were between 1.8 and 1.9.

EXHIBIT 4: ARANTINE HILLS SEWER GENERATION FLOW DATA

ARANTINE HILLS - SEWER GENERATION

PLANNING AREA FLOWS

Planning Area	Phase	Land Use	Acres (ac)	Density (du/ac)	Residential Flow Factors (gpd/du)	Ultimate Flow Factor (gpd/ac)	Dwelling Units (du)	Ave Day Generated Flows (gpd)	Ave Day Generated Flows (cfs)	Peak Dry Flows * (cfs)	Peak Wet Flows ** (cfs)	Peak Wet Flows *** (cfs)
1	3	Low Density Residential	19.9	3 to 6	270	-	60	16,200	0.025	0.066	0.065	0.083
2	3	Low Density Residential	9.3	3 to 6	270	-	28	7,560	0.012	0.033	0.030	0.041
3	3	Park	1.0	-	-	130	-	130	0.000	0.001	0.001	0.001
4	3	Medium Density Residential	14.7	6 to 15	240	-	103	24,720	0.038	0.097	0.099	0.122
5	3	Medium Density Residential	6.9	6 to 15	240	-	48	11,520	0.018	0.048	0.046	0.061
6	1	High Density Residential	8.1	15 to 36	200	-	146	29,200	0.045	0.113	0.117	0.143
7	1	Medium Density Residential	19.1	6 to 15	240	-	134	32,160	0.050	0.123	0.129	0.156
8	1	Park	11.0	-	-	130	-	1,430	0.002	0.007	0.006	0.009
9	1	Park	1.0	-	-	130	-	130	0.000	0.001	0.001	0.001
10	1	Medium Density Residential	12.9	6 to 15	240	-	90	21,600	0.033	0.086	0.087	0.108
11	1	Medium Density Residential	12.3	6 to 15	240	-	86	20,640	0.032	0.082	0.083	0.104
12	1	Park	2.0	-	-	130	-	260	0.000	0.001	0.001	0.002
13	1	Mixed Use I	19.9	-	-	-	-	-	-	-	-	-
13	1	HDR	12.9	25 to 40	200		451	90,200	0.140	0.319	0.363	0.403
13	1	General Commercial	7.0			1,050	-	7,350	0.011	0.032	0.030	0.040
14	1	Mixed Use II	18.6	-	-	1,155	-	21,483	0.033	0.085	0.086	0.108
15	2	General Commercial	38.3	-	-	1,050	-	40,215	0.062	0.152	0.162	0.192
16	4	High Density Residential	26.4	15 to 36	200	-	475	95,000	0.147	0.334	0.382	0.423
17	1	Open Space	3.0	-	-	130	-	390	0.001	0.002	0.002	0.003
18	1	Open Space	27.9	-	-	130	-	3,627	0.006	0.017	0.015	0.021
19	1	Open Space	6.0	-	-	130	-	780	0.001	0.004	0.003	0.005
-	-	Master Planned Roadways	16.5	-	-	-	-	-	-	-	-	-
		SUBTOTAL	**294.7**	-	-	-		**424,595**	**0.657**	**1.601**	**1.708**	**2.025**
Offsite Flows(APN 282-040-003	3	Low Density Residential	160.0	-	-	1,200	-	192,000	0.297	0.638	0.772	0.808
		TOTAL	**454.7**	-	-	-		**616,595**	**0.954**	**2.239**	**2.480**	**2.832**

* Peak Dry Weather flows are determined by using the following relationship: $Q_{peak}(cfs)=1.95 \times Q_{ave}(cfs)^{0.92}$

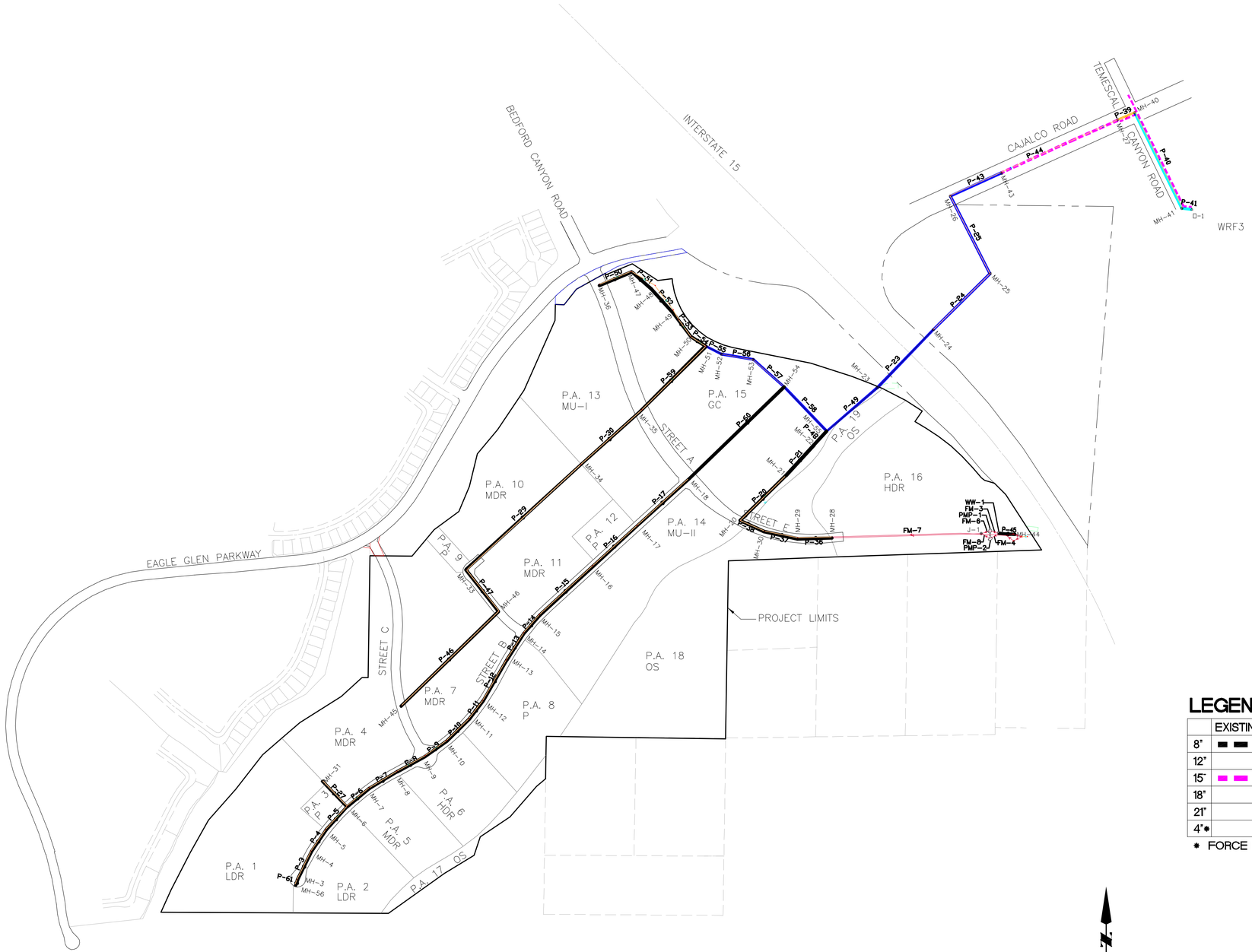
**Peak Wet Weather flows are determined by using the following relationship: $Q_{peak}(cfs)=2.6 \times Q_{ave}(cfs)$

***Peak Wet Weather flows are determined by using the following relationship: $Q_{peak}(cfs)=1.265 \times Q_{peakdry}(cfs)$

Planning Area 16 Pump Station Requirement is 0.42 cfs

EXHIBIT 5: HYDRAULIC ANALYSIS MANHOLE AND PIPE SITE LAYOUT

ARANTINE HILLS SEWER ANALYSIS
PIPE AND MANHOLE EXHIBIT



LEGEND:

	EXISTING SEWER	PROPOSED SEWER
8"		
12"		
15"		
18"		
21"		
4"*		

* FORCE MAIN

GRAPHIC SCALE
400' 0 200' 400' 800'
SCALE=1"=400'

AEI CASC ENGINEERING
937 SOUTH VIA LATA
SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

EXHIBIT 5

EXHIBIT 6: HYDRAULIC ANALYSIS RESULTS – AVERAGE DAY FLOWS

Sewer Average Day Manhole Report

Label	Rim Elevation (ft)	Invert In Elevation 1 (ft)	Known Flow (cfs)	Total Flow (cfs)
MH-3	1,101.38	1,093.38	0	0.3
MH-4	1,092.00	1,084.00	0	0.3
MH-5	1,084.00	1,076.00	0	0.3
MH-6	1,075.00	1,064.00	0.0117	0.337
MH-7	1,066.70	1,058.70	0	0.337
MH-8	1,056.30	1,048.30	0.0178	0.3548
MH-9	1,046.90	1,038.90	0.0452	0.4
MH-10	1,039.00	1,031.00	0	0.4
MH-11	1,029.60	1,021.60	0.0006	0.4006
MH-12	1,023.50	1,015.50	0	0.4006
MH-13	1,010.20	1,002.20	0.0022	0.4028
MH-14	1,001.10	993.1	0	0.4028
MH-15	994.5	986.5	0	0.4028
MH-16	974	966	0	0.4028
MH-17	957	949	0.0393	0.4421
MH-18	942	934	0	0.4421
MH-20	950	941	0	0.2121
MH-21	926	918	0	0.1519
MH-22	910	902	0	0.126
MH-23	897	889	0	0.8842
MH-24	877	869	0	0.8625
MH-25	862	852	0	0.8465
MH-26	860.5	840.5	0	0.832
MH-27	814	798.18	0.4727	2.3627
MH-28	985	977	0	0.3519
MH-29	975	967	0	0.297
MH-30	960	952	0	0.2576
MH-31	1,073.70	N/A	0.0253	0.0253
MH-33	997	989	0.05	0.0882
MH-34	956.3	948.3	0.0654	0.1536
MH-35	938	930	0	0.1536
MH-36	931	N/A	0.151	0.151
MH-40	811	797.28	0	2.3616
MH-41	808.6	794.65	0.5298	2.8841
MH-43	843	823	1.07	1.8978
MH-44	935	N/A	0.15	0.15
MH-45	1,043.00	N/A	0.0382	0.0382
MH-46	999	991.4	0	0.0382
MH-47	917	909	0	0.151
MH-48	916	906	0	0.151
MH-49	916	903.3	0	0.151
MH-50	916	900.9	0	0.151
MH-51	917	899.5	0	0.3046
MH-52	912	898.5	0	0.3046
MH-53	910	897.5	0	0.3046
MH-54	909	894.7	0	0.7467
MH-55	908	891.96	0.0622	0.8949
MH-56	1,101.00	N/A	0.3	0.3

Sewer Average Day Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-3	MH-3	MH-4	1,093.38	1,084.00	0.040085	234	8 inch	0.3	2.4193	0.013	4.72	23.8
P-4	MH-4	MH-5	1,084.00	1,076.00	0.042105	190	8 inch	0.3	2.4795	0.013	4.8	23.5
P-5	MH-5	MH-6	1,076.00	1,064.00	0.052402	229	8 inch	0.3	2.7661	0.013	5.19	22.2
P-6	MH-6	MH-7	1,064.00	1,058.70	0.024537	216	8 inch	0.337	1.8928	0.013	4.1	28.6
P-7	MH-7	MH-8	1,058.70	1,048.30	0.043697	238	8 inch	0.337	2.5259	0.013	5.03	24.7
P-8	MH-8	MH-9	1,048.30	1,038.90	0.040517	232	8 inch	0.3548	2.4323	0.013	4.97	25.8
P-9	MH-9	MH-10	1,038.90	1,031.00	0.040102	197	8 inch	0.4	2.4198	0.013	5.13	27.5
P-10	MH-10	MH-11	1,031.00	1,021.60	0.040517	232	8 inch	0.4	2.4323	0.013	5.15	27.4
P-11	MH-11	MH-12	1,021.60	1,015.50	0.03631	168	8 inch	0.4006	2.3025	0.013	4.95	28.2
P-12	MH-12	MH-13	1,015.50	1,002.20	0.038551	345	8 inch	0.4006	2.3725	0.013	5.06	27.8
P-13	MH-13	MH-14	1,002.20	993.1	0.039224	232	8 inch	0.4028	2.3931	0.013	5.1	27.8
P-14	MH-14	MH-15	993.1	986.5	0.036872	179	8 inch	0.4028	2.3203	0.013	4.99	28.2
P-15	MH-15	MH-16	986.5	966	0.038534	532	8 inch	0.4028	2.372	0.013	5.06	27.9
P-16	MH-16	MH-17	966	949	0.038636	440	8 inch	0.4028	2.3751	0.013	5.07	27.9
P-17	MH-17	MH-18	949	934	0.029014	517	8 inch	0.4421	2.0582	0.013	4.7	31.5
P-20	MH-20	MH-21	941	918	0.046939	490	8 inch	0.2121	2.6179	0.013	4.51	19.2
P-21	MH-21	MH-22	918	902	0.052288	306	8 inch	0.1519	2.7631	0.013	4.24	15.9
P-23	MH-23	MH-24	889	869	0.033389	599	12 inch	0.8842	6.5098	0.013	5.79	24.9
P-24	MH-24	MH-25	869	852	0.028961	587	12 inch	0.8625	6.0628	0.013	5.47	25.5
P-25	MH-25	MH-26	852	840.5	0.017969	640	12 inch	0.8465	4.7756	0.013	4.59	28.5
P-27	MH-31	MH-6	1,066.50	1,064.00	0.009579	261	8 inch	0.0253	1.1826	0.013	1.37	10.1
P-29	MH-33	MH-34	989	948.3	0.035546	1,145.00	8 inch	0.0882	2.2782	0.013	3.15	13.4
P-30	MH-34	MH-35	948.3	930	0.031771	576	8 inch	0.1536	2.1538	0.013	3.57	18.1
P-36	MH-28	MH-29	977	967	0.03937	254	8 inch	0.3519	2.3976	0.013	4.91	25.9
P-37	MH-29	MH-30	967	952	0.06	250	8 inch	0.297	2.9598	0.013	5.43	21.4
P-38	MH-30	MH-20	952	941	0.038596	285	8 inch	0.2576	2.3739	0.013	4.45	22.2
P-39	MH-27	MH-40	798.18	797.28	0.006429	140	15 inch	2.3627	5.1791	0.013	4.12	47.4
P-40	MH-40	MH-41	797.28	794.65	0.003259	807	15 inch	2.3616	3.6875	0.013	3.19	58.2
P-41	MH-41	O-1	794.65	794.46	0.003958	48	15 inch	2.8841	4.064	0.013	3.59	62.2
P-43	MH-26	MH-43	840.5	823	0.042373	413	12 inch	0.832	7.3335	0.013	6.19	22.7
P-44	MH-43	MH-27	823	798.18	0.026688	930	15 inch	1.8978	10.5525	0.013	6.51	28.7
P-45	MH-44	WW-1	927.5	922.5	0.043103	116	8 inch	0.15	2.5087	0.013	3.95	16.6

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-46	MH-45	MH-46	1,035.50	991.4	0.044144	999	8 inch	0.0382	2.5388	0.013	2.64	8.6
P-47	MH-46	MH-33	991.4	989	0.006154	390	8 inch	0.0382	0.9479	0.013	1.33	13.7
P-48	MH-22	MH-55	902	891.96	0.023458	428	8 inch	0.126	1.8507	0.013	3.03	17.7
P-49	MH-55	MH-23	891.96	889	0.015179	195	12 inch	0.8949	4.3893	0.013	4.39	30.6
P-50	MH-36	MH-47	924	909	0.057915	259	8 inch	0.151	2.908	0.013	4.39	15.5
P-51	MH-47	MH-48	909	906	0.015957	188	8 inch	0.151	1.5264	0.013	2.79	21.2
P-52	MH-48	MH-49	906	903.3	0.011111	243	8 inch	0.151	1.2737	0.013	2.45	23.2
P-53	MH-49	MH-50	903.3	900.9	0.011111	216	8 inch	0.151	1.2737	0.013	2.45	23.2
P-54	MH-50	MH-51	900.9	899.5	0.011111	126	8 inch	0.151	1.2737	0.013	2.45	23.2
P-55	MH-51	MH-52	899.5	898.5	0.005435	184	8 inch	0.3046	0.8908	0.013	2.31	40.3
P-56	MH-52	MH-53	898.5	897.5	0.004926	203	8 inch	0.3046	0.8481	0.013	2.23	41.4
P-57	MH-53	MH-54	897.5	894.7	0.007125	393	8 inch	0.3046	1.0199	0.013	2.55	37.5
P-58	MH-54	MH-55	894.7	891.96	0.007008	391	12 inch	0.7467	2.9823	0.013	3.16	34.1
P-59	MH-35	MH-51	930	899.5	0.045252	674	8 inch	0.1536	2.5705	0.013	4.05	16.6
P-60	MH-18	MH-54	934	894.7	0.033418	1,176.00	8 inch	0.4421	2.2089	0.013	4.94	30.3
P-61	MH-56	MH-3	1,094.00	1,093.38	0.017714	35	8 inch	0.3	1.6082	0.013	3.53	29.3

Sewer Average Day Pump Report

Label	To Pipe	Ground Elevation (ft)	Pump Type	Shutoff Head (ft)	Shutoff Discharge (gpm)	Design Head (ft)	Design Discharge (gpm)	Maximum Operating Discharge (gpm)	Maximum Operating Head (ft)	Initial Relative Speed Factor	Control Status	Pressure Flow (gpm)	Intake Pump Pressure (psi)	Discharge Pump Pressure (psi)	Pump Head (ft)
PMP-1	FM-6	913	Standard (3 Point)	100	0	76	175	200	75	1	On	79.11	-0.13	34.99	81.17
PMP-2	FM-8	913	Standard (3 Point)	100	0	76	175	200	75	1	On	78.85	-0.13	35	81.19

Sewer Average Day Force Main Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)
FM-3	WW-1	911.5	PMP-1	913	10	4	Ductile Iron	4	79.11	2.02	0.29
FM-4	WW-1	911.5	PMP-2	913	10	4	Ductile Iron	4	78.85	2.01	0.3
FM-6	PMP-1	913	J-1	947	10	4	Ductile Iron	4	79.11	2.02	0.29
FM-7	J-1	947	MH-28	977	1,134.00	4	Ductile Iron	4	157.96	4.03	16.26
FM-8	PMP-2	913	J-1	947	10	4	Ductile Iron	4	78.85	2.01	0.3

Sewer Average Day Wet Well Report

Label	Ground Elevation (ft)	Base Elevation (ft)	Minimum Elevation (ft)	Initial Elevation (ft)	Alarm Elevation (ft)	Maximum Elevation (ft)	Average Area (ft^2)	Known Flow (cfs)	Total Flow (cfs)	Forcemain Discharge (gpm)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)
WW-1	930	910	911.5	913	922.8	930	700	0	0.15	90.64	913	913	0

EXHIBIT 7: HYDRAULIC ANALYSIS RESULTS – PEAK FLOWS (WET AND DRY)

Sewer Peak Dry Weather Manhole Report

Label	Rim Elevation (ft)	Invert In Elevation 1 (ft)	Known Flow (cfs)	Total Flow (cfs)
MH-3	1101.38	1093.38	0	0.62
MH-4	1092.00	1084.00	0	0.62
MH-5	1084.00	1076.00	0	0.62
MH-6	1075.00	1064.00	0.03	0.72
MH-7	1066.70	1058.70	0	0.72
MH-8	1056.30	1048.30	0.05	0.77
MH-9	1046.90	1038.90	0.11	0.88
MH-10	1039.00	1031.00	0	0.88
MH-11	1029.60	1021.60	0.0021	0.8821
MH-12	1023.50	1015.50	0	0.8821
MH-13	1010.20	1002.20	0.01	0.8921
MH-14	1001.10	993.10	0	0.8921
MH-15	994.50	986.50	0	0.8921
MH-16	974.00	966.00	0	0.8921
MH-17	957.00	949.00	0.11	1.0021
MH-18	942.00	934.00	0	1.0021
MH-20	950.00	941.00	0	0.2122
MH-21	926.00	918.00	0	0.1521
MH-22	910.00	902.00	0	0.1262
MH-23	897.00	888.00	0	1.9746
MH-24	877.00	869.00	0	1.9555
MH-25	862.00	852.00	0	1.9408
MH-26	860.50	840.50	0	1.9265
MH-27	814.00	798.18	1.0672	5.171
MH-28	985.00	977.00	0	0.3519
MH-29	975.00	967.00	0	0.297
MH-30	960.00	952.00	0	0.2576
MH-31	1073.70	N/A	0.07	0.07
MH-33	997.00	989.00	0.12	0.22
MH-34	956.30	948.30	0.17	0.39
MH-35	938.00	930.00	0	0.39
MH-36	931.00	N/A	0.35	0.35
MH-40	811.00	797.28	0	5.1696
MH-41	808.60	794.65	1.14	6.3
MH-43	843.00	823.00	2.1906	4.1125
MH-44	935.00	N/A	0.33	0.33
MH-45	1043.00	N/A	0.1	0.1
MH-46	999.00	991.40	0	0.1
MH-47	917.00	909.00	0	0.35
MH-48	916.00	906.00	0	0.35
MH-49	916.00	903.30	0	0.35
MH-50	916.00	900.90	0	0.35
MH-51	917.00	899.50	0	0.74
MH-52	912.00	898.50	0	0.74
MH-53	910.00	897.50	0	0.74
MH-54	909.00	894.70	0	1.7421
MH-55	908.00	890.90	0.154	1.9838
MH-56	1101.00	N/A	0.62	0.62

Sewer Peak Dry Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-3	MH-3	MH-4	1093.38	1084.00	0.0401	234	8 inch	0.62	2.4193	0.013	5.8	34.5
P-4	MH-4	MH-5	1084.00	1076.00	0.0421	190	8 inch	0.62	2.4795	0.013	5.9	34.1
P-5	MH-5	MH-6	1076.00	1064.00	0.0524	229	8 inch	0.62	2.7661	0.013	6.39	32.2
P-6	MH-6	MH-7	1064.00	1058.70	0.0245	216	8 inch	0.72	1.8928	0.013	5.05	42.8
P-7	MH-7	MH-8	1058.70	1048.30	0.0437	238	8 inch	0.72	2.5259	0.013	6.24	36.5
P-8	MH-8	MH-9	1048.30	1038.90	0.0405	232	8 inch	0.77	2.4323	0.013	6.18	38.7
P-9	MH-9	MH-10	1038.90	1031.00	0.0401	197	8 inch	0.88	2.4198	0.013	6.38	41.7
P-10	MH-10	MH-11	1031.00	1021.60	0.0405	232	8 inch	0.88	2.4323	0.013	6.41	41.6
P-11	MH-11	MH-12	1021.60	1015.50	0.0363	168	8 inch	0.8821	2.3025	0.013	6.16	42.9
P-12	MH-12	MH-13	1015.50	1002.20	0.0386	345	8 inch	0.8821	2.3725	0.013	6.3	42.2
P-13	MH-13	MH-14	1002.20	993.10	0.0392	232	8 inch	0.8921	2.3931	0.013	6.35	42.3
P-14	MH-14	MH-15	993.10	986.50	0.0369	179	8 inch	0.8921	2.3203	0.013	6.21	43
P-15	MH-15	MH-16	986.50	966.00	0.0385	532	8 inch	0.8921	2.372	0.013	6.31	42.5
P-16	MH-16	MH-17	966.00	949.00	0.0386	440	8 inch	0.8921	2.3751	0.013	6.32	42.5
P-17	MH-17	MH-18	949.00	934.00	0.0290	517	8 inch	1.0021	2.0582	0.013	5.86	49.2
P-20	MH-20	MH-21	941.00	918.00	0.0469	490	8 inch	0.2122	2.6179	0.013	4.51	19.3
P-21	MH-21	MH-22	918.00	902.00	0.0523	306	8 inch	0.1521	2.7631	0.013	4.24	15.9
P-23	MH-23	MH-24	888.00	869.00	0.0317	599	12 inch	1.9746	6.345	0.013	7.13	38.3
P-24	MH-24	MH-25	869.00	852.00	0.0290	587	12 inch	1.9555	6.0628	0.013	6.88	39.1
P-25	MH-25	MH-26	852.00	840.50	0.0180	640	12 inch	1.9408	4.7756	0.013	5.77	44.4
P-27	MH-31	MH-6	1066.50	1064.00	0.0096	261	8 inch	0.07	1.1826	0.013	1.86	16.5
P-29	MH-33	MH-34	989.00	948.30	0.0355	1145	8 inch	0.22	2.2782	0.013	4.13	21
P-30	MH-34	MH-35	948.30	930.00	0.0318	576	8 inch	0.39	2.1538	0.013	4.68	28.8
P-36	MH-28	MH-29	977.00	967.00	0.0394	254	8 inch	0.3519	2.3976	0.013	4.91	25.9
P-37	MH-29	MH-30	967.00	952.00	0.0600	250	8 inch	0.297	2.9598	0.013	5.43	21.4
P-38	MH-30	MH-20	952.00	941.00	0.0386	285	8 inch	0.2576	2.3739	0.013	4.45	22.2
P-39	MH-27	MH-40	798.18	797.28	0.0064	140	18 inch	5.171	8.4217	0.013	5.01	56.6
P-40	MH-40	MH-41	797.28	794.65	0.0033	807	21 inch	5.1696	9.045	0.013	3.89	54.2
P-41	MH-41	O-1	794.65	794.46	0.0040	48	21 inch	6.3	9.9684	0.013	4.38	57.7
P-43	MH-26	MH-43	840.50	823.00	0.0424	413	12 inch	1.9265	7.3335	0.013	7.87	35
P-44	MH-43	MH-27	823.00	798.18	0.0267	930	15 inch	4.1125	10.5525	0.013	8.06	43.3
P-45	MH-44	WW-1	927.50	922.50	0.0431	116	8 inch	0.33	2.5087	0.013	4.98	24.5

Sewer Peak Dry Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-46	MH-45	MH-46	1035.50	991.40	0.0441	999	8 inch	0.1	2.5388	0.013	3.53	13.6
P-47	MH-46	MH-33	991.40	989.00	0.0062	390	8 inch	0.1	0.9479	0.013	1.76	21.9
P-48	MH-22	MH-55	902.00	890.90	0.0259	428	8 inch	0.1262	1.9459	0.013	3.14	17.3
P-49	MH-55	MH-23	890.90	888.00	0.0149	195	12 inch	1.9838	4.3446	0.013	5.41	47.4
P-50	MH-36	MH-47	924.00	909.00	0.0579	259	8 inch	0.35	2.908	0.013	5.62	23.4
P-51	MH-47	MH-48	909.00	906.00	0.0160	188	8 inch	0.35	1.5264	0.013	3.55	32.6
P-52	MH-48	MH-49	906.00	903.30	0.0111	243	8 inch	0.35	1.2737	0.013	3.11	35.8
P-53	MH-49	MH-50	903.30	900.90	0.0111	216	8 inch	0.35	1.2737	0.013	3.11	35.8
P-54	MH-50	MH-51	900.90	899.50	0.0111	126	8 inch	0.35	1.2737	0.013	3.11	35.8
P-55	MH-51	MH-52	899.50	898.50	0.0054	184	12 inch	0.74	2.6264	0.013	2.87	36.3
P-56	MH-52	MH-53	898.50	897.50	0.0049	203	12 inch	0.74	2.5005	0.013	2.77	37.3
P-57	MH-53	MH-54	897.50	894.70	0.0071	393	12 inch	0.74	3.0071	0.013	3.17	33.8
P-58	MH-54	MH-55	894.70	890.90	0.0097	391	12 inch	1.7421	3.5121	0.013	4.46	49.8
P-59	MH-35	MH-51	930.00	899.50	0.0453	674	8 inch	0.39	2.5705	0.013	5.31	26.3
P-60	MH-18	MH-54	934.00	894.70	0.0334	1176	8 inch	1.0021	2.2089	0.013	6.17	47.2
P-61	MH-56	MH-3	1094.00	1093.38	0.0177	35	8 inch	0.62	1.6082	0.013	4.31	43.1

Sewer Peak Dry Weather Pump Report

Label	To Pipe	Ground Elevation (ft)	Pump Type	Shutoff Head (ft)	Shutoff Discharge (gpm)	Design Head (ft)	Design Discharge (gpm)	Maximum Operating Discharge (gpm)	Maximum Operating Head (ft)	Initial Relative Speed Factor	Control Status	Pressure Flow (gpm)	Intake Pump Pressure (psi)	Discharge Pump Pressure (psi)	Pump Head (ft)
PMP-1	FM-6	913	Standard (3 Point)	100	0	76	175	200	75	1	On	79.11	-0.13	34.99	81.17
PMP-2	FM-8	913	Standard (3 Point)	100	0	76	175	200	75	1	On	78.85	-0.13	35	81.19

Sewer Peak Dry Weather Force Main Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)
FM-3	WW-1	911.5	PMP-1	913	10	4	Ductile Iron	4	79.11	2.02	0.29
FM-4	WW-1	911.5	PMP-2	913	10	4	Ductile Iron	4	78.85	2.01	0.3
FM-6	PMP-1	913	J-1	947	10	4	Ductile Iron	4	79.11	2.02	0.29
FM-7	J-1	947	MH-28	977	1,134.00	4	Ductile Iron	4	157.96	4.03	16.26
FM-8	PMP-2	913	J-1	947	10	4	Ductile Iron	4	78.85	2.01	0.3

Sewer Peak Dry Weather Wet Well Report

Label	Ground Elevation (ft)	Base Elevation (ft)	Minimum Elevation (ft)	Initial Elevation (ft)	Alarm Elevation (ft)	Maximum Elevation (ft)	Average Area (ft^2)	Known Flow (cfs)	Total Flow (cfs)	Forcemain Discharge (gpm)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)
WW-1	930	910	911.5	913	922.8	930	700	0	0.33	9.85	913	913	0

PEAK WET WEATHER FLOWS

Sewer Peak Wet Weather Manhole Report

Label	Rim Elevation (ft)	Invert In Elevation 1 (ft)	Known Flow (cfs)	Total Flow (cfs)
MH-3	1,101.38	1,093.38	0	0.82
MH-4	1,092.00	1,084.00	0	0.82
MH-5	1,084.00	1,076.00	0	0.82
MH-6	1,075.00	1,064.00	0.04	0.94
MH-7	1,066.70	1,058.70	0	0.94
MH-8	1,056.30	1,048.30	0.06	1
MH-9	1,046.90	1,038.90	0.14	1.14
MH-10	1,039.00	1,031.00	0	1.14
MH-11	1,029.60	1,021.60	0.0027	1.1427
MH-12	1,023.50	1,015.50	0	1.1427
MH-13	1,010.20	1,002.20	0.01	1.1527
MH-14	1,001.10	993.1	0	1.1527
MH-15	994.5	986.5	0	1.1527
MH-16	974	966	0	1.1527
MH-17	957	949	0.13	1.2827
MH-18	942	934	0	1.2827
MH-20	950	941	0	0.2181
MH-21	926	918	0	0.1586
MH-22	910	902	0	0.1325
MH-23	897	888	0	2.497
MH-24	877	869	0	2.4777
MH-25	862	852	0	2.4626
MH-26	860.5	840.5	0	2.4475
MH-27	814	798.18	1.3502	6.6078
MH-28	985	977	0	0.3547
MH-29	975	967	0	0.3013
MH-30	960	952	0	0.2628
MH-31	1,073.70	N/A	0.08	0.08
MH-33	997	989	0.16	0.28
MH-34	956.3	948.3	0.21	0.49
MH-35	938	930	0	0.49
MH-36	931	N/A	0.44	0.44
MH-40	811	797.28	0	6.6063
MH-41	808.6	794.65	1.443	8.0395
MH-43	844.88	837.38	2.8263	5.2644
MH-44	935	N/A	0.42	0.42
MH-45	1,043.00	N/A	0.12	0.12
MH-46	999	991.4	0	0.12
MH-47	917	909	0	0.44
MH-48	916	906	0	0.44
MH-49	916	903.3	0	0.44
MH-50	916	900.9	0	0.44
MH-51	917	899.5	0	0.93
MH-52	912	898.5	0	0.93
MH-53	910	897.5	0	0.93
MH-54	909	894.7	0	2.2127
MH-55	908	890.9	0.2	2.5062
MH-56	1,101.00	N/A	0.82	0.82

Sewer Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-3	MH-3	MH-4	1093.38	1084.00	0.0401	234	8 inch	0.82	2.4193	0.013	6.26	40.1
P-4	MH-4	MH-5	1084.00	1076.00	0.0421	190	8 inch	0.82	2.4795	0.013	6.38	39.6
P-5	MH-5	MH-6	1076.00	1064.00	0.0524	229	8 inch	0.82	2.7661	0.013	6.9	37.3
P-6	MH-6	MH-7	1064.00	1058.70	0.0245	216	8 inch	0.94	1.8928	0.013	5.41	49.8
P-7	MH-7	MH-8	1058.70	1048.30	0.0437	238	8 inch	0.94	2.5259	0.013	6.7	42.2
P-8	MH-8	MH-9	1048.30	1038.90	0.0405	232	8 inch	1	2.4323	0.013	6.63	44.7
P-9	MH-9	MH-10	1038.90	1031.00	0.0401	197	8 inch	1.14	2.4198	0.013	6.83	48.3
P-10	MH-10	MH-11	1031.00	1021.60	0.0405	232	8 inch	1.14	2.4323	0.013	6.86	48.1
P-11	MH-11	MH-12	1021.60	1015.50	0.0363	168	8 inch	1.1427	2.3025	0.013	6.58	49.8
P-12	MH-12	MH-13	1015.50	1002.20	0.0386	345	8 inch	1.1427	2.3725	0.013	6.73	48.9
P-13	MH-13	MH-14	1002.20	993.10	0.0392	232	8 inch	1.1527	2.3931	0.013	6.79	48.9
P-14	MH-14	MH-15	993.10	986.50	0.0369	179	8 inch	1.1527	2.3203	0.013	6.64	49.8
P-15	MH-15	MH-16	986.50	966.00	0.0385	532	8 inch	1.1527	2.372	0.013	6.75	49.2
P-16	MH-16	MH-17	966.00	949.00	0.0386	440	8 inch	1.1527	2.3751	0.013	6.75	49.1
P-17	MH-17	MH-18	949.00	934.00	0.0290	517	8 inch	1.2827	2.0582	0.013	6.22	57.2
P-20	MH-20	MH-21	941.00	918.00	0.0469	490	8 inch	0.2181	2.6179	0.013	4.55	19.5
P-21	MH-21	MH-22	918.00	902.00	0.0523	306	8 inch	0.1586	2.7631	0.013	4.3	16.3
P-23	MH-23	MH-24	888.00	869.00	0.0317	599	12 inch	2.497	6.345	0.013	7.6	43.6
P-24	MH-24	MH-25	869.00	852.00	0.0290	587	12 inch	2.4777	6.0628	0.013	7.33	44.5
P-25	MH-25	MH-26	852.00	840.50	0.0180	640	12 inch	2.4626	4.7756	0.013	6.13	50.9
P-27	MH-31	MH-6	1066.50	1064.00	0.0096	261	8 inch	0.08	1.1826	0.013	1.93	17.6
P-29	MH-33	MH-34	989.00	948.30	0.0355	1145	8 inch	0.28	2.2782	0.013	4.43	23.7
P-30	MH-34	MH-35	948.30	930.00	0.0318	576	8 inch	0.49	2.1538	0.013	5	32.4
P-36	MH-28	MH-29	977.00	967.00	0.0394	254	8 inch	0.3547	2.3976	0.013	4.92	26
P-37	MH-29	MH-30	967.00	952.00	0.0600	250	8 inch	0.3013	2.9598	0.013	5.45	21.5
P-38	MH-30	MH-20	952.00	941.00	0.0386	285	8 inch	0.2628	2.3739	0.013	4.48	22.5
P-39	MH-27	MH-40	798.18	797.28	0.0064	140	18 inch	6.6078	8.4217	0.013	5.28	66.7
P-40	MH-40	MH-41	797.28	794.65	0.0033	807	21 inch	6.6063	9.045	0.013	4.11	63.4
P-41	MH-41	O-1	794.65	794.46	0.0040	48	21 inch	8.0395	9.9684	0.013	4.61	68.1
P-43	MH-26	MH-43	840.50	837.38	0.0076	413	12 inch	2.4475	3.0965	0.013	4.37	67.1
P-44	MH-43	MH-27	837.38	798.18	0.0422	930	15 inch	5.2644	13.2616	0.013	10.18	43.8
P-45	MH-44	WW-1	927.50	922.50	0.0431	116	8 inch	0.42	2.5087	0.013	5.33	27.7

Sewer Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-46	MH-45	MH-46	1035.50	991.40	0.0441	999	8 inch	0.12	2.5388	0.013	3.73	14.8
P-47	MH-46	MH-33	991.40	989.00	0.0062	390	8 inch	0.12	0.9479	0.013	1.86	24
P-48	MH-22	MH-55	902.00	890.90	0.0259	428	8 inch	0.1325	1.9459	0.013	3.18	17.7
P-49	MH-55	MH-23	890.90	888.00	0.0149	195	12 inch	2.5062	4.3446	0.013	5.73	54.5
P-50	MH-36	MH-47	924.00	909.00	0.0579	259	8 inch	0.44	2.908	0.013	6.01	26.3
P-51	MH-47	MH-48	909.00	906.00	0.0160	188	8 inch	0.44	1.5264	0.013	3.78	36.8
P-52	MH-48	MH-49	906.00	903.30	0.0111	243	8 inch	0.44	1.2737	0.013	3.31	40.5
P-53	MH-49	MH-50	903.30	900.90	0.0111	216	8 inch	0.44	1.2737	0.013	3.31	40.5
P-54	MH-50	MH-51	900.90	899.50	0.0111	126	8 inch	0.44	1.2737	0.013	3.31	40.5
P-55	MH-51	MH-52	899.50	898.50	0.0054	184	12 inch	0.93	2.6264	0.013	3.06	41.1
P-56	MH-52	MH-53	898.50	897.50	0.0049	203	12 inch	0.93	2.5005	0.013	2.95	42.2
P-57	MH-53	MH-54	897.50	894.70	0.0071	393	12 inch	0.93	3.0071	0.013	3.37	38.2
P-58	MH-54	MH-55	894.70	890.90	0.0097	391	12 inch	2.2127	3.5121	0.013	4.73	57.6
P-59	MH-35	MH-51	930.00	899.50	0.0453	674	8 inch	0.49	2.5705	0.013	5.67	29.6
P-60	MH-18	MH-54	934.00	894.70	0.0334	1176	8 inch	1.2827	2.2089	0.013	6.56	54.7
P-61	MH-56	MH-3	1094.00	1093.38	0.0177	35	8 inch	0.82	1.6082	0.013	4.63	50.6

Sewer Peak Wet Weather Pump Report

Label	To Pipe	Ground Elevation (ft)	Pump Type	Shutoff Head (ft)	Shutoff Discharge (gpm)	Design Head (ft)	Design Discharge (gpm)	Maximum Operating Discharge (gpm)	Maximum Operating Head (ft)	Initial Relative Speed Factor	Control Status	Pressure Flow (gpm)	Intake Pump Pressure (psi)	Discharge Pump Pressure (psi)	Pump Head (ft)
PMP-1	FM-6	913	Standard (3 Point)	100	0	76	175	200	75	1	On	78.22	-0.12	35.02	81.24
PMP-2	FM-8	913	Standard (3 Point)	100	0	76	175	200	75	1	On	81	-0.14	34.92	81.04

Sewer Peak Wet Weather Force Main Report

Label	Upstream Node	Upstream Invert Elevation (ft)	Downstream Node	Downstream Invert Elevation (ft)	Length (ft)	Diameter (in)	Material	Minor Loss Coefficient	Pressure Flow (gpm)	Velocity (ft/s)	Pressure Pipe Headloss (ft)
FM-3	WW-1	911.5	PMP-1	913	10	4	Ductile Iron	4	78.22	2	0.28
FM-4	WW-1	911.5	PMP-2	913	10	4	Ductile Iron	4	81	2.07	0.32
FM-6	PMP-1	913	J-1	947	10	4	Ductile Iron	4	78.22	2	0.28
FM-7	J-1	947	MH-28	977	1,122.00	4	Ductile Iron	4	159.22	4.07	16.34
FM-8	PMP-2	913	J-1	947	10	4	Ductile Iron	0	81	2.07	0.05

Sewer Peak Wet Weather Wet Well Report

Label	Ground Elevation (ft)	Base Elevation (ft)	Minimum Elevation (ft)	Initial Elevation (ft)	Alarm Elevation (ft)	Maximum Elevation (ft)	Average Area (ft²)	Known Flow (cfs)	Total Flow (cfs)	Forcemain Discharge (gpm)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)
WW-1	930	910	911.5	913	922.8	930	700	0	0.42	-29.29	913	913	0

PEAK DRY WEATHER FLOWS

PEAK WET WEATHER FLOWS

EXHIBIT 8: CITY OF CORONA 2005 SEWER MASTER PLAN
EXISTING AVERAGE AND PEAK DAY WEATHER FLOWS

Appendix 2
Existing Hydraulic Model Results

Pipe Model ID	U/S MH Model ID	D/S MH Model ID	Pipe Dia (in)	Length (ft)	Slope	Average Flow (cfs)	Pumped Flow (cfs)	Total Peak Dry Weather Flow (cfs)	Peak Dry Weather Velocity (ft/s)	Peak Dry Weather d/D	Full Flow (cfs)
8057	30-82970	30-83100	15	234	0.0052	0.7452	0.0000	1.4878	3.38	0.39	4.6793
7867	30-83100	30-83180	15	177	0.0051	0.7452	0.0000	1.4878	3.35	0.39	4.6162
7868	30-83180	30-83230	15	135	0.0796	0.7452	0.0000	1.4878	8.97	0.19	18.2739
7869	30-83230	30-83340	15	129	0.0101	0.7452	0.0000	1.4878	4.29	0.33	6.4944
7873	30-83340	30-83470	15	225	0.0040	0.7452	0.0000	1.4878	3.07	0.42	4.0973
7870	30-83470	30-83560	15	236	0.0040	0.7639	0.0000	1.5220	3.09	0.42	4.0877
7871	30-83560	30-83640	15	346	0.0040	0.7781	0.0000	1.5481	3.11	0.43	4.1023
7872	30-83640	30-83680	15	48	0.0040	0.7974	0.0000	1.5833	3.12	0.43	4.0908

Copy of Manhole numbers from the 2005 Sewer Master Plan

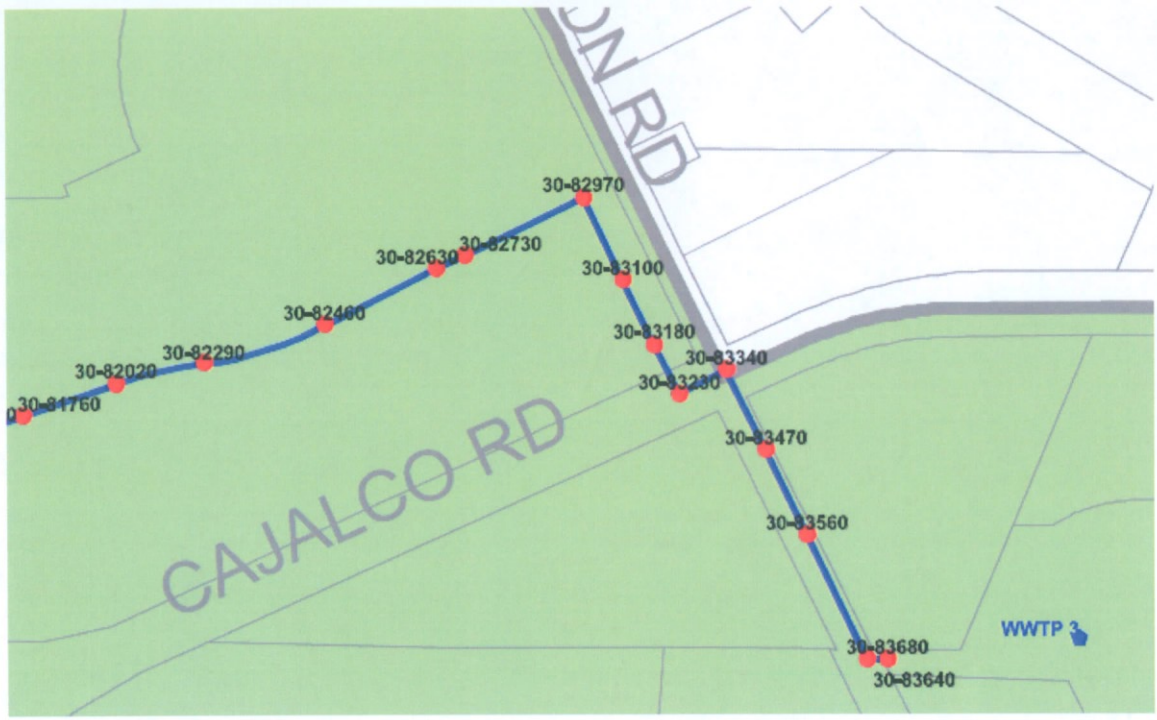


EXHIBIT 9: CITY OF CORONA 2005 SEWER MASTER PLAN POINT SOURCE DATA, TABLE 6-2

Table 5 (Continued)
Future Design Flows
(Including County Service Area)

Development Name	Area (ac)	Dwelling Unit	Future Flows (gpd)	
El Cerrito WRF3	2728.7	770	~~556,484~~	~~0,1092 CFS = WRF2~~
3M WRF3				~~0,7683 CFS = WRF3~~
Calico WRF2				
Compton WRF2				**
Overlook WRF3				
Crossings WRF3				
Bel Air WRF2				
~~El Cerrito East~~ *	847	~~210~~ 2400	~~127,050~~ 648,000	~~=1.0 CFS~~
~~Eagle Valley~~	1058.5	3204	822,190	~~=1.27 CFS~~
~~Eagle Valley East~~	778	4208	1,260,000	~~=1.95 CFS~~
Arantine Hills	508.9	785	339,765	
Dos Lagos	528.2	370	246,446	=0.38 CFS
Weirick Road	547	210	96,050	=0.15 CFS
~~TR 33583~~	No Information		37,000	~~=0.057 CFS~~
North Main Street WRF1	75.13	N/A	526,000	

* UPDATED PER MEETING WITH THE CITY 4-7-10

** THE CITY HAS PROVIDED UPDATED DEVELOPMENT AREA INFORMATION FOR THE EL CERRITO AREA, THE DATA IS INCLUDED IN SECTION III - DESIGN CRITERIA OF THIS REPORT. THE CROSSINGS FLOWS ARE INCLUDED SEPARATELY.

Table 6-1 (Cont.)
Future Sewer System Areas

Development	Location	Service Area		Land Use	DU	Area (ac)	Unit Flow Factor (gpd/Ac)	Total Average Flow (gpd)
Corona Magnolia	City	26	C	Commercial		18.2	1,050	19,110
			OP	Office Professional		34.8	1,260	43,848
				Subtotal		**53.0**		**62,958**
Temescal Canyon	City	26	GI	General Industrial		1,303.5	1,155	1,505,543
				Subtotal		**1,303.5**		**1,631,459**
El Cerrito	City and Sphere of Influence	28,31,36	RR-1	Rural Residential 1		581.3	150	87,195
			RR-2	Rural Residential 2		627.3	300	188,190
			C	Commercial		170.8	1,050	179,340
			OP	Office Professional		0.03	1,155	35
			LI	Light Industrial		121.1	840	101,724
			MR	Mineral Resources		920.9	0	0
			HCD	Hillside Controlled Development		307.3	0	0
				Subtotal		**2,728.7**		**556,484**
El Cerrito East	Sphere of Influence	34	RR-1	Rural Residential 1		847.0	150	~~127,050~~ 648,000
				Subtotal		**847.0**		**~~127,050~~**
Eagle Valley	City	32	E	Estate	200	192.0	500	96,000
			LDR	Low Density Residential	1,435	422.0	1,000	422,000
			LMDR	Low Medium Density Residential	264	38.0	1,200	45,600
			MDR	Medium Density Residential	645	43.0	1,700	73,100
			HDR	High Density Residential	660	33.0	2,000	66,000
			C	Commercial		22.0	1,050	23,100
			I	School		20.0	800	16,000
			OS-P	Open Space Recreational		288.5	130	37,505
				Subtotal		**1,058.5**	822,190	**~~779,305~~** 1,260,000
Eagle Valley East	Sphere of Influence	33	RR-1	Rural Residential 1		868.0	150	~~130,200~~
				Subtotal		**868.0**	1,260,000	**~~130,200~~**
Arantine Hills	City	30	E	Estate	165	72.8	500	36,400
			LDR	Low Density Residential	620	178.6	1,000	178,600
			HDR	High Density Residential		26.1	2,000	52,200
			OS	Open Space		144.6	0	0
			OS-P	Open Space Recreational		13.0	130	1,690
			C	Commercial		42.3	1,050	44,415
			LI	Light Industrial		31.5	840	26,460
				Subtotal		**508.9**		**339,765**
Dos Lagos	City	30	LDR	Low Density Residential		73.5	1,000	73,500
			C	Commercial		102.0	1,050	107,100
			LI	Light Industrial		24.6	840	20,664
			OP	Office Professional		19.0	1,260	23,940
			OS	Open Space		135.0	0	0
			OS-P	Open Space Recreational		163.4	130	21,242
			WWTP	Wastewater Treatment Plant		10.7	0	0
				Subtotal		**528.2**		**246,446**
Weirick Road	Sphere of Influence	35	RR-1	Rural Residential 1		507.0	150	76,050
			E	Estate		40.0	500	20,000
				Subtotal		**547.0**		**96,050**
					Total	**11,661**		**5,255,546**

0.1092 cfs = WRF2
0.7683 cfs = WRF3
= 1.00 cfs WRF3
= 1.27 cfs WRF3
= 1.95 cfs WRF3
= 0.38 cfs WRF3
= 0.15 cfs WRF3

Section 6

ULTIMATE WASTEWATER SYSTEM

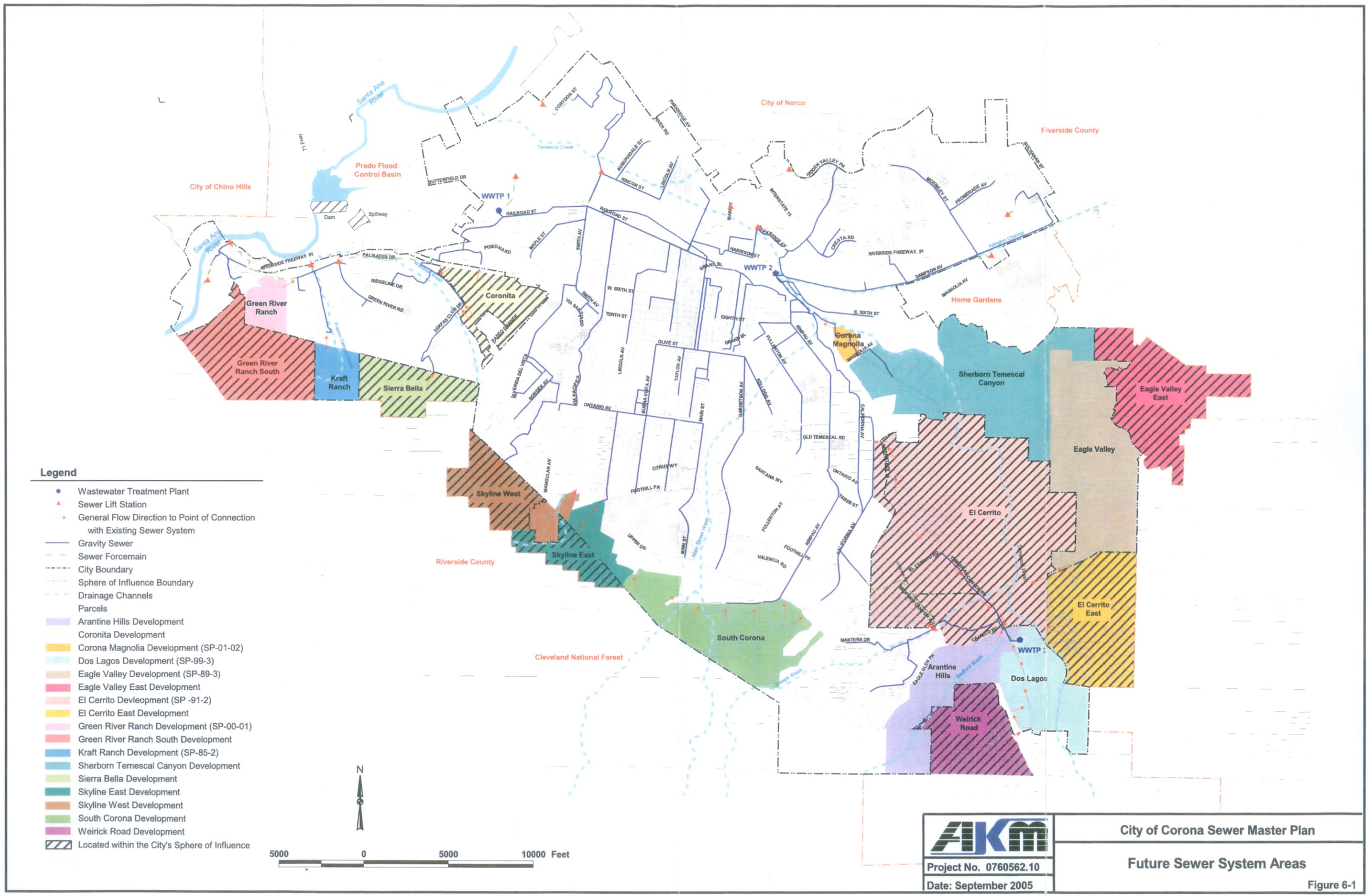
6-1 Future Sewer System Areas

Approximately 38.5 square miles (24,668 acres) of residential, commercial, and industrial land is encompassed within the City boundaries. Currently, about 5,030 acres of this area is vacant land zoned for future commercial, industrial, and residential uses. At ultimate build out, these areas will be occupied by homes and businesses that will contribute wastewater to the City's collection system. In addition to the currently vacant areas within the City, there is approximately 6,560 acres of land located in the Sphere of Influence that will become a part of the City's sewer system area. The estimated ultimate sewer system area population is 178,000 persons (per City's General Plan 2003).

Table 6-1 provides detailed land use, acreage, dwelling units, and total wastewater flow information for each of the future sewer system areas, which are illustrated on Figure 6-1.

Table 6-1
Future Sewer System Areas

Development	Location	Service Area	Land Use		DU	Area (ac)	Unit Flow Factor (gpd/Ac)	Total Average Flow (gpd)
Green River Ranch	City	10	E	Estate	32	98.2	500	49,100
			C	Commercial		8.1	1,050	8,505
			MU	Mixed Use		59.0	700	41,300
				Subtotal		**165.3**		**98,905**
Green River Ranch South	Sphere of Influence	10		Residential		688.7	-	-
				Subtotal		**688.7**	-	-
Kraft Ranch	City	10	RR-1	Rural Residential 1	2	12.0	150	1,800
			LDR	Low Density Residential	90	40.0	500	20,000
			OS	Open Space		129.0	0	0
				Subtotal		**181.0**		**21,800**
Sierra Bella	Sphere of Influence	10	E	Estate	220	178.4	500	89,200
			OS-P	Open Space Recreational		13.0	130	1,690
			OS	Open Space		127.5	0	0
				Subtotal		**318.9**		**90,890**
Coronita	Riverside County	10	LDR	Low Density Residential	736	199.2	1,000	199,200
			C	Commercial		10.7	1,050	11,235
				Subtotal		**209.9**		**210,435**
Skyline West	Sphere of Influence	14	E	Estate		332.9	500	166,450
	City		LDR	Low Density Residential		111.6	1,000	111,600
				Subtotal		**444.5**		**278,050**
Skyline East	Sphere of Influence	16	RR-1	Rural Residential		232.0	150	34,800
	City		E	Estate		28.8	500	14,400
	City		LDR	Low Density Residential		124.3	1,000	124,300
				Subtotal		**385.1**		**173,500**
South Corona	City	16,22,24	E	Estate		824.5	500	412,250
				Subtotal		**824.5**		**412,250**


City of Chino Hills
Prado Flood Control Basin
Santa Ana River
Dam
Spillway
Temescal Creek
City of Norco
Riverside County
WWTP 1
WWTP 2
Green River Ranch
Green River Ranch South
Kraft Ranch
Sierra Bella
Coronita
Skyline West
Skyline East
South Corona
Cleveland National Forest
Home Gardens
Gorona Magnolia
Sherborn Temescal Canyon
Eagle Valley East
Eagle Valley
El Cerrito
El Cerrito East
Arantine Hills
Dos Lagos
Weirick Road
RIVERSIDE FREEWAY 91
INTERSTATE 15
BUTTERFIELD DR
RAILROAD ST
POMONA RD
MAPLE ST
SMITH AV
PALISADES DR
RIDGELINE DR
GREEN RIVER RD
SERRAS CLUB DR
PASEO GRANDE
W. SIXTH ST
TENTH ST
EIGHTH ST
OLIVE ST
ONTARIO AV
MAIN ST
LINCOLN AV
TAYLOR AV
BUENA VISTA AV
VIA PASCOLA
VIA SAN CARLO
VALENCIA DEL VISTA
BORDER AV
RINCON ST
AUBURNDALE ST
LINCOLN AV
PARKRIDGE AV
RIVER RD
CORTON ST
HIDDEN VALLEY PK
HARRISON ST
GRAND BL
MAGNOLIA AV
E. SIXTH ST
RIMPAU AV
FULLERTON AV
GARRETSON AV
KELLOGG AV
CALIFORNIA AV
OLD TEMESCAL RD
SANTANA WY
CITRUS WY
FOOTHILL PK
MANGULAR AV
UPPER DR
FULLERTON AV
VALENCIA RD
TABER ST
ALLEGHENY AV
CRESTA RD
BOXHILL ST
PROMENADE AV
BUCHANAN ST
SAMPSON AV
EL CERRITO RD
MASTERS DR
EAGLE GLEN PK
CAMINO REAL
Main Street Wash
Bedford Wash
Temescal Wash
Bridge Wash
Legend
Wastewater Treatment Plant
Sewer Lift Station
General Flow Direction to Point of Connection with Existing Sewer System
Gravity Sewer
Sewer Forcemain
City Boundary
Sphere of Influence Boundary
Drainage Channels
Parcels
Arantine Hills Development
Coronita Development
Corona Magnolia Development (SP-01-02)
Dos Lagos Development (SP-99-3)
Eagle Valley Development (SP-89-3)
Eagle Valley East Development
El Cerrito Devleopment (SP -91-2)
El Cerrito East Development
Green River Ranch Development (SP-00-01)
Green River Ranch South Development
Kraft Ranch Development (SP-85-2)
Sherborn Temescal Canyon Development
Sierra Bella Development
Skyline East Development
Skyline West Development
South Corona Development
Weirick Road Development
Located within the City's Sphere of Influence
N
5000 0 5000 10000 Feet
AKM
Project No. 0760562.10
Date: September 2005
City of Corona Sewer Master Plan
Future Sewer System Areas
Figure 6-1

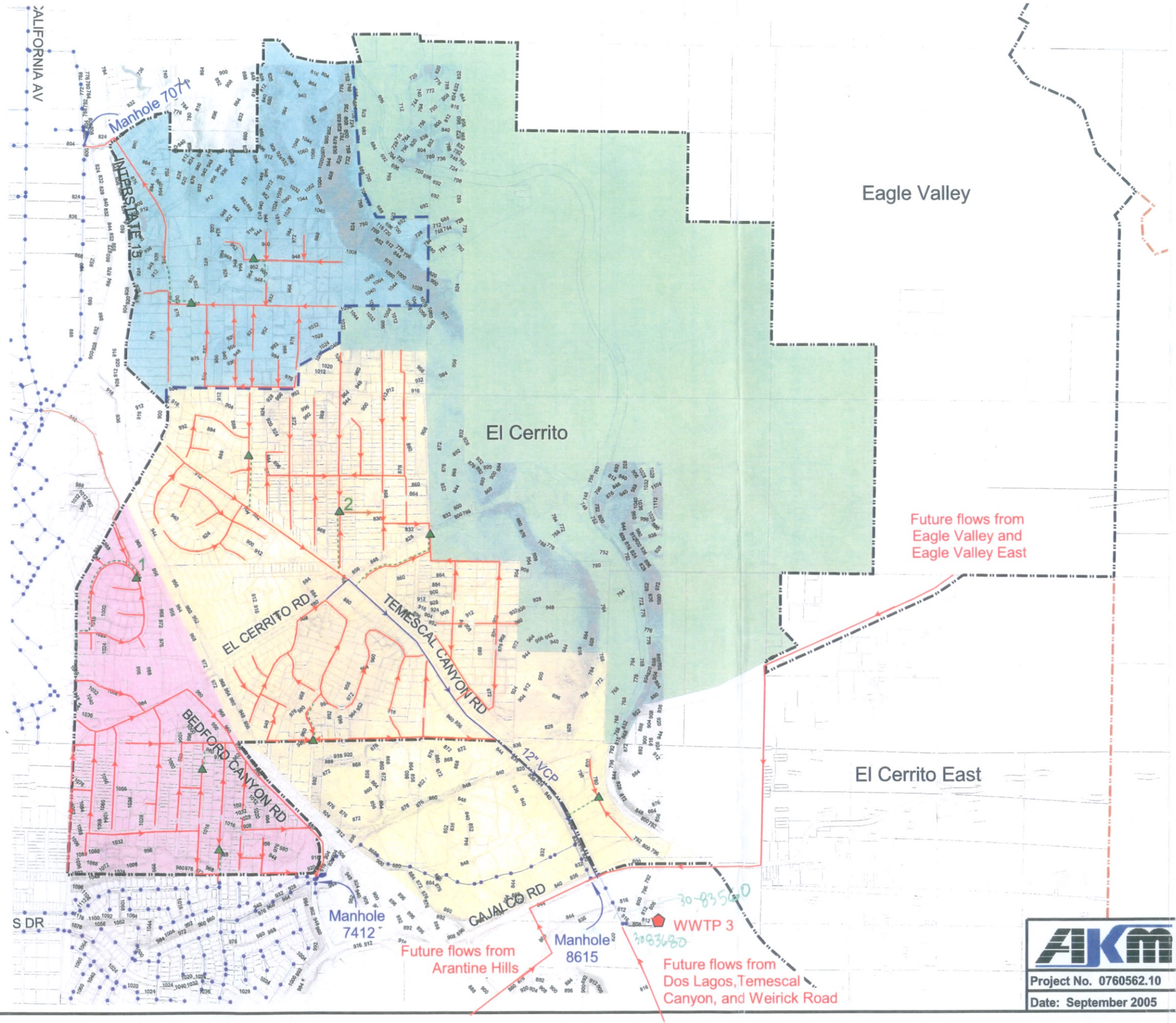
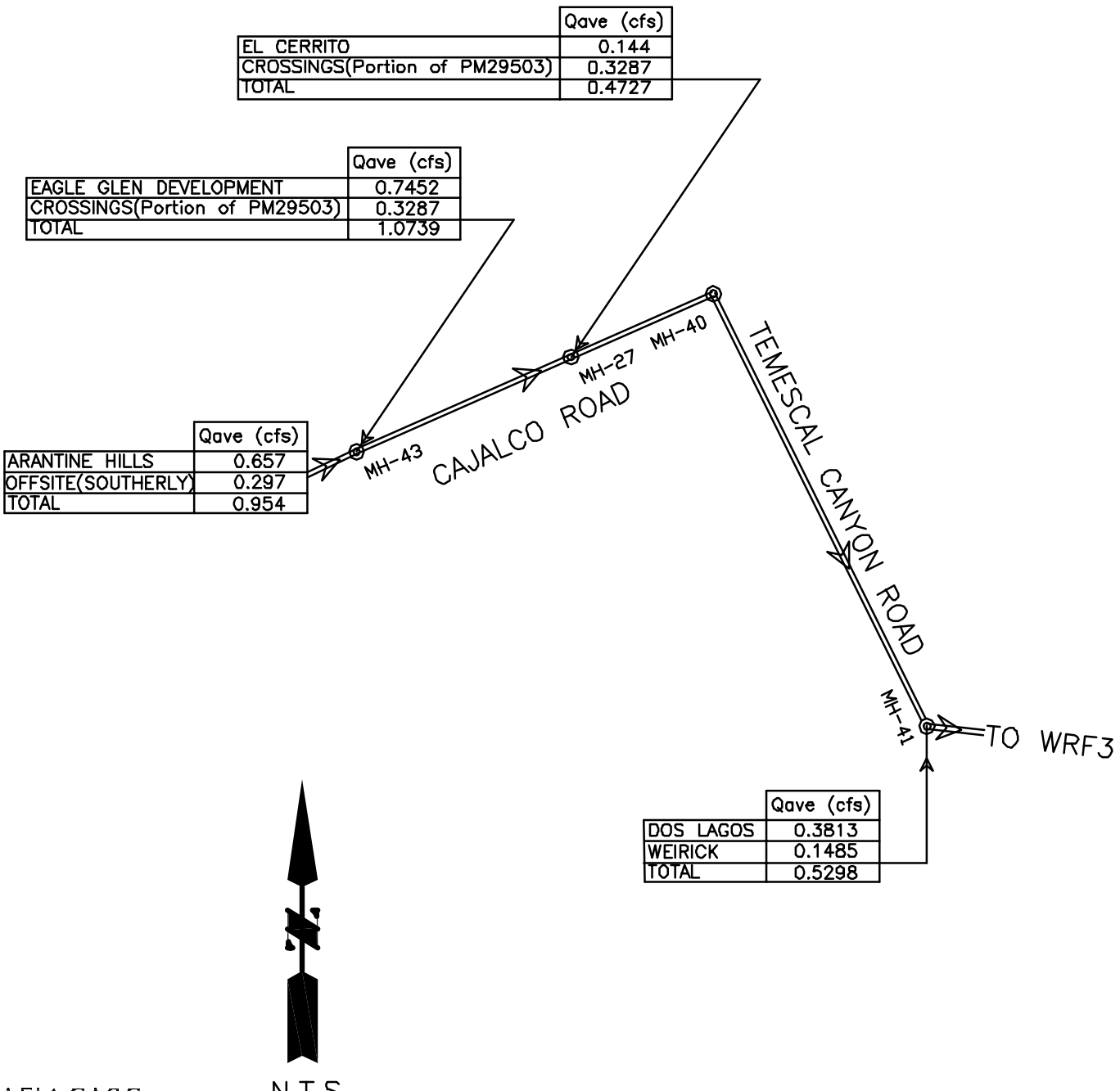

CALIFORNIA AV
Manhole 7071
INTERSTATE 15
Eagle Valley
El Cerrito
EL CERRITO RD
TEMESCAL CANYON RD
BEDFORD CANYON RD
12" VCP
GAJALCO RD
S DR
Manhole 7412
Manhole 8615
WWTP 3
Future flows from Eagle Valley and Eagle Valley East
El Cerrito East
Future flows from Arantine Hills
Future flows from Dos Lagos,Temescal Canyon, and Weirick Road
1
2
Legend
City Boundary
Sphere of Influence Boundary
Boundary between WWTP 2 and WWTP 3 Tributary Areas
Existing Gravity Sewer
Proposed 8" Sewer Location
Potential Future Forcemain Location
Existing Sewer Manhole
Potential Future Lift Station Location
1 Can be gravity drained northwest to intersection of Taber Street and Compton Avenue by construction of deep sewers.
2 Lift Station can be eliminated if easements can be obtained to the east. Sewers may have to be constructed deep.
Alternative Gravity Sewer Alignment
Tributary to WWTP 2
El Cerrito Area Tributary to Manhole 7071 (Average Flow = 0.1092 cfs)
Tributary to WWTP 3
El Cerrito Area Tributary to Manhole 7412 (Average Flow = 0.1592 cfs)
El Cerrito Area Tributary to Manhole 8615 (Average Flow = 0.6091 cfs)
Mineral Resources Area (No expected sewage flow)
N
1500 0 1500 3000 Feet
AKM
Project No. 0760562.10
Date: September 2005
City of Corona Sewer Master Plan
Future El Cerrito Sewer System Area
Figure 6-3

EXHIBIT 10: FLOW DIAGRAM

FLOW DIAGRAM
AVERAGE DAY FLOWS



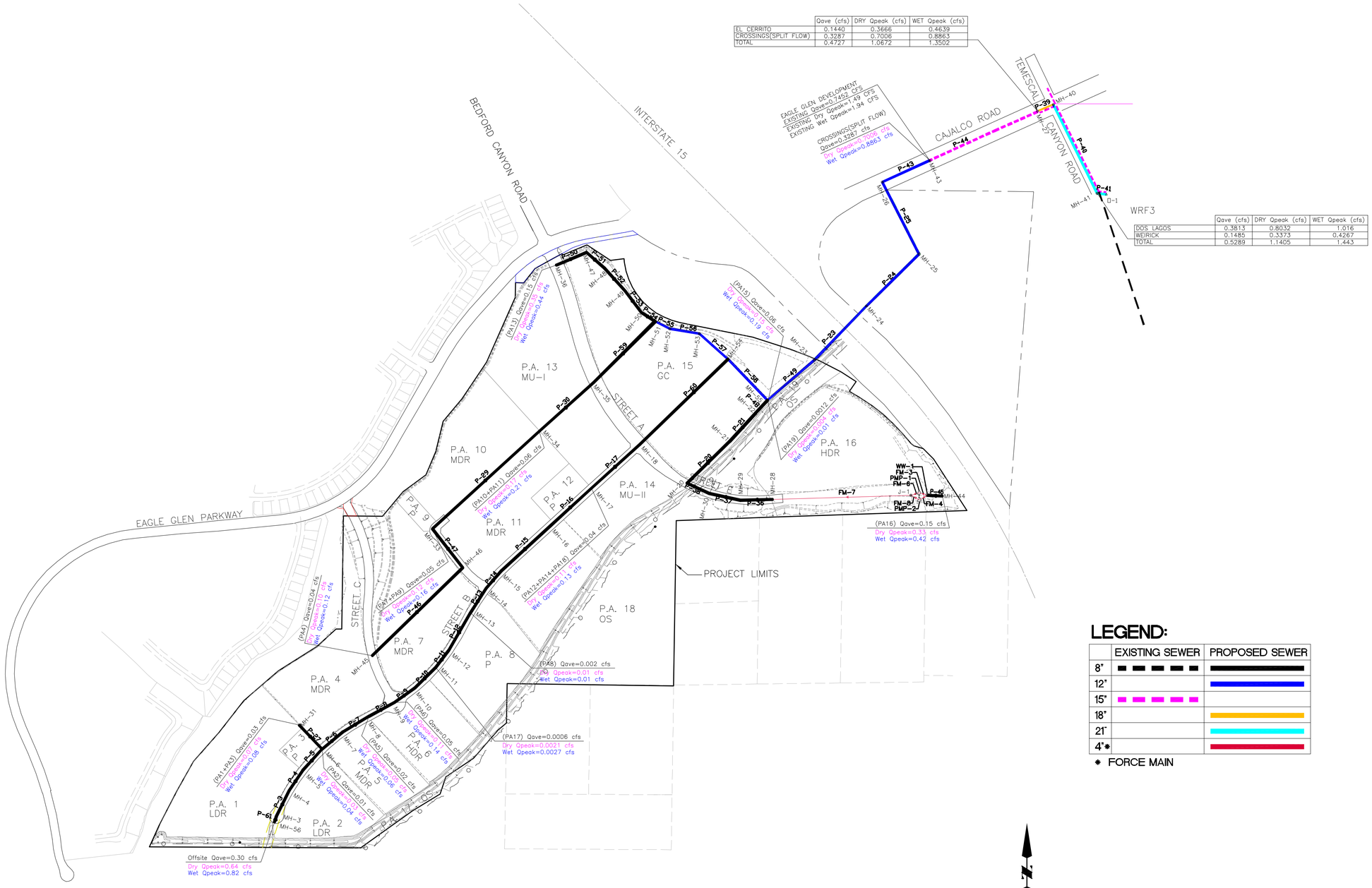
AEI CASC ENGINEERING
937 SOUTH VIA LATA
SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

Q:\337113\Master_Sewer\Exhibits\ M440-AVE DAY FLOWS.dwg 11/01/10 16:02

EXHIBIT 10

EXHIBIT 11: AVERAGE AND PEAK FLOW EXHIBIT

ARANTINE HILLS SEWER ANALYSIS
AVERAGE AND PEAK FLOWS EXHIBIT



	Qave (cfs)	DRY Qpeak (cfs)	WET Qpeak (cfs)
EL CERRITO	0.1440	0.3666	0.4639
CROSSINGS(SPLIT FLOW)	0.3287	0.7006	0.8863
TOTAL	0.4727	1.0672	1.3502

WRF3	Qave (cfs)	DRY Qpeak (cfs)	WET Qpeak (cfs)
DOS LAGOS	0.3813	0.8032	1.016
WEIRICK	0.1485	0.3373	0.4267
TOTAL	0.5289	1.1405	1.443

LEGEND:

	EXISTING SEWER	PROPOSED SEWER
8"		
12"		
15"		
18"		
21"		
4"*		

* FORCE MAIN

GRAPHIC SCALE
400' 0 200' 400' 800'
SCALE=1"400'

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0:\13711\Master_Sewer\Exhibits\ SEWER FLOWS EXHIBIT 11.dwg 01/11/11 07:02

EXHIBIT 11

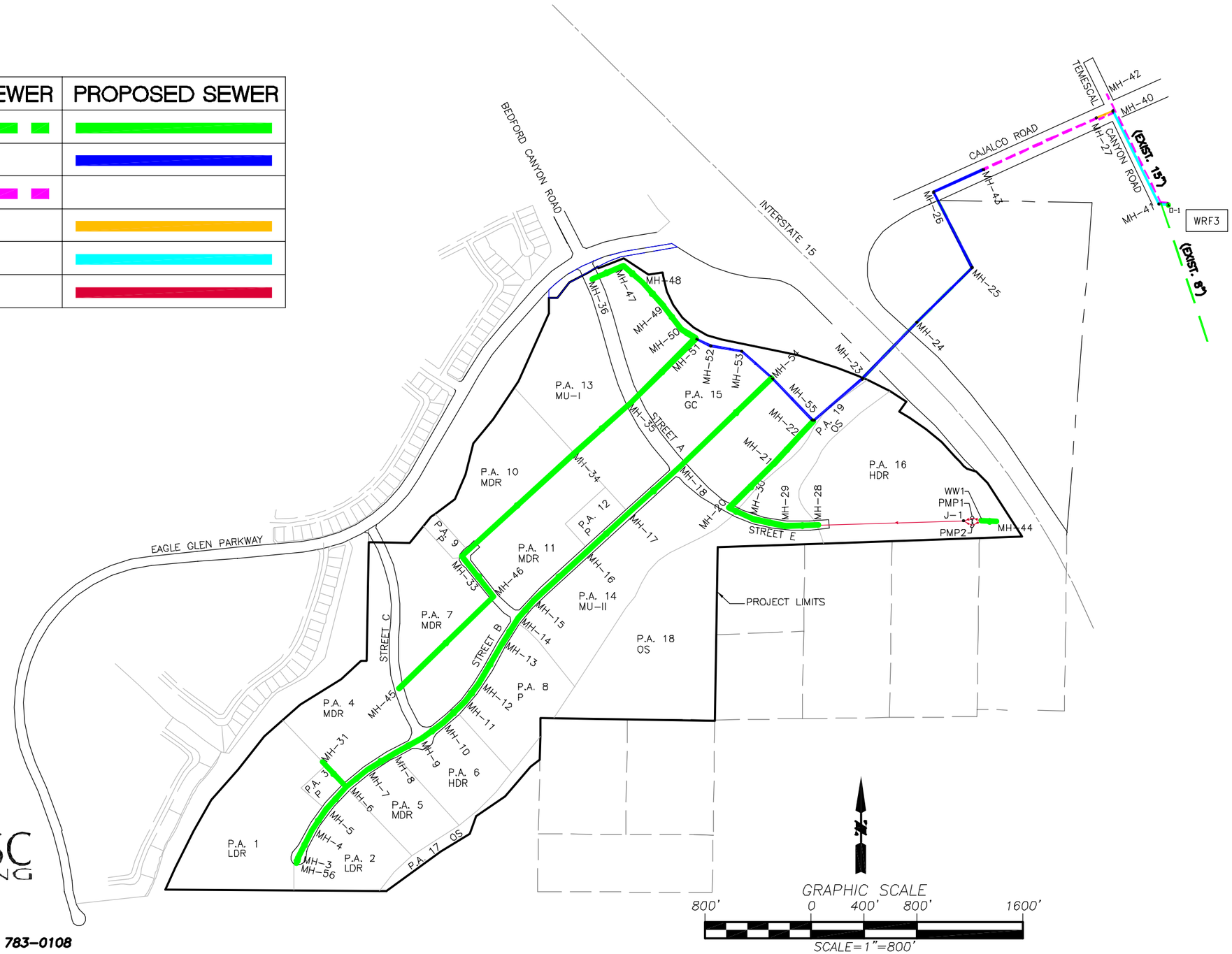
EXHIBIT 12: EXISTING AND PROPOSED PIPE LINE EXHIBIT

ARANTINE HILLS
EXISTING AND PROPOSED SEWER PIPELINE EXHIBIT

LEGEND:

	EXISTING SEWER	PROPOSED SEWER
8"		
12"		
15"		
18"		
21"		
4"*		

* FORCE MAIN



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COLTON, CA 92324
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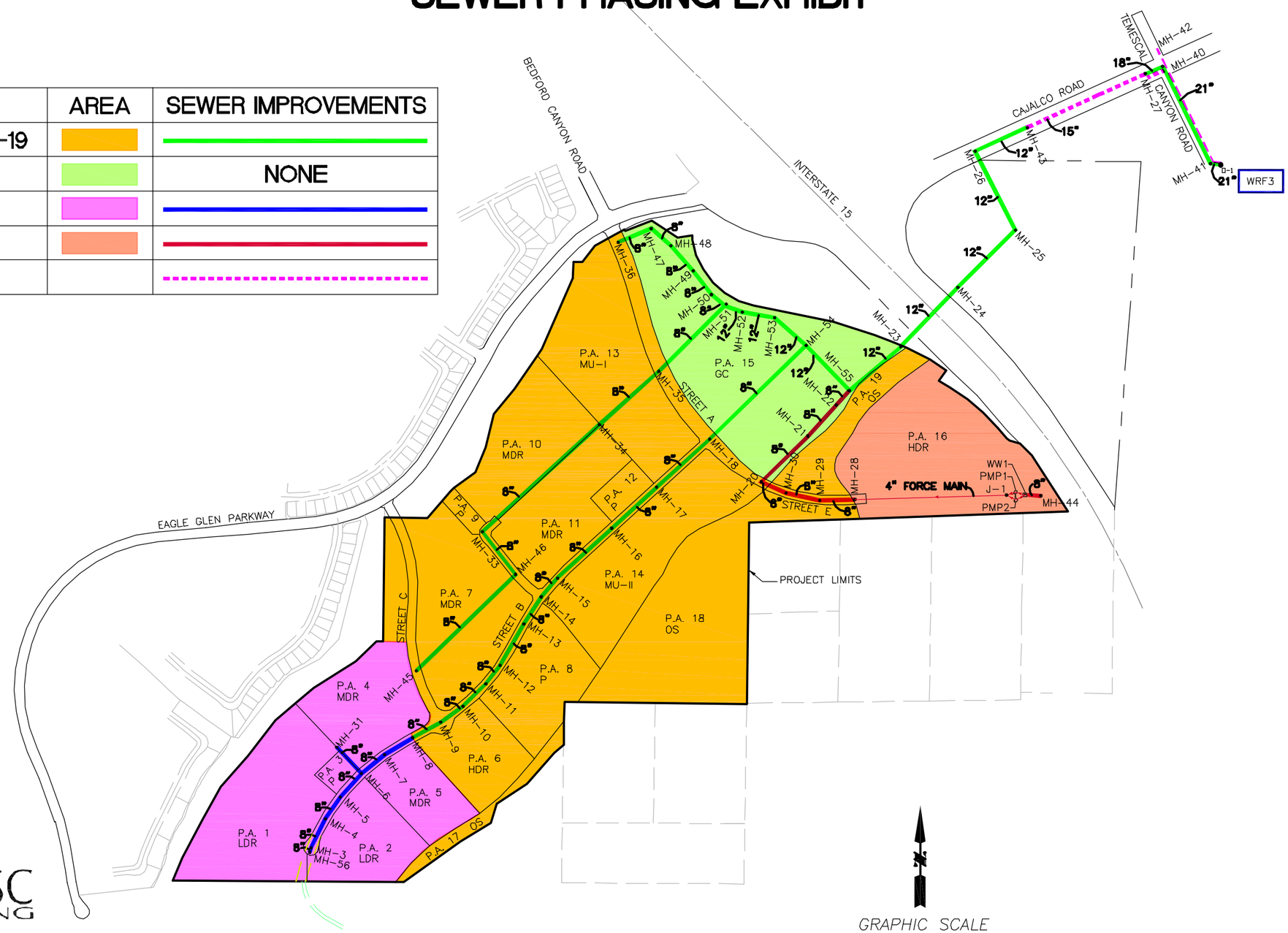
EXHIBIT 12

EXHIBIT 13: SEWER PHASING EXHIBIT

ARANTINE HILLS
SEWER PHASING EXHIBIT

LEGEND:

	P.A.	AREA	SEWER IMPROVEMENTS
PHASE 1	16-14; 17-19		
PHASE 2	15		NONE
PHASE 3	1-5		
PHASE 4	16		
EXIST. 15" SEWER			



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SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

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EXHIBIT 13

EXHIBIT 14: HYDRAULIC ANALYSIS RESULTS – PHASE 1, PHASE 2 AND PHASE 3 PEAK FLOWS

Phase 1 Sewer Peak Wet Weather Manhole Report

Label	Rim Elevation (ft)	Invert In Elevation 1 (ft)	Known Flow (cfs)	Total Flow (cfs)
MH-8	1056.30	N/A	0.06	0.06
MH-9	1046.90	1038.90	0.14	0.2
MH-10	1039.00	1031.00	0	0.2
MH-11	1029.60	1021.60	0.0027	0.2027
MH-12	1023.50	1015.50	0	0.2027
MH-13	1010.20	1002.20	0.01	0.2127
MH-14	1001.10	993.10	0	0.2127
MH-15	994.50	986.50	0	0.2127
MH-16	974.00	966.00	0	0.2127
MH-17	957.00	949.00	0.13	0.3427
MH-18	927.50	908.67	0	0.3427
MH-23	897.00	888.00	0	1.2827
MH-24	877.00	869.00	0	1.2827
MH-25	862.00	852.00	0	1.2827
MH-26	860.50	840.50	0	1.2827
MH-27	814.00	798.18	1.3502	5.4592
MH-33	997.00	989.00	0.16	0.28
MH-34	956.30	948.30	0.21	0.49
MH-35	938.00	930.00	0	0.49
MH-36	931.00	N/A	0.44	0.44
MH-40	811.00	797.28	0	5.4592
MH-41	808.60	794.65	1.443	6.9022
MH-43	844.88	837.38	2.8263	4.109
MH-45	1043.00	N/A	0.12	0.12
MH-46	999.00	991.40	0	0.12
MH-47	917.00	909.00	0	0.44
MH-48	916.00	906.00	0	0.44
MH-49	916.00	903.30	0	0.44
MH-50	916.00	900.90	0	0.44
MH-51	917.00	899.50	0	0.93
MH-52	912.00	898.50	0	0.93
MH-53	910.00	897.50	0	0.93
MH-54	909.00	894.70	0	1.2727
MH-55	908.00	890.90	0.01	1.2827

Phase 1 Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-8	MH-8	MH-9	1048.30	1038.90	0.0405	232	8 inch	0.06	2.4323	0.013	2.94	10.8
P-9	MH-9	MH-10	1038.90	1031.00	0.0401	197	8 inch	0.2	2.4198	0.013	4.19	19.4
P-10	MH-10	MH-11	1031.00	1021.60	0.0405	232	8 inch	0.2	2.4323	0.013	4.21	19.4
P-11	MH-11	MH-12	1021.60	1015.50	0.0363	168	8 inch	0.2027	2.3025	0.013	4.06	20.1
P-12	MH-12	MH-13	1015.50	1002.20	0.0386	345	8 inch	0.2027	2.3725	0.013	4.15	19.8
P-13	MH-13	MH-14	1002.20	993.10	0.0392	232	8 inch	0.2127	2.3931	0.013	4.24	20.1
P-14	MH-14	MH-15	993.10	986.50	0.0369	179	8 inch	0.2127	2.3203	0.013	4.14	20.5
P-15	MH-15	MH-16	986.50	966.00	0.0385	532	8 inch	0.2127	2.372	0.013	4.21	20.2
P-16	MH-16	MH-17	966.00	949.00	0.0386	440	8 inch	0.2127	2.3751	0.013	4.21	20.2
P-17	MH-17	MH-18	949.00	908.67	0.0780	517	8 inch	0.3427	3.3749	0.013	6.21	21.5
P-23	MH-23	MH-24	888.00	869.00	0.0317	599	12 inch	1.2827	6.345	0.013	6.33	30.5
P-24	MH-24	MH-25	869.00	852.00	0.0290	587	12 inch	1.2827	6.0628	0.013	6.12	31.2
P-25	MH-25	MH-26	852.00	840.50	0.0180	640	12 inch	1.2827	4.7756	0.013	5.16	35.4
P-29	MH-33	MH-34	989.00	948.30	0.0355	1145	8 inch	0.28	2.2782	0.013	4.43	23.7
P-30	MH-34	MH-35	948.30	930.00	0.0318	576	8 inch	0.49	2.1538	0.013	5	32.4
P-39	MH-27	MH-40	798.18	797.28	0.0064	140	18 inch	5.4592	8.4217	0.013	5.07	58.6
P-40	MH-40	MH-41	797.28	794.65	0.0033	807	21 inch	5.4592	9.045	0.013	3.94	56
P-41	MH-41	O-1	794.65	794.46	0.0040	48	21 inch	6.9022	9.9684	0.013	4.47	61.2
P-43	MH-26	MH-43	840.50	837.38	0.0076	413	12 inch	1.2827	3.0965	0.013	3.76	44.9
P-44	MH-43	MH-27	837.38	798.18	0.0422	930	15 inch	4.109	13.2616	0.013	9.53	38.2
P-46	MH-45	MH-46	1035.50	991.40	0.0441	999	8 inch	0.12	2.5388	0.013	3.73	14.8
P-47	MH-46	MH-33	991.40	989.00	0.0062	390	8 inch	0.12	0.9479	0.013	1.86	24
P-49	MH-55	MH-23	890.90	888.00	0.0149	195	12 inch	1.2827	4.3446	0.013	4.81	37.2
P-50	MH-36	MH-47	924.00	909.00	0.0579	259	8 inch	0.44	2.908	0.013	6.01	26.3
P-51	MH-47	MH-48	909.00	906.00	0.0160	188	8 inch	0.44	1.5264	0.013	3.78	36.8
P-52	MH-48	MH-49	906.00	903.30	0.0111	243	8 inch	0.44	1.2737	0.013	3.31	40.5
P-53	MH-49	MH-50	903.30	900.90	0.0111	216	8 inch	0.44	1.2737	0.013	3.31	40.5
P-54	MH-50	MH-51	900.90	899.50	0.0111	126	8 inch	0.44	1.2737	0.013	3.31	40.5
P-55	MH-51	MH-52	899.50	898.50	0.0054	184	12 inch	0.93	2.6264	0.013	3.06	41.1
P-56	MH-52	MH-53	898.50	897.50	0.0049	203	12 inch	0.93	2.5005	0.013	2.95	42.2
P-57	MH-53	MH-54	897.50	894.70	0.0071	393	12 inch	0.93	3.0071	0.013	3.37	38.2
P-58	MH-54	MH-55	894.70	890.90	0.0097	391	12 inch	1.2727	3.5121	0.013	4.11	41.6

Phase 1 Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-59	MH-35	MH-51	930.00	899.50	0.0453	674	8 inch	0.49	2.5705	0.013	5.67	29.6
P-60	MH-18	MH-54	908.67	894.70	0.0119	1176	12 inch	0.3427	3.883	0.013	3.05	20.1

PHASE 2 ANALYSIS

Phase 2 Sewer Peak Wet Weather Manhole Report

Label	Rim Elevation (ft)	Invert In Elevation 1 (ft)	Known Flow (cfs)	Total Flow (cfs)
MH-8	1,056.30	N/A	0.06	0.06
MH-9	1,046.90	1,038.90	0.14	0.2
MH-10	1,039.00	1,031.00	0	0.2
MH-11	1,029.60	1,021.60	0.0027	0.2027
MH-12	1,023.50	1,015.50	0	0.2027
MH-13	1,010.20	1,002.20	0.01	0.2127
MH-14	1,001.10	993.1	0	0.2127
MH-15	994.5	986.5	0	0.2127
MH-16	974	966	0	0.2127
MH-17	957	949	0.13	0.3427
MH-18	927.5	908.67	0	0.3427
MH-23	897	888	0	1.4727
MH-24	877	869	0	1.4727
MH-25	862	852	0	1.4727
MH-26	860.5	840.5	0	1.4727
MH-27	814	798.18	1.3502	5.6492
MH-33	997	989	0.16	0.28
MH-34	956.3	948.3	0.21	0.49
MH-35	938	930	0	0.49
MH-36	931	N/A	0.44	0.44
MH-40	811	797.28	0	5.6492
MH-41	808.6	794.65	1.443	7.0922
MH-43	844.88	837.38	2.8263	4.299
MH-45	1,043.00	N/A	0.12	0.12
MH-46	999	991.4	0	0.12
MH-47	917	909	0	0.44
MH-48	916	906	0	0.44
MH-49	916	903.3	0	0.44
MH-50	916	900.9	0	0.44
MH-51	917	899.5	0	0.93
MH-52	912	898.5	0	0.93
MH-53	910	897.5	0	0.93
MH-54	909	894.7	0	1.2727
MH-55	908	890.9	0.2	1.4727

Phase 2 Sewer Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-8	MH-8	MH-9	1,048.30	1,038.90	0.040517	232	8 inch	0.06	2.4323	0.013	2.94	10.8
P-9	MH-9	MH-10	1,038.90	1,031.00	0.040102	197	8 inch	0.2	2.4198	0.013	4.19	19.4
P-10	MH-10	MH-11	1,031.00	1,021.60	0.040517	232	8 inch	0.2	2.4323	0.013	4.21	19.4
P-11	MH-11	MH-12	1,021.60	1,015.50	0.03631	168	8 inch	0.2027	2.3025	0.013	4.06	20.1
P-12	MH-12	MH-13	1,015.50	1,002.20	0.038551	345	8 inch	0.2027	2.3725	0.013	4.15	19.8
P-13	MH-13	MH-14	1,002.20	993.1	0.039224	232	8 inch	0.2127	2.3931	0.013	4.24	20.1
P-14	MH-14	MH-15	993.1	986.5	0.036872	179	8 inch	0.2127	2.3203	0.013	4.14	20.5
P-15	MH-15	MH-16	986.5	966	0.038534	532	8 inch	0.2127	2.372	0.013	4.21	20.2
P-16	MH-16	MH-17	966	949	0.038636	440	8 inch	0.2127	2.3751	0.013	4.21	20.2
P-17	MH-17	MH-18	949	908.67	0.078008	517	8 inch	0.3427	3.3749	0.013	6.21	21.5
P-23	MH-23	MH-24	888	869	0.03172	599	12 inch	1.4727	6.345	0.013	6.58	32.8
P-24	MH-24	MH-25	869	852	0.028961	587	12 inch	1.4727	6.0628	0.013	6.37	33.6
P-25	MH-25	MH-26	852	840.5	0.017969	640	12 inch	1.4727	4.7756	0.013	5.36	38.1
P-29	MH-33	MH-34	989	948.3	0.035546	1,145.00	8 inch	0.28	2.2782	0.013	4.43	23.7
P-30	MH-34	MH-35	948.3	930	0.031771	576	8 inch	0.49	2.1538	0.013	5	32.4
P-39	MH-27	MH-40	798.18	797.28	0.006429	140	18 inch	5.6492	8.4217	0.013	5.11	59.9
P-40	MH-40	MH-41	797.28	794.65	0.003259	807	21 inch	5.6492	9.045	0.013	3.97	57.3
P-41	MH-41	O-1	794.65	794.46	0.003958	48	21 inch	7.0922	9.9684	0.013	4.5	62.3
P-43	MH-26	MH-43	840.5	837.38	0.007554	413	12 inch	1.4727	3.0965	0.013	3.89	48.6
P-44	MH-43	MH-27	837.38	798.18	0.042151	930	15 inch	4.299	13.2616	0.013	9.65	39.2
P-46	MH-45	MH-46	1,035.50	991.4	0.044144	999	8 inch	0.12	2.5388	0.013	3.73	14.8
P-47	MH-46	MH-33	991.4	989	0.006154	390	8 inch	0.12	0.9479	0.013	1.86	24
P-49	MH-55	MH-23	890.9	888	0.014872	195	12 inch	1.4727	4.3446	0.013	5	40.1
P-50	MH-36	MH-47	924	909	0.057915	259	8 inch	0.44	2.908	0.013	6.01	26.3
P-51	MH-47	MH-48	909	906	0.015957	188	8 inch	0.44	1.5264	0.013	3.78	36.8
P-52	MH-48	MH-49	906	903.3	0.011111	243	8 inch	0.44	1.2737	0.013	3.31	40.5
P-53	MH-49	MH-50	903.3	900.9	0.011111	216	8 inch	0.44	1.2737	0.013	3.31	40.5
P-54	MH-50	MH-51	900.9	899.5	0.011111	126	8 inch	0.44	1.2737	0.013	3.31	40.5
P-55	MH-51	MH-52	899.5	898.5	0.005435	184	12 inch	0.93	2.6264	0.013	3.06	41.1
P-56	MH-52	MH-53	898.5	897.5	0.004926	203	12 inch	0.93	2.5005	0.013	2.95	42.2
P-57	MH-53	MH-54	897.5	894.7	0.007125	393	12 inch	0.93	3.0071	0.013	3.37	38.2
P-58	MH-54	MH-55	894.7	890.9	0.009719	391	12 inch	1.2727	3.5121	0.013	4.11	41.6

Phase 2 Sewer Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-59	MH-35	MH-51	930	899.5	0.045252	674	8 inch	0.49	2.5705	0.013	5.67	29.6
P-60	MH-18	MH-54	908.67	894.7	0.011879	1,176.00	12 inch	0.3427	3.883	0.013	3.05	20.1

PHASE 3 ANALYSIS

Phase 3 Sewer Peak Wet Weather Manhole Report

Label	Rim Elevation (ft)	Invert In Elevation 1 (ft)	Known Flow (cfs)	Total Flow (cfs)
MH-3	1,101.38	1,093.38	0	0.82
MH-4	1,092.00	1,084.00	0	0.82
MH-5	1,084.00	1,076.00	0	0.82
MH-6	1,075.00	1,064.00	0.04	0.94
MH-7	1,066.70	1,058.70	0	0.94
MH-8	1,056.30	1,048.30	0.06	1
MH-9	1,046.90	1,038.90	0.14	1.14
MH-10	1,039.00	1,031.00	0	1.14
MH-11	1,029.60	1,021.60	0.0027	1.1427
MH-12	1,023.50	1,015.50	0	1.1427
MH-13	1,010.20	1,002.20	0.01	1.1527
MH-14	1,001.10	993.1	0	1.1527
MH-15	994.5	986.5	0	1.1527
MH-16	974	966	0	1.1527
MH-17	957	949	0.13	1.2827
MH-18	942	934	0	1.2827
MH-23	897	888	0	2.4127
MH-24	877	869	0	2.4127
MH-25	862	852	0	2.4127
MH-26	860.5	840.5	0	2.4127
MH-27	814	798.18	1.3502	6.5892
MH-31	1,073.70	N/A	0.08	0.08
MH-33	997	989	0.16	0.28
MH-34	956.3	948.3	0.21	0.49
MH-35	938	930	0	0.49
MH-36	931	N/A	0.44	0.44
MH-40	811	797.28	0	6.5892
MH-41	808.6	794.65	1.443	8.0322
MH-43	844.88	837.38	2.8263	5.239
MH-45	1,043.00	N/A	0.12	0.12
MH-46	999	991.4	0	0.12
MH-47	917	909	0	0.44
MH-48	916	906	0	0.44
MH-49	916	903.3	0	0.44
MH-50	916	900.9	0	0.44
MH-51	917	899.5	0	0.93
MH-52	912	898.5	0	0.93
MH-53	910	897.5	0	0.93
MH-54	909	894.7	0	2.2127
MH-55	908	890.9	0.2	2.4127
MH-56	1,101.00	N/A	0.82	0.82

Phase 3 Sewer Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-3	MH-3	MH-4	1093.38	1084.00	0.0401	234	8 inch	0.82	2.4193	0.013	6.26	40.1
P-4	MH-4	MH-5	1084.00	1076.00	0.0421	190	8 inch	0.82	2.4795	0.013	6.38	39.6
P-5	MH-5	MH-6	1076.00	1064.00	0.0524	229	8 inch	0.82	2.7661	0.013	6.9	37.3
P-7	MH-7	MH-8	1058.70	1048.30	0.0437	238	8 inch	0.94	2.5259	0.013	6.7	42.2
P-8	MH-8	MH-9	1048.30	1038.90	0.0405	232	8 inch	1	2.4323	0.013	6.63	44.7
P-9	MH-9	MH-10	1038.90	1031.00	0.0401	197	8 inch	1.14	2.4198	0.013	6.83	48.3
P-10	MH-10	MH-11	1031.00	1021.60	0.0405	232	8 inch	1.14	2.4323	0.013	6.86	48.1
P-11	MH-11	MH-12	1021.60	1015.50	0.0363	168	8 inch	1.1427	2.3025	0.013	6.58	49.8
P-12	MH-12	MH-13	1015.50	1002.20	0.0386	345	8 inch	1.1427	2.3725	0.013	6.73	48.9
P-13	MH-13	MH-14	1002.20	993.10	0.0392	232	8 inch	1.1527	2.3931	0.013	6.79	48.9
P-14	MH-14	MH-15	993.10	986.50	0.0369	179	8 inch	1.1527	2.3203	0.013	6.64	49.8
P-15	MH-15	MH-16	986.50	966.00	0.0385	532	8 inch	1.1527	2.372	0.013	6.75	49.2
P-16	MH-16	MH-17	966.00	949.00	0.0386	440	8 inch	1.1527	2.3751	0.013	6.75	49.1
P-17	MH-17	MH-18	949.00	934.00	0.0290	517	8 inch	1.2827	2.0582	0.013	6.22	57.2
P-23	MH-23	MH-24	888.00	869.00	0.0317	599	12 inch	2.4127	6.345	0.013	7.53	42.8
P-24	MH-24	MH-25	869.00	852.00	0.0290	587	12 inch	2.4127	6.0628	0.013	7.28	43.9
P-25	MH-25	MH-26	852.00	840.50	0.0180	640	12 inch	2.4127	4.7756	0.013	6.1	50.3
P-27	MH-31	MH-6	1066.50	1064.00	0.0096	261	8 inch	0.08	1.1826	0.013	1.93	17.6
P-29	MH-33	MH-34	989.00	948.30	0.0355	1,145.00	8 inch	0.28	2.2782	0.013	4.43	23.7
P-30	MH-34	MH-35	948.30	930.00	0.0318	576	8 inch	0.49	2.1538	0.013	5	32.4
P-39	MH-27	MH-40	798.18	797.28	0.0064	140	18 inch	6.5892	8.4217	0.013	5.27	66.6
P-40	MH-40	MH-41	797.28	794.65	0.0033	807	21 inch	6.5892	9.045	0.013	4.1	63.3
P-41	MH-41	O-1	794.65	794.46	0.0040	48	21 inch	8.0322	9.9684	0.013	4.61	68
P-43	MH-26	MH-43	840.50	837.38	0.0076	413	12 inch	2.4127	3.0965	0.013	4.36	66.4
P-44	MH-43	MH-27	837.38	798.18	0.0422	930	15 inch	5.239	13.2616	0.013	10.17	43.7
P-46	MH-45	MH-46	1035.50	991.40	0.0441	999	8 inch	0.12	2.5388	0.013	3.73	14.8
P-47	MH-46	MH-33	991.40	989.00	0.0062	390	8 inch	0.12	0.9479	0.013	1.86	24
P-49	MH-55	MH-23	890.90	888.00	0.0149	195	12 inch	2.4127	4.3446	0.013	5.68	53.2
P-50	MH-36	MH-47	924.00	909.00	0.0579	259	8 inch	0.44	2.908	0.013	6.01	26.3
P-51	MH-47	MH-48	909.00	906.00	0.0160	188	8 inch	0.44	1.5264	0.013	3.78	36.8
P-52	MH-48	MH-49	906.00	903.30	0.0111	243	8 inch	0.44	1.2737	0.013	3.31	40.5
P-53	MH-49	MH-50	903.30	900.90	0.0111	216	8 inch	0.44	1.2737	0.013	3.31	40.5

Phase 3 Sewer Peak Wet Weather Pipe Report

Label	Upstream Node	Downstream Node	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Length (ft)	Section Size	Total Flow (cfs)	Design Capacity (cfs)	Mannings n	Average Velocity (ft/s)	Normal Depth / Rise (d/D) (%)
P-54	MH-50	MH-51	900.90	899.50	0.0111	126	8 inch	0.44	1.2737	0.013	3.31	40.5
P-55	MH-51	MH-52	899.50	898.50	0.0054	184	12 inch	0.93	2.6264	0.013	3.06	41.1
P-56	MH-52	MH-53	898.50	897.50	0.0049	203	12 inch	0.93	2.5005	0.013	2.95	42.2
P-57	MH-53	MH-54	897.50	894.70	0.0071	393	12 inch	0.93	3.0071	0.013	3.37	38.2
P-58	MH-54	MH-55	894.70	890.90	0.0097	391	12 inch	2.2127	3.5121	0.013	4.73	57.6
P-59	MH-35	MH-51	930.00	899.50	0.0453	674	8 inch	0.49	2.5705	0.013	5.67	29.6
P-6	MH-6	MH-7	1064.00	1058.70	0.0245	216	8 inch	0.94	1.8928	0.013	5.41	49.8
P-60	MH-18	MH-54	934.00	894.70	0.0334	1,176.00	8 inch	1.2827	2.2089	0.013	6.56	54.7
P-61	MH-56	MH-3	1094.00	1093.38	0.0177	35	8 inch	0.82	1.6082	0.013	4.63	50.6

PHASE 1 ANALYSIS

PHASE 2 ANALYSIS

PHASE 3 ANALYSIS