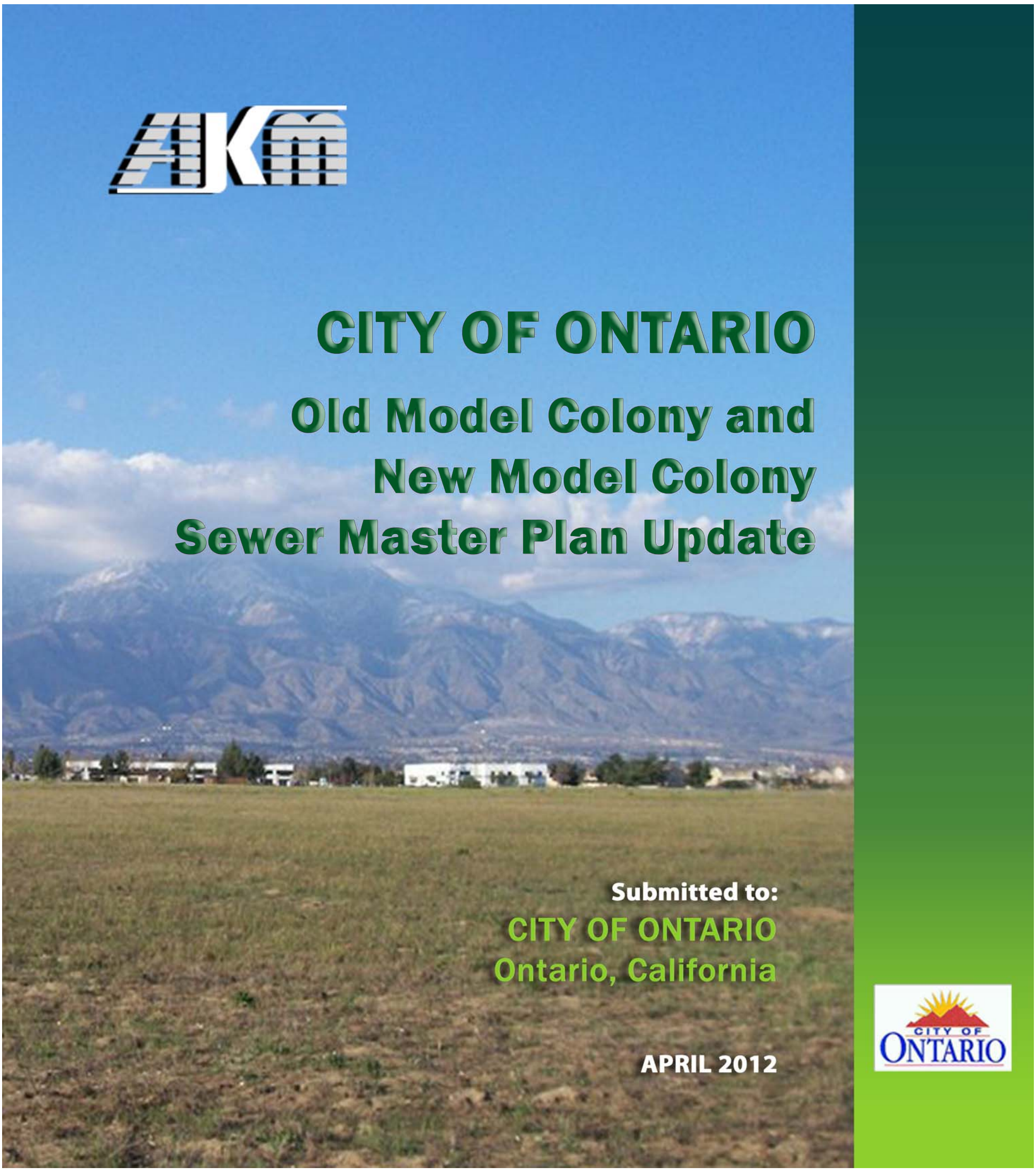
Appendix K: 2012 Old Model Colony and New Model Colony Sewer Master Plan Update


CITY OF ONTARIO
Old Model Colony and
New Model Colony
Sewer Master Plan Update
Submitted to:
CITY OF ONTARIO
Ontario, California
APRIL 2012
CITY OF
ONTARIO

CITY OF ONTARIO

OLD MODEL COLONY and NEW MODEL COLONY SEWER MASTER PLAN UPDATE

Date of Signing: 4/30/12

Date of Signing: 4/30/12

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April 2012

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Section 1

EXECUTIVE SUMMARY

1-1 Introduction

Background

The City of Ontario has a population of about 174,536. Its boundaries cover approximately 49 square miles of residential, commercial, industrial, public and agricultural lands as well as the Ontario International Airport.

The existing Old Model Colony sewer collection system is made up of a network of gravity sewers, pump stations, and force mains. The gravity system consists of approximately 365.7 miles (1,931,134 ft) of pipe and 7,582 manholes and cleanouts. The system also includes three pump stations and 11,588 feet of associated force mains. The total existing average sewer load for Old Model Colony is estimated at 18.75 mgd. With an existing population of 174,536 persons, this is equivalent to approximately 107 gpd/person.

Objectives

The objective of this Master Plan is to evaluate the City's sewer collection system and to provide a framework for undertaking the construction of new and replacement facilities for the service area in an efficient and cost effective manner. As a planning document, it is general in nature and is predicated upon the best information available at this time.

1-2 Study Area

Location

The study area is located approximately 35 miles east of downtown Los Angeles and encompasses approximately 49 square miles of residential, commercial, industrial, public and agricultural lands as well as the Ontario International Airport.

The City is divided into two distinct areas, Old Model Colony (OMC) and New Model Colony (NMC). The two areas are generally divided by Riverside Drive. OMC consists of existing residential, commercial, and industrial developments. It comprises approximately 36 square miles. NMC is an agricultural area that was annexed to the City in 1999. It is approximately 13 square miles and currently consists of primarily agricultural land. The City's 2010 General Plan details plans to develop the agricultural lands in NMC into a mix of residential, commercial, industrial, and public uses. The ultimate residential population of NMC is expected to reach 162,518. Development of NMC has begun with the construction of the Brookfield Homes Development, Edenglen, located southwest of the intersection of Riverside Drive and Mill Creek Avenue.

Topography

Elevations within the study area range from 1170 feet amsl at the north City boundary near Grove Avenue to 630 feet amsl at the intersection of Archibald Avenue and Schaefer Avenue. The terrain slopes generally from north to south and east to west.

Climate

The climate in the area is Mediterranean-like with generally moderate temperatures and low humidity year-round. The average median temperature is approximately 83^{o} F. The average annual days of sunshine is 312. The historical average annual rainfall is about 11.3 inches. Most of the rainfall typically occurs between October and April

Land Use

Existing Conditions - The City is a well planned urban community with a balance of residential, commercial, and industrial land uses. Within the service area, the primary land use in the City is residential (8,921 Ac or 27.9 %). Industrial use also makes up a significant portion of the total existing land use (4,898 Ac or 15.3%). Approximately 3,369 acres or 10.5 percent of the total is currently undeveloped. The total number of housing units in the City is estimated at 47,390.

Ultimate Conditions - The ultimate land uses are based upon the City's latest general plan document entitled *The Ontario Plan (2010).* The residential area increases to 10,915 acres (34.2 percent of total). The employment area, including business parks and industrial uses, is expected to entail about 8,103 acres (25.4 percent of total). The total number of ultimate housing units is estimated at 104,030.

Population

Since its incorporation in 1890, the City of Ontario has grown from a population of 683 to approximately 174,536 in 2010 (*Ref: California Department of Finance*). With the total number of housing units at approximately 47,795 and a 3.7 percent vacancy rate, the population per household is estimated to be 3.8 (*Ref: California Department of Finance*).

The ultimate population in New Model Colony is expected to be approximately 162,518 (*Ref: 2010 General Plan Approved Landuse Buildout Estimate Table*). The ultimate population in Old Model Colony is estimated at 195,752. The total ultimate population is estimated at 358,270 which will more than double the existing population.

1-3 Criteria

General

Establishing performance standards is an important part of evaluating existing wastewater collection systems, as it forms the basis for system analysis and system improvement recommendations. These standards include methodology for estimating wastewater design flows and minimum design standards for the collection system pipes, pump stations, and force mains.

Flow Monitoring

In order to estimate the residential, commercial, and industrial wastewater flows in the City, a temporary flow monitoring study was conducted by ADS Environmental Services from November 4, 2006 to December 12, 2006 at fifteen locations.

Unit Flow Factors

Unit flow factors utilized in this study were developed based upon the existing land uses obtained from the City's GIS and results of the flow monitoring studies. Water use records, aerial photographs and field reviews supplemented this information. The Ultimate Unit Flow Factors are shown in Table 1-1. See Section 4-2 for further details on the development of the unit flow factors utilized in this study.

Table 1-1
Ultimate Unit Flow Factors

Landuse		Density (du/ac)	Density (people/du)	FAR	Aveage Dry Weather Unit Flow Factor[1]			
Residential								
Rural Residential	RR	0 - 2	4.0		250	gpd/du	500	gpd/ac
Low Density Residential	LDR	2 - 5	4.0		240	gpd/du	1,200	gpd/ac
Low Medium Density Residential	LMDR	5 - 11	4.0		240	gpd/du	2,000	gpd/ac
Medium Density Residential (OMC)	MDR	11 - 25	3.8		210	gpd/du	4,200	gpd/ac
Medium Density Residential (NMC)	MDR	11 - 25	3.3		182	gpd/du	4,200	gpd/ac
High Density Residential (OMC)	HDR	25 - 45	3.3		180	gpd/du	6,300	gpd/ac
High Density Residential (MU Areas)	HDR	25 - 45	2.0		110	gpd/du	5,000	gpd/ac
Commercial								
Business Park	BP			0.40	70	gpd/tsf	1,200	gpd/ac
General Commercial	GC			0.30	70	gpd/tsf	900	gpd/ac
Hospitality[2]	HOS			1.00	100	gpd/tsf	140	gpd/room
Neighborhood Commercial	NC			0.30	100	gpd/tsf	1,300	gpd/ac
Office Commercial	OC			0.75	90	gpd/tsf	3,000	gpd/ac
Restaurant[3]					1,000	gpd/tsf		
Industrial								
Industrial	IND			0.55	70	gpd/tsf	1,600	gpd/ac
Mixed Use								
Mixed Use	MU				Use various unit flow factors for			
Open Space								
Open Space Non-Recreational	OS-NR						200	gpd/ac
Open Space Recreational	OS-R						200	gpd/ac
Public								
Public Facility	PF						1,500	gpd/ac
Public School - Elementary[4]	PS				15	gpd/stu		
Public School - Junior High or High School[4]	PS				20	gpd/stu		

[1] Unit Flow Factor Abbreviations:
ac = acre
du = dwelling unit
gpd = gallons per day
room = hotel/motel room
stu = student
tsf = thousand square feet

[2] For future hospitality areas, sewage loads can be estimated based on the number of projected rooms. It is not recommended to estimate the load based on acreage.

[3] For future restaurants, sewage loads can be estimated based on the building square footage.

[4] For future schools, sewage loads should be estimated based on the number of students. It is not recommended to estimate the load based on acreage.

Peaking Factors

The adequacy of a sewage collection system is based upon its ability to convey the peak dry weather flow (PDWF) and peak wet weather flow (PWWF).

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. Based upon the information from the temporary flow monitoring effort, the following peaking relationships for dry weather and wet weather were selected for this study:

$$Q_{peak}\ (mgd) = 2.0 \times Q_{ave}\ (mgd)^{0.92}$$

where Q_{peak} = Peak Dry Weather Flow
Q_{ave} = Average Dry Weather Flow

Peak Wet Weather Flow (PWWF) = 1.34 x Peak Dry Weather Flow (PDWF)

Sewer Design Criteria

Design criteria are established to ensure that the collection system can operate effectively under all flow conditions. Each pipe segment must convey the peak wet weather flows without surcharging the system. Low flows must be conveyed at a velocity that will prevent solids from settling and blocking the system. A summary of the established sewer system criteria is shown in Table 1-2. Specific details of the criteria recommended for the collection system, the pump stations, and service to Specific Plan and development sub-areas are included in Section 4 of this report.

1-4 Existing Sewer System

General Description

The City's existing sewer collection system in Old Model Colony is made up of a network of gravity sewers, pump stations, and force mains. The gravity system consists of approximately 365.7 miles (1,931,134 ft) of pipe and 7,582 manholes and cleanouts. The system also includes three existing pump stations and 11,588 feet of associated force mains. The total existing average sewer load for Old Model Colony is estimated at 18.75 mgd. With an existing population of 174,536 persons, this is equivalent to approximately 107 gpd/person.

The general direction of flow is from north to south and east to west. The majority of the local sewers tie directly into one of the Inland Empire Utilities Agency (IEUA) trunk sewers crossing through the City. The sewage is then transported to IEUA's Regional Plant No. 1 (RP-1) and RP-5 for treatment.

The existing sewers are primarily constructed of vitrified clay pipe with sizes ranging from 4-inches to 42-inches in diameter. Approximately 75 percent of the pipes are 8-inches in diameter. The majority of the sewer system was constructed between 1950 and 1990. Some of the collection system was constructed as early as 1895.

Table 1-2
Sewer System Criteria

Collection System	
Minimum Pipe Size	8-inch
Minimum Velocity	2.0 ft/sec at average flow 3.0 ft/sec at peak dry weather flow
Pipe Depth to Diameter Ratio for *Existing Pipes*	0.64 for all pipe sizes at peak dry weather flow 0.82 for all pipe sizes at peak wet weather flow
Pipe Depth to Diameter Ratio for *New Construction*	0.50 for pipes 12-inches and smaller at peak dry weather flow 0.64 for pipes 15-inches and larger at peak dry weather flow 0.82 for all pipe sizes at peak wet weather flow
Pump Stations	
Pumps	▪ Minimum 2 each sized at peak wet weather flow ▪ Minimum solids handling capacity 3"
Wet Wells	▪ Sized to limit pump cycling to less than 4 to 6 times/hr ▪ Provide sufficient storage at peak wet weather flow to allow response to a failure ▪ Equipment to be maintained must be accessible without entering structure
Ventilation	▪ 12 -air changes/hour minimum in dry well and as required by NFPA 820 ▪ 30-air changes/hour minimum in wet well if not operated continuously ▪ 12-air changes/hour minimum in wet well if operated continuously
Controls	Redundant system. Float operated back-up controls.
Emergency Power	Stationary source with automatic transfer switch
Telemetry	Full SCADA with dialer system as back up at all pump stations to alert personnel in the event of a station failure.
Force Mains	▪ Minimum velocity 3.0 ft/sec ▪ Maximum velocity 5.0 ft/sec ▪ Minimum size 4" ▪ Air/Vacs installed in vaults ▪ Plumb Air/Vacs piping back to wet well to avoid discharges of raw sewage to vaults

Regional Facilities

Regional wastewater services are provided to the City of Ontario and its neighboring agencies by the Inland Empire Utilities Agency (IEUA). Several regional trunk sewers collect sewage generated in the City and transport it to IEUA's Regional Plant No.1 and Regional Plant No.5 for treatment. RP-1, located south of the Pomona Freeway (SR-60) and west of Cucamonga Creek, has been in operation since 1948 and has a current capacity of 44 million gallons per day. RP-1 also serves the Cities of Rancho Cucamonga, Upland, Montclair, Fontana, and portions of unincorporated San Bernardino County.

IEUA began operation of Regional Plant No. 5 (RP-5) in March 2004. RP-5 is located in the City of Chino at the southeast corner of Kimball Avenue and El Prado Road. Sewage generated in New Model Colony, as well as the wastewater flows diverted from the Old Model Colony sewer pump station tributary areas are treated at RP-5. The ultimate treatment capacity of RP-5 will be 60 million gallons per day.

IEUA had originally planned to bypass an average flow of up to 20 mgd from RP-1 to RP-5 via the NMC sewer system and Kimball Interceptor Sewer located on Kimball Avenue west of Baker Street. The first NMC sewer constructed (Eastern Trunk Sewer) was designed to carry 9 mgd of bypass flow from RP-1. Currently, IEUA does not expect to pursue the remaining 11 mgd bypass capacity in the NMC sewer system.

Sewersheds

The City's service area has been divided into eight (8) sewersheds, primarily based on the outlet points where the City's system ties into a downstream facility owned by IEUA.

Inverted Siphons

The City's existing sewer collection system includes inverted siphons at nine locations. Each was constructed to go under a major flood control channel or a conflicting utility. The primary concern with siphons is the fact that grease and debris can often build up in the depressed section requiring frequent maintenance to prevent sewer spills.

Flow Splits

Multiple flow splits exist within the existing sewer collection system. Field investigations were conducted at the "major" flow splits, which are identified as those located on a main trunk sewer with larger tributary areas.

Septic Tanks

There are approximately 206 septic tanks in Old Model Colony per City records. Initial recommendations for connecting the parcels with septic tanks to the existing sewer system are provided in Section 5-6. It was beyond the scope of work of this study to conduct evaluations of individual site. Future work to determine the feasibility of connecting these parcels to the sewer system may include field investigations, site surveys, and review of existing utility plans.

Pump Stations

Details of the existing Magnolia Pump Station, Haven Pump Station, and Edenglen Pump Station are provided in Section 5-8. Each of the firm capacities of the pump stations was found to be sufficient for pumping the existing and ultimate estimated tributary peak wet weather sewage flows.

1-5 Ultimate Sewer System

The ultimate sewer collection system will include service to New Model Colony. Approximately 140,000 feet of additional trunk sewer will be added to the City's system in New Model Colony, ranging in size from 12-inches to 36-inches.

The ultimate average sewage generation for Old Model Colony and New Model Colony is estimated at 45.03 mgd. The increase in ultimate flow is due to development of New Model Colony anticipated densification in land use and population per the City's 2010 General Plan and the assumption that the area will be fully occupied. Water conservation efforts were not included in the ultimate average sewage generation estimate. For planning purposes, it is believed to be better not to include water conservation efforts that are not definitive. This will prevent the undersizing of gravity sewers and pump stations. A summary of the projected sewage generation by landuse is shown in Table 1-3.

Table 1-3
City of Ontario
Ultimate Sewage Generation

Land Use Type	OMC Sewer Loads (gpd)	NMC Sewer Loads (gpd)	Sewer Loads due to High Water Users (gpd)	Total (gpd)	Total (mgd)
Rural Residential	226,497	0	0	226,497	0.23
Low Density Residential	4,022,533	3,486,222	35,039	7,543,793	7.54
Low-Medium Density Residential	546,270	1,030,784	108,882	1,685,936	1.69
Medium Density Residential	3,100,730	5,082,309	250,186	8,433,225	8.43
High Density Residential	1,516,007	0	0	1,516,007	1.52
General Commercial	354,181	133,876	15,364	503,422	0.50
Business Park	718,599	936,539	3,155	1,658,293	1.66
Hospitality	631,304	0	0	631,304	0.63
Neighborhood Commercial	214,663	139,885	31,247	385,795	0.39
Office Commercial	1,178,265	367,181	0	1,545,446	1.55
Industrial	10,205,821	450,619	1,125,948	11,782,388	11.78
Public Facility	144,223	3,725	0	147,948	0.15
Public School	565,600		0	565,600	0.57
Airport	507,053		0	507,053	0.51
Mixed Use	4,971,008	1,791,707	2,298	6,765,013	6.77
Open Space - Non-Recreational	137,649	101,268	0	238,918	0.24
Open Space - Recreational	105,621	92,647	691,819	890,087	0.89
Total	**29,146,027**	**13,616,761**	**2,263,937**	**45,026,724**	**45.03**

1-6 Hydraulic Sewer Model

Hydraulic Model Software

To perform a detailed analysis of the sewer collection system, it is essential to create a mathematical model that is capable of simulating the operating characteristics of the system. The simulations for this study were performed utilizing Info Sewer, which is a GIS based computer program with the ability to perform steady state analyses of the flows in sanitary sewer systems.

Construction of Model Geometry

Information gathered from the City sewer GIS files, atlas sheets, as-built drawings and interviews with City staff was used to create the model geometry of the existing system. Only active sewers owned by the City of Ontario were included in the hydraulic model. Regional sewers were not modeled.

Missing Information

The City's existing sewer GIS data was not 100 percent complete. Approximately 1,175 reaches were found to be missing invert elevations, the length of the pipe, and/or the slope of the pipe. Several steps, described in Section 7-3, were taken to fill in the data gaps with the most accurate data available.

Split Manholes and Flow Patterns

From the existing sewer GIS and sewer atlas sheets, 135 split manholes (more than one pipe exiting the manhole) were identified in the collection system. Many of these split manholes are located at summits in the upstream portions of the system. Thirty-eight (38) split manholes were identified for further investigation due to their potential significance on the hydraulic model results. As-built plans were reviewed and field inspections of the 38 "major" split manhole locations were conducted. The information obtained was used to select flow monitoring locations and to calibrate the hydraulic model.

Model Loads

The existing land uses and the calibrated unit flow factors were utilized to apply the average loads (sewage flows) to the existing model. The ultimate land uses and the ultimate unit flow factors were utilized to apply the average loads to the ultimate model.

Peak dry weather flows are calculated in the model by a user defined relationship. The peaking formula used in the sewer model is as follows:

$$Q_{peak}\ (cfs) = 2.0 \times Q_{ave}(cfs)^{0.92}$$

The sewage loads were applied to the model manholes with the use of Traffic Area Zone (TAZ) information provided by the City's planning department. TAZ information included a breakdown of the ultimate land uses in terms of number of dwelling units for residential areas, building square footage for commercial and industrial areas, and acreage for open space and public facilities. This information combined with the ultimate unit flow factors was used to calculate the sewage loads for

each TAZ area. The loads were then distributed to the manholes located within each TAZ area. School loads were calculated separately and applied to appropriate nodes.

Schools

The school loads were calculated individually based upon the number of students. The public elementary school unit flow factor recommended is 15 gpd/student. The public junior high school and high school unit flow factor recommended is 20 gpd/student. These are typical factors used for planning purposes, based upon review of water use records and accounting for irrigation. The calculated flows were then manually input into the model at the appropriate node.

High Water Users

High water users will typically contribute large volumes of sewage to the collection system. Irrigation uses are excluded because this water does not contribute to the sewer system. For this study, the City provided water use records for its entire service area over a one year period. The high water users were initially considered to be those customers with an average water use of 14,400 gpd (10 gpm) or more. The land uses associated with each of the high water users were typically either commercial, industrial, or multi-family residential. These land use types typically have minimum amounts of landscape irrigation needs and primarily use the water indoors. Therefore, the sewage generation was estimated by taking 90 percent of the recorded average water use.

Pump Stations

The City recently decommissioned four sewage pump stations, namely Turner Pump Station, Riverside-Archibald Pump Station, Archibald Ranch Pump Station, and Whispering Lakes Pump Station. The flows tributary to these pump stations have been diverted to the newly constructed Eastern Trunk Sewer which flows south through New Model Colony to the IEUA Kimball Interceptor Sewer on Kimball Avenue. The sewers tributary to these four pump stations were modeled up until the decommissioned pump station location in the OMC models and the flows are added at the same location represented in the NMC model.

The tributary flows to the Magnolia Pump Station were transferred in the model to the outflow point, manhole O11123, located on Magnolia Avenue south of Cedar Court. The tributary flows to Edenglen Pump Station were transferred in the model to manhole R21218 on Riverside Drive. The ultimate tributary flows to Haven Pump Station were transferred to manhole G90 in the NMC model.

Siphons

It should be noted that the Info Sewer model does not include a detailed hydraulic analysis of the siphons in the existing sewer system. The model calculates an average slope using the inverts at the upstream and downstream end of the siphon. The hydraulic analysis results are based upon this calculated slope. If a siphon is in need of replacement, a detailed hydraulic analysis should be performed during the preliminary design phase of the project to size the siphon and determine the hydraulic grade lines in the adjacent portions of the system.

1-7 System Analysis

Hydraulic Analysis

The analysis of the existing sewer collection system was based upon the calculated existing and ultimate peak dry weather flows. The hydraulic analysis results can be found in the appendix of this report.

Existing pipes that exceed the following criteria are considered hydraulically deficient:

Peak Dry Weather d/D > 0.64

The total length of sewer found to be capacity deficient per the developed criteria is 45,724 feet. This is about 2.4 percent (45,724 / 1,931,134) of the total system length.

Each of the firm capacities of the pump stations was found to be sufficient for pumping the existing and ultimate estimated tributary peak wet weather sewage flows.

Condition Assessment

Condition assessment of the existing sewer system was not a part of the scope of work for this master plan. Per the General Waste Discharge Requirements, discussed in Sub-section 2-5, the City's Operation and Maintenance Plan must have been completed and certified by November 2, 2008.

The City has currently completed video inspections of about 1.6 million feet of its existing sewer system. It is planned to have the remaining footage completed in FY 2010-2011. The City plans to budget yearly for sewer condition evaluation and repairs.

'Hot Spots'

Hot Spots are areas of the system with reoccurring problems that require maintenance and cleaning on a quarterly basis minimum. Currently, there are 102 reaches with a total length of 23,247 feet that are considered to be Hot Spots in the existing system. Operations staff reports that the causes of the hot spots are grease, roots, sags, and some hydraulic issues where flow in a low flow sewer is restricted from merging properly into sewers carrying flows with high velocities.

Sanitary Sewer Overflows

There were a total of 34 sanitary sewer overflows responded to by the City of Ontario crews between January 2007 and September 2010. The details of these spills are shown in Table 8-3. The total number of reported spills over the past four years is as follows:

10 spills in 2007 (1.64 spills per 100 miles, excluding 4 on private property)

7 spills in 2008 (0.55 spills per 100 miles, excluding 5 on private property)

11 spills in 2009 (1.36 spills per 100 miles, excluding 6 on private property)

6 spills in 2010 (0.82 spills per 100 miles, excluding 3 on private property)

A sewer collection system with less than three (3) spills from the publicly owned system (excludes private property spills that do not result from a blockage in the public system) per 100 miles per year is considered an adequate system. For the Old Model Colony sewer system (365.7 miles), this is an average of eleven (3 x 3.657) spills per year. Per the provided documentation, the City has an excellent record with minimal spills.

Maintenance Program

A comprehensive maintenance program is an important tool in assuring reliable system operation. This not only includes regular inspections and preventative maintenance, but also good record keeping.

Preventative maintenance is a crucial element of the maintenance program. The preventative maintenance program (PMP) consists of cleaning, inspection, condition assessment, and rehabilitation tasks. Currently, the City has a documented preventative maintenance program. The City should review and update the PMP annually as a part of the City's Operation and Maintenance Plan that is required by the Statewide WDR.

Sewer inspection includes CCTV inspection and condition assessment of the collection system, visual inspection of manholes and their flow channels, ground surface inspection of rights of way and easements, and odor and corrosion monitoring. Condition assessment includes, review of the inspection data, and formulation of maintenance, rehabilitation, and replacement projects. Following the completion of the initial CCTV inspection program, the City should develop a continuing inspection plan based upon the knowledge gained from the initial program. Each spill site must be CCTV inspected to pinpoint the cause of the spill, and implementation of corrective measures for preventing repeat spills.

The City currently has about 365.7 miles of pipe. In order to comply with the upcoming CMOM requirements, WDR requirements, and the City's regular preventative maintenance program, the City must quantify the number of employees and equipment necessary to perform these tasks.

Minimum staff recommendations are as follows:

1. Two cleaning crews consisting of three employees each are needed to run the hydro-jet machines and clean the sewers on a routine basis.
2. A separate crew consisting of three employees is needed to televise sewers on a routine basis following cleaning, perform hot spot cleaning, conduct flow monitoring, and performing emergency repairs. As an alternative, the City can contract out the CCTV inspection services and flow monitoring services.

3. A pump station maintenance crew consisting of two employees to keep up with the sewer pump station maintenance work.

4. One full time staff member is recommended to ensure that the City can complete all elements of the general waste discharge requirements, including the Fats, Oils, and Grease (FOG) enforcement and source pollution control enforcement.

1-8 Capital Improvement Program

The primary goal of the Capital Improvement Program (CIP) is to provide the City of Ontario with a long-range planning tool for implementing its sewer infrastructure improvements in an orderly manner and a basis for financing of these improvements. To accomplish this goal, the program is phased based upon the implementation cost of the facilities, the quantity of work the City can reasonably administer each year, and the funds available for these projects.

Capital Improvement Project Priorities

The capital improvement projects were selected primarily with consideration of the health and safety of the public and protection of the environment by minimizing the possibility of overflows. The projects that will eliminate the capacity deficiencies in the gravity collection system are prioritized based upon the hydraulic analyses conducted during this study. As the City completes CCTV inspection of the system, severe and major defects identified should be incorporated into the CIP and addressed. When the CCTV inspection is completed and a full condition assessment has been conducted, the capital improvement project priorities should be reevaluated.

For this study, the gravity sewer projects were prioritized as follows:

1. Facilities identified with capacity deficiencies under existing peak dry weather conditions. **Flow monitoring is recommended prior to project implementation.**

2. Facilities that have calculated ultimate capacity deficiencies but are currently considered adequate under existing peak dry weather conditions. **Flow monitoring is recommended prior to project implementation.** When the measured peak flows exceed the pipe capacity (d/D = 0.64 during peak dry weather conditions), the projects should be reprioritized.

In some cases, larger sewers are given higher priorities than small sewers because they serve larger areas and a spill would be expected to be larger in quantity. When segments of sewers with lower priorities are located in the same vicinity as a higher priority project, an exception is made to include these lower priority sewers in that project to provide a more economically feasible Capital Improvement Program.

Capital Improvement Program

Old Model Colony

The Capital Improvement Program is developed based upon the results of the hydraulic analyses and the established priorities. The recommended improvement project locations in Old Model Colony are illustrated on Figure 1-1 and are listed in detail in Table 1-4 by priority, along with cost estimates. These estimates are based upon recent information for similar projects in the Southern California area, and include contingencies for this planning level study.

The cost estimates presented in Table 1-4 reflect replacement of the existing facilities. Replacement costs are generally more conservative and will therefore allow the City more flexibility for each project. Preliminary design studies should be conducted utilizing detailed utility information to identify and evaluate project alternatives such as parallel pipes and/or diversions prior to final design. The pipe ID numbers and upstream and downstream manhole ID numbers given in Table 1-4 correspond to the City's sewer GIS and atlas maps.

The construction costs are based upon the following:

8-18 inch diameter pipe	$40 / diameter inch / ft
21 inch diameter pipe and greater	$35 / diameter inch / ft

Old Model Colony is largely occupied and there are many existing utilities to consider. Therefore, the costs of replacing sewer facilities will be generally higher than in an area that is undeveloped such as New Model Colony. The total costs shown in Table 1-4 include engineering, administration and contingency costs. Contingency costs are estimated at 15 percent of the construction costs. Engineering and administration costs are estimated at 15 percent of the construction plus contingency costs.

The recommended CIP has been based upon the best information currently available. It should be updated as new information becomes available from sources such as CCTV inspections and from maintenance crew observations. The project priorities may be revised to correspond to changed conditions, such as impending facility failures, or to take advantage of concurrent construction such as street paving projects or adjacent infrastructure work.

Some of the projects recommended are small and it may not be feasible to implement them as a single project. Therefore, several projects should be combined and bid as a package. Some of the projects may be broken down into smaller components to fit the City's budgetary and other obligations.

The Old Model Colony CIP shown in Table 1-4 includes about $44.6 million dollars in gravity collection system projects. The City has currently completed video inspections of about 1.6 million feet of its existing sewer system. It is planned to have the remaining footage completed in FY 2010-2011. The City plans to budget yearly for sewer condition evaluation and repairs.

New Model Colony

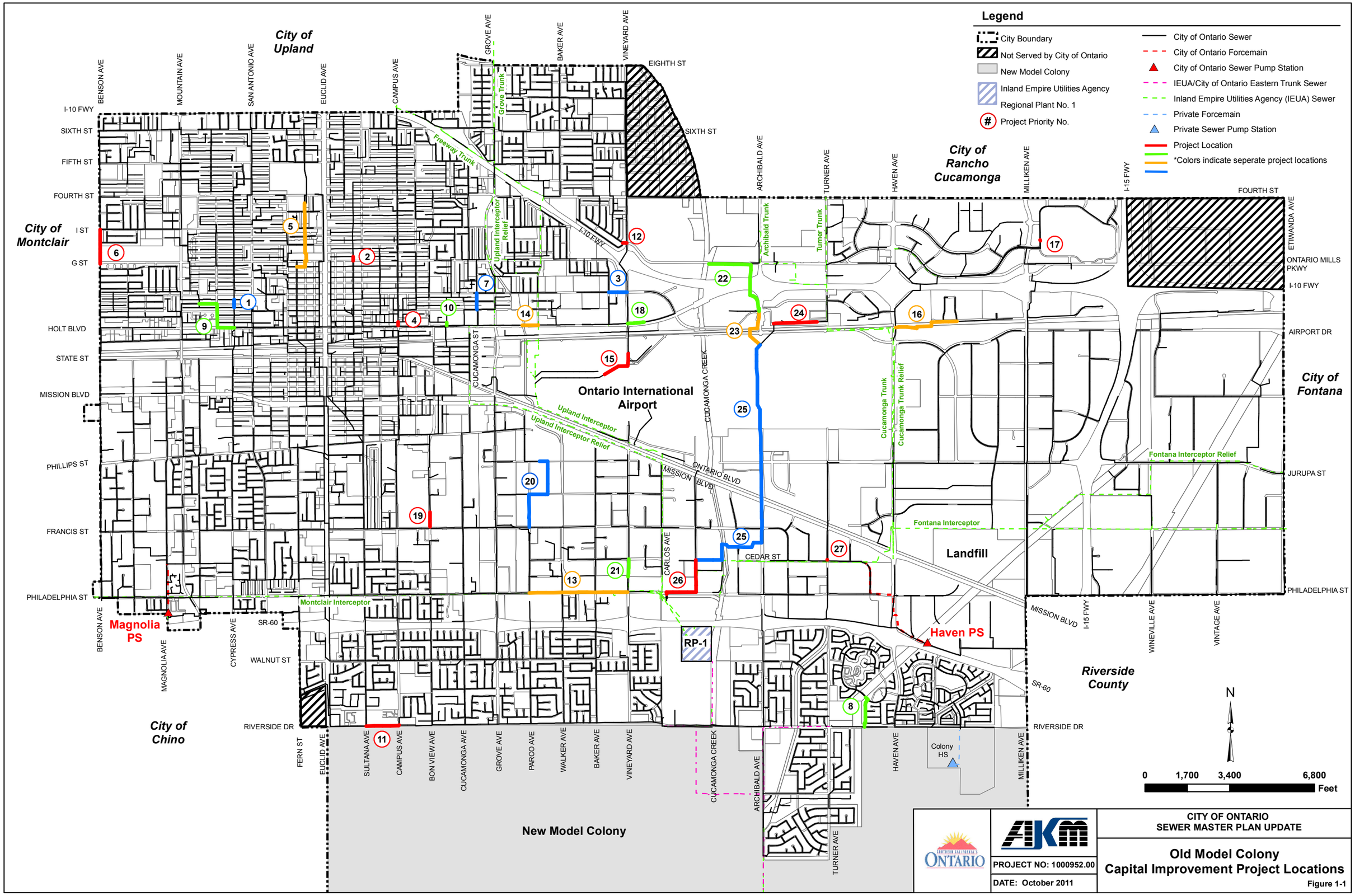
The proposed pipes for New Model Colony are shown on Figure 1-2 and are listed in Table 1-5.

Cost estimates are based on the following:

8-18 inch diameter pipe	$21 / diameter inch / ft
21 inch diameter pipe and greater	$17 / diameter inch / ft

The total costs shown in Table 1-2 include engineering, administration and contingency costs. Contingency costs are estimated at 10 percent of the construction costs. Engineering and administration costs are estimated at 15 percent of the construction plus contingency costs.

The New Model Colony CIP shown in Table 1-5 includes about $59.7 million dollars in gravity collection system projects.


Legend
City Boundary
Not Served by City of Ontario
New Model Colony
Inland Empire Utilities Agency
Regional Plant No. 1
Project Priority No.
City of Ontario Sewer
City of Ontario Forcemain
City of Ontario Sewer Pump Station
IEUA/City of Ontario Eastern Trunk Sewer
Inland Empire Utilities Agency (IEUA) Sewer
Private Forcemain
Private Sewer Pump Station
Project Location
*Colors indicate seperate project locations
City of Upland
City of Montclair
City of Rancho Cucamonga
City of Fontana
City of Chino
Riverside County
Ontario International Airport
Landfill
New Model Colony
RP-1
Magnolia PS
Haven PS
Colony HS
Grove Trunk
Freeway Trunk
Upland Interceptor Relief
Archibald Trunk
Turner Trunk
Cucamonga Trunk
Cucamonga Trunk Relief
Upland Interceptor
Upland Interceptor Relief
Fontana Interceptor Relief
Fontana Interceptor
Montclair Interceptor
BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
EIGHTH ST
SIXTH ST
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
I-15 FWY
FOURTH ST
ETIWANDA AVE
ONTARIO MILLS PKWY
I-10 FWY
AIRPORT DR
I-10 FWY
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
CUCAMONGA ST
CUCAMONGA CREEK
ONTARIO BLVD
MISSION BLVD
CARLOS AVE
CEDAR ST
JURUPA ST
PHILADELPHIA ST
MISSION BLVD
I-15 FWY
WINEVILLE AVE
VINTAGE AVE
SR-60
CYPRESS AVE
WALNUT ST
SR-60
RIVERSIDE DR
RIVERSIDE DR
FERN ST
SULTANA AVE
BON VIEW AVE
PARCO AVE
WALKER AVE
1
2
3
4
5
6
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11
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16
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20
21
22
23
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25
26
27
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1,700
3,400
6,800
Feet
CITY OF ONTARIO
SEWER MASTER PLAN UPDATE
Old Model Colony
Capital Improvement Project Locations
Figure 1-1
PROJECT NO: 1000952.00
DATE: October 2011

Table 1-4
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
1	North	J121052	J12119	J12123	Easement north and south of Hollowell St, east of Boulder Ave	8	12	181	0.0079	480	86,736	13,010	14,962	114,708	100	0
	North	J121053	J12123	J12125		8	12	136	0.0079	480	65,136	9,770	11,236	86,142	100	0
							Subtotal	**316**		**Subtotal**	**151,872**	**22,781**	**26,198**	**200,851**		
2	North	I131014	I13124	I13129	Cherry Ave north of G St	8	10	172	0.0033	400	68,800	10,320	11,868	90,988	100	0
							Subtotal	**172**		**Subtotal**	**68,800**	**10,320**	**11,868**	**90,988**		
3	North	J171006	J17103	J17105	D St between Corona Ave and Vineyard Ave	8	12	361	0.0060	480	173,280	25,992	29,891	229,163	100	0
	North	J171007	J17105	J17104		8	12	361	0.0060	480	173,112	25,967	29,862	228,941	100	0
							Subtotal	**722**		**Subtotal**	**346,392**	**51,959**	**59,753**	**458,103**		
4	North	J141077	J14163	J14170	Campus Ave north of Holt Blvd	8	12	28	0.0170	480	13,248	1,987	2,285	17,520	100	0
	North	J141084	J14170	J14186		8	12	85	0.0140	480	40,800	6,120	7,038	53,958	100	0
							Subtotal	**113**		**Subtotal**	**54,048**	**8,107**	**9,323**	**71,478**		
5	North	H131048	H13126	H13139	Easement west of Euclid Ave from north of J St to easement south of G St	8	10	325	0.0030	400	130,000	19,500	22,425	171,925	100	0
	North	H131038	H13139	H13154		8	10	345	0.0060	400	138,000	20,700	23,805	182,505	100	0
	North	H131039	H13154	H13161		8	10	325	0.0030	400	130,000	19,500	22,425	171,925	100	0
	North	H131075	H13161	I13102		8	10	320	0.0030	400	128,000	19,200	22,080	169,280	100	0
	North	I131036	I13102	I13113		8	10	320	0.0030	400	128,000	19,200	22,080	169,280	100	0
	North	I131035	I13113	I13120		8	10	320	0.0020	400	128,000	19,200	22,080	169,280	100	0
	North	I131028	I13120	I13122		8	10	57	0.0053	400	22,720	3,408	3,919	30,047	100	0
	North	I131027	I13122	I13131		8	10	297	0.0098	400	118,920	17,838	20,514	157,272	100	0
	North	I131033	I13131	I13132		8	10	62	0.0060	400	24,664	3,700	4,255	32,618	100	0
	North	I131059	I13132	I13137		8	10	190	0.0075	400	76,000	11,400	13,110	100,510	100	0
	North	I131060	I13137	I13FI		8	10	46	0.0075	400	18,556	2,783	3,201	24,540	100	0
	North	I131062	I13FI	I13145		8	10	351	0.0075	400	140,400	21,060	24,219	185,679	100	0
							Subtotal	**2,958**		**Subtotal**	**1,183,260**	**177,489**	**204,112**	**1,564,861**		
6	West	I101005	H10135	I10108	Benson Ave between I St and G St	8	12	527	0.0183	480	252,912	37,937	43,627	334,476	100	0
	West	I101011	I10108	I10111		8	12	395	0.0184	480	189,600	28,440	32,706	250,746	100	0
	West	I101012	I10111	I10112		8	12	444	0.0184	480	213,024	31,954	36,747	281,724	100	0
							Subtotal	**1,366**		**Subtotal**	**655,536**	**98,330**	**113,080**	**866,946**		
7	North	J151018	J15114	J15125	Virginia Ave between D St and Nocta St	8	10	326	0.0041	400	130,200	19,530	22,460	172,190	80	20
	North	J151045	J15125	J15137		8	10	333	0.0041	400	133,120	19,968	22,963	176,051	80	20
							Subtotal	**658**		**Subtotal**	**263,320**	**39,498**	**45,423**	**348,241**		
8	South	R201064	R20119	R20122	Deer Creek Lp west of Laurel Tree Dr	10	15	129	0.0032	600	77,268	11,590	13,329	102,187	100	0
	South	R201051	R20122	R20129	Laurel Tree Dr between Deer Creek Lp and Riverside Dr	10	15	245	0.0052	600	146,718	22,008	25,309	194,035	100	0
	South	R201050	R20129	R20138		10	15	237	0.0052	600	142,014	21,302	24,497	187,814	100	0
	South	R201049	R20138	R20146		10	15	237	0.0052	600	142,200	21,330	24,530	188,060	100	0
	South	R201042	R20146	R20151		10	15	233	0.0120	600	139,800	20,970	24,116	184,886	99	1
	South	R201043	R20151	R20150		10	15	32	0.0076	600	19,200	2,880	3,312	25,392	99	1
	South	R201044	R20150	R20161		10	15	144	0.0040	600	86,544	12,982	14,929	114,454	99	1
							Subtotal	**1,256**		**Subtotal**	**753,744**	**113,062**	**130,021**	**996,826**		
9	North		J11132		Hollowell St, west of Boulder Ave		12	720		480	345,600	51,840	59,616	457,056	69	31
	North				Boulder Ave, Hollowell St to Holt Blvd		12	950		480	456,000	68,400	78,660	603,060	70	30
	North			J12198	Holt Blvd, east of Boulder Ave		12	680		480	326,400	48,960	56,304	431,664	70	30
							Subtotal	**2,350**		**Subtotal**	**1,128,000**	**169,200**	**194,580**	**1,491,780**		
10	North	J151033	J15145	J15155	Easement north of Holt Blvd, east of Allyn Ave	8	10	130	0.0081	400	51,800	7,770	8,936	68,506	89	11
							Subtotal	**130**		**Subtotal**	**51,800**	**7,770**	**8,936**	**68,506**		
11	South	R141017	R14156	R14155	Riverside Dr between Sultana Ave and Campus Ave	12	15	321	0.0011	600	192,360	28,854	33,182	254,396	89	11
	South	R141018	R14155	R14154		12	15	321	0.0011	600	192,366	28,855	33,183	254,404	84	16
	South	R141019	R14154	R14153		12	15	227	0.0016	600	136,200	20,430	23,495	180,125	80	20
	South	R141016	R14153	R14150		12	15	320	0.0011	600	192,240	28,836	33,161	254,237	76	24
	South	R141060	R14150	R14148		12	15	26	0.0016	600	15,420	2,313	2,660	20,393	76	24
							Subtotal	**1,214**		**Subtotal**	**728,586**	**109,288**	**125,681**	**963,555**		
12	North	I171011	I17103	I17104	Plaza Serena St Granada Ct to Vineyard Ave	8	12	153	0.0040	480	73,646	11,047	12,704	97,397	70	30
							Subtotal	**153**		**Subtotal**	**73,646**	**11,047**	**12,704**	**97,397**		
13	West	P161009	P16112	P16111	Philadelphia St between Parco Ave and Vineyard Ave	36	42	323	0.0005	1470	474,075	71,111	81,778	626,964	85	15
	West	P161010	P16111	P16109		36	42	330	0.0005	1470	485,100	72,765	83,680	641,545	85	15
	West	P161011	P16109	P16107		36	42	323	0.0005	1470	474,810	71,222	81,905	627,936	85	15
	West	P161012	P16107	P16105		36	42	312	0.0005	1470	458,640	68,796	79,115	606,551	85	15
	West	P161021	P16105	P16104		36	42	340	0.0005	1470	499,065	74,860	86,089	660,013	85	15
	West	P161022	P16104	P16103		36	42	327	0.0005	1470	479,955	71,993	82,792	634,740	85	15
	West	P161023	P16103	P16102		36	42	327	0.0005	1470	480,690	72,104	82,919	635,713	85	15
	West	P171003	P16102	P17132		36	42	326	0.0005	1470	479,749	71,962	82,757	634,468	85	15
	West	P171015	P17132	P17131		36	42	323	0.0005	1470	475,016	71,252	81,940	628,208	85	15
	West	P171018	P17131	P17130		36	42	325	0.0005	1470	477,015	71,552	82,285	630,852	85	15
	West	P171020	P17130	P17128		36	42	330	0.0005	1470	485,100	72,765	83,680	641,545	85	15
	West	P171021	P17128	P17126		36	42	309	0.0006	1470	453,789	68,068	78,279	600,136	85	15
							Subtotal	**3,893**		**Subtotal**	**5,723,004**	**858,451**	**987,218**	**7,568,673**		
14	North	J161027	J16135	J16137	Holt Blvd west of Imperial Ave	10	15	330	0.0026	600	197,700	29,655	34,103	261,458	62	38
	North	J161047	J16137	J16133		10	15	303	0.0026	600	181,800	27,270	31,361	240,431	61	39
							Subtotal	**633**		**Subtotal**	**379,500**	**56,925**	**65,464**	**501,889**		
15	North	K171005	K17104	K17107	Vineyard Ave south of Airport Dr	15	18	294	0.0061	720	211,968	31,795	36,564	280,328	69	31
	North	K171006	K17107	K17108	Easement west of Vineyard Ave, south of Airport Dr	18	21	237	0.0024	735	173,982	26,097	30,012	230,091	69	31
	North	K171024	K17108	K17109		18	21	373	0.0020	735	274,008	41,101	47,266	362,376	69	31
	North	K171022	K17109	K17110		18	21	204	0.0019	735	149,859	22,479	25,851	198,189	69	31
	North	K171020	K17110	K17111		18	21	419	0.0019	735	307,965	46,195	53,124	407,284	69	31
							Subtotal	**1,527**		**Subtotal**	**1,117,782**	**167,667**	**192,817**	**1,478,267**		

Table 1-4
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
16	East	J211031	J21115	J21116	Guasti Rd between Sequoia Ave and Ponderosa Ave	8	12	342	0.0032	480	164,160	24,624	28,318	217,102	53	47
	East	J211030	J21116	J21117		8	12	199	0.0018	480	95,606	14,341	16,492	126,439	53	47
	East	J211036	J21117	J21118	Guasti Rd west of Ponderosa Ave	8	15	139	0.0055	600	83,292	12,494	14,368	110,154	38	62
	East	J211029	J21118	J21120		8	15	340	0.0032	600	204,000	30,600	35,190	269,790	42	58
	East	J211028	J21120	J21122	Easement east of Haven Ave	8	15	135	0.0032	600	81,000	12,150	13,973	107,123	42	58
	East	J211027	J21122	J21123		8	15	326	0.0032	600	195,600	29,340	33,741	258,681	37	63
	East	J211017	J21123	J21124		8	15	254	0.0032	600	152,610	22,892	26,325	201,827	33	67
	East	J211042	J21124	J21132		8	15	67	0.0027	600	40,422	6,063	6,973	53,458	33	67
	East	J211043	J21132	J21128		8	15	198	0.0027	600	118,884	17,833	20,507	157,224	33	67
	East	J211019	J21128	J21125		8	15	198	0.0027	600	118,884	17,833	20,507	157,224	30	70
	East	J211016	J21125	J21126		8	15	326	0.0033	600	195,600	29,340	33,741	258,681	28	72
	East	J211041	J21126	J21127		8	15	158	0.0032	600	94,800	14,220	16,353	125,373	28	72
							Subtotal	**2,683**		**Subtotal**	**1,544,858**	**231,729**	**266,488**	**2,043,075**		
17	East	Proposed1	I23100	I23101	Mills Cir north of Mall Dr	-	15	40	0.1292	-	100,000	15,000	17,250	132,250	66	34
							Subtotal	**40**		**Subtotal**	**100,000**	**15,000**	**17,250**	**132,250**		
18	North	J171057	J17127	J17128	Holt Blvd east of Vineyard Ave	12	15	326	0.0009	600	195,600	29,340	33,741	258,681	55	45
	North	J171056	J17128	J17131		12	15	326	0.0051	600	195,600	29,340	33,741	258,681	50	50
							Subtotal	**652**		**Subtotal**	**391,200**	**58,680**	**67,482**	**517,362**		
19	West	N141086	N14135	N14145	Bonview Ave north of Francis St	8	12	326	0.0060	480	156,480	23,472	26,993	206,945	39	61
	West	N141085	N14145	N14151		8	12	254	0.0060	480	121,920	18,288	21,031	161,239	38	62
							Subtotal	**580**		**Subtotal**	**278,400**	**41,760**	**48,024**	**368,184**		
20	West	M161010	M16105	M16104	Acacia St west of Walker St	8	12	322	0.0023	480	154,685	23,203	26,683	204,571	17	83
	West	M161013	M16104	M16108	Easement between Acacia St and Locust St	8	12	296	0.0189	480	142,080	21,312	24,509	187,901	20	80
	West	M161017	M16108	M16109		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	M161016	M16109	M16110		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	N161002	M16110	N16100		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	N161013	N16100	N16103		8	12	114	0.0050	480	54,677	8,202	9,432	72,310	20	80
	West	N161016	N16103	N16104	Locust St east of Parco Ave	8	12	90	0.0037	480	43,200	6,480	7,452	57,132	18	82
	West	N161012	N16104	N16105		8	12	326	0.0050	480	156,480	23,472	26,993	206,945	18	82
	West	N161011	N16105	N16108		8	12	326	0.0050	480	156,480	23,472	26,993	206,945	20	80
	West	N161017	N16108	N16999	Parco Ave between Locust St and Francis St	8	12	292	0.0050	480	140,160	21,024	24,178	185,362	18	82
	West	N169999	N16999	N16998		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	18	82
	West	N169998	N16998	N16506		8	12	62	0.0050	480	29,760	4,464	5,134	39,358	17	83
	West	N161038	N16506	N16112		8	12	204	0.0050	480	98,078	14,712	16,919	129,709	17	83
	West	N161037	N16112	N16119		8	12	152	0.0050	480	72,960	10,944	12,586	96,490	17	83
							Subtotal	**3,369**		**Subtotal**	**1,616,880**	**242,532**	**278,912**	**2,138,324**		
21	West	O171058	O17121	O17142	Vineyard Ave south of Cedar St	8	12	349	0.0048	480	167,520	25,128	28,897	221,545	27	73
	West	O171057	O17142	O17152		8	12	347	0.0033	480	166,454	24,968	28,713	220,136	28	72
	West	O171047	O17152	O17153		8	12	95	0.0444	480	45,600	6,840	7,866	60,306	27	73
							Subtotal	**791**		**Subtotal**	**379,574**	**56,936**	**65,477**	**501,987**		
22	East	I181015	I18109	I18110	Inland Empire Blvd west of Archibald Ave	15	18	346	0.0028	720	249,120	37,368	42,973	329,461	1	99
	East	I181026	I18110	I18111		15	18	346	0.0028	720	249,120	37,368	42,973	329,461	1	99
	East	I181002	I18111	I19120		15	18	345	0.0028	720	248,530	37,279	42,871	328,680	1	99
	East	I191027	I19120	I19121		15	18	347	0.0028	720	249,710	37,457	43,075	330,242	1	99
	East	I191029	I19121	I19122	Easement between Inland Empire Blvd and Guasti Rd	15	21	216	0.0020	735	158,760	23,814	27,386	209,960	11	89
	East	I191022	I19122	I19123		15	21	283	0.0020	735	207,638	31,146	35,817	274,601	10	90
	East	J191006	I19123	J19102		15	21	735	0.0020	735	540,225	81,034	93,189	714,448	10	90
	East	J191016	J19102	J19103		15	21	104	0.0171	735	76,440	11,466	13,186	101,092	10	90
	East	J191027	J19103	J19105		15	21	323	0.0170	735	237,405	35,611	40,952	313,968	10	90
	East	J191018	J19105	J19106		15	21	233	0.0170	735	171,255	25,688	29,541	226,485	9	91
	East	J191017	J19106	J19107		15	21	54	0.0170	735	39,690	5,954	6,847	52,490	9	91
	East	J191019	J19107	J19111		15	21	113	0.0136	735	83,055	12,458	14,327	109,840	11	89
							Subtotal	**3,445**		**Subtotal**	**2,510,948**	**376,642**	**433,138**	**3,320,728**		
23	East	J191020	J19111	J19114	Easement south of Guasti Rd	15	21	223	0.0097	735	163,905	24,586	28,274	216,764	13	87
	East	J191021	J19114	J19118		15	21	229	0.0091	735	168,668	25,300	29,095	223,063	13	87
	East	J191022	J19118	J19132		15	21	228	0.0090	735	167,808	25,171	28,947	221,926	13	87
	East	J191052	J19132	J19133		15	21	204	0.0086	735	149,675	22,451	25,819	197,946	13	87
	East	J191051	J19133	J19134		15	21	95	0.0082	735	69,825	10,474	12,045	92,344	12	88
	East	J191003	J19134	K19101		18	21	284	0.0061	735	208,740	31,311	36,008	276,059	12	88
	East	K191008	K19101	K19104		18	21	298	0.0059	735	219,030	32,855	37,783	289,667	10	90
	East	K191007	K19104	K19105		18	21	125	0.0058	735	91,875	13,781	15,848	121,505	10	90
	East	K191006	K19105	K19106		18	21	9	0.0056	735	6,615	992	1,141	8,748	10	90
	East	K191005	K19106	K19108		18	21	85	0.0059	735	62,475	9,371	10,777	82,623	10	90
							Subtotal	**1,780**		**Subtotal**	**1,308,616**	**196,292**	**225,736**	**1,730,645**		
24	East	J191004	J20131	J19116	Old Guasti Rd west of Turner Ave	8	12	303	0.0045	480	145,200	21,780	25,047	192,027	18	82
	East	J191047	J19116	J19119		8	12	297	0.0044	480	142,416	21,362	24,567	188,345	16	84
	East	J191046	J19119	J19121		8	12	313	0.0045	480	150,384	22,558	25,941	198,883	14	86
	East	J191035	J19121	J19123		8	12	354	0.0048	480	169,776	25,466	29,286	224,529	12	88
	East	J191034	J19123	J19125		8	12	380	0.0042	480	182,544	27,382	31,489	241,414	11	89
	East	J191036	J19125	J19126		8	12	80	0.0054	480	38,400	5,760	6,624	50,784	10	90
							Subtotal	**1,727**		**Subtotal**	**828,720**	**124,308**	**142,954**	**1,095,982**		

Table 1-4
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
25	East	K191002	K19108	K19109	Archibald Ave south of Airport Dr to south of Francis St	18	21	217	0.0035	735	159,208	23,881	27,463	210,553	10	90
	East	K191003	K19109	K19111		18	21	221	0.0038	735	162,435	24,365	28,020	214,820	10	90
	East	K191004	K19111	K19112		18	21	253	0.0038	735	185,955	27,893	32,077	245,925	10	90
	East	K191009	K19112	K19115		18	21	285	0.0035	735	209,475	31,421	36,134	277,031	10	90
	East	K191028	K19115	K19116		18	21	119	0.0035	735	87,465	13,120	15,088	115,672	10	90
	East	K191027	K19116	K19118		18	21	215	0.0035	735	158,025	23,704	27,259	208,988	10	90
	East	L191002	K19118	L19100		15	21	651	0.0128	735	478,257	71,739	82,499	632,495	10	90
	East	L191014	L19100	L19101		15	21	419	0.0120	735	307,965	46,195	53,124	407,284	10	90
	East	L191005	L19101	L19102		15	21	205	0.0120	735	150,624	22,594	25,983	199,200	10	90
	East	L191006	L19102	L19103		15	21	436	0.0132	735	320,460	48,069	55,279	423,808	10	90
	East	L191007	L19103	L19104		15	21	339	0.0084	735	249,165	37,375	42,981	329,521	10	90
	East	L191001	L19104	M19100		15	21	318	0.0085	735	233,730	35,060	40,318	309,108	10	90
	East	M191008	M19100	M19102		15	21	331	0.0085	735	243,285	36,493	41,967	321,744	10	90
	East	M191011	M19102	M19104		15	21	326	0.0085	735	239,610	35,942	41,333	316,884	10	90
	East	M191014	M19104	M19106		15	21	329	0.0113	735	241,815	36,272	41,713	319,800	10	90
	East	M191018	M19106	M19108		15	21	343	0.0130	735	252,105	37,816	43,488	333,409	10	90
	East	M191019	M19108	M19110	Archibald Ave south of Airport Dr to south of Francis St	15	21	326	0.0129	735	239,610	35,942	41,333	316,884	11	89
	East	M191002	M19110	N19101		15	21	351	0.0130	735	257,985	38,698	44,502	341,185	11	89
	East	N191010	N19101	N19105		15	21	272	0.0132	735	199,949	29,992	34,491	264,433	11	89
	East	N191011	N19105	N19107		15	21	61	0.0158	735	45,107	6,766	7,781	59,654	11	89
	East	N191021	N19107	N19108		15	21	242	0.0129	735	177,583	26,638	30,633	234,854	11	89
	East	N191022	N19108	N19109		15	21	363	0.0129	735	267,077	40,062	46,071	353,209	11	89
	East	N191023	N19109	N19110		15	21	326	0.0073	735	239,610	35,942	41,333	316,884	11	89
	East	N191024	N19110	N19112		15	21	319	0.0130	735	234,480	35,172	40,448	310,099	11	89
	East	N191033	N19112	N19118		15	21	25	0.0332	735	18,375	2,756	3,170	24,301	11	89
	East	N191003	N19118	O19102		15	21	314	0.0115	735	231,011	34,652	39,849	305,511	11	89
	East	O191028	O19102	O19107		15	21	253	0.0079	735	185,654	27,848	32,025	245,527	12	88
	East	O191016	O19107	O19106	Easement between Archibald Ave and west side of Cucomonga Creek	18	30	322	0.0016	1050	337,764	50,665	58,264	446,693	11	89
	East	O191017	O19106	O19114		18	30	186	0.0016	1050	195,153	29,273	33,664	258,090	11	89
	East	O191018	O19114	O19113		18	30	291	0.0016	1050	305,550	45,833	52,707	404,090	11	89
	East	O191006	O19113	O18106		18	30	250	0.0016	1050	262,500	39,375	45,281	347,156	11	89
	East	O181079	O18106	O18105		18	30	387	0.0016	1050	406,350	60,953	70,095	537,398	12	88
	East	O181025	O18105	O18103		18	30	121	0.0016	1050	127,050	19,058	21,916	168,024	12	88
	East	O181012	O18103	O18102		18	30	177	0.0016	1050	185,703	27,855	32,034	245,592	12	88
	East	O181016	O18102	O18108	Easement west of Cucamonga Creek	18	30	310	0.0016	1050	325,647	48,847	56,174	430,668	12	88
	East	O181015	O18108	O18118		18	30	311	0.0016	1050	326,162	48,924	56,263	431,349	12	88
	East	O181075	O18118	O18117	Easement between Cucamonga Creek	18	30	356	0.0016	1050	374,189	56,128	64,548	494,864	12	88
	East	O181014	O18117	O18116		18	30	356	0.0016	1050	373,800	56,070	64,481	494,351	12	88
	East	O181013	O18116	O18115		18	30	356	0.0016	1050	374,094	56,114	64,531	494,739	12	88
							Subtotal	**11,281**		**Subtotal**	**9,369,981**	**1,405,497**	**1,616,322**	**12,391,799**		
26	East	O181027	O18115	O18124	Hellman Ave between Cedar St and Philadelphia St	18	30	40	0.0047	1050	42,000	6,300	7,245	55,545	13	87
	East	O181084	O18124	O18130		18	30	287	0.0048	1050	301,350	45,203	51,983	398,535	13	87
	East	O181098	O18130	O18135		18	30	75	0.0046	1050	78,750	11,813	13,584	104,147	13	87
	East	O181087	O18135	O18148		18	30	235	0.0050	1050	246,855	37,028	42,582	326,466	13	87
	East	O181004	O18148	P18101		18	30	369	0.0022	1050	386,925	58,039	66,745	511,708	13	87
	East	P181019	P18101	P18108		18	30	263	0.0022	1050	276,423	41,463	47,683	365,569	13	87
	East	P181007	P18108	P18107	Philadelphia St west of Hellman Ave	18	30	333	0.0014	1050	350,070	52,511	60,387	462,968	13	87
	East	P181008	P18107	P18106		18	30	336	0.0014	1050	352,800	52,920	60,858	466,578	13	87
	East	P181011	P18106	P18105		18	30	251	0.0014	1050	263,025	39,454	45,372	347,851	13	87
	East	P181016	P18105	P18133		18	30	249	0.0014	1050	261,450	39,218	45,100	345,768	13	87
	East	P181060	P18133	P18132		18	30	74	0.0112	1050	77,700	11,655	13,403	102,758	13	87
							Subtotal	**2,512**		**Subtotal**	**2,637,348**	**395,602**	**454,943**	**3,487,893**		
27	East	O201020	O20118	O20119	Turner Ave north of Cedar St	10	15	9	0.0078	-	100,000	15,000	17,250	132,250	19	81
							Subtotal	**9**		**Subtotal**	**100,000**	**15,000**	**17,250**	**132,250**		
							Total	**46,329**		**Total**	**33,745,815**	**5,061,872**	**5,821,153**	**44,628,841**		

STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
BENSON AVE
MAGNOLIA AVE
CYPRESS AVE
SR-60
WALNUT ST
RIVERSIDE DR
FERN ST
EUCLID AVE
CHINO AVE
SCHAEFER AVE
EDISON AVE
EUCALYPTUS AVE
MERRILL AVE
CUCAMONGA CREEK
ONTARIO BLVD
MISSION BLVD
CEDAR ST
SULTANA AVE
CAMPUS AVE
BON VIEW AVE
CUCAMONGA AVE
GROVE AVE
PARCO AVE
WALKER AVE
BAKER AVE
VINEYARD AVE
CARPENTER AVE
ARCHIBALD AVE
HAVEN AVE
TURNER AVE
SUMNER AVE
CLEVELAND AVE.
MILLIKEN AVE
I-15 FWY
WINEVILLE AVE
VINTAGE AVE
JURUPA ST

City of Fontana

Riverside County

City of Chino

Upland Interceptor Relief
Cucamonga Trunk
Cucamonga Trunk Relief
Fontana Interceptor Relief
Fontana Interceptor

Magnolia PS
Haven PS
RP-1
RP-5

Walker Ave Trunk Sewer
Euclid Ave Trunk Sewer
Bon View Ave Trunk Sewer
Grove Ave Trunk Sewer
Western Trunk Sewer
Carpenter Ave Trunk Sewer
Eastern Trunk Sewer
Haven Ave Trunk Sewer
Cleveland Ave Trunk Sewer
Edison Ave Trunk Sewer
Eucalyptus Ave Trunk Sewer
Merrill Ave Trunk Sewer
Bellgrave Ave Trunk Sewer
Kimball Interceptor

Colony HS

A70 B50 C50 D70
A60 B40 C40 D60
A50 B30 C30 D50
A40 B20 C20 D40
A30 B10 C10 D10
A20
A10
D120 D110 D100A D100 D90 D150 D165 D170
E380
E680 E620 E560
F10 F40 F50
G90 G80 G70 G65 G60 G50 G40 G35 G25 G20 G10
H70 H60 H50 H40 H30 H20 H10

Legend

- City Boundary
- Magnolia PS Tributary Area
- Haven PS Tributary Area - Future NMC Service Area
- Not Served by City of Ontario
- NMC Service Area
- Regional Wastewater Treatment Plant
- Manholes
- Regional Connections to IEUA Trunks Sewer
- City of Ontario Sewer Pump Station
- City of Ontario Force Main
- City of Ontario Sewer
- IEUA/City of Ontario RP-1 Bypass Sewer - Joint Facility
- IEUA/City of Ontario Eastern Trunk Sewer - Joint Facility
- IEUA Kimball Interceptor Extension
- Proposed Western Trunk Sewer
- Inland Empire Utilities Agency (IEUA) Sewer
- Proposed City of Ontario NMC Sewer
- Private Forcemain
- Private Sewer Pump Station

N

0 1,750 3,500 7,000 Feet

CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

Proposed New Model Colony Capital Improvement Projects

Figure 1-2

PROJECT NO: 1000952.00
DATE: April 2012

Table 1-5
New Model Colony Proposed Sewer System

Pipe ID	U/S MH ID	D/S MH ID	Street Location	Proposed Pipe Size (in)	Length (ft)	Estimated Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Engineering & Admin. Cost ($)	Total Cost ($)	% OMC	% NMC
D120	D120	D110	Carpenter Ave	18	2,528	0.0063	378	955,673	95,567	157,686	1,208,926	100	0
D110	D110	D100A		21	2,650	0.0094	357	946,082	94,608	156,104	1,196,794	84	16
D100A	D100A	D60	Schaefer Ave	30	3,852	0.0013	510	1,964,483	196,448	324,140	2,485,071	84	16
D60	D60	D50		30	2,640	0.0114	510	1,346,187	134,619	222,121	1,702,926	64	36
D50	D50	D40		30	2,639	0.0072	510	1,346,141	134,614	222,113	1,702,868	55	45
D40	D40	D30	Walker Ave	30	1,291	0.0047	510	658,242	65,824	108,610	832,676	51	49
D30	D30	D20		30	950	0.0056	510	484,372	48,437	79,921	612,731	51	49
D20	D20	D10		30	376	0.0121	510	191,727	19,173	31,635	242,535	51	49
D10	D10	C10		30	2,636	0.0025	510	1,344,288	134,429	221,807	1,700,524	49	51
C10	C10	B10	Merrill Ave	36	2,651	0.0026	612	1,622,386	162,239	267,694	2,052,319	35	65
B10	B10	A30		36	4,170	0.0028	612	2,552,029	255,203	421,085	3,228,317	25	75
A30	A30	A20		36	2,655	0.0105	612	1,624,780	162,478	268,089	2,055,347	19	81
A20	A20	A10	Euclid Ave	36	2,521	0.0056	612	1,542,828	154,283	254,567	1,951,678	19	81
Western Trunk Sewer				**Subtotal**	**31,558**			**16,579,219**	**1,657,922**	**2,735,571**	**20,972,713**		
F40	F40	E620	Eucalyptus Ave	15	3,900	0.0044	315	1,228,500	122,850	202,703	1,554,053	0	100
Eucalyptus Avenue Trunk Sewer				**Subtotal**	**3,900**			**1,228,500**	**122,850**	**202,703**	**1,554,053**		
G40	G40	F10		27	2,960	0.0025	459	1,358,640	135,864	224,176	1,718,680	68	32
F10	F10	E680	Edison Ave	30	2,762	0.0020	510	1,408,450	140,845	232,394	1,781,689	64	36
Edison Avenue Trunk Sewer				**Subtotal**	**5,722**			**2,767,090**	**276,709**	**456,570**	**3,500,368**		
G90	G90	G80		18	1,556	0.0095	378	588,092	58,809	97,035	743,936	100	0
G80	G80	G70		21	2,419	0.0111	357	863,549	86,355	142,486	1,092,390	100	0
G70	G70	G65		21	2,620	0.0078	357	935,340	93,534	154,331	1,183,205	94	6
G65	G65	G60	Haven Ave	21	1,440	0.0131	357	513,982	51,398	84,807	650,187	94	6
G60	G60	G50		21	2,632	0.0092	357	939,624	93,962	155,038	1,188,624	73	27
G50	G50	G40		21	1,304	0.0086	357	465,528	46,553	76,812	588,893	73	27
Haven Avenue Trunk Sewer				**Subtotal**	**11,970**			**4,306,115**	**430,612**	**710,509**	**5,447,236**		
H70	H70	H60		12	1,016	0.0100	252	255,947	25,595	42,231	323,773	0	100
H60	H60	H50		12	1,325	0.0116	252	333,900	33,390	55,094	422,384	0	100
H50	H50	H40		12	1,328	0.0088	252	334,656	33,466	55,218	423,340	0	100
H40	H40	H30	Cleveland Ave	15	2,665	0.0086	315	839,475	83,948	138,513	1,061,936	0	100
H30	H30	H20		15	1,263	0.0079	315	397,845	39,785	65,644	503,274	0	100
H20	H20	H10		18	1,560	0.0076	378	589,664	58,966	97,295	745,925	0	100
H10	H10	G10		24	2,879	0.0009	408	1,174,434	117,443	193,782	1,485,659	0	100
G10	G10	F50	Merrill Ave	24	2,829	0.0033	408	1,154,127	115,413	190,431	1,459,971	0	100
F50	F50	E560		24	2,190	0.0032	408	893,536	89,354	147,433	1,130,323	0	100
G35	G35	G25		12	2,521	0.0058	252	635,168	63,517	104,803	803,487	0	100
G25	G25	G20	Sumner Ave	12	1,149	0.0084	252	289,456	28,946	47,760	366,162	0	100
G20	G20	G10		12	1,694	0.0094	252	426,888	42,689	70,437	540,013	0	100
Cleveland, Bellgrave, Merrill Ave Trunk Sewer				**Subtotal**	**22,417**			**7,325,095**	**732,510**	**1,208,641**	**9,266,246**		
D70	D70	D60	Walker Ave	12	2,624	0.0050	252	661,305	66,130	109,115	836,550	0	100
Walker Avenue Trunk Sewer				**Subtotal**	**2,624**			**661,305**	**66,130**	**109,115**	**836,550**		
C50	C50	C40		12	2,643	0.0095	252	666,146	66,615	109,914	842,674	0	100
C40	C40	C30	Grove Ave	15	2,643	0.0095	315	832,632	83,263	137,384	1,053,280	0	100
C30	C30	C20		18	2,632	0.0061	378	994,870	99,487	164,153	1,258,510	0	100
C20	C20	C10		18	2,670	0.0090	378	1,009,395	100,939	166,550	1,276,884	0	100
Grove Avenue Trunk Sewer				**Subtotal**	**10,589**			**3,503,042**	**350,304**	**578,002**	**4,431,349**		
B50	B50	B40		12	2,647	0.0109	252	667,161	66,716	110,082	843,959	0	100
B40	B40	B30	Bon View Ave	15	2,635	0.0089	315	830,130	83,013	136,972	1,050,115	0	100
B30	B30	B20		18	2,628	0.0094	378	993,375	99,337	163,907	1,256,619	0	100
B20	B20	B10		18	2,655	0.0076	378	1,003,554	100,355	165,586	1,269,495	0	100
Bon View Avenue Trunk Sewer				**Subtotal**	**10,566**			**3,494,220**	**349,422**	**576,546**	**4,420,189**		
A70	A70	A60		12	2,646	0.0120	252	666,785	66,679	110,020	843,484	0	100
A60	A60	A50	Euclid Ave	15	2,627	0.0088	315	827,558	82,756	136,547	1,046,860	0	100
A50	A50	A40		18	2,646	0.0091	378	1,000,082	100,008	165,014	1,265,104	0	100
A40	A40	A30		18	2,669	0.0112	378	1,008,784	100,878	166,449	1,276,112	0	100
Euclid Avenue Trunk Sewer				**Subtotal**	**10,588**			**3,503,210**	**350,321**	**578,030**	**4,431,560**		
D100	D100	D90		12	2,322	0.0078	252	585,144	58,514	96,549	740,207	0	100
D150	D90	D150		15	2,637	0.0076	315	830,566	83,057	137,043	1,050,667	0	100
D160	D150	D165	Carpenter Ave	18	2,615	0.0077	378	988,297	98,830	163,069	1,250,196	0	100
D170	D165	D170		18	2,494	0.0108	378	942,732	94,273	155,551	1,192,556	0	100
D180	D170	E380		18	1,237	0.0125	378	467,586	46,759	77,152	591,496	0	100
Carpenter Avenue Trunk Sewer				**Subtotal**	**11,304**			**3,814,325**	**381,433**	**629,364**	**4,825,122**		
				Total	**121,238**		**Total**	**47,182,122**	**4,718,212**	**7,785,050**	**59,685,384**		

Section 2

INTRODUCTION

2-1 Purpose

This section provides an overview and outline for the City of Ontario (City) Sewer Master Plan Update. The intent of this study is to update the Sewer Master Plan with the 2010 General Plan information as well as consolidate the 2007 New Model Colony Sewer Densification Study and the 2008 Old Model Colony Sewer Master Plan into one report. A brief background description, objectives and scope of work, acknowledgments, and a list of abbreviations used throughout the report are provided.

2-2 City History and Background

The City of Ontario was incorporated on December 10, 1891 with a population of about 683. It is one of California's first planned communities that was initially developed as an agricultural community largely devoted to citrus fruits. The production of peaches, walnuts, lemons, and grapes also played an important role in the growth of Ontario. Latimer Field was established by airplane enthusiasts in 1923. From then on, the area became increasingly aviation conscious. Urban growth pushed the aviators further east to the present location of Ontario International Airport, which was used as a training center for pilots during World War II.

Since World War II, Ontario has become a much more diversified community. The population steadily grew by approximately 20,000 every ten years from 1950 to 1980. From 1980 to 1990, the population jumped from 88,820 to 133,179. Ontario has been one of Southern California's fastest growing cities for more than 25 years.

Wanting to cash in on the postwar boom, the City began efforts to recruit business and industry to the area. Rapid growth during this period began the City's transformation from an agricultural giant to a community of light industry and housing. Today, almost all of the citrus groves and vineyards are gone. The remaining form of agriculture is dairy farming, which is holding out on the southern outskirts of the City. As part of a 14,000 acre agricultural preserve, approximately 8,200 acres of this area is within the City of Ontario's Sphere of Influence (SOI), now referred to as the New Model Colony (NMC).

Agricultural industries, predominantly dairy farms, occupy approximately 98 percent of the NMC. The population grew steadily from 1950 through 1990 with an increase in housing units from 110 to 789. At the time of the 1990 census, the vacancy rate within the NMC was 37 percent (1998 City of Ontario SOI General Plan).

Today, Ontario is a full service city with a population exceeding 174,000. It consists of approximately 50 square miles of residential, commercial, and industrial areas. The economy now reflects a large industrial and manufacturing base. Residents enjoy the mild Southern California climate as well as the many available amenities in and around the Los Angeles area.

Anticipated growth is expected to more than double the population to an estimated 358,270 as substantial residential development begins in the 8,200 acre New Model Colony (*Ref: 2010 General Plan*).

2-3 Previous Studies and Work Completed

2000 Sphere of Influence Sewer Master Plan, 2001 New Model Colony Sewer Master Plan, 2005 New Model Colony Sewer Master Plan Alternatives Analysis

These documents evaluated the sewer service needs of New Model Colony, as well as the feasibility of eliminating five existing sewer pump stations that served the southerly portion of Old Model Colony (OMC).

As a result of these studies, it was recommended that the City pursue the construction of the Eastern Trunk Sewer, Western Trunk Sewer, and Haven Avenue Trunk Sewer at increased sizes to accommodate not only the New Model Colony flows, but also the Old Model Colony flows resulting from the removal of five of the existing City sewer pump stations. An alternative was proposed to eliminate Archibald Ranch, Haven, Riverside/Archibald, Turner, and Whispering Lakes Pump Stations from the Old Model Colony sewer system. The flow tributary to these pump stations would be diverted to New Model Colony sewers, which would convey the flow south to the IEUA's Kimball Interceptor Sewer.

2003 Phasing of Sewer Pump Station Improvements and Removals

A study of the City's sewer pump stations was conducted in 2003 by AKM Consulting Engineers. This study developed more detailed flow and condition data for each pump station, upon which a phasing plan was based for the necessary improvements and pump station elimination projects.

Since 2003, the City and IEUA worked jointly to have the Eastern Trunk Sewer designed and constructed. The Eastern Trunk Sewer size was increased to allow IEUA the ability to bypass RP-1 and convey some of the tributary flows to RP-5 through Kimball Interceptor Sewer. At the same time, the City abandoned the Archibald Ranch, Riverside/Archibald, Turner, and Whispering Lakes Pump Stations, and diverted their tributary flows to the Eastern Trunk Sewer. Haven Pump Station is still in operation. It cannot be eliminated until the facilities in Haven Avenue and Merrill Avenue are constructed and tied to the Eastern Trunk Sewer on Archibald Avenue.

Most of the tributary flows to the Magnolia Pump Station were diverted to IEUA's Montclair Interceptor through two new connections: one at Oaks Avenue and one at Magnolia Avenue.

2006 New Model Colony Sewer Master Plan Addendum and 2007 New Model Colony Sewer Densification Study

These documents updated the sewer evaluation of New Model Colony with the current land use information, pump station flow information, pump station diversions, and planned pipe alignments. Cost estimates were made for interim and ultimate facilities. Violations of the "Cooperative Agreement for the Sewer Conveyance Facitlities of the Eastern Trunk Sewer, Kimball Interceptor, Sewer Extension, and RP-1 Outfall" between the City and the Inland Empire Utilities Agency (IEUA) were identified. IEUA's Kimball Interceptor was added to the hydraulic analysis to evaluate its capacity from Baker Avenue west to Regional Plant No. 5 (RP-5).

2008 Old Model Colony Sewer Master Plan

This document was prepared to evaluate the existing collection system in Old Model Colony. At the time of the study, the total estimated existing and ultimate loads were 13.8 mgd and 30.1 mgd, respectively. The sewer network consisted of 365.7 miles of gravity pipe, 7582 manholes and 3 pump stations with 11,588 feet of forcemains. The OMC sewer system was analyzed based on available GIS data, flow monitoring studies, and water use records.

Approximately 47,236 feet of pipe was deemed capacity deficient based on the peak dry weather criteria of d/D>0.64. Among these hydraulically deficient pipes, 41,477 feet was recommended improvement at an estimated cost of $45.7 million. Additionally, CCTV inspection and condition assessment were included in the Capital Improvement Program at a cost of $3.86 million over four years.

Holt Boulevard Trunk Sewer

Since the completion of the 2008 OMC Sewer Master Plan, the Holt Boulevard Trunk Sewer has been constructed in Holt Street between Cucamonga Avenue and a point located west of Cypress Avenue. The Holt Boulevard Trunk Sewer will ultimately intercept sewage flows north of Holt and divert it east to the existing IEUA Upland Interceptor Relief in Cucamonga Avenue.

Brooks Street Sewer Replacement

The Brooks Street Sewer Replacement has been designed to alleviate flows to the existing Brooks Street sewer that was previously identified as hydraulically deficient in the Old Model Colony Sewer Master Plan. The existing sewer is also very shallow and is known to surcharge. In early 2010, the City had an overflow pipe constructed to an adjacent sewer in order to prevent future sanitary sewer overflows at this location. This overflow pipe was only intended to be a temporary solution.

The Brooks Street Sewer Feasibility Study was completed April 28, 2010. The purpose of the study was to:

- Examine the impact of constructing the designed Brooks Street Sewer Replacement project on the downstream sewers without the Hold Boulevard Trunk Sewer, Phase B in operation.
- Determine if the Brooks Street Sewer could be constructed before the Hold Boulevard Trunk Sewer was reconstructed.
- Evaluate alternate flow diversions to reduce the existing and ultimate flows in the existing Brooks Street Sewer and determine what effect the diversion would have on the downstream sewers.

As a result of the feasibility study, the City plans to implement two diversions in lieu of constructing the Brooks Street Sewer Replacement. The two diversions are as follows:

- Manhole J10141 at Benson Avenue, north of Stoneridge Court – all flows diverted south
- Manhole J11132 at Hollowell Street, between Mountain Avenue and Boulder Avenue – all flows diverted south

These diversions were considered as existing when constructing and running the hydraulic analysis for this study.

2-4 Objectives and Scope of Work

The objective of this Master Plan is to evaluate the City's sewer collection system and to provide a framework for undertaking the construction of new and replacement facilities for the service area in an efficient and cost effective manner. As a planning document, it is general in nature and is predicated upon the best information available at this time.

The scope of work for the Old Model Colony and New Model Colony Sewer Master Plan Update consists of the following tasks:

1. *Reevaluate unit flow factors for Old Model Colony and New Model Colony based on newly defined densities and recent water consumption data*
2. *Reload the Old Model Colony and New Model Colony hydraulic models based on new landuse defined by the City's 2010 General Plan information*
3. *Develop detailed unit flow factors for mixed use areas and apply to the model manually*
4. *Rerun the analyses and identify any hydraulic deficiencies*
5. *Reevaluate Capital Improvement Program*
6. *Incorporate new results into one comprehensive Citywide Sewer Master Plan Document*

2-5 Statewide General Waste Discharge Requirements

The State Water Resources Control Board (SWRCB), which oversees all wastewater permitting and enforcement, adopted Resolution 2004-80 requiring staff to work with stakeholders in developing a regulatory program that will provide a consistent approach for reducing SSOs. To assist in the development of the regulatory program, a statewide SSO Guidance Committee composed of representatives from the Regional Water Quality Control Boards, county environmental health departments, environmental groups, U.S. EPA, local public collection system owners and other collection system experts was formed. SWRCB staff and the SSO Guidance Committee drafted the Statewide General Waste Discharge Requirements (WDR) for Sewage Collection System Agencies.

The State Water Board adopted the Statewide General Waste Discharge Requirements for sanitary sewer systems and the associated monitoring and reporting program by issuing Order No. 2006-0003-DWQ on May 2, 2006.

The WDR and reporting program addresses SSO reporting and proper collection system management and operation necessary to protect public health, water quality, and the public's investment in the sewer system infrastructure. The Statewide WDR is essentially California's equivalent of the proposed Federal regulation, Capacity, Management, Operation, and Maintenance (CMOM), and includes all elements of CMOM.

The fifth paragraph of the preamble to the Waste Discharge Requirements is:

"To facilitate proper funding and management of sanitary sewer systems, each Enrollee must develop and implement a system-specific Sewer System Management Plan (SSMP). To be effective, SSMPs must include provisions to provide proper and efficient management, operation, and maintenance of sanitary sewer systems, while taking into consideration risk management and cost benefit analysis. Additionally, an SSMP must contain a spill response plan that establishes standard procedures for immediate response to an SSO in a manner designed to minimize water quality impacts and potential nuisance conditions."

The Sewer System Management Plan must address the following elements:

- Goals
- Organization Structure
- Legal Authority
- Operation and Maintenance Program, including a Preventive Maintenance Program and a Rehabilitation and Replacement Program
- Design and Performance Provisions
- Overflow Emergency Response Plan
- Fats, Oils, and Grease (FOG) Control Program
- System Evaluation and Capacity Assurance Plan – *Completed as a part of this Master Plan*

- Monitoring, Measurement, and Program Modifications
- Sewer System Management Plan Program Audits
- Communication Program

The following completion schedules applied to the City of Ontario (population greater than 100,000):

- Application for Permit Coverage — November 2, 2006
- Reporting Program — November 2, 2006
- SSMP Development Plan and Schedule — August 2, 2007
- Goal — November 2, 2007
- Organization Structure — November 2, 2007
- Overflow Emergency Response Program — November 2, 2008
- Legal Authority — November 2, 2008
- Operation and Maintenance Program — November 2, 2008
- Fats, Oils and Grease Control Program — November 2, 2008
- Design and Performance — May 2, 2009
- System Evaluation and Capacity Assurance Plan — May 2, 2009
- Monitoring and Program Modifications — May 2, 2009
- Program Audits — May 2, 2009
- Communication Program — May 2, 2009
- Final Sewer System Management Plan — May 2, 2009

Enrollees were required to certify that the final SSMP and its constituent subparts were in compliance with the Sanitary Sewer Order within the time frame above. Enrollees were also required to obtain their governing board's approval of the SSMP Development Plan and Schedule and final SSMP at a public hearing prior to certification as complete and in compliance. Enrollees did not send their SSMP to the State or Regional Water Boards for review or approval; but, need to make them available upon request. The City of Ontario has completed each of the aforementioned elements of the required SSMP.

Currently, the SWRCB staff is conducting a review and update of the WDRs, Order No. 2006-003-DWQ. Program reviews and updates are conducted routinely to maintain consistency with current policies, regulations, and statutes. A revised order has been drafted and public comments were taken up until May 13, 2011. The SWRCB staff is now reviewing comments. It is expected that the final version of the order will be completed by the end of 2011.

2-6 Future Regulations – Capacity, Management, Operations and Maintenance (CMOM)

Concerned over the disturbing trend of frequent and large sanitary sewer overflows (SSOs), their environmental and health impacts, and the condition of the infrastructure, President Clinton directed the Environmental Protection Agency (EPA) on May 29, 1999 to develop new national regulations to prevent sanitary sewer overflows. Since directed, the EPA worked to develop draft National Pollutant Discharge Elimination System (NPDES) regulations for sanitary sewers and sanitary sewer overflows (SSOs).

The purpose of the proposed regulation is to improve collection systems' capacity, management, operation and maintenance (CMOM) programs, prevent avoidable sewer spills, improve treatment facility performance, and reduce health and environmental risks.

Under the proposed regulations, an NPDES permit is required for all publicly-owned collection systems, and the following general standards must be implemented:

- Proper management, operation and maintenance
- Adequate capacity to convey base flows and peak flows
- Stop and mitigate the impact of sanitary sewer overflows
- Provide notification of sewer spills to parties exposed to pollutants
- Develop a written summary of the CMOM program and make it, with audits, available to the public upon request

The components of the CMOM program consist of:

- *Goals*
- *Organization Structure*
- *Legal Authority*
- *Measures and Activities*
- *Design and Performance Provisions*
- *Monitoring, Measurement and Program Modifications*
- *Overflow Emergency Response Plan*
- *System Evaluation and Capacity Assurance Plan*
- *CMOM Program Audits*

At the end of March, 2000, EPA sent a draft notice of proposed rulemaking (NPRM) to the Office of Management and Budget (OMB) for review, which reflected the recommendations of the SSO Federal Advisory Subcommittee that were provided in October 1999.

The OMB reviewed the proposed regulations and approved it for publication in the Federal Register in January 2001. However, the Bush administration decided to review the proposed regulations prior to official publication.

Throughout 2001, the public and the wastewater collection/treatment community sent letters to the EPA expressing concern with the regulatory language of the proposal and urging the agency to work with affected entities to develop a more sensible, workable proposal.

In November 2001, the Assistant Administrator for Water instructed the Office of Wastewater Management (OWM) to develop a new SSO/CMOM Proposed Rule that will:

- Summarize key comments from the public on the January 2001 draft notice
- Provide additional discussion on how the public's comments related to the proposed provisions
- Provide comments on potential alternatives

CMOM was ready to be published in the Federal Register in 2001 for the 120 day comment period. However, the process was halted by the then-incoming Bush Administration so that the regulation could be reviewed.

Currently, there is no change in the status of the SSO Proposed Rule, which contained CMOM. It was never moved for publication in the Federal Register nor adopted during the Bush administrations and there has been no publication action to date by EPA.

In lieu of publishing the SSO Rule, the EPA published a guidance document in 2005 that contains most of what was in the original SSO Rule concerning CMOM. The guidance document is entitled "Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems".

2-7 Government Accounting Standards Board Statement 34 (GASB 34)

Government Accounting Standards Board Statement 34 (GASB 34), issued in June 1999, requires that agencies have an asset management system in place. They must establish the condition in which they will maintain their assets, assess the condition of their infrastructure, estimate the useful lives and replacement costs, and determine the cost to maintain the desired condition of the infrastructure. Section I, Background, of the proposed CMOM regulations acknowledge GASB 34, and the regulations encompass many of the components of GASB 34. Complying with Statement 34 will provide agencies with the necessary tools for maintaining the integrity of their assets and will most likely improve their bond rating.

2-8 Organization of Sewer Master Plan Report

This Sewer Master Plan report presents the methodology, findings, and recommendations of a comprehensive study of the City's sewer collection system. A brief outline of the report follows:

Section 1: ***Executive Summary*** provides an overview of the key findings and recommendations of this report

Section 2: ***Introduction*** provides an overview and outline for the Sewer Master Plan.

Section 3: ***Study Area*** describes the physical features, land use characteristics and population of the study area.

Section 4: ***Criteria*** describes the standards and procedures utilized in developing the existing and future wastewater flows, assessing the existing system, and selecting the recommended improvements.

Section 5: ***Existing Sewer System*** describes the City's existing sewer collection system, drainage regions, and the regional facilities that will receive flows from the study area.

Section 6: ***Ultimate Sewer System*** describes the City's ultimate sewer collection system, including New Model Colony.

Section 7: ***Hydraulic Sewer Model*** describes the methodology used in the construction of the City's hydraulic sewer model. Base data and assumptions used are described in detail this section.

Section 8: ***System Analysis*** describes the hydraulic model and identifies the hydraulically deficient segments of the system. Condition assessment of the sewer collection system, 'hot spots' and maintenance practices are also discussed.

Section 9: ***Capital Improvement Program*** presents a prioritized, capital improvement program for the recommended projects.

The ***Appendices*** contain background information and are referred to in the text as the location of supplementary facts and figures.

2-9 Acknowledgments

AKM Consulting Engineers would like to express their sincere appreciation to the following individuals for their valuable assistance and support throughout the preparation of this study:

- Scott Burton, Assistant Utilities General Manager
- Dennis Mejia, Utilities Engineering Division Manager
- Jeffrey Krizek, Associate Engineer
- Sheldon Yu, Senior Associate Civil Engineer
- Fernando Cobos, Utilities Project Manager
- Ivan Sanchez, Engineering Assistant/GIS

2-10 Abbreviations

To conserve space and improve readability, abbreviations have been used in this report. Each abbreviation has been spelled out in the text the first time it is used. Subsequent usage of the term is usually identified by its abbreviation. The list of abbreviations utilized in this report is contained in Table 2-1.

Please also note that the terms “sewer” or “sewage” and “wastewater” are generally interchangeable throughout this report.

Table 2-1
Abbreviations

Abbreviations	Explanation
AC, Ac	Acres
ACP	Asbestos Cement Pipe
ADWF	Average Dry Weather Flow
amsl	Above Mean Sea Level
BMP	Best Management Practices
CCTV	Closed Circuit Television
cfs	Cubic Feet per Second
CI	Cast Iron Pipe
CIP	Capital Improvement Program
City	City of Ontario
CMOM	Capacity, Management, Operation and Maintenance
CWEA	California Water Environment Association
d/D	Depth to Diameter Ratio
Dia	Diameter
DIP	Ductile Iron Pipe
DU, du	Dwelling Unit
D/S	Downstream
EDU	Equivalent Dwelling Unit
EPA	Environmental Protection Agency
ETS	Eastern Trunk Sewer
FAR	Floor Area Ratio
FOG	Fats, Oil, and Grease
fps	Feet per Second
GASB 34	Government Accounting Standards Board Statement 34
GIS	Geographic Information System
gpcd	Gallons per Capita per Day
GPD, gpd	Gallons per Day
gpm	Gallons per Minute
HP	Horsepower
ID	Identification
IEUA	Inland Empire Utilities Agency
I/I	Inflow and Infiltration
LF	Lineal Feet
Mat	Material
mg	Million Gallons
MGD, mgd	Million Gallons per Day
MH	Manhole
NCPI	National Clay Pipe Institute
NMC	New Model Colony
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OMC	Old Model Colony

Table 2-1 (Continued)
Abbreviations

Abbreviations	Explanation
OSHA	Occupational Safety & Health Administration
PDWF	Peak Dry Weather Flow
PMP	Preventative Maintenance Program
PS	Pump Station
PVC	Polyvinyl Chloride
PWWF	Peak Wet Weather Flow
RFP	Request for Proposal
RP	Regional Plant
RPM	Revolutions per Minute
SAMP	Sub-Area Master Plan
SBC	San Bernardino County
SBCFCD	San Bernardino County Flood Control District
SSO	Sanitary Sewer Overflow
SSMP	Sewer System Management Plan
SWRCB	State Water Resources Control Board
TDH	Total Dynamic Head
TSF	Thousand Square Feet
UFF	Unit Flow Factor
U/S	Upstream
VCP	Vitrified Clay Pipe
WDR	Waste Discharge Requirements
WTS	Western Trunk Sewer

Section 3

STUDY AREA

3-1 Purpose

This section describes the study area of the Old Model Colony and New Model Colony Sewer Master Plan Update, discusses the existing and future land uses within the study area, and population estimates for present day and ultimate build out.

3-2 Location

The study area, shown on Figure 3-1, coincides with the City of Ontario boundary with the exception of two small areas in the north central and northeastern portion of the City. It is located approximately 35 miles east of downtown Los Angeles and encompasses approximately 49 square miles of residential, commercial, industrial, public and agricultural lands as well as the Ontario International Airport. It is bordered by the Cities of Chino and Montclair on the west; the Cities of Upland and Rancho Cucamonga on the north; the City of Fontana and Riverside County on the east; and Riverside County, and the City of Chino on the south.

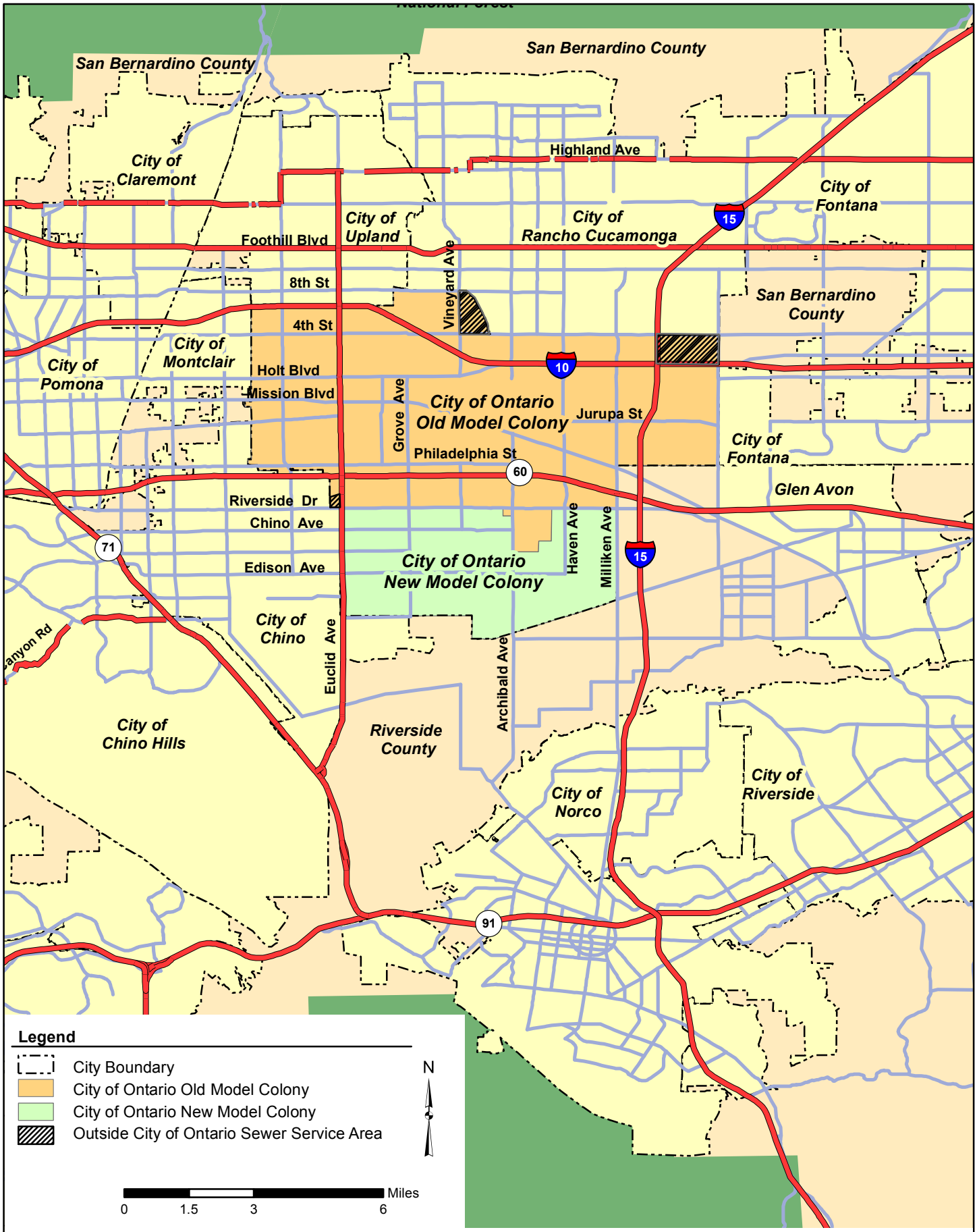
The major highways crossing through portions of the study area include the San Bernardino Freeway (I-10) on the north, the Pomona Freeway (SR-60) on the south, and the Ontario Freeway (I-15) on the east. Major roads within the City include Euclid Avenue, Mission Boulevard, and Philadelphia Street.

The City is divided into two distinct areas, Old Model Colony (OMC) and New Model Colony (NMC). The two areas are generally divided by Riverside Drive. OMC consists of existing residential, commercial, and industrial developments. It comprises approximately 36 square miles. NMC is an agricultural area that was annexed to the City in 1999. It is approximately 13 square miles and currently consists of primarily agricultural land. The City's 2010 General Plan details plans to develop the agricultural lands in NMC into a mix of residential, commercial, industrial, and public uses. The ultimate residential population of NMC is expected to reach 162,518. Development of NMC has begun with the construction of the Brookfield Homes Development, Edenglen, located southwest of the intersection of Riverside Drive and Mill Creek Avenue.

3-3 Topographical Description and geology

General

The San Bernardino Plain is an expanse of sand, gravel and boulders. Dominating the valley are Mt. San Antonio, Cucamonga Peak, and Ontario Peak. Cucamonga Peak is visibly flat on top which represents sections of the original valley floor. Loose dirt and gravel flows swiftly from the slopes of these young mountains with the sometimes torrential rains.



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Regional Location Map

Figure 3-1

The valley and plain has taken more than 10 million years to form. Geologists place the beginning of the area's geologic history between 12 and 28 million years ago, the same time the San Andreas Fault is believed to have been formed. The San Gabriel Mountains are part of the east-west trending transverse ranges, which run across the north-south grain of California. The San Gabriel Mountains are intersected 25 miles east of Ontario at the Cajon Pass by the San Andreas Fault. These mountains were partially formed by geologic activity along this fault. Visible to the south of Ontario is a portion of the peninsular range consisting of the Santa Ana Mountains, the base of which is carved by the Santa Ana River. Several blocks of the Peninsular Range are separated by faults generally attributed to the San Andreas Fault system. Small rolling hills make up the north and west portions of the valley (Chino Hills, Diamond Bar, and the Covina Hills).

The Transverse and Peninsular Ranges meet in the San Gorgonio Pass area, 50 miles east of Ontario. Mount San Gorgonio is the tallest peak in Southern California and is frequently visible from Ontario.

Elevations

The topography of the region generally slopes in a southwesterly direction from 1170 to 630 feet above mean sea level (amsl).

Soils

Native soils, shown on Figure 3-2, consist of the following

Class I Soils

- Chino Silt Loam
- Grangeville Fine Sandy Loam
- Hanford Sandy Loam

Class II Soils

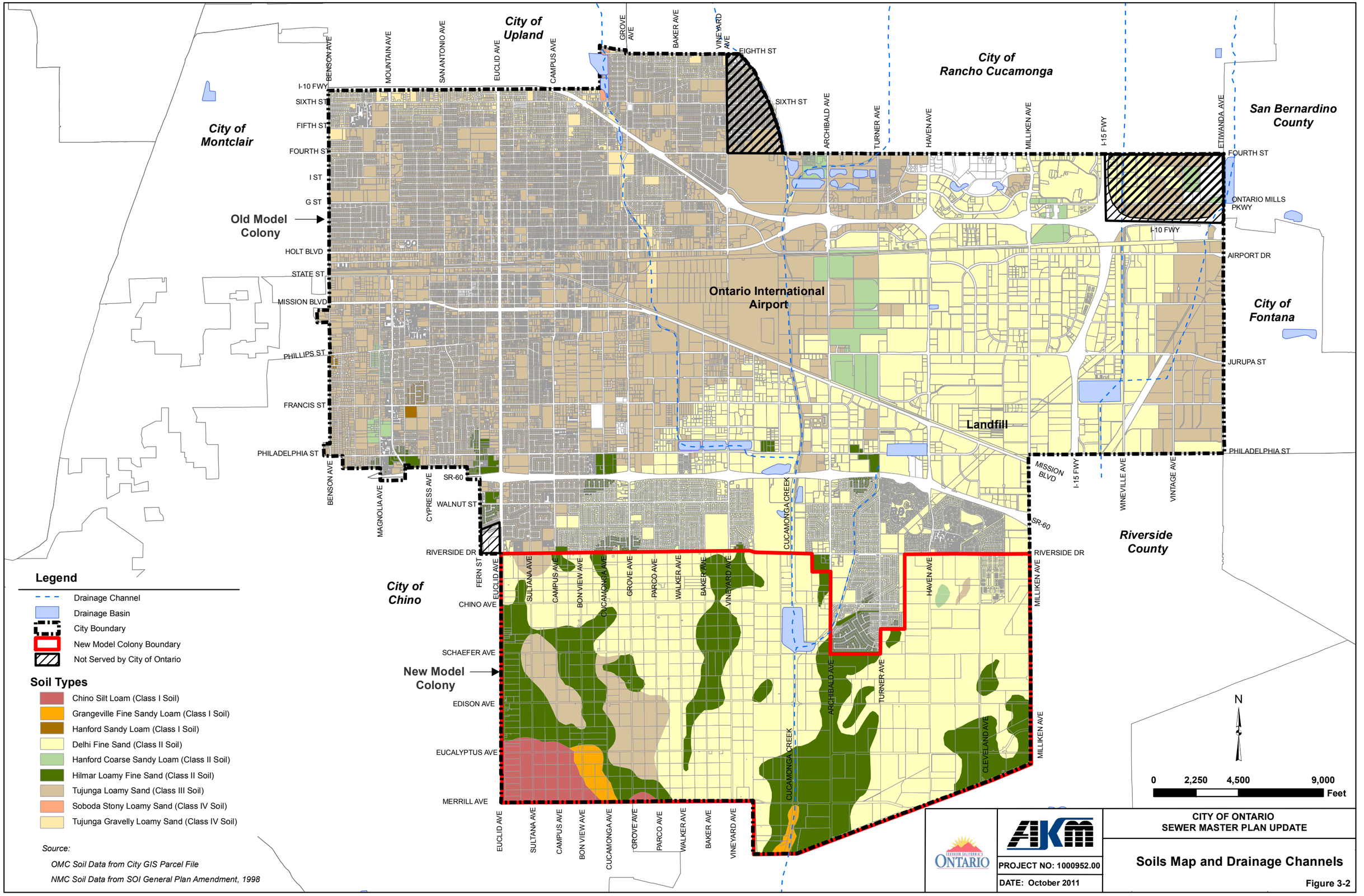
- Delhi Fine Sand
- Hanford Coarse Sandy Loam
- Hilmar Loamy Fine Sand

Class III Soils

- Tujunga Loamy Sand

Class IV Soils

- Soboda Stony Loamy Sand
- Tujunga Gravelly Loamy Sand



Legend

- Drainage Channel
- Drainage Basin
- City Boundary
- New Model Colony Boundary
- Not Served by City of Ontario

Soil Types

- Chino Silt Loam (Class I Soil)
- Grangeville Fine Sandy Loam (Class I Soil)
- Hanford Sandy Loam (Class I Soil)
- Delhi Fine Sand (Class II Soil)
- Hanford Coarse Sandy Loam (Class II Soil)
- Hilmar Loamy Fine Sand (Class II Soil)
- Tujunga Loamy Sand (Class III Soil)
- Soboda Stony Loamy Sand (Class IV Soil)
- Tujunga Gravelly Loamy Sand (Class IV Soil)

Source:

OMC Soil Data from City GIS Parcel File

NMC Soil Data from SOI General Plan Amendment, 1998

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SEWER MASTER PLAN UPDATE

Soils Map and Drainage Channels

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Figure 3-2

Due to the presence of predominantly dairy industries over a long period of time, prime agricultural soils, high in salts and nitrates, cover approximately 2,999 acres or 36 percent of the total area in the NMC (SOI General Plan Amendment, 1998). Organic materials (manure and feed) are reportedly present in thickness of up to six feet.

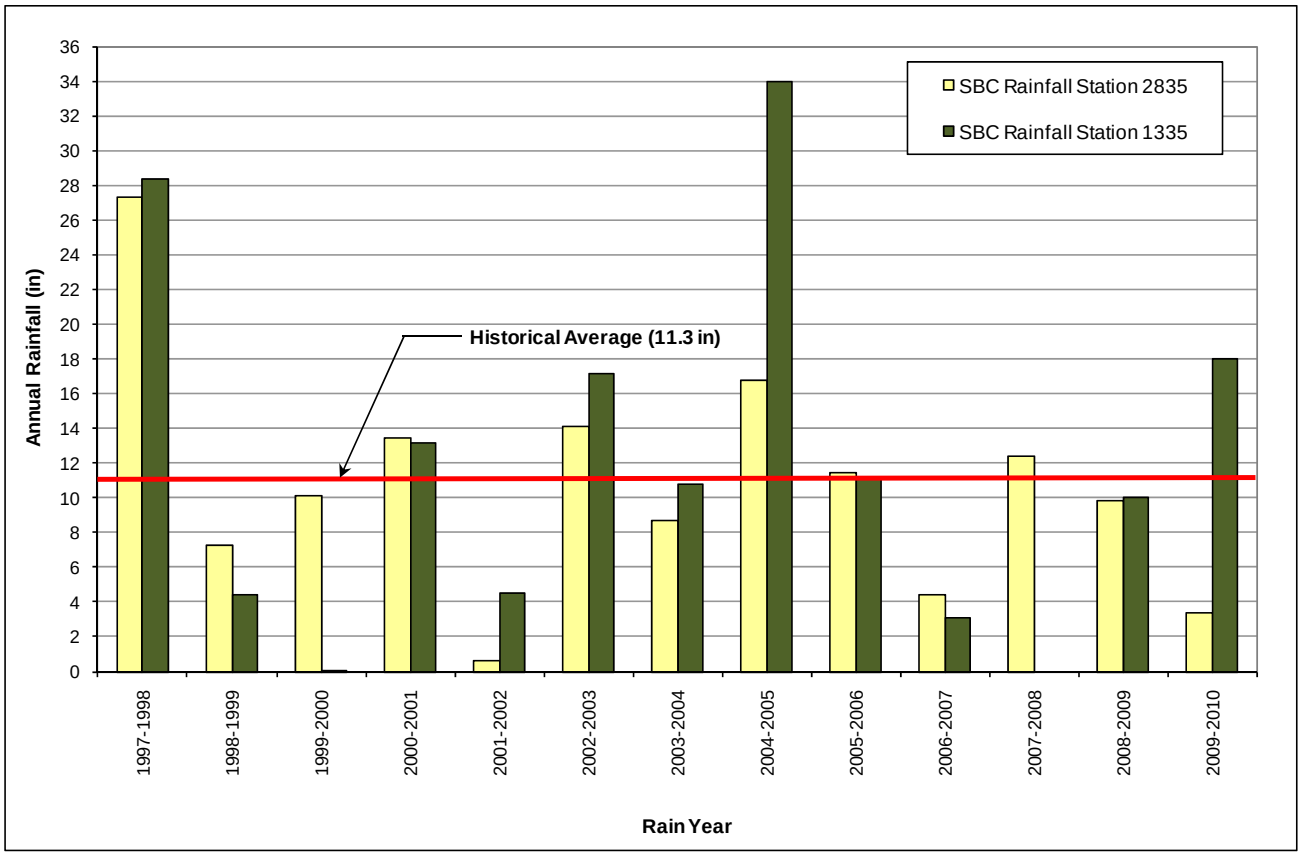
The NMC is located within the Chino Groundwater Basin, which has been found to maintain a relatively shallow water table. The SOI General Plan Amendment reported findings of groundwater elevations ranging from 530 to 590 feet in 1991.

3-4 Climate

The climate in the study area is Mediterranean-like with generally moderate temperatures and low humidity year-round. The average median temperature is approximately 83^{o} F. The average annual days of sunshine is 312.

The historical average annual rainfall is about 11.3 inches. Most of the rainfall typically occurs between October and April. Figure 3-3 shows the seasonal rainfall from 1994 to 2010 as measured by the San Bernardino County Rain Gauge Stations 2835 and 1335. Station 2835 is located at a local fire station on Mountain Avenue, south of Fourth Street. Station 1335 is located on the southeast corner of Francis Street and Parco Avenue.

Figure 3-3
Seasonal Rainfall 1997-2010



3-5 Land Use

The land use information utilized in the preparation of the Sewer Master Plan Update is primarily based upon the City's GIS parcel land use data and Official Land Use Plan map. This information was supplemented by aerial photographs, field reviews, and information provided by City staff.

Existing Conditions

The City is a well planned urban community with a balance of residential, commercial, and industrial land uses. Within the service area, the primary land use in the City is residential (8,921 Ac or 27.9 %). Industrial use also makes up a significant portion of the total existing land use (4,898 Ac or 15.3%). Approximately 3,369 acres or 10.5 percent of the total is currently undeveloped. Table 3-1 provides a summary of the existing land uses. Figure 3-4 shows the locations of these land uses.

Table 3-1
Existing Study Area Land Uses

Landuse Description		Service Area				Outside Service Area		Total City			
		OMC (Ac)	NMC (Ac)	Total (Ac)	% of Total	OMC (Ac)	% of Total	OMC (Ac)	NMC (Ac)	Total (Ac)	% of Total
RR	Rural Residential	566		566	1.8			566		566	1.8
SFR	Single Family Residential	4,489	2,585	7,074	22.6	115	17.8	4,604	2,585	7,189	22.5
MFR	Multiple Family Residential	1,076	23	1,099	3.5	67	10.4	1,143	23	1,166	3.6
Total Residential		**6,131**	**2,608**	**8,739**	**27.9**	**182**		**6,313**	**2,608**	**8,921**	**27.9**
COM	Commercial	1,735	76	1,811	5.8	24	3.7	1,759	76	1,835	5.7
IND	Industrial	4,606	65	4,671	14.9	227	35.1	4,833	65	4,898	15.3
OPEN	Open Space	725	9	734	2.3			725	9	734	2.3
PUBLIC	Public	326	15	341	1.1			326	15	341	1.1
SCHL	Schools	419	38	457	1.5			419	38	457	1.4
ARPT	Airport	1,500		1,500	4.8			1,500		1,500	4.7
LF	Landfill	209		209	0.7			209		209	0.7
AGR	Agriculture	206	2,733	2,939	9.4	20	3.1	226	2,733	2,959	9.3
INF	Infrastructure	869	85	954	3.0	35	5.4	904	85	989	3.1
ROW	Right-of-Ways	4,362	372	4,734	15.1			4,362	372	4,734	14.8
UND	Undeveloped	1,767	1,523	3,290	10.5	79	12.2	1,846	1,523	3,369	10.5
UNK	Unknown	77	658	735	2.3	70	10.8	147	658	805	2.5
VAC	Vacant Buildings	198		198	0.6	9	1.4	207		207	0.6
Total		**23,130**	**8,182**	**31,312**	**100**	**646**	**100**	**23,776**	**8,182**	**31,958**	**100**

As shown in Figure 3-4, some areas of the City are not within the sewer system service area. Cucamonga Valley Water District provides sewer service to the area north of Fourth Street and East of Vineyard Avenue as well as the area north of the I-10 Freeway and east of the I-15 Freeway. The City of Chino provides sewer service to the northeast corner of Riverside Drive and Fern Street and the northeast corner of Mountain Avenue and SR-60.

City of Upland
City of Rancho Cucamonga
City of Montclair
San Bernardino County
City of Fontana
City of Chino
Riverside County
Ontario International Airport
Landfill
Old Model Colony
New Model Colony

BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
EIGHTH ST
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
I-15 FWY
ETIWANDA AVE

I-10 FWY
SIXTH ST
FIFTH ST
FOURTH ST
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
ONTARIO MILLS PKWY
AIRPORT DR
JURUPA ST

SR-60
WALNUT ST
RIVERSIDE DR
CHINO AVE
SCHAEFER AVE
EDISON AVE
EUCALYPTUS AVE
MERRILL AVE
CUCAMONGA CREEK
MAGNOLIA AVE
CYPRESS AVE
FERN ST
SULTANA AVE
BON VIEW AVE
PARCO AVE
WALKER AVE
CLEVELAND AVE
WINEVILLE AVE
VINTAGE AVE

Legend

- City Boundary
- New Model Colony Boundary
- Not Served by City of Ontario

Landuses

- Rural Residential
- Single Family Residential
- Multi Family Residential
- Agriculture
- Airport
- Commercial
- Industrial
- Infrastructure
- Landfill
- Open Space
- Public
- School
- Undeveloped
- Unknown
- Vacant

N

0 2,250 4,500 9,000 Feet

CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

Existing Land Use Map

PROJECT NO: 1000952.00
DATE: October 2011

Figure 3-4

The total number of housing units in the City is estimated at 47,390. With a population of 173,188 and a 3.67 percent vacancy rate, the average number of persons per household is estimated at 3.768 (Ref: *California Department of Finance, Demographic Research Unit*).

Ultimate Conditions

The ultimate land uses are based upon the City's latest general plan document entitled *The Ontario Plan (2010).* Table 3-2 provides a summary of the ultimate land uses and Figure 3-5 shows the locations of these land uses. The residential area increases to 10,915 acres (34.2 percent of total). The employment area, including business parks and industrial uses, is expected to entail about 8,103 acres (25.4 percent of total).

Residential Land Uses

The Ontario Plan defines five residential land use categories: Rural, Low Density, Low-Medium Density, Medium Density, and High Density. The plan assumes densities for each of the residential land use categories. The assumed densities are summarized in Table 3-3.

Retail / Service

Four retail / service uses are defined: Neighborhood Commercial, General Commercial, Office Commercial, and Hospitality. The assumed intensities for each commercial use are shown in Table 3-3.

Employment

Two employment uses are defined: Business Park and Industrial. The assumed intensities for each commercial use are shown in Table 3-3.

Open Space

Open Space land use designations include Non-Recreational Open Space, Recreational Open Space and Water Open Space (i.e. lakes, ponds, etc).

Public

Public land use designations include Public Facility and Public School.

Other

Other land use designations include the Ontario International Airport, Landfill, Railroad and Roadways.

Table 3-2
Ultimate Study Area Land Uses

Land Use Category	Acres[2]	% of Total Area	Density (du/ac)[3]	Intensity (FAR)[3]	Units	Population[4]	Square Feet (Non-Office)	Square Feet (Office)	Total Square Feet	Jobs[5] (Non-Office)	Jobs[5] (Office)	Total Jobs[5]
Residential												
Rural Res	453	1.4	2.0		906	3,621						
LDR (OMC)	4,308	13.5	4.0		17,232	68,876						
LDR (NMC)	3,158	9.9	4.5		14,211	56,801						
LMDR (OMC)	295	0.9	8.5		2,508	10,026						
LMDR (NMC)	505	1.6	8.5		4,295	17,167						
MDR (OMC)	896	2.8	18.0		16,124	61,551						
MDR (NMC)	1,059	3.3	22.0		23,294	77,964						
HDR	241	0.8	35.0		8,421	28,185						
Subtotal	***10,915***	***34.2***			***86,991***	***324,192***						
Mixed Use												
Downtown	109	0.3	35.0		2,279	4,557	756,202	756,202	1,512,403	543	2,163	2,706
Euclid & Francis	10	0.0	30.0		156	312	181,210	0	181,210	419	0	419
Holt	55	0.2	30.0		412	824	478,289	1,195,722	1,674,011	343	3,420	3,763
Meredith	246	0.8	40.0		2,957	5,914	2,146,637	5,366,592	7,513,229	1,541	15,348	16,890
Hospitality	76	0.2	60.0		457	914	1,493,672	1,493,672	2,987,345	1,072	4,272	5,344
Ontario Festival (MxU in 14)	37	0.1	20.0		368	736	112,211	240,451	352,662	81	688	768
Guasti	83	0.3	30.0		500	1,001	1,089,871	1,271,516	2,361,388	783	3,637	4,419
Ontario Center (E. of Haven)	345	1.1	40.0		4,139	8,278	1,502,384	7,511,922	9,014,306	1,079	21,484	22,563
Mills	240	0.7	40.0		479	958	3,912,233	1,564,893	5,477,126	2,809	4,476	7,285
NMC south	316	1.0	35.0		3,315	6,630	962,632	5,775,795	6,738,427	691	16,519	17,210
NMC east	264	0.8	25.0		1,978	3,956	1,378,413	1,206,111	2,584,524	990	3,449	4,439
SR60 & Hamner	41	0.1	0.0		0	0	349,112	313,305	662,417	251	896	1,147
Subtotal	***1,822***	***5.7***			***17,039***	***34,078***	***14,362,865***	***26,696,182***	***41,059,046***	***10,601***	***76,351***	***86,952***
Retail/Service												
NC	277	0.9		0.30			2,896,914	724,229	3,621,143	6,692	2,071	8,763
GC	552	1.7		0.30			6,488,654	720,962	7,209,616	4,659	2,062	6,721
OC	526	1.6		0.75			5,151,406	12,019,946	17,171,352	3,699	34,377	38,076
HOS	145	0.5		1.00			5,049,475	1,262,369	6,311,844	3,626	3,610	7,236
Subtotal	***1,499***	***4.7***					***19,586,449***	***14,727,505***	***34,313,954***	***18,675***	***42,121***	***60,796***
Employment												
BP	1,357	4.2		0.40			11,821,313	11,821,313	23,642,626	7,684	33,809	41,493
IND	6,747	21.1		0.55			145,469,382	16,163,265	161,632,647	94,555	46,227	140,782
Subtotal	***8,103***	***25.4***					***157,290,695***	***27,984,578***	***185,275,273***	***102,239***	***80,036***	***182,275***
Other												
OS-NR	1,243	3.9										
OS-R	991	3.1										
OS-W	59	0.2										
PF	99	0.3										
PS	627	2.0										
ARPT	1,422	4.5										
Rail	247	0.8										
LF	137	0.4										
ROW	4,794	15.0										
Subtotal	***9,619***	***30.1***										
Total	***31,958***	***100.0***			***104,030***	***358,270***	***191,240,009***	***69,408,264***	***260,648,273***	***131,515***	***198,508***	***330,023***

Notes

[1] Historically, citywide buildout levels do not achieve the maximum allowable density/ intensity on every parcel and are, on average, lower than allowed by the General Plan. Accordingly, the buildout estimates in this General Plan do not assume buildout at the maximum density or intensity and instead are adjusted downward to account for variations in buildout intensity. Buildout assumptions are as agreed upon on 2-4-08.

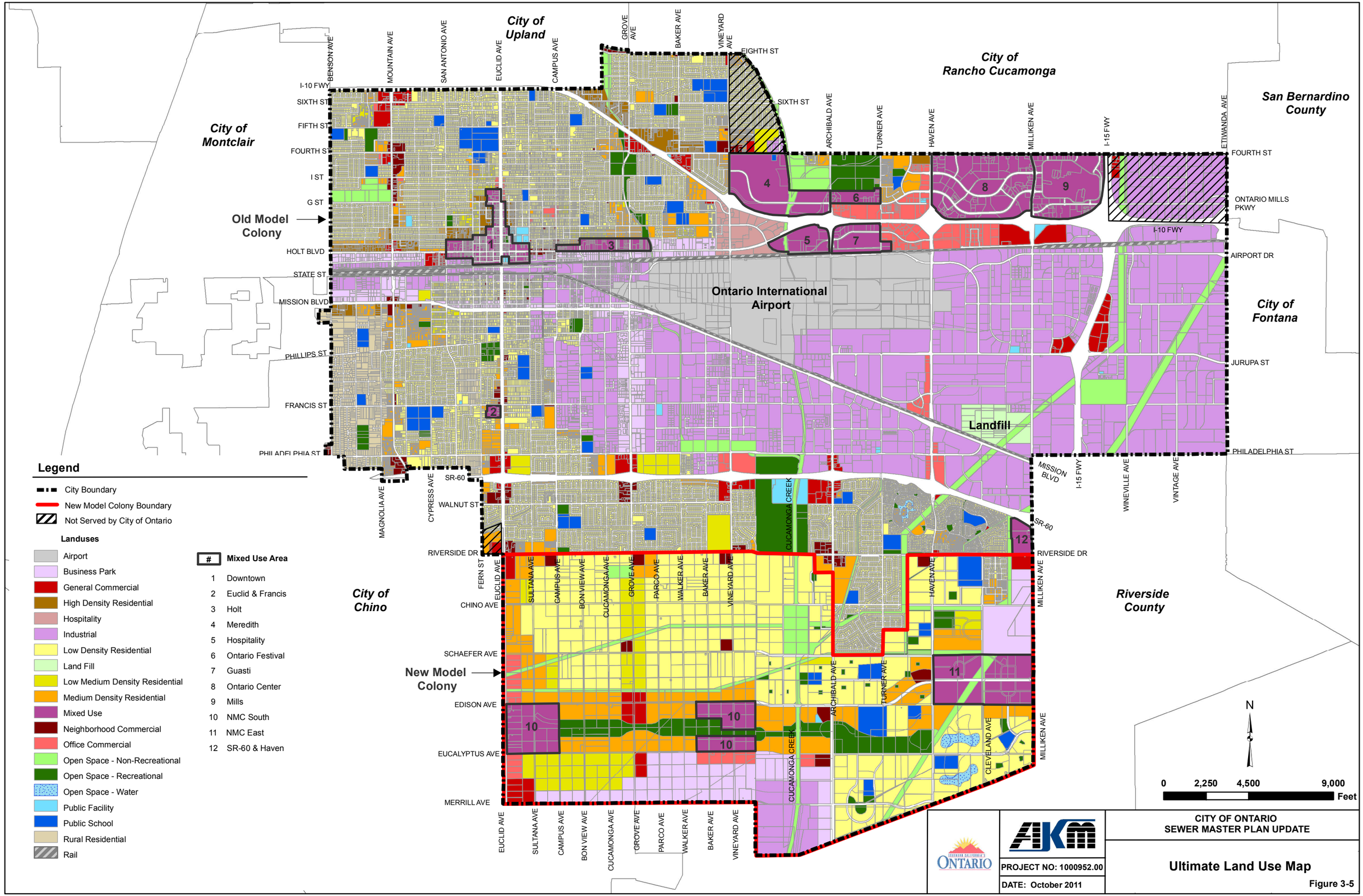
[2] Acres are given as adjusted gross acreages, which do not include the right-of-way for roadways, flood control facilities, or railroads.

[3] Density/ Intensity includes both residential density, expressed as units per acre, and non-residential intensity, expressed as floor area ratio (FAR), which is the amount of building square feet in relation to the size of the lot.

[4] Estimates of population by residential designation are based on a persons-per-household factor that varies by housing type. 3.347 pph for MF, 3.278 pph for sfa, and 3.997 pph for sfd.

[5] The factors used to generate the number of employees are 2.310 e/ 1000 sf of community commercial; .718 e/ 1000 sf of regional commercial; .650 e/ 1000 sf of industrial; and 2.86 e/ 1000 sf of office.

Reference: The Ontario Plan Approved Landuse Buildout Estimates, January 2010



Legend

- City Boundary
- New Model Colony Boundary
- Not Served by City of Ontario

Landuses

- Airport
- Business Park
- General Commercial
- High Density Residential
- Hospitality
- Industrial
- Low Density Residential
- Land Fill
- Low Medium Density Residential
- Medium Density Residential
- Mixed Use
- Neighborhood Commercial
- Office Commercial
- Open Space - Non-Recreational
- Open Space - Recreational
- Open Space - Water
- Public Facility
- Public School
- Rural Residential
- Rail

#	Mixed Use Area
1	Downtown
2	Euclid & Francis
3	Holt
4	Meredith
5	Hospitality
6	Ontario Festival
7	Guasti
8	Ontario Center
9	Mills
10	NMC South
11	NMC East
12	SR-60 & Haven

CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

PROJECT NO: 1000952.00
DATE: October 2011

Ultimate Land Use Map

Figure 3-5

Table 3-3
Future Buildout

Land Use	Acres	Assumed Density/ Intensity	Units	Population	Non-Residential Square Feet
Residential					
Rural	453	2 du/ac	906	3,621	
Low Density	7,466	4.0 du/ac (OMC) 4.5 du/ac (NMC)	31,443	125,678	
Low-Medium Density	800	8.5 du/ac	6,803	27,193	
Medium Density	1,955	18.0 du/ac (OMC) 22.0 du/ace (NMC)	39,418	139,515	
High Density	241	35 du/ac	8,421	28,185	
Subtotal	**10,915**		**86,991**	**324,192**	
Mixed Use					
Downtown	109	60% of the area at 35 du/ac 40% of the area at 0.80 FAR for office and retail	2,279	4,557	1,512,403
East Holt Boulevard	55	25% of the area at 30 du/ac 50% of the area at 1.0 FAR office 25% of the area at 0.80 FAR retail	412	824	1,674,011
Meredith	246	30% of the area at 40 du/ac 70% at 1.0 FAR for office and retail uses	2,957	5,914	7,513,229
Transit Center	76	10% of the area at 60 du/ac 90% of the area at 1.0 FAR office and retail	457	914	2,987,345
Inland Empire Corridor	37	50% of the area at 20 du/ac 30% of the area at 0.50 FAR office 20% of the area at 0.35 FAR retail	368	736	352,662
Guasti	83	20% of the area at 30 du/ac 30% of the area at 1.0 FAR retail 50% of the area at 0.70 FAR office	500	1,001	2,361,388
Ontario Center	345	30% of the area at 40 du/ac 50% of the area at 1.0 FAR office 20% of the area at 0.5 FAR retail	4,139	8,278	9,014,306
Ontario Mills	240	5% of the area at 40 du/ac 20% of the area at 0.75 FAR office 75% of the area at 0.5 FAR retail	479	958	5,477,126
NMC east	264	30% of the area at 25 du/ac 30% of the area at 0.35 FAR for office 40% of the area at 0.3 FAR for retail uses	1,978	3,956	2,584,524
NMC west	316	30% of the area at 35 du/ac 70% of the area at 0.7 FAR office and retail	3,315	6,630	6,738,427
Euclid / Francis	10	50% of the area at 30 du/ac 50% of area at 0.8 FAR retail	156	312	181,210
SR-60 / Haven	41	65% of the area at 0.3 FAR retail 35% of the area at 0.5 FAR office			662,417
Subtotal	**1,822**		**17,039**	**34,078**	**41,059,046**
Retail/Service					
Neighborhood Commercial	277	0.30 FAR			3,621,143
General Commercial	552	0.30 FAR			7,209,616
Office/Commercial	526	0.75 FAR			17,171,352
Hospitality	145	1.00 FAR			6,311,844
Subtotal	**1,499**				**34,313,954**

Table 3-3 (Continued)
Future Buildout

Land Use	Acres	Assumed Density/ Intensity	Units	Population	Non-Residential Square Feet
Employment					
Business Park	1,357	0.40 FAR			23,642,626
Industrial	6,747	0.55 FAR			161,632,647
Subtotal	**8,103**				**185,275,273**
Other					
Open Space – Non-Recreation	1,243	Not applicable			
Open Space – Recreation	991	Not applicable			
Open Space - Water	59	Not applicable			
Public Facility	99	Not applicable			
Public School	627	Not applicable			
Los Angeles/Ontario International Airport (LAONT)	1,422	Not applicable			
Landfill	137	Not applicable			
Railroad	247	Not applicable			
Roadways	4,794	Not applicable			
Subtotal	**9,619**				
TOTAL	**31,958**		**104,030**	**358,270**	**260,648,273**

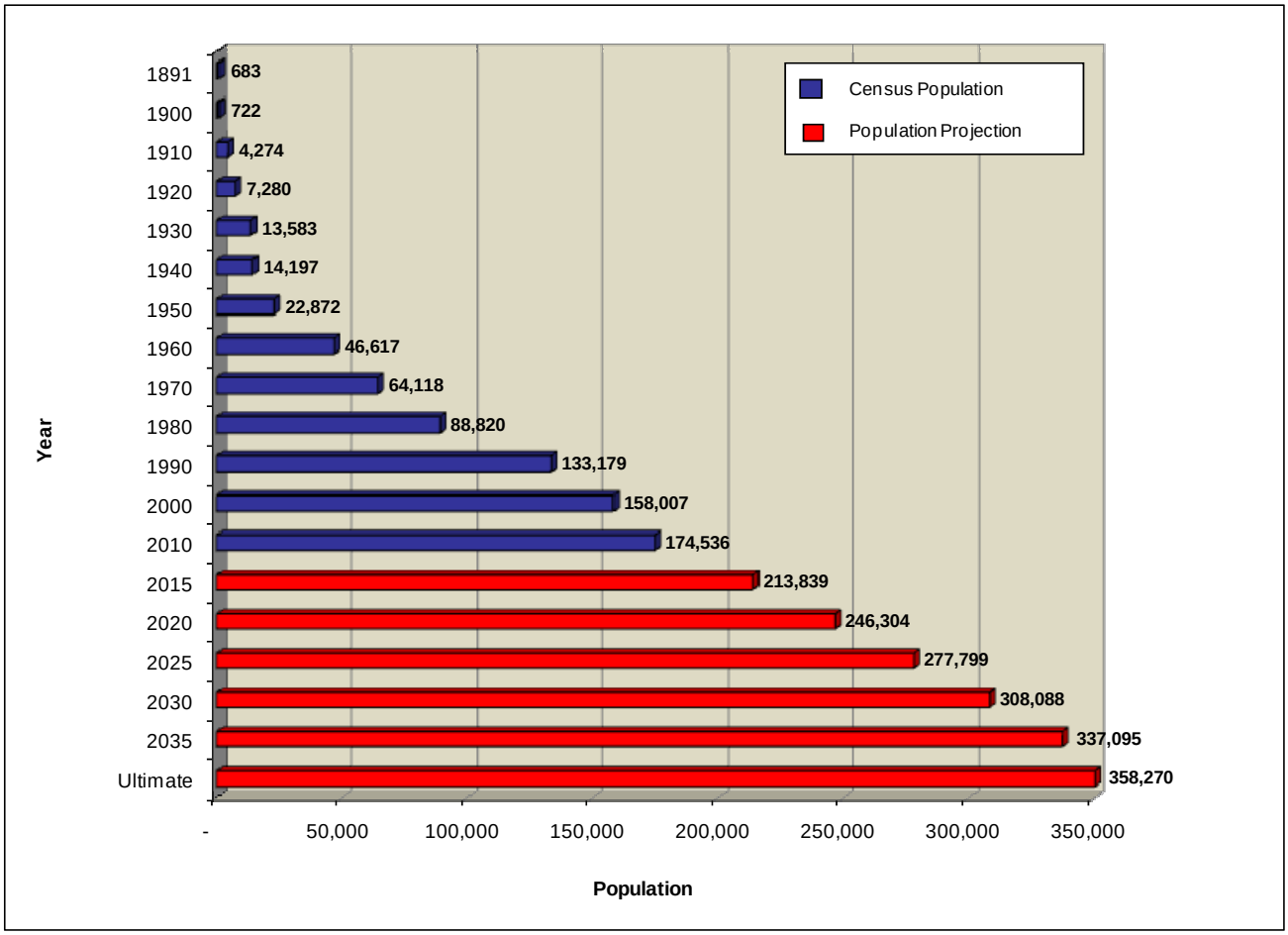
3-6 Population

Since its incorporation in 1890, the City of Ontario has grown from a population of 683 to approximately 174,536 in 2010 (*Ref: California Department of Finance*). The historical population increased from 1890 to 2010, as well as future projections are depicted on Figure 3-6. With the total number of housing units at approximately 47,795 and a 3.7 percent vacancy rate, the population per household is estimated to be 3.8 (*Ref: California Department of Finance*).

It should be noted that the estimates shown on Figure 3-6 for the year 2000 through 2035 includes New Model Colony, which was annexed by the City in 1999. The City of Ontario Planning Department estimated the population in New Model Colony in 1999 to be about 1,500 persons (*Ref: Sphere of Influence General Plan Amendment Digest).* The population shown also includes the 628 acres of land within the City of Ontario's Old Model Colony, but outside of the study area of this Master Plan.

The ultimate population in New Model Colony is expected to be approximately 162,518 (*Ref: 2010 General Plan Approved Landuse Buildout Estimate Table*). The ultimate population in Old Model Colony is estimated at 195,752. The total ultimate population is estimated at 358,270 which will more than double the existing population.

Figure 3-6
City of Ontario Population History and Projections



Reference: Historical population data from California State Department of Finance.
Population projections from SCAG Adopted 2008 Regional Transportation Plan Growth Forecast

Section 4

CRITERIA

4-1 General

Establishing performance standards is an important part of evaluating existing wastewater collection systems, as it forms the basis for system analysis and system improvement recommendations. These standards include methodology for estimating wastewater design flows and minimum design standards for the collection system pipes, pump stations, and force mains.

Average wastewater flows can be reasonably estimated from land use and their corresponding unit flow factors. The results are then compared to measured flows. Peaking factors are needed for estimating peak dry weather and peak wet weather flows. Peak wet weather flows include an allowance for inflow and infiltration (I/I).

Collection system design standards include minimum pipe size, minimum flow velocity, and depth of flow to pipe diameter ratio (d/D). Pump station criteria includes the capacity and number of pumps, wet well and force main sizes, redundancy, emergency power, remote monitoring capabilities, as well as safety and regulatory agency requirements. Finally, facility useful lives are needed for adequately scheduling replacement of the aging infrastructure.

4-2 Unit Flow Factors

Flow Monitoring Data

Data collection and review is essential in developing unit flow factors, calibrating the system model, and estimating the ultimate average day and peak flows.

In order to estimate the residential, commercial, and industrial wastewater flows in the City's existing sewer system (Old Model Colony), a temporary flow monitoring study was conducted by ADS Environmental Services from November 4, 2006 to December 12, 2006 at fifteen locations. The selected flow monitoring locations and a summary of the results are shown on Figure 4-1 and in Table 4-1. Due to limited availability of City field staff during installation and operation of the flow metering equipment, the flow measurements were not taken simultaneously. Data was obtained in five different 14-day time periods. The measured flows are graphically depicted on Figure 4-2. The flow monitoring raw data can be found in Appendix A.

The flow monitoring sites were strategically selected to aid in the development of unit flow factors, calibration of the model, and the determination of flows at locations where two pipes exit the manhole (flow splits). Sites were selected in an attempt to get a good sampling of data across the study area. At the same time, the areas tributary to each site must generate depths of flow large enough to develop accurate flow rates.

Legend

- City Boundary
- Not Served by City of Ontario
- New Model Colony
- Inland Empire Utilities Agency Regional Wastewater Treatment Plant No. 1
- City of Ontario Sewer
- City of Ontario Forcemain
- City of Ontario Sewer Pump Station
- IEUA/City of Ontario Eastern Trunk Sewer
- Other Agency Sewer
- Private Forcemain
- Private Sewer Pump Station
- # Flow Monitoring Site
- Area Tributary to Site 1A
- Area Tributary to Site 2A
- Area Tributary to Site 2B
- Portion of Area Tributary to Site 2A & 2B
- Area Tributary to Site 2C
- Area Tributary to Site 3
- Area Tributary to Site 4
- Area Tributary to Site 5
- Area Tributary to Site 6
- Area Tributary to Site 7
- Portion of Area Tributary to Site 7
- Area Tributary to Site 8
- Area Tributary to Site 9
- Area Tributary to Site 10
- Area Tributary to Sites 11A, 11B, 12A, and 12B

City of Upland
City of Montclair
City of Rancho Cucamonga
City of Fontana
City of Chino
Riverside County
Ontario International Airport
Landfill
New Model Colony
RP-1
Magnolia PS
Haven PS
Edenglen PS
Colony HS

BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
I-15 FWY
ETIWANDA AVE
VINTAGE AVE
WINEVILLE AVE
CUCAMONGA CREEK
SULTANA AVE
BON VIEW AVE
PARCO AVE
WALKER AVE
FERN ST
CYPRESS AVE
MAGNOLIA AVE

I-10 FWY
SIXTH ST
FIFTH ST
FOURTH ST
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
WALNUT ST
SR-60
RIVERSIDE DR
EIGHTH ST
ONTARIO MILLS PKWY
AIRPORT DR
JURUPA ST
MISSION BLVD

1A, 2A, 2B, 2C, 3, 4, 5, 6, 7, 8, 9, 10, 11A, 11B, 12A, 12B

N

0 1,700 3,400 6,800 Feet

CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

PROJECT NO: 1000952.00
DATE: October 2011

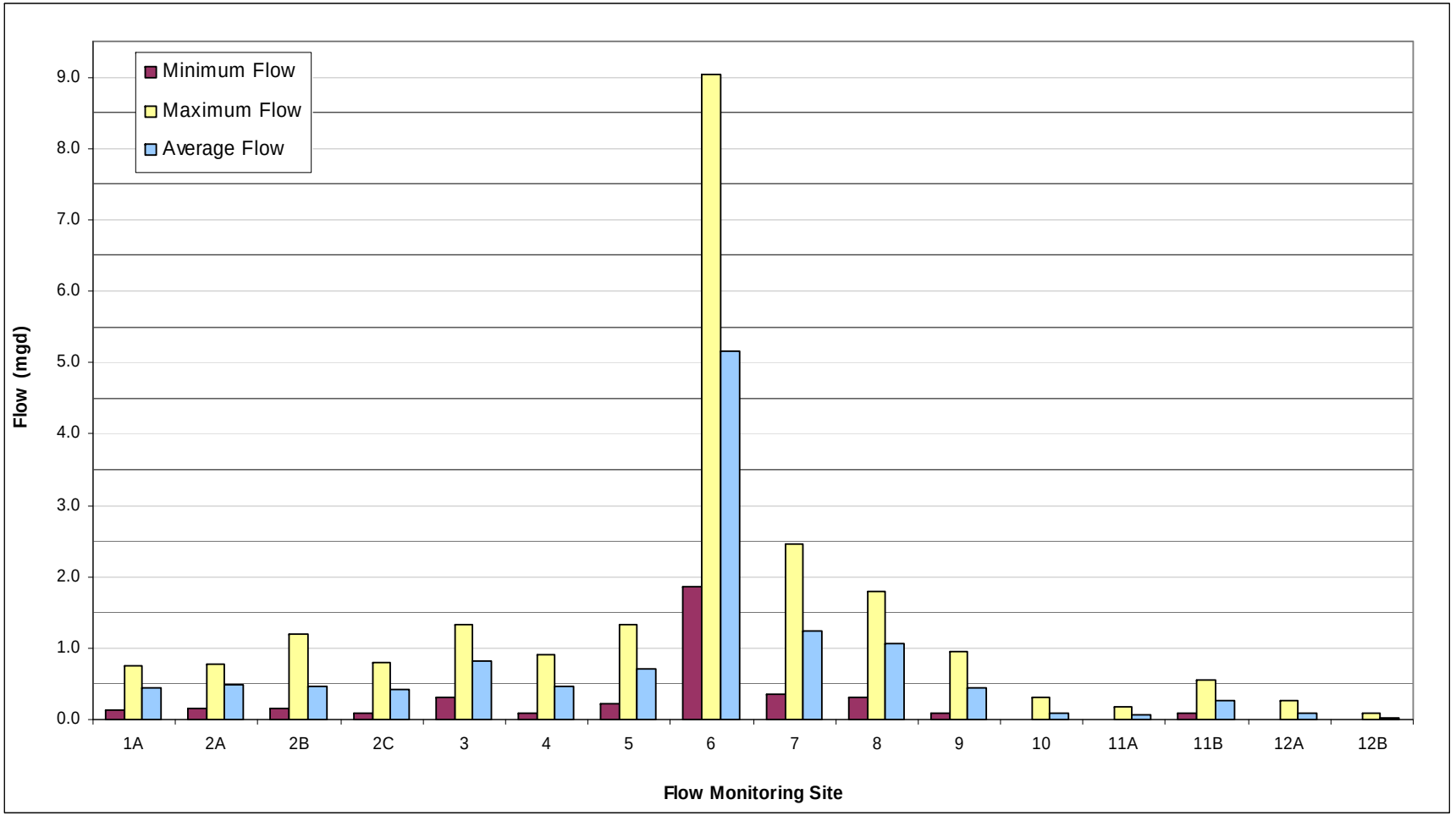
Flow Monitoring Locations

Figure 4-1

Table 4-1
Flow Monitoring Results

Site ID	Pipe ID	Manhole ID	Location	Pipe Size (in)	Reason	Depth (in)			Velocity (ft/s)			Flow (mgd)		
						Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
1A	L131087	L13120	East California St & South Euclid Ave (east of Laurel Ave)	10	Flow Split	2.72	6.85	4.52	1.68	3.37	2.79	0.136	0.755	0.452
2A	K121041	K12125	West of Cypress Ave located in parking lot	12	Flow Split	2.64	9.60	6.13	1.83	3.90	2.62	0.163	0.781	0.492
2B	K121051	K12121	Main St, West of San Antonio Ave	8	Flow Split	2.57	9.97	6.13	1.70	5.50	2.62	0.148	1.199	0.464
2C	K121030	K12127	West of Cypress Ave near train tracks	12	Flow Split	1.28	3.32	2.37	2.45	7.20	5.39	0.078	0.798	0.416
3	O111023	O11121	Mountain Ave, north of Spruce Ct	24	Pump Station Flows / Calibration	10.87	16.49	13.36	0.34	0.98	0.69	0.308	1.328	0.821
4	J141084	J14175	Campus Ave, south of Holt Blvd	12	Unit Flow Factors	1.54	3.88	2.69	2.29	6.28	5.01	0.093	0.902	0.466
5	Q171003	Q17147	Intersection of Walnut St & Baker Ave	18	Unit Flow Factors	3.72	9.20	6.42	1.13	2.40	1.85	0.212	1.333	0.715
6	P171043	P17116	Philadelphia St, East of Vineyard Ave	42	Calibration	7.71	20.11	14.14	2.21	3.17	2.76	1.867	9.038	5.159
7	K151010	K15116	Cucamonga Blvd & North of Ontario Blvd	18	Calibration	2.81	7.59	5.02	2.99	5.52	4.54	0.358	2.464	1.250
8	K171003	K17102	North Vineyard Ave, 50 yards north of Terminal Wy	15	Unit Flow Factors / Calibration	2.95	6.72	4.72	2.45	5.86	4.84	0.320	1.794	1.069
9	J211003	K21100	Haven St, North of Airport Dr	27	Unit Flow Factors / Calibration	1.90	4.85	3.42	1.21	3.03	2.17	0.098	0.952	0.440
10	N251013	N25109	Vintage Ave, North of Francis St	24	Unit Flow Factors / Calibration	0.43	2.87	1.75	0.18	2.45	1.31	0.002	0.307	0.088
11A	J151017	J15116	D St, West of Cucamonga Ave	8	Flow Split	0.78	3.76	2.22	0.35	1.73	1.15	0.004	0.176	0.067
11B	I151073	I15180	E St, West of Virginia Ave	8	Flow Split	1.23	2.88	1.96	3.70	7.54	5.73	0.085	0.548	0.255
12A	J151042	J15122	South west of the Intersection of Holmes Ave and D St	8	Flow Split	0.05	5.62	2.90	0.00	3.02	1.18	0.000	0.269	0.090
12B	J151047	J15127	Elma St, West of Virginia Ave	8	Flow Split	0.29	1.99	1.03	0.17	2.31	1.00	0.001	0.090	0.020

Figure 4-2
Measured Flow Data



Site 10 was selected with the intent of developing a unit flow factor for industrial land uses. The flow monitoring indicated in extremely low flows. Through the assistance of City staff, an undocumented connection to an IEUA trunk sewer was found in Vintage Avenue, just south of Jurupa Street.

Based on the flow monitoring data conducted in Old Model Colony and the existing land uses obtained from the City's GIS, calibrated unit flow factors as shown in Table 4-2 were developed. Water use records, aerial photographs and field reviews supplemented this information. The flow factors were developed in units of gallons per day per acre. The multiple family flow factor was found to vary throughout the City from 2,800 gpd/Ac to 6,800 gpd/Ac.

Table 4-2
Calibrated Unit Flow Factors

Land Use		Density (du/Ac)	Average Dry Weather Unit Flow Factor	Units
Rural Residential	RR	0 - 2	500	gpd/Ac
Single Family Residential	SFR	2 - 5	1,200	gpd/Ac
Multi-Family Residential	MFR	11 - 25	*2,800	gpd/Ac
Commercial	COM	-	1,000	gpd/Ac
Industrial	IND	-	400	gpd/Ac
Open Spaces	OPEN	-	200	gpd/Ac
Public Facilities	PUBLIC	-	1,000	gpd/Ac
Schools	SCH	-	25	gpd/student

Note that unit flow factors based on flow monitoring of sewage generated by existing users

** Minimum - unit flow factor for MFR found to vary throughout City*

Edenglen Lift Station Capacity Study

Edenglen is the City's newest residential community located south of Riverside Drive and east of Hamner Avenue. The community is the first development of NMC. There is an existing sewage lift station serving the currently occupied 201 dwelling units.

The City completed a study of the Edenglen Lift Station capacity on May 18, 2010. Flow monitoring data as well as water consumption from monthly billing data was evaluated. Water consumption records showed that some units had relatively low water use compared to the average, suggesting "under-occupied" units and low contributions to the sewer system. Ultimately, a factor of safety was recommended to account for the limited number of dwelling units, accuracy of measuring low flows, and uncertainties related to physical occupancies and lifestyle habits of existing and future residents. The recommended sewer flow factor was therefore 240 gpd/du.

Sewer Unit Flow Factors

The sewer unit flow factors shown in Table 4-3 were used for this study.

The residential unit flow factors in gpd/du are primarily based upon the City's Edenglen Lift Station Capacity Study and the calibrated unit flow factors developed for OMC, which were based on flow monitoring data and water use records. The projected population densities for each type of residential land use were also taken into consideration.

Table 4-3
Ultimate Unit Flow Factors

Landuse		Density (du/ac)	Density (people/du)	FAR	Aveage Dry Weather Unit Flow Factor[1]			
Residential								
Rural Residential	RR	0 - 2	4.0		250	gpd/du	500	gpd/ac
Low Density Residential	LDR	2 - 5	4.0		240	gpd/du	1,200	gpd/ac
Low Medium Density Residential	LMDR	5 - 11	4.0		240	gpd/du	2,000	gpd/ac
Medium Density Residential (OMC)	MDR	11 - 25	3.8		210	gpd/du	4,200	gpd/ac
Medium Density Residential (NMC)	MDR	11 - 25	3.3		182	gpd/du	4,200	gpd/ac
High Density Residential (OMC)	HDR	25 - 45	3.3		180	gpd/du	6,300	gpd/ac
High Density Residential (MU Areas)	HDR	25 - 45	2.0		110	gpd/du	5,000	gpd/ac
Commercial								
Business Park	BP			0.40	70	gpd/tsf	1,200	gpd/ac
General Commercial	GC			0.30	70	gpd/tsf	900	gpd/ac
Hospitality[2]	HOS			1.00	100	gpd/tsf	140	gpd/room
Neighborhood Commercial	NC			0.30	100	gpd/tsf	1,300	gpd/ac
Office Commercial	OC			0.75	90	gpd/tsf	3,000	gpd/ac
Restaurant[3]					1,000	gpd/tsf		
Industrial								
Industrial	IND			0.55	70	gpd/tsf	1,600	gpd/ac
Mixed Use								
Mixed Use	MU				Use various unit flow factors for			
Open Space								
Open Space Non-Recreational	OS-NR						200	gpd/ac
Open Space Recreational	OS-R						200	gpd/ac
Public								
Public Facility	PF						1,500	gpd/ac
Public School - Elementary[4]	PS				15	gpd/stu		
Public School - Junior High or High School[4]	PS				20	gpd/stu		

[1] Unit Flow Factor Abbreviations:
ac = acre
du = dwelling unit
gpd = gallons per day
room = hotel/motel room
stu = student
tsf = thousand square feet

[2] For future hospitality areas, sewage loads can be estimated based on the number of projected rooms. It is not recommended to estimate the load based on acreage.

[3] For future restaurants, sewage loads can be estimated based on the building square footage.

[4] For future schools, sewage loads should be estimated based on the number of students. It is not recommended to estimate the load based on acreage.

Retail/service and employment water use was estimated by using a factor of 43 gpd/person (see Technical Memorandum "Ultimate Citywide Water Demand Estimate", dated June 2011). It is estimated that the sewage generation for retail/service and employment will be about 90 percent of the water use. This results in a factor of 39 gpd/person. The commercial sewer unit flow factors in gpd/tsf are primarily based on this factor of 39 gpd/person and the employment population per tsf. A minimum of 70 gpd/tsf is recommended for commercial uses.

The City's 2010 General Plan defines an area along Vineyard Avenue, south of the I-10 Freeway and north of the Ontario International Airport, as the hospitality area. It consists of numerous hotels and restaurants that provide service for patrons of the airport. In developing the sewer unit flow factor for this area, the water use information was examined. In 2008, the total average water use for this area was about 544,000 gpd. Per the City's 2010 General Plan, the estimated floor area of these buildings is 6,312 tsf. The equivalent water unit flow factor is therefore about 86 gpd/tsf (544,000/6,312). There is some uncertainty about the level of occupancy for the period of water use data used and there are a couple of undeveloped lots. The general plan square footage is the ultimate estimate. Therefore, it is recommended to use a factor of safety when estimating the water use and sewer loads. For planning purposes, the hospitality unit flow factor recommended is 100 gpd/tsf. For future hospitality developments, a unit flow factor of 140 gpd/room can also be utilized. This factor was developed from examination of water records and the number of associated rooms of hotels located in the Southern California area.

For future restaurants, if the building square footage is known, it is recommended to estimate the sewage load based on a unit flow factor of 1000 gpd/tsf. This factor was developed from examination of water records and the building square footage for restaurants located in the Southern California area.

The industrial unit flow factor is estimated at 70 gpd/tsf. Depending on the type of industrial processes used at certain facilities, this factor may be low. The water use records were utilized to identify any high water users that may potentially produce more sewage. The sewage load representing high water users were increased in the hydraulic model on a case by case basis.

The open space unit flow factor recommended is 200 gpd/ac. The public facility unit flow factor recommended is 1,500 gpd/ac. The public elementary school unit flow factor recommended is 15 gpd/student. The public junior high school and high school unit flow factor recommended is 20 gpd/student. These are typical factors used for planning purposes, based upon review of water use records and accounting for irrigation. For this study, the available water use records for each school in Ontario was looked at along with the acreage of the school parcel and the latest student enrollment numbers. The recommended sewage unit flow factors for schools is based on a percentage (about 40-45%) of the water use. The remainder of the water use is assumed to be utilized for irrigation.

The development of the sewer unit flow factors is documented in more detail in the Technical Memorandum, Sewer Load Estimates (see Appendix C).

4-3 Peaking Factors

Peak Dry Weather

The wastewater unit flow factors discussed in Sub-section 4-2 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:

$PDWF = a \times ADWF^{b}$ where PDWF = Peak Dry Weather Flow
ADWF = 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. Coefficient "b" is typically found to be in the range of 0.91 to 0.92 based on empirical studies. Using a coefficient "b" of 0.92, the resulting coefficient "a" can be calculated from the measured flow data. The calculated coefficient "a" for each flow monitoring site is shown graphically on Figure 4-3. The coefficient "a" selected for this study is based on the information shown on Figure 4-3. It was determined that a coefficient "a" of 2.0 would cover most situations in the system without being overly conservative. If the coefficient selected is too conservative, hydraulic deficiencies would be unecessarily identified.

Based on the information shown in Figure 4-3, the following peaking relationship was selected for this study:

$$PDWF\ (mgd) = 2.0 \times ADWF\ (mgd)^{0.92}$$

Please note that the units of the peaking formula above are in million gallons per day (mgd).

Peak Wet Weather

The peak wet weather flow (PWWF) has two components: peak dry weather flow (PDWF) and rainfall dependent inflow/infiltration (I/I) as expressed by the following equation:

$$PWWF = PDWF + I/I$$

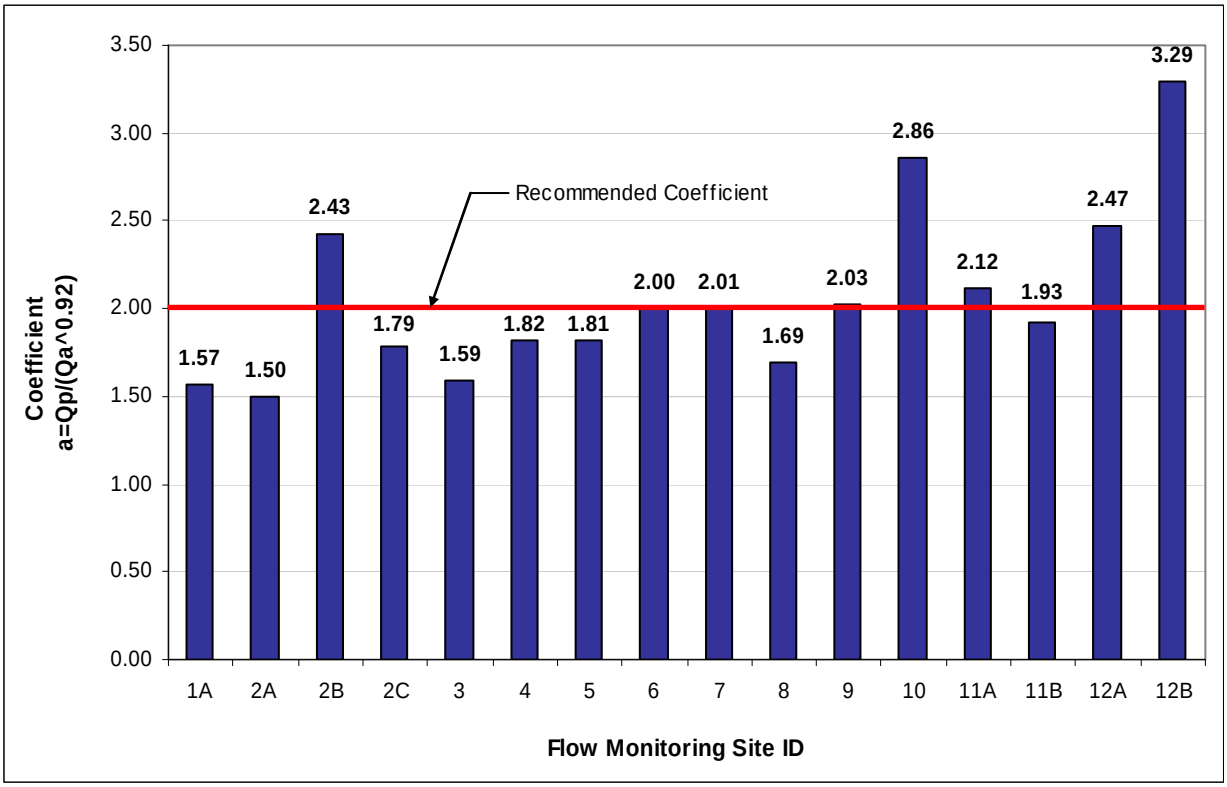
Inflow and infiltration is discussed further in Sub-section 4-4.

The flow monitoring effort for this study did not cover a wet weather period. Until wet weather flow data can be collected, it is recommended that the peak wet weather flow be estimated as the following:

Peak Wet Weather Flow (PWWF) = 1.34 x Peak Dry Weather Flow (PDWF)

Although the PWWF/PDWF factor of 1.34 may not cover all situations, it is not reasonable or feasible to design the sewer system to carry the flows that would result from the use of a larger ratio. Instead, it is recommended that the City concentrate on projects such as replacing manhole covers, installing plugs in manhole covers, and replacing or relining cracked pipes to reduce inflow and infiltration.

Figure 4-3
Peaking Formula Coefficient "a"



4-4 Inflow and Infiltration

Inflow is the surface water that typically gains entry to the sewer system through perforated or unsealed manhole covers during rainfall events. Infiltration is defined as water entering the collection system from the ground through defective pipes, pipe joint connections, or manhole walls. The sewer system design capacity must include allowances for these extraneous flow components, which inevitably become a part of the total flow. The amount of inflow and infiltration (I/I) that enters the system typically depends upon the availability, adequacy, and location of the storm water drainage facilities; age and condition of structures; materials and methods of construction; the location of the groundwater table; and the characteristics of the soil. In the absence of flow monitoring data, many regulating agencies utilize commonly accepted practices for estimating I/I. For example, I/I is often estimated based on the diameter and length of pipeline (100 to 400 gpd/ in. dia/ mile) or as a percentage of the peak flow or pipeline capacity.

AKM's experience from other master planning studies and review of limited flow monitoring information available during severe rainfall events indicate that the peak wet weather flow can vary

from 10 percent of average dry weather flows in steeper areas with adequate drainage facilities, to over 400 percent of average dry weather flows in flat areas that lack significant drainage facilities.

For this study, extraneous flow due to inflow and infiltration is included in the peak wet weather flow formula described above. If better data becomes available subsequently for specific areas, the analysis shall be updated based upon that information.

4-5 Sewer Design Criteria

Design criteria are established to ensure that the wastewater collection system can operate effectively under all flow conditions. Each pipe segment must be capable of carrying peak wet weather flows in the hydraulically stable zone of the pipe. Low flows must be conveyed at a velocity that will prevent solids from settling and blocking the system.

The design capacity of a gravity pipeline is the calculated capacity of the pipeline based on the Manning formula:

$$\mathbf{Q = 1.486\ A\ R^{2/3}\ S^{1/2} / n}$$

where, **Q** = flow in cubic feet per second
R = hydraulic radius in feet = A / P
A = cross-sectional area of the pipe in square feet
P = wetted perimeter in feet
S = slope of pipe in feet of rise per foot of length
n = Manning's friction factor

Sewer system capacity is established using a Manning's friction factor of 0.013 for vitrified clay pipe.

The design and analysis of sewer pipes is typically based upon the depth to diameter ratio (d/D). In this study, **existing** pipes are considered capacity deficient if the d/D is above 0.64 at peak dry weather flows. This d/D ratio was arrived at by taking 75 percent of a pipe's maximum stable flow capacity, which is at a d/D of 0.82. The area above a d/D of 0.82 is considered hydraulically unstable. This provides capacity for 25 percent of peak dry weather flow for inflow and infiltration. Calculated capacity deficiencies shall be verified through flow monitoring prior to replacing facilities.

The extra pipeline capacity allows for the possibility that actual wastewater flows may be slightly higher than anticipated, especially during the hours when instantaneous or intermittent peaks may occur. These peaks are generally observed between the hours of 6:00 a.m. and 9:00 a.m. and 7:00 p.m. and 9:00 p.m. during weekdays and somewhat later in the morning hours during weekends in the predominantly residential areas. They may also be observed during rainfall events due to inflow and infiltration. Additionally, the area above the water surface helps to keep the sewage aerated, reducing the possibility of septic conditions and odors.

For **new construction**, the design and analysis of gravity sewer pipes shall be based on the following depth to diameter ratios:

- Pipes **12-inches and smaller** in diameter shall be designed to flow at a maximum **d/D of 0.50** under peak dry weather flows

- Pipes **15-inches and greater** in diameter shall be designed to flow at a maximum **d/D of 0.64** under peak dry weather flows
- For either group, the depth of flow to diameter ratio shall not exceed **0.82 with peak wet weather flows**

At a minimum, all pipes shall be 8 inches or larger in diameter and the velocity of flow in the pipe shall be greater than 2 feet per second at average dry weather flow (ADWF). This velocity will prevent deposition of solids in the sewer and help to resuspend any materials that may have already settled in the pipe. The minimum corresponding slopes for various pipe sizes are shown in Table 4-4.

It is important to note that the slopes listed in Table 4-4 assume the depth of flow in the pipe is 50 or 64 percent full depending on the size. If there is insufficient flow to create this condition, greater slopes than those shown may be required.

The peak flow velocity shall be less than 10 feet per second in vitrified clay pipe.

The City recognizes that minimum slopes and velocities are sometimes not achievable under certain circumstances. On a case by case basis, the City may approve sewer designs that do not meet these criteria.

Table 4-4
Minimum Sewer Slopes

Sewer Size	2 ft/s Velocity Slope
8"	0.0057
10"	0.0042
12"	0.0033
15"	0.0019
18"	0.0014
21"	0.0011
24"	0.0008
27"	0.0008
30"	0.0007
33"	0.0006
36" & larger	0.0005

4-6 Pump Station Design Criteria

It is desirable to develop a sewer collection system with as few pump stations as possible due to the associated cost and maintenance required. The City's policy does not allow new pump stations. If a pump station is absolutely necessary, the following criteria shall be minimum standards.

The pump station must be designed to be reliable, and sized with sufficient capacity. They must contain redundant equipment, an emergency power supply, bypass pumping capability, sufficient wet well storage, and be able to notify the appropriate personnel in the event of failure.

The primary components of a typical pump station are the wet well, motors, valves, dry well, pumps, ventilation, electrical, controls and the force main. The following general criteria are recommended.

The wet well stores the incoming wastewater until a pump is activated to discharge it to a gravity facility for further conveyance. It shall be designed with sufficient capacity to prevent short cycles whereby the pumps frequently start and stop, yet small enough that it will regularly evacuate sewage from the wet well to prevent the wastewater from becoming septic. Generally, the desired number of pump cycles shall be limited to no more that 6 per hour for motors up to 10 horsepower. Motors up to 75 horsepower shall start no more than 4 times per hour. Larger motors shall cycle less frequently. Pump stations shall also have sufficient volume to store sewage in the event of mechanical or electrical failures, until the City can respond to the failure and prevent overflows. The necessary emergency storage is dependent upon how rapidly the City can respond to a failure

and mitigate it. A minimum emergency storage of 30 minutes at peak wet weather flow shall be provided.

The pumps shall be sized to efficiently handle the peak wet weather flows. A minimum of two pumps sized at the peak wet weather flow to the station shall be provided so that sufficient standby capacity is available when one pump is removed for repairs or experiences a mechanical failure. The pumps shall be able to pass a minimum solid size of 3 inches without clogging. The shafts, seals and impellers shall be constructed of wear resistant material to provide long life. Tungsten Carbide seals, Ni-Hard impellers, and 316 stainless steel pump shafts are recommended. For services where aggressive agents may be found in the sewage, such as at golf courses, complete stainless steel construction is recommended. This includes the pump bowl, shaft, impeller, and motor housing.

The dry well houses the valves, pumps, motors and electrical equipment and controls. It must be well ventilated and provide unobstructed access to all equipment. A minimum 3-foot clearance from all obstructions shall be provided. Greater clearances may be required for equipment with special maintenance needs. Provisions for equipment removal including hatches, large door openings, and hoists shall also be provided.

The force mains shall be selected to operate within a 3 feet per second to 5 feet per second velocity range, but shall not be smaller than 4-inches in diameter.

While submersible pump stations may be utilized for the small flows, the larger pump stations shall be the wet well/dry well type. They shall be designed with easy access to all equipment. The National Electric Code classifies the wet wells of wastewater pumping stations as Class I, Group D, Division 1 facilities if ventilated at less than 12 air changes per hour, and Division 2 if continuously ventilated at 12 or more air changes per hour. Dry wells, which are physically separated from wet wells, if ventilated at less than 12 air changes per hour, are classified as Class I, Group D, Division 2 locations. Wet wells, and under certain circumstances dry wells, are considered confined spaces and shall be entered in accordance with the corresponding requirements of Occupational Safety and Health Administration (OSHA).

All pump stations shall incorporate redundant control systems for operation of the pumps. A float system shall be used as a backup for a primary control system that utilizes an ultrasonic device or a bubbler system for level measurement and pump operation.

Full SCADA telemetry equipment which includes a telephone dialer as a backup, must be provided at all sewer pump stations. When an alarm or failed condition occurs, the dialer calls pre-programmed telephone numbers in sequence until the call is acknowledged, indicating response will be provided by City staff. If the alarm or failed condition is not corrected within a set time, the dialer will call the pre-programmed numbers again. The dialer can also be used to remotely check the status of the station if desired.

A summary of sewer system design criteria is listed in Table 4-5.

Table 4-5
Sewer System Criteria

Collection System	
Minimum Pipe Size	8-inch
Minimum Velocity	2.0 ft/sec at average flow 3.0 ft/sec at peak dry weather flow
Pipe Depth to Diameter Ratio for *Existing Pipes*	0.64 for all pipe sizes at peak dry weather flow 0.82 for all pipe sizes at peak wet weather flow
Pipe Depth to Diameter Ratio for *New Construction*	0.50 for pipes 12-inches and smaller at peak dry weather flow 0.64 for pipes 15-inches and larger at peak dry weather flow 0.82 for all pipe sizes at peak wet weather flow
Pump Stations	
Pumps	▪ Minimum 2 each sized at peak wet weather flow ▪ Minimum solids handling capacity 3"
Wet Wells	▪ Sized to limit pump cycling to less than 4 to 6 times/hr ▪ Provide sufficient storage at peak wet weather flow to allow response to a failure ▪ Equipment to be maintained must be accessible without entering structure
Ventilation	▪ 12 -air changes/hour minimum in dry well and as required by NFPA 820 ▪ 30-air changes/hour minimum in wet well if not operated continuously ▪ 12-air changes/hour minimum in wet well if operated continuously
Controls	Redundant system. Float operated back-up controls.
Emergency Power	Stationary source with automatic transfer switch
Telemetry	Full SCADA with dialer system as back up at all pump stations to alert personnel in the event of a station failure.
Force Mains	▪ Minimum velocity 3.0 ft/sec ▪ Maximum velocity 5.0 ft/sec ▪ Minimum size 4" ▪ Air/Vacs installed in vaults ▪ Plumb Air/Vacs piping back to wet well to avoid discharges of raw sewage to vaults

4-7 Service Life of Pipe and Lift Station Equipment

In addition to the design criteria discussed in previous sections, the useful lives for which one can expect relatively trouble-free service is also of great importance when assessing an existing or future sewer system. Once the service life of a facility is exceeded, it becomes subject to failure and is often expensive to maintain. The determination of useful life can be difficult and depends on many different considerations including the following:

- Type of materials used and recorded performance of similar installations
- Velocities and flow rates expected in the system
- Chemical and biological conditions of the wastewater
- Construction methods and installation

The values listed in Table 4-6 are generally accepted as prudent planning criteria and are used as benchmarks for replacement recommendations in this study.

Table 4-6
Planning Criteria for Facility Useful Life

Facility	Description	Useful Life (Years)
Gravity Sewers:	Cast Iron Pipe (CIP)	20
	Plastic Pipe	65
	Vitrified Clay Pipe (VCP)	75
Force Mains:	Asbestos-Cement Pipe (ACP)	40
	Ductile Iron Pipe (DIP)	40
	Plastic Pipe	30
Pump Stations:	Structure	60
	Piping	30
	Valving	20
	Mechanical	15
	Electrical	15

4-8 Criteria for Specific Plans and Development Subareas

Each party wishing to pursue development of a tract or area within the City service area shall develop a Sub-Area Master Plan (SAMP). The developer's plans for providing adequate sewer service to all users within the proposed development, how the local sewer system will connect to the backbone and regional system, and the impact of the proposed development to the downstream facilities (to the regional system) shall be fully described in the SAMP. The local sub-area sewers shall meet the sewer design criteria provided in this document and the City Standard Drawings for

Sewer Construction. At a minimum, sewage flow calculations shall be based upon the unit flow factors contained in Table 4-3 or higher factors if specific conditions require it.

Where flow from a new development or redevelopment is proposed to be added to an existing City sewer, the existing sewer shall be flow monitored by a qualified company acceptable to the City at the owner's cost for a minimum period of two weeks to verify the existing minimum, average, and peak dry weather flows. The location(s) of flow monitoring shall be determined by the City. Two copies of the flow monitoring report shall be submitted to the City in the City's required format. The City will determine the adequacy of capacity in all the City facilities that will convey the subject flow to the regional facilities. Service to proposed development or redevelopment shall be subject to availability of capacity in the City sewers and regional sewers.

A typical Sub-Area Sewer Master Plan Report shall include, but not be limited to the following:

- Map showing project boundaries and drainage areas
- Detailed land use description and map
- Average dry weather, peak dry weather, and peak wet weather flow calculations
- Exhibit showing all proposed sewer facilities and connections to the downstream regional system
- Phasing of development and wastewater flows
- Hydraulic calculations for phased and fully developed ultimate conditions, from the development to the regional system, meeting all sewer design criteria
- Results of flow monitoring, if project area is tributary to existing City sewers

Section 5

EXISTING SEWER SYSTEM

5-1 General Description

The existing sewer collection system in Old Model Colony, shown in Figure 5-1, is made up of a network of gravity sewers, pump stations, and force mains. The gravity system consists of approximately 365.7 miles (1,931,134 ft) of pipe and 7,582 manholes and cleanouts. The system also includes three pump stations and 11,588 feet of associated forcemains. The total existing average sewer load for Old Model Colony is estimated at 18.75 mgd. With an existing population of 174,536 persons, this is equivalent to approximately 107 gpd/person.

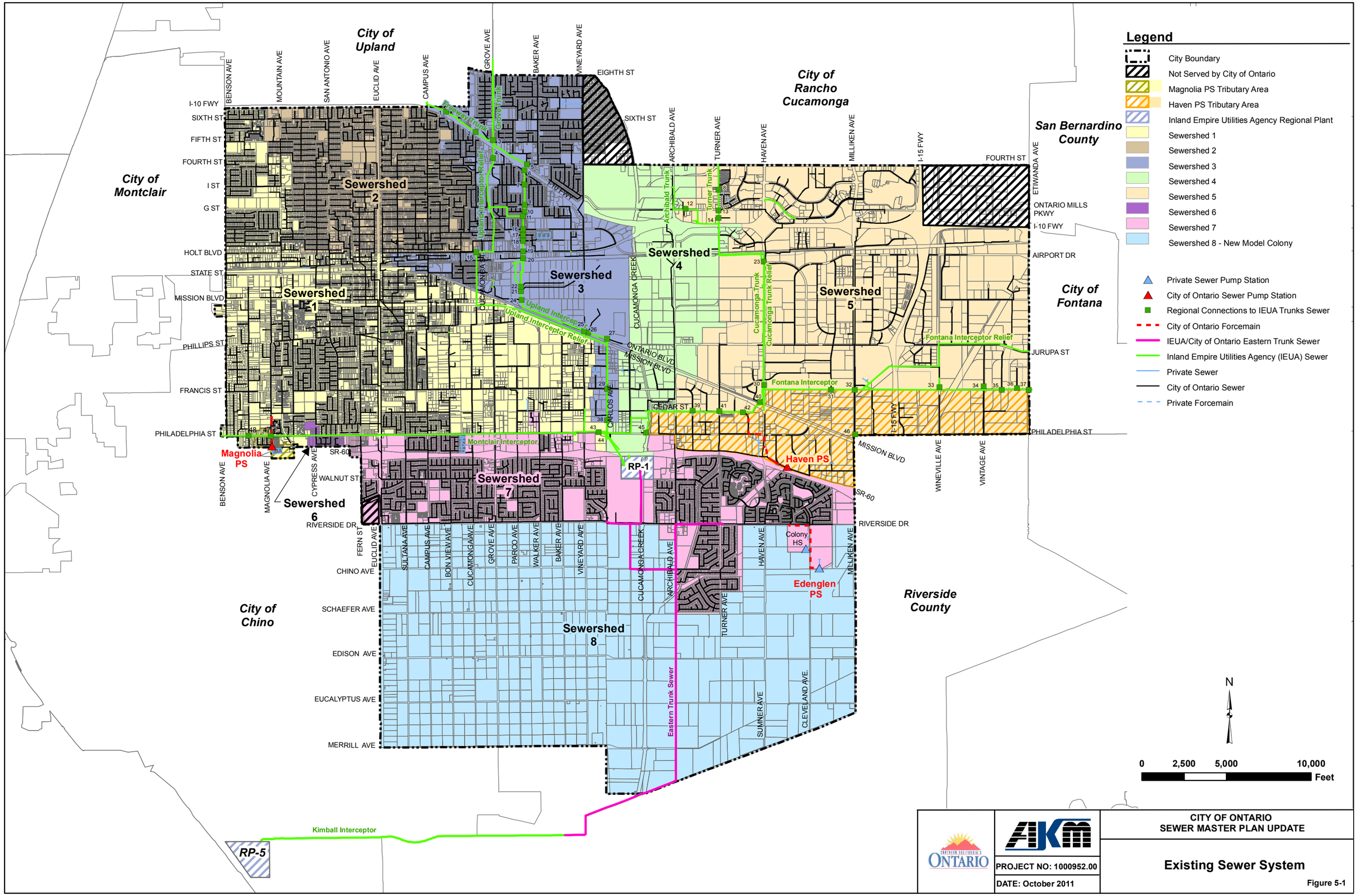
The general direction of flow is from north to south and east to west. The majority of the local sewers tie into one of the Inland Empire Utilities Agency (IEUA) trunk sewers crossing through the City. The sewage is then transported to IEUA's Regional Plant No.1 (RP-1) or Regional Plant No.5 (RP-5) for treatment.

Currently, the sewer system in New Model Colony consists of the RP-1 Outfall and the Eastern Trunk Sewer (ETS) which are joint use facilities. IEUA uses the RP-1 Outfall as a sewer bypass for RP-1. IEUA will ultimately be able to discharge an average flow of 20 mgd to the RP-1 Outfall. There will be a distribution box located at the intersection of Chino Avenue and Ontario Avenue. At this point, the average flow to the east is limited to 9 mgd. The remaining flow (11 mgd average) will be diverted west to the future Western Trunk Sewer, which will terminate at IEUA's Kimball Interceptor Sewer at the intersection of Euclid Avenue and Kimball Avenue.

IEUA and the City have agreed to temporarily divert the Whispering Lakes Pump Station flow east to the RP-1 Outfall line during the interim phases of the New Model Colony development. The diversion sewer ties into the RP-1 Outfall at the intersection of Riverside Drive and Ontario Avenue. The Whispering Lakes Pump Station flow is temporarily a part of IEUA's average daily flow capacity of 9 mgd that is conveyed to the ETS. Ultimately, the Whispering Lakes Pump Station flow will be diverted to the west following development of the western portion of New Model Colony and construction of the Western Trunk Sewer (WTS).

The existing sewers are primarily constructed of vitrified clay pipe with sizes ranging from 4-inches to 42-inches in diameter. Approximately 75 percent of the pipes are 8-inches in diameter. Figure 5-2 shows the length of gravity sewers (feet) in the existing system by pipe size. The majority of the sewer system was constructed between 1950 and 1990 as shown on Figure 5-3. Some of the collection system was constructed as early as 1895.

The RP-1 Outfall (Bypass Sewer) and the Eastern Trunk Sewer are joint facilities, owned by the City and IEUA. The total length of these facilities is 27,160 feet. The pipe sizes range from 33 inches to 48 inches in diameter.



CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

PROJECT NO: 1000952.00

DATE: October 2011

Existing Sewer System

Figure 5-1

Figure 5-2
Total Length of Gravity Sewer by Size (feet)

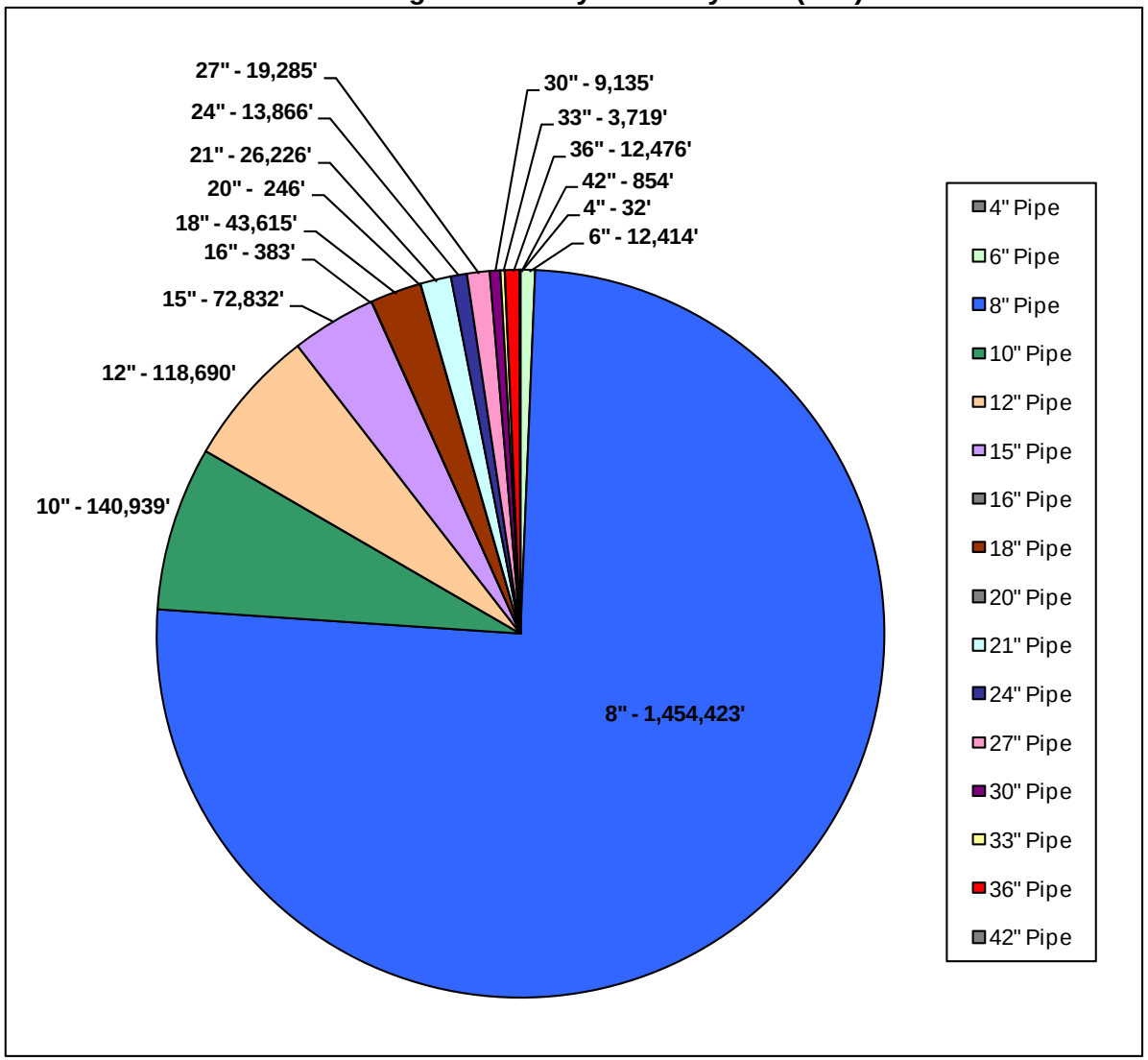
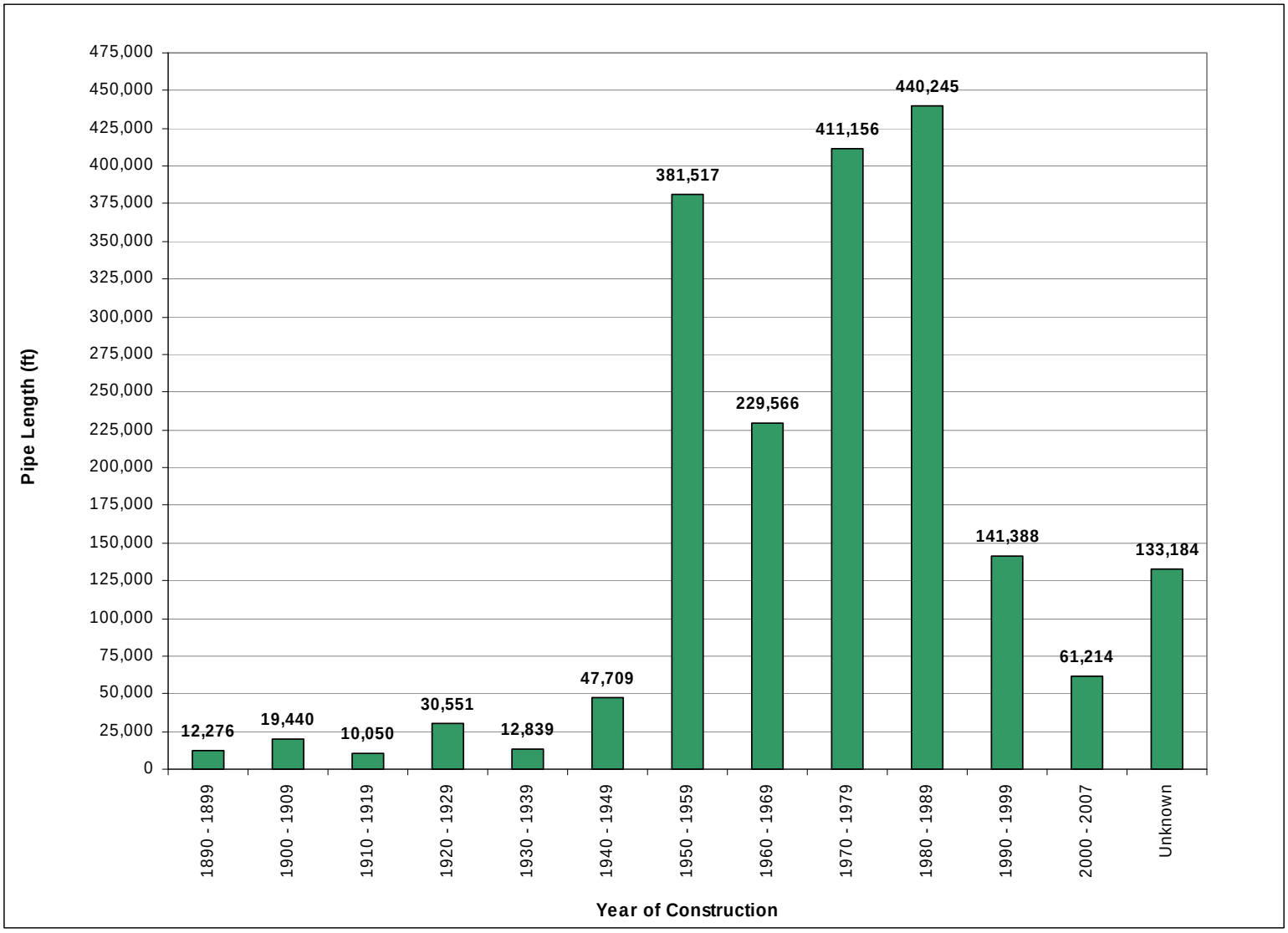


Figure 5-3
Total Length of Gravity Sewer by Year of Construction



5-2 Regional Facilities and Points of Connection

The Inland Empire Utilities Agency (IEUA) is the regional agency that provides wastewater collection, treatment and disposal to the west end of San Bernardino County. Its 242 square mile service area includes the Cities of Upland, Montclair, Ontario, Fontana, Chino, Chino Hills, Rancho Cucamonga, and unincorporated areas of San Bernardino County. IEUA's wastewater collection system accepts flows from the collection systems operated by contracting agencies and conveys this wastewater to one of its nearby regional plants for treatment and disposal.

Several regional trunk sewers collect most of the sewage generated in the service area and transport it to IEUA's Regional Plant No.1 for treatment. RP-1 is located south of the Pomona Freeway (SR-60) and west of Cucamonga Creek, as shown on Figure 5-4. It has been in operation since 1948. It has a current capacity of 44 million gallons per day. RP-1 also serves the Cities of Rancho Cucamonga, Upland, Montclair, Fontana, and portions of unincorporated San Bernardino County.

IEUA began operation of Regional Plant No.5 in March 2004. RP-5 is located in the City of Chino at the southeast corner of Kimball Avenue and El Prado Road, as shown on Figure 5-4. It has an ultimate capacity of 60 million gallons per day. Sewage generated in New Model Colony, as well as the flow diverted from the Old Model Colony lift station tributary areas is treated at RP-5.

IEUA had originally planned to bypass an average flow of up to 20 mgd from RP-1 to RP-5 via the NMC sewer system and Kimball Interceptor Sewer on Kimball Avenue. The first NMC sewer constructed (Eastern Trunk Sewer) was designed to carry 9 mgd of bypass flow from RP-1. Currently, IEUA does not expect to pursue the remaining 11 mgd bypass capacity in the NMC sewer system.

There are 47 existing regional connection locations where the OMC facilities connect to IEUA trunk sewers. These locations are listed in Table 5-1.

Table 5-1
Regional Connection Locations

	Regional Connec-tion ID	Manhole ID	Dia (ft)	Rim Elev (ft)	Invert Elev (ft)	Depth (ft)	Year Installed	Existing Flows		Ultimate Flows		Location	Connects to
								Average (mgd)	Peak (mgd)	Average (mgd)	Peak (mgd)		
1		F14119	5.0	1134.40	1125.91	8.49	1957	0.0099	0.0286	0.0267	0.0713	Hope Ave, north of I-10 Fwy	18" Sewer
2	O-45	G15120	6.0	1105.40	1097.56	7.84	1991	0.0043	0.0134	0.0322	0.0848	North of I-10 Fwy at extension to Cucamonga Ave	8" Sewer
3		G15140	4.0	1091.60	1082.32	9.28	1963	0.1406	0.3291	0.2774	0.6147	Grove Ave at Fifth St	24" Sewer
4		H15109	4.0	-	1065.08	-	1956	0.0696	0.1723	0.0836	0.2040	Grove Ave, north of Fourth St	30" Sewer
5	O-05	H16121	4.0	1055.80	1043.94	11.86	1957	0.2307	0.5189	0.4214	0.9030	Fourth St at I-10 Fwy	21" Sewer
6	O-06	H16128	4.0	1050.20	1037.52	12.68	1956	0.0013	0.0043	0.0027	0.0086	South of I-10 Fwy at extension of Imperial Ave	21" Sewer
7	O-08	H16158	4.0	1034.60	1022.32	12.28	1956	0.0237	0.0640	0.0205	0.0559	I St at Imperial Ave	21" Sewer
8	O-35	H20125	5.0	1009.20	995.35	13.85	1989	0.1905	0.4351	0.0910	0.2205	Turner Ave, south of Fourth St	24" Sewer
9	O-07	I16124	4.0	1015.67	1004.27	11.40	1962	0.0219	0.0593	0.0208	0.0568	Imperial Ave, north of G St	21" Sewer
10	O-09	I16143	4.0	-	997.89	-	1956	0.0062	0.0186	0.0076	0.0223	Imperial Ave at F St	21" Sewer
11		I16151	4.0	1008.61	994.03	14.58	1956	0.0049	0.0151	0.0032	0.0103	Imperial Ave at Flora St	21" Sewer
12	O-24	I19107	4.0	988.63	978.12	10.51	1987	0.0497	0.1265	0.2265	0.5101	Inland Empire Blvd, east of Archibald Ave	10" Sewer
13	O-23	I20136	5.0	994.80	981.50	13.30	1985	0.1564	0.3628	0.3161	0.6931	Turner Ave at Inland Empire Blvd	24" Sewer
14		I20139	4.0	990.20	975.10	15.10	-	0.0187	0.0514	0.0601	0.1506	Turner Ave, north I-10 Fwy	24" Sewer
15		J15175	5.0	984.25	964.35	19.30	2006	2.0191	3.8175	2.3642	4.4139	Holt Blvd at Cucamonga Ave	30" Sewer
16		J16108	4.0	994.80	982.93	11.87	1956	0.1715	0.3949	0.1485	0.3460	Imperial Ave at D St	21" Sewer
17	O-28	J16116	4.0	990.20	978.58	11.62	1956	0.0087	0.0254	0.0076	0.0224	Imperial Ave at Elma Ct	21" Sewer
18	O-29	J16122	4.0	986.40	974.24	12.16	1956	0.0426	0.1096	0.0318	0.0837	Imperial Ave at Nocta St	21" Sewer
19	O-12	J16133	5.0	975.40	963.00	12.40	1956	0.2307	0.5189	0.3873	0.8357	Imperial Ave at Holt Blvd	21" Sewer
20	O-11	K16101	4.0	971.40	957.16	14.24	1956	0.0104	0.0300	0.0219	0.0595	North side of Southern Pacific Railroad at extension of Imperial Ave	21" Sewer
21		K16130	4.0	946.00	927.82	18.18	2002	0.9725	1.9494	1.4055	2.7355	Airport	27" Sewer
22		K16132	4.0	946.83	927.82	19.01	2002	0.0000	0.0000	0.0000	0.0000	Airport	20" Sewer
23		K21103	4.0	955.00	944.67	10.33	1985	1.0229	2.0421	2.7067	4.9988	Haven Ave at Airport Dr	27" Sewer
24	O-13	L16120	4.0	936.20	923.22	12.98	1999	0.3630	0.7873	0.5655	1.1837	Easement north of Ontario Blvd, east of Mildred Ave	27" Sewer
25	O-15	M17109	5.0	907.28	895.13	12.15	1956	0.0180	0.0496	0.0158	0.0441	Vineyard Ave, north of Union Pacific Railroad	30" Sewer
26	O-17	M17113	4.0	905.20	893.48	11.72	1956	0.0765	0.1879	0.0172	0.0476	West of Vineyard Ave, north of Union Pacific Railroad	30" Sewer

Table 5-1 (continued)
Regional Connection Locations

	Regional Connec-tion ID	Manhole ID	Dia (ft)	Rim Elev (ft)	Invert Elev (ft)	Depth (ft)	Year Installed	Existing Flows		Ultimate Flows		Location	Connects to
								Average (mgd)	Peak (mgd)	Average (mgd)	Peak (mgd)		
27	O-16	M17117	4.0	897.40	883.50	13.90	1956	0.0174	0.0481	0.0199	0.0545	North of Union Pacific Railroad at extension of Carlos Ave	30" Sewer
28		M25IEUA	-	-	-	-	-	0.5515	1.1568	1.4409	2.7988	Vintage Ave, south of Jurupa St	-
29	O-18	N17135	4.0	863.00	852.04	10.96	1956	0.0382	0.0993	0.1670	0.3855	Carlos Ave at Francis St	30" Sewer
30	O-33	N21131	5.0	864.60	852.23	12.37	1992	0.6195	1.2874	2.2137	4.1547	Haven Ave, south of Francis St	30" Sewer
31	O-30	N22129	5.0	870.36	848.04	22.32	1985	0.0179	0.0495	0.0829	0.2024	Easement south of Francis St at extension of Dupont Ave	39" Sewer
32	O-26	N22130	6.0	877.15	849.28	27.87	1986	0.0266	0.0711	0.0989	0.2381	Milliken Ave, south of Francis St	39" Sewer
33		N24114	4.0	877.30	866.42	10.88	1986	0.0423	0.1089	0.1154	0.2743	Wineville Ave, north of Francis St	10" Sewer
34		N25111	5.0	873.42	864.40	9.02	1986	0.1557	0.3614	0.1445	0.3375	Vintage Ave, north of Francis St	36" Sewer
35	O-37	N25116	4.0	-	-	-	1986	0.0319	0.0841	0.0772	0.1895	Francis St at Champagne Ave	33" Sewer
36		N26116	6.0	874.53	865.89	8.64	1986	0.0056	0.0169	0.0441	0.1132	Chablis Ave at Francis St	33" Sewer
37	O-34	N26120	4.0	876.47	863.48	12.99	1986	0.0936	0.2262	0.0662	0.1644	Etiwanda Ave at Marlay Ave	33" Sewer
38		O17145	5.0	848.20	838.79	9.41	1987	0.0125	0.0354	0.0534	0.1350	Carlos Ave, south of Cedar St	15" Sewer
39	O-42	O19119	4.0	836.22	828.26	7.96	1988	0.0138	0.0388	0.0756	0.1859	Business Pw at Cedar St	18" Sewer
40		O20110	4.0	859.00	846.16	12.84	1993	0.0158	0.0440	0.1634	0.3777	North side of Southern Pacific Railroad, west of Haven Ave	18" Sewer
41	O-43	O20119	4.0	838.70	829.66	9.04	1988	0.1162	0.2762	0.5655	1.1837	Turner Ave at Cedar St	18" Sewer
42		O20137	4.0	846.20	-	-	1989	0.4006	0.8620	1.8986	3.6073	Cedar St, east of Sterling Ave	54" Sewer
43		P17113	4.0	-	826.85	-	1991	4.4615	7.9168	6.2141	10.7384	Philadelphia St, east of Vineyard Ave	42" Sewer
44		P18110	4.0	836.70	829.19	7.51	-	0.0032	0.0101	0.0285	0.0757	Philadelphia St at Cucomonga Creek	8" Sewer
45		P22103	4.0	-	-	-	-	0.0519	0.1316	0.1761	0.4046	Philadelphia St at Milliken Ave	24" Sewer
46		PH07	4.0	837.80	815.72	22.08	-	0.1301	0.3063	0.1746	0.4014	Philadelphia St at Magnolia Ave	30" Sewer
47		PH10	4.0	835.00	814.49	20.51	-	0.0442	0.1134	0.0516	0.1309	Philadelphia St at Oaks Ave	30" Sewer
							Total	**12.7143**		**23.1337**			

5-3 Sewersheds

For this study, the City has been divided into eight major sewersheds, as shown on Figure 5-1. Descriptions of each sewershed are as follows:

Sewershed 1

Sewershed 1 covers of approximately 6,500 acres located in the west portion of OMC. It is generally located west of Euclid Avenue, Mission Boulevard, and Carlos Avenue; and north of Philadelphia Street. Sewage is collected by the City's system and generally flows from north to south towards IEUA's Montclair Interceptor on Philadelphia Street. The flow is then conveyed east on Philadelphia Street to RP-1 for treatment.

Sewershed 1 also includes the 45 acre area tributary to Magnolia Pump Station, located on Magnolia Avenue south of Philadelphia Street.

A portion of Sewershed 1, north of Holt Boulevard and east of Mountain Avenue, will ultimately become a part of Sewershed 2 when the Holt Boulevard Sewer (Phase B) is put into operation. The flow generated in this area will be diverted to the new Holt Boulevard Sewer and conveyed east to the IEUA Upland Interceptor Relief at the intersection of Holt Boulevard and Cucamonga Street.

Sewershed 2

Sewershed 2 covers approximately 2,028 acres north of Holt Boulevard and east of Mountain Avenue. The sewage generated in this area is tributary to the recently constructed Holt Boulevard Sewer (Phase A & B). The flow direction is generally north to south towards Holt Boulevard. The Holt Boulevard Sewer then conveys the flow east to the IEUA Upland Interceptor Relief at the intersection of Holt Boulevard and Cucamonga Street. The IEUA trunk sewer continues south on Cucamonga Street to Mission Boulevard, then east to Carlos Avenue and south to RP-1.

Sewershed 3

Sewershed 3 covers approximately 3,070 acres located in the north central portion of OMC, generally east of Sewersheds 1 and 2, and west of Vineyard Avenue and Cucamonga Creek. Sewage is collected by the City's system and generally flows from north to south towards the IEUA Upland Interceptor on Ontario Boulevard. The IEUA Upland Interceptor in Ontario Boulevard and the Upland Interceptor Relief in Mission Boulevard combine into one 33-inch trunk sewer at the intersection of Mission Boulevard and Carlos Avenue, which carries flows south to RP-1 for treatment.

Sewershed 4

Sewershed 4 is located in the central portion of OMC and consists of about 1,800 acres. It is generally located east of Vineyard Avenue/Cucamonga Creek and west of Turner Avenue. Sewage is conveyed south towards RP-1, located just south of the Pomona Freeway west of Cucamonga Creek.

Sewershed 5

Sewershed 5 is the largest sewershed, covering about 7,040 acres. It is located in the eastern portion of OMC, generally east of Turner Avenue and north of Pomona Freeway/Philadelphia Street. It consists primarily of industrial and commercial land uses. Sewage is collected by the

City's system and transported to IEUA's Turner Trunk, Archibald Trunk, Cucamonga Trunk, Cucamonga Trunk Relief, and the Fontana Interceptor. The flow is ultimately treated at the RP-1 facility.

Sewershed 5 also includes the area tributary (1,580 acres) to Haven Pump Station, located just north of the Pomona Freeway (SR-60) and east of Haven Avenue. Ultimately, the sewage tributary to Haven Pump Station will be diverted south through the New Model Colony sewer system to IEUA's Kimball Interceptor Sewer. The pump station will be eliminated when the New Model Colony trunk sewer on Haven Avenue is constructed.

Sewershed 6

Sewershed 6 is 44 acres of land tributary to the City of Chino's sewer system. This sewershed is located in the southwest portion of OMC in the vicinity of Cypress Avenue and Philadelphia Street. A sewer agreement between the Cities of Ontario and Chino was signed in December 1981 (see Appendix D). In this agreement, the City of Chino agreed to provide sewer collection service for up to 202 dwelling units in this area. Sewer service for any additional units requires an amendment to this original agreement. Currently, service fees from the existing units in Sewershed 6 are collected by the City of Ontario. The City of Chino bills Ontario for the service at their current equivalent dwelling unit rate.

Sewershed 7

Sewershed 7 is comprised of the southern portion of OMC, generally south of Philadelphia Street west of Carlos Avenue and south of the Pomona Freeway east of Carlos Avenue. It is approximately 3,430 acres of primarily low density residential land. Previously, this area was served by four pump stations that pumped the tributary area sewage to RP-1 for treatment. These pump stations were eliminated with the construction of the Eastern Trunk Sewer in New Model Colony. Sewer diversion pipelines were constructed to carry the tributary flows from the site of the abandoned pump stations to the Eastern Trunk Sewer.

Sewershed 8

Sewershed 8 is the NMC area, which is approximately 13 square miles. The existing landuse is primarily agriculture with supporting single family residential. Currently, sewer service in the NMC is accomplished through septic tanks and subsurface disposal fields. A sewer collection system will be constructed as new development progresses.

Development of NMC has begun with the construction of the Brookfield Homes Development, Edenglen, located southwest of the intersection of Riverside Drive and Mill Creek Avenue. Currently, Edenglen is considered part of Sewershed 7. There is a temporary lift station located on the southerly portion of the property that collects sewage and pumps it north to the existing sewer system in Riverside Drive. In the future, the sewage generated in Edenglen will flow by gravity through New Model Colony to the Eastern Trunk Sewer.

5-4 Inverted Siphons

The City's existing sewer collection system includes inverted siphons at nine locations. Each was constructed to go under a major flood control channel or a conflicting utility. The primary concern with each siphon is the fact that grease and debris can often build up in the siphon requiring frequent maintenance to prevent sewer spills. The existing siphon locations and descriptions are listed in Table 5-2, and shown on Figure 5-4.

Table 5-2
Existing Siphons

Site	Pipe ID	U/S MH ID	D/S MH ID	Location	Purpose of Siphon	Dia (in)	Length (ft)	Year Installed	Mat	U/S Invert (ft)	D/S Invert	Plan No.
1	J23IS1008	J23103	J23104	New Guasti Road, east of Milliken Ave	Crossing under 64" RCP Storm Drain	6	59	1986	DIP	969.94	969.72	S10966
	J23IS1007	J23103	J23104			6	59	1986	DIP	969.94	969.72	S10966
2	N14IS1090	N14160	N14159	Francis St at Bon View Ave	Crossing under 12" and 18" Sewer Forcemain	24	21	1991	VCP	863.45	862.95	S10028
	N14IS1089	N14160	N14159			24	21	1991	VCP	863.45	862.95	S10028
3	N16IS1036	N16118	N16117	Francis St at West Cucamonga Channel	Crossing under West Cucamonga Channel	24	156	1991	VCP	852.14	851.47	S10023
	N16IS1035	N16118	N16117			15	156	1991	VCP	852.14	851.47	S10023
4	P17IS1012	O17156	P17102	Vineyard Ave, north of Philadelphia St	Crossing under 36" Steel Casing	18	176	1991	VCP	831.51	829.40	S10016
	P17IS1011	O17156	P17102			24	176	1991	VCP	831.51	829.40	S10016
5	P18CL1059	P18132	P18131	South of Philadelphia St west of Haven Ave	Crossing under Concrete Rectangular Storm Drain (b=43'-4"; d=10'-1" to 11'-8")	8	186	2001	VCP	828.11	825.32	1-201-40
	P18CL1062	P18132	P18131			18	186	2001	VCP	828.11	825.32	1-201-40
	P18CL1063	P18132	P18131			24	186	2001	VCP	828.11	825.32	1-201-40
6	J17CL1063	J17155	J17156	Intersection of Vineyard Ave and Holt Blvd	Crossing under 96" RCP Storm Drain	6	59	1983	DIP	955.83	954.47	D10802
	J17CL1063	J17155	J17156			12	59	1983	DIP	955.83	954.47	D10802
7	O18CL1012	O18103	O18102	2200 S Hellman behind Maglite	Crossing under Cucamonga Creek	18	177	1965	ACP	839.23	838.94	S11357
8	P20CL1039	P20127	P20126	60 Frwy and Turner	Unknown	10	70	1988	DIP	105.73	105.60	S11129
	P20CL1038	P20127	P20126			16	70	1988	DIP	105.73	105.60	S11129
9	R18CL1056	R18113	R18116	2400 E Riverside Dr	Unknown	10	257	1988	VCP	Unknown		S11082

Legend

- City Boundary
- Not Served by City of Ontario
- Magnolia PS Tributary Area
- Haven PS Tributary Area
- New Model Colony
- Inland Empire Utilities Agency
- Regional Plant No. 1
- City of Ontario Sewer
- City of Ontario Forcemain
- City of Ontario Sewer Pump Station
- IEUA/City of Ontario Eastern Trunk Sewer
- Private Forcemain
- Private Sewer Pump Station
- I181025 Siphon Location with Pipe ID
- G11158 Split Manhole Location with ID
- Flow Direction at Split Manhole
- Plug Location

Note: If plug is not shown, pipe is open but may serve as an overflow.

- City of Monclair Sewer
- City of Upland Sewer
- Cucamonga County Water District Sewer
- C.V. Water District
- Inland Empire Utilities Agency Sewer
- IEUA Non-Reclaimable Wastewater System
- Metropolitan Water District Sewer
- Private Sewer
- Sunkist Sewer

City of Upland

City of Montclair

City of Rancho Cucamonga

City of Fontana

City of Chino

Riverside County

Ontario International Airport

Landfill

New Model Colony

BENSON AVE · MOUNTAIN AVE · SAN ANTONIO AVE · EUCLID AVE · CAMPUS AVE · GROVE AVE · BAKER AVE · VINEYARD AVE · ARCHIBALD AVE · TURNER AVE · HAVEN AVE · MILLIKEN AVE · I-15 FWY · ETIWANDA AVE

I-10 FWY · SIXTH ST · FIFTH ST · FOURTH ST · I ST · G ST · HOLT BLVD · STATE ST · MISSION BLVD · PHILLIPS ST · FRANCIS ST · PHILADELPHIA ST · WALNUT ST · RIVERSIDE DR · SR-60 · ONTARIO MILLS PKWY · AIRPORT DR · JURUPA ST · MISSION BLVD

Freeway Trunk · Grove Trunk · Upland Interceptor Relief · Upland Interceptor · Archibald Trunk · Turner Trunk · Cucamonga Trunk · Cucamonga Trunk Relief · Fontana Interceptor Relief · Fontana Interceptor · Monclair Interceptor · CUCAMONGA CREEK · DEVILS HOLE · MISSION BLVD

MAGNOLIA PS · HAVEN PS · EDENGLEN PS · COLONY HIGH SCHOOL · RP-1

N

0 1,200 2,400 4,800 Feet

ONTARIO CALIFORNIA	AKM	CITY OF ONTARIO SEWER MASTER PLAN UPDATE
	PROJECT NO: 1000952.00	Siphon and Split Manhole Locations
	DATE: October 2011	Figure 5-4

5-5 Flow Splits

Multiple flow splits exist within the existing sewer collection system. Field investigations were conducted at the "major" flow splits, which are identified as those located on a main trunk sewer with larger tributary areas. Flow splits that occur at the top of sewersheds are not considered "major". Details of the "major" flow splits and the results of the field investigations are listed in Table 5-3. Flow split locations are shown on Figure 5-4.

Table 5-3
Flow Splits

No.	Manhole ID	Plan No.	Location	Flow Direction from Split Manhole	Field Comments
1	G11158	S-12470	Intersection of Mountain Ave and Princeton St	East	Pipe is plugged to the south (8" outlet).
2	G15140	S-13691	Intersection of Grove Ave and Fifth St	Southeast	Inaccessible due to busy intersection. Diverted southeast to new IEUA Upland Interceptor. Outlet/pipe to south is abandoned per City's 2007 GIS.
3	H15163	S-12203	Calvaras Ave north of "I" St	Southeast	The elevation to the southerly pipe seems to be a little bit higher and therefore it serves as an overflow pipe. Lines are parallel.
4	H16115	S-16115	Intersection of "B" St and Fourth St	South and Southeast	Inaccessible due to busy intersection. Plan shows that the sewer splits into parallel lines (8" & 8") right before entering IEUA sewer.
5	I14170	S-10264	Intersection of Monterey St and Orion St	South	Higher elevation on the east outlet.
6	I15172	S-11568	Easement south of Flora St, east of Grove Ave	East	Pipe is plugged to the west.
7	I15180	S-11411	"E" St west of Virginia Ave	East	There is a bridge blocking the flow to the south.
8	I15182	S-11411	"E" St west of Virginia Ave	East and West	Full flow for a shallow pipe.
9	J10141	S-13096	Benson Ave north of Stoneridge St	South	Pipe is plugged to east
10	J11132	S-10635	Hollowell St east of Mountain Ave	West	Flow is blocked to the south.
11	J14117	S-10261	Campus Ave at easement north of Nocta St	South	Much higher invert elevation on the west outlet.
12	J14152	S-10256	Monterey Ave at easement south of Nocta St	West	Higher invert elevation on the east outlet.
13	J15121	S-13122	Between "D" St and Elma St, west of Virginia Ave	East and West	On private property. Majority of the flow goes to the west.
14	J15137	S-13121	Intersection of Nocta St and Virginia Ave	East and West	Majority of flow goes to the west.
15	J15155	S-11005	Holt Blvd btw Bon View Ave and Cucamonga Ave	West and South	Large flow from north entering manhole. Flow splits between the south and west outlets.
16	K12110	S-13485	Brooks St west of Cypress Ave	South	
17	K12125	S-10753	Alley south of Holt Blvd, west of Cypress Ave	East and South	
18	K13124	S-10657	Main St west of Sultana Ave	East	Higher invert elevation on the south outlet.
19	K14126	S-11571, S-11335, S-10656	Intersection of State St and Campus Ave	East	No flow to the south.
20	K15120	S-10949	Intersection of Garfield Ave and Main St	South	There are two lines exiting manhole to the south and end up converging again to the same sewer downstream

Table 5-3 (Continued)
Flow Splits

No.	Manhole ID	Plan No.	Location	Flow Direction from Split Manhole	Field Comments
21	L13107	S-11313	Alley north of California St, east of Euclid Ave	East and South	
22	L13115	S-11313	Intersection of California St and Euclid Ave	West	Inaccessible in field. Operations crew says that the southeast outlet is plugged.
23	L13122	S-10772	Intersection of California St and Palm Ave	East and South	High flows.
24	L13131	No plans	Mission Blvd east of Euclid Ave	East and South	Primarily flows to the south.
25	L13159	S-10410	Easement between Maitland St and Ralston St, east of Plum Ave	East	There is a lot of flow from the northwest and very little from the west. The outlet to the southeast is plugged.
26	L13171	S-10410	Easement between Ralston St and Belmont St, east of Plum Ave	East	The outlet to the southeast is plugged.
27	L25107	S-10520, S-10549	Intersection of Santa Ana St and Vintage Ave	East	There is a bridge that blocks the south outlet.
28	M13101	S-12679	Belmont St west of Sultana Ave	East	There is no flow to the south east.
29	M13131	S-13111	Intersection of Phillips St and Fern Ave	Southeast	The outlet is plugged to the south.
30	M13134	S-12206	Euclid Ave south of Acacia St	South	There is a bridge blocking flow to the east.
31	M13144	S-13111	Intersection of Euclid Ave and Acacia St	South	Flow is plugged on the east.
32	M14100	S-12404	Intersection of Belmont St and Bon View Ave	South and West	Flow is normally suppsed to go both south and west. However, the west outlet was plugged with grease in the field.
33	M22132	S-10006, S-10830	Intersection of Milliken Ave and Jurupa St	West	Pipe is plugged to the south. Difficult to access sight.
34	N15142	S-10770, S-10027	Intersection of Francis St and Cucamonga Ave	East	No flow to the south.
35	Q19131	S-12048, S-11956	Intersection of Woodlark Dr and Walnut St	Southwest	Field crew says that line to the south east does not exist.
36	R13107	S-12125, S-12130, S-11234	Blue Jay Wy east of Fern Ave	South	Pump Station is eliminated. All flow goes to the south.
37	R18118	S-11422	Riverside Dr west of Colonial Ave	West	The south line appears to be plugged. Parallel pipes to west.
38	R19165	S-11832	Riverside Dr east of Archibald Ave	Southeast	Pump station is eliminated. All flow goes to the southeast and is carried west in Riverside Dr. sewer (Eastern Trunk Sewer through New Model Colony).

5-6 Septic Tanks

There are about 206 existing septic tanks in the OMC per City records. These locations are shown on Figure 5-5 and listed in Table 5-4. The comment column of Table 5-4 provides an initial recommendation for connecting the parcel with a septic tank to the existing sewer system. These comments are based on a master plan level study. It was beyond the scope of work to conduct a study for each individual site. Future work to determine the feasibility of connecting these parcels to the sewer system may include field investigations, site surveys, and review of existing utility plans.

Legend

- City Boundary
- Not Served by City of Ontario
- Old Model Colony Sewer Service Area
- New Model Colony
- Septic Tank Locations
- Inland Empire Utilities Agency Regional Wastewater Treatment Plant No. 1
- City of Ontario Sewer
- City of Ontario Forcemain
- City of Ontario Sewer Pump Station
- IEUA/City of Ontario Eastern Trunk Sewer
- Private Forcemain
- Private Sewer Pump Station
- Inland Empire Utilities Agency Sewer
- Private Sewer

City of Upland
City of Montclair
City of Rancho Cucamonga
City of Fontana
City of Chino
Riverside County
Ontario International Airport
New Model Colony
Landfill
RP-1
Magnolia PS
Haven PS
Edenglen PS
Colony HS

BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
I-15 FWY
ETIWANDA AVE
I-10 FWY
AIRPORT DR
JURUPA ST
PHILADELPHIA ST
WINEVILLE AVE
VINTAGE AVE
MISSION BLVD
SR-60
RIVERSIDE DR
WALNUT ST
CYPRESS AVE
MAGNOLIA AVE
FERN ST
SULTANA AVE
BON VIEW AVE
CUCAMONGA AVE
PARCO AVE
WALKER AVE
CUCAMONGA CREEK
ONTARIO MILLS PKWY
I-10 FWY
SIXTH ST
FIFTH ST
FOURTH ST
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
EIGHTH ST

Freeway Trunk
Grove Trunk
Upland Interceptor Relief
Archibald Trunk
Turner Trunk
Cucamonga Trunk
Cucamonga Trunk Relief
Upland Interceptor
Upland Interceptor Relief
Fontana Interceptor Relief
Fontana Interceptor
Montclair Interceptor

N

0 1,700 3,400 6,800 Feet

CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

PROJECT NO: 100952.00
DATE: October 2011

OMC Septic Tank Locations

Figure 5-5

Table 5-4
Septic Tanks

	Parcel No.	Address				Area (Ac)	Existing Land Use	Comments
1	11032230	2445	E	GUASTI	RD	1.68	INF	Requires about 260' of sewer lateral to tie to MH J18106; flat grade
2	11321105	1241	E	AIRPORT	DR	0.85	IND	Nearest City MH is K15125 in State St; Further investigation needed
3	11321116	1215	E	AIRPORT	DR	0.14	IND	Nearest City MH is K15125 in State St; Further investigation needed
4	11321119	1225	E	AIRPORT	DR	0.15	MFR	Nearest City MH is K15125 in State St; Further investigation needed
5	11321133	1215	E	AIRPORT	DR	0.86	IND	Nearest City MH is K15125 in State St; Further investigation needed
6	11322120	1236	E	AIRPORT	DR	0.47	COM	Nearest City MH is K15125 in State St; Further investigation needed
7	11322123	1218	E	AIRPORT	DR	1.64	IND	Nearest City MH is K15125 in State St; Further investigation needed
8	11326107	0	E	AIRPORT		20.30	ARPT	Requires about 500' of sewer lateral to tie to MH M18102; 7 ft drop; s=0.0140
9	11333102	1240	E	ONTARIO	BL	0.41	VACANT	Possibly tie to IEUA sewer on Mission Boulevard
10	11333103	1250	E	ONTARIO	BL	0.64	IND	Possibly tie to IEUA sewer on Mission Boulevard
11	11333201	915	S	GROVE	AV	1.86	COM	Possibly tie to IEUA sewer on Mission Boulevard
12	11334302	905	S	PEACH	AV	0.68	SFR	Requires about 120' of sewer lateral to tie to MH L15127; 2 ft drop; s=0.0166
13	11334306	1332	E	KERN	ST	0.97	SFR	Requires about 240' of sewer lateral to tie to MH L16108; 2 ft drop; s=0.0083
14	11334307	1028	S	MILDRED	AV	0.66	IND	Tie to sewer in Mildred Avenue
15	11334320	1044	S	MILDRED	AV	0.18	UND	Tie to sewer in Mildred Avenue
16	11334322	1050	S	MILDRED	AV	0.18	SFR	Tie to sewer in Mildred Avenue
17	11334323	1056	S	MILDRED	AV	0.17	UND	Tie to sewer in Mildred Avenue
18	11334326	1337	E	BELMONT	ST	0.30	UND	Tie to sewer in Mildred Avenue
19	11335103	1348	E	BELMONT	ST	0.77	SFR	Tie to sewer in Mildred Avenue
20	11335112	1324	S	MILDRED	AV	0.86	MFR	Tie to sewer in Mildred Avenue
21	11335113	1338	S	MILDRED	AV	0.83	SFR	Tie to sewer in Mildred Avenue
22	21016109	2562	E	FOURTH	ST	0.34	SFR	Possibly tie to CWD sewer in Fourth Street
23	21018134	2814	E	FOURTH	ST	0.89	IND	Possibly tie to CWD sewer in Fourth Street
24	21040102	1011	N	ARCHIBALD	AV	3.42	MFR	Possibly tie to CVWD sewer in Archibald Ave
25	23805229	5355	E	AIRPORT	DR	4.35	COM	Possibly tie to Sewer in Airport Drive at MHJ25107
26	100855113	1337	W	FIFTH	ST	0.23	SFR	Requires about 330' of sewer lateral to tie to MH G101135; flat grade
27	101021101	1302	W	G	ST	9.82	COM	Requires about 350' of sewer lateral to tie to MH I10115; 5 ft drop; s=0.0143
28	101050178	940	W	HOLT	BL	0.35	COM	Tie to existing sewer at MHJ11161
29	101113210	1021	W	HOLT	BL	0.51	COM	GIS shows laterals to existing sewer
30	101113211	1013	W	HOLT	BL	0.28	COM	GIS shows laterals to existing sewer
31	101116105	833	W	STATE	ST	5.88	SFR	Requires about 500' of sewer lateral to tie to MH K12137; flat grade
32	101118213	1056	W	MISSION	BL	0.63	COM	Requires about 400' of sewer lateral to tie to MH L11108; 2 ft drop; s=0.005
33	101120104	501	S	OAKS	AV	0.47	UND	Possibly contruct 580 feet of sewer in Oaks Ave and tie to MH K10118
34	101120106	1341	W	STATE	ST	0.84	VACANT	Possibly contruct 580 feet of sewer in Oaks Ave and tie to MH K10118
35	101120109	1241	W	STATE	ST	5.32	SFR	Requires about 200' of sewer lateral & easement to tie to MH K11135; 5 ft drop; s=0.0200
36	101120111	520	S	MAGNOLIA	AV	2.41	AGR	Tie to sewer in Magnolia Street at MH K11140
37	101120112	531	S	OAKS	AV	1.13	IND	GIS shows lateral to Oaks Street
38	101121107	631	S	OAKS	AV	1.77	COM	Tie to sewer in Oaks Street
39	101122101	604	S	OAKS	AV	0.35	SFR	Tie to sewer in Oaks Street
40	101122102	616	S	OAKS	AV	0.90	SFR	Tie to sewer in Oaks Street
41	101122103	630	S	OAKS	AV	1.27	IND	Tie to sewer in Oaks Street
42	101122105	1428	W	MISSION	BL	0.36	VACANT	Requires about 170' of sewer lateral to tie to MH L10103; 2 ft drop; s=0.0117
43	101138210	1045	W	MISSION	BL	0.42	COM	Requires about 200' of sewer lateral to tie to MH L11500; 1 ft drop; s=0.005
44	101158102	1308	W	PHILLIPS	ST	0.86	SFR	Possibly contruct 450 feet of sewer in Phillips St and tie to CO M10500
45	101158103	1326	W	PHILLIPS	ST	0.96	SFR	Possibly contruct 450 feet of sewer in Phillips St and tie to CO M10500

Table 5-4 (Continued)
Septic Tanks

	Parcel No.	Address				Area (Ac)	Existing Land Use	Comments
46	101158104	1336	W	PHILLIPS	ST	1.37	SFR	Possibly contruct 450 feet of sewer in Phillips St and tie to CO M10500
47	101158114	1224	W	PHILLIPS	ST	0.57	SFR	Requires about 400' of sewer lateral to tie to MH M11140; 4 ft drop; s=0.0100
48	101158115	1250	W	PHILLIPS	ST	6.53	SFR	GIS shows laterals to existing sewer
49	101158202	1345	W	PHILLIPS	ST	0.36	SFR	Possibly contruct 450 feet of sewer in Phillips St and tie to CO M10500
50	101158203	1329	W	PHILLIPS	ST	0.56	SFR	Possibly contruct 450 feet of sewer in Phillips St and tie to CO M10500
51	101158204	1315	W	PHILLIPS	ST	0.46	SFR	Possibly contruct 450 feet of sewer in Phillips St and tie to CO M10500
52	101158205	1307	W	PHILLIPS	ST	0.52	SFR	Possibly contruct 450 feet of sewer in Phillips St and tie to CO M10500
53	101159116	1542	W	PHILLIPS	ST	0.96	SFR	Possibly contruct 500 feet of sewer in Phillips St & Helen Ave and tie to CO M10501
54	101159117	1530	W	PHILLIPS	ST	0.93	SFR	Possibly contruct 500 feet of sewer in Phillips St & Helen Ave and tie to CO M10501
55	101159118	1518	W	PHILLIPS	ST	0.92	SFR	Possibly contruct 500 feet of sewer in Phillips St & Helen Ave and tie to CO M10501
56	101159119	1510	W	PHILLIPS	ST	0.86	SFR	Possibly contruct 500 feet of sewer in Phillips St & Helen Ave and tie to CO M10501
57	101421107	1216	W	FRANCIS	ST	0.43	SFR	Possibly contruct 550 feet of sewer in Francis St and tie to MH N1153
58	101421108	1228	W	FRANCIS	ST	0.43	SFR	Possibly contruct 550 feet of sewer in Francis St and tie to MH N1153
59	101421109	1240	W	FRANCIS	ST	3.19	SFR	Possibly contruct 550 feet of sewer in Francis St and tie to MH N1153
60	101421114	1252	W	FRANCIS	ST	0.59	SFR	Possibly contruct 550 feet of sewer in Francis St and tie to MH N1153
61	101444106	1253	W	FRANCIS	ST	1.76	SFR	Possibly contruct 550 feet of sewer in Francis St and tie to MH N1153
62	101444107	1241	W	FRANCIS	ST	0.91	SFR	Possibly contruct 550 feet of sewer in Francis St and tie to MH N1153
63	101444109	1225	W	FRANCIS	ST	0.47	SFR	Possibly contruct 550 feet of sewer in Francis St and tie to MH N1153
64	101451108	814	W	PHILADELPHIA	ST	0.42	SFR	Tie to sewer in Philadelphia Street at MH P12129
65	101451109	830	W	PHILADELPHIA	ST	0.50	SFR	Tie to sewer in Philadelphia Street at MH P12129
66	101451110	842	W	PHILADELPHIA	ST	1.21	SFR	Tie to sewer in Philadelphia Street at MH P12129
67	101451111	852	W	PHILADELPHIA	ST	0.99	SFR	Tie to sewer in Philadelphia Street at MH P12129
68	101514104	839	W	PHILADELPHIA	ST	1.90	PUBLIC	Tie to sewer in Philadelphia Street at MH P12129
69	101514105	831	W	PHILADELPHIA	ST	2.92	PUBLIC	Tie to sewer in Philadelphia Street at MH P12129
70	101514110	931	W	PHILADELPHIA	ST	0.33	PUBLIC	Tie to sewer in Philadelphia Street at MH P12129
71	104745122	1128	E	FIFTH	ST	0.30	SFR	Requires about 130' of sewer lateral to tie to MH G15145; flat grade
72	104746215	1221	E	FOURTH	ST	0.84	AGR	Possibly contruct 300 feet of sewer in Fourth St and tie to MH H15112; may buck grade
73	104746216	1209	E	FOURTH	ST	0.13	COM	Possibly contruct 300 feet of sewer in Fourth St and tie to MH H15112; may buck grade
74	104746217	1205	E	FOURTH	ST	0.15	SFR	Possibly contruct 300 feet of sewer in Fourth St and tie to MH H15112; may buck grade
75	104749326	829	E	PRINCETON	ST	0.14	SFR	Possibly contruct 500 feet of sewer in Princeton St & Berlyn Ave and tie to MH G14178
76	104749327	823	E	PRINCETON	ST	0.14	SFR	Possibly contruct 500 feet of sewer in Princeton St & Berlyn Ave and tie to MH G14178
77	104749328	811	E	PRINCETON	ST	0.42	UND	Possibly contruct 500 feet of sewer in Princeton St & Berlyn Ave and tie to MH G14178
78	104751221	1125	N	CAMPUS	AV	0.26	SFR	Tie to sewer in Campus Ave
79	104802217	522	W	J	ST	0.13	SFR	Possibly contruct 350 feet of sewer in J St and tie to MH H12179
80	104802218	526	W	J	ST	0.16	SFR	Possibly contruct 350 feet of sewer in J St and tie to MH H12179
81	104802219	528	W	J	ST	0.19	SFR	Possibly contruct 350 feet of sewer in J St and tie to MH H12179
82	104804315	122	W	I	ST	0.28	SFR	Possibly contruct 200 feet of sewer in Bonview Ave and tie to CO L14500
83	104809313	1037	N	CAMPUS	AV	0.15	SFR	Tie to sewer in Campus Ave
84	104829239	804	N	SAN ANTONIO	AV	0.20	SFR	Requires about 150' of sewer lateral to tie to MH I12107; may buck grade

Table 5-4 (Continued)
Septic Tanks

	Parcel No.	Address				Area (Ac)	Existing Land Use	Comments
85	104833208	519	W	FLORA	ST	0.33	MFR	Requires about 200' of sewer lateral to tie to MH I12181; Flat grade
86	104837101	302	E	G	ST	0.09	SFR	Requires about 160' of sewer lateral to tie to MH I13140; 3 ft drop; s=0.019
87	104903103	615	W	MAIN	ST	0.60	COM	Possibly contruct 980 feet of sewer in Main St and tie to sewer in San Antonio Ave; flat grade
88	104903106	545	W	MAIN	ST	1.20	IND	Possibly contruct 980 feet of sewer in Main St and tie to sewer in San Antonio Ave; flat grade
89	104903107	539	W	MAIN	ST	0.31	VACANT	Possibly contruct 980 feet of sewer in Main St and tie to sewer in San Antonio Ave; flat grade
90	104910223	210	S	BON VIEW	AV	0.14	SFR	Requires about 120' of sewer lateral to tie to MH K14112; 2 ft drop; s=0.016
91	104913101	125	S	BON VIEW	AV	0.80	SFR	Requires about 120' of sewer lateral to tie to MH K14112; 2 ft drop; s=0.016
92	104913102	902	E	HOLT	BL	0.80	COM	Tie to sewer in Holt Blvd at MH J14183
93	104915101	214	S	GROVE	AV	0.20	SFR	Nearest City MH is K15125 in State St; Further investigation needed
94	104915102	228	S	GROVE	AV	0.25	SFR	Nearest City MH is K15125 in State St; Further investigation needed
95	104915104	1160	E	MAIN	ST	0.11	SFR	Nearest City MH is K15125 in State St; Further investigation needed
96	104915106	320	S	GROVE	AV	0.13	SFR	Nearest City MH is K15125 in State St; Further investigation needed
97	104915108	1157	E	STATE	ST	0.16	SFR	Nearest City MH is K15125 in State St; Further investigation needed
98	104915109	1157	E	MAIN	ST	0.12	SFR	Nearest City MH is K15125 in State St; Further investigation needed
99	104915113	1153	E	STATE	ST	0.51	SFR	Possibly tie to existing sewer on California Street at MH K15125
100	104915115	1151	E	MAIN	ST	1.02	SFR	Possibly tie to existing sewer on California Street at MH K15125
101	104915138	310	S	GROVE	AV	0.18	SFR	Nearest City MH is K15125 in State St; Further investigation needed
102	104916117	1152	E	STATE	ST	0.15	SFR	Nearest City MH is K15125 in State St; Further investigation needed
103	104916119	408	S	GROVE	AV	0.46	SFR	Nearest City MH is K15125 in State St; Further investigation needed
104	104917206	1125	E	CALIFORNIA	ST	0.80	COM	Possibly tie to existing sewer on California Street
105	104920409	854	E	ONTARIO	BL	0.24	SFR	Requires about 160' of sewer lateral to tie to MH K14146; Requires the grade to be bucked
106	104921201	731	S	TAYLOR	AV	0.18	VACANT	Possibly contruct 900 feet of sewer in Taylor Ave & California St and tie to MH L14113
107	104921203	717	S	TAYLOR	AV	0.33	COM	Possibly contruct 900 feet of sewer in Taylor Ave & California St and tie to MH L14113
108	104921204	713	S	TAYLOR	AV	0.17	SFR	Possibly contruct 900 feet of sewer in Taylor Ave & California St and tie to MH L14113
109	104921205	635	S	TAYLOR	AV	0.17	COM	Possibly contruct 900 feet of sewer in Taylor Ave & California St and tie to MH L14113
110	104921206	635	S	TAYLOR	AV	0.49	COM	Possibly contruct 900 feet of sewer in Taylor Ave & California St and tie to MH L14113
111	104921208	621	S	TAYLOR	AV	0.16	VACANT	Possibly contruct 900 feet of sewer in Taylor Ave & California St and tie to MH L14113
112	104921311	614	S	BON VIEW	AV	0.21	IND	Possibly contruct 200 feet of sewer in Bonview Ave and tie to CO L14500
113	104921312	620	S	BON VIEW	AV	0.17	IND	Possibly contruct 200 feet of sewer in Bonview Ave and tie to CO L14500
114	104921313	628	S	BON VIEW	AV	0.17	IND	Possibly contruct 200 feet of sewer in Bonview Ave and tie to CO L14500
115	104922102	616	E	SUNKIST	ST	0.61	IND	Requires about 80' of sewer lateral to tie to MH L13104; 1 ft drop; s=0.013
116	104928103	633	W	STATE	ST	1.26	IND	Requires about 250' of sewer lateral to tie to sewer in San Antonio Ave; flat grade
117	104929412	507	W	NEVADA	ST	0.07	SFR	Requires about 70' of sewer lateral to tie to MH L12101; 1 ft drop; s=0.0143
118	104932102	645	W	CALIFORNIA	ST	0.22	SFR	Possibly contruct 650 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129
119	104932103	627	W	CALIFORNIA	ST	0.31	MFR	Possibly contruct 650 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129

Table 5-4 (Continued)
Septic Tanks

	Parcel No.	Address				Area (Ac)	Existing Land Use	Comments
120	104932104	621	W	CALIFORNIA	ST	0.25	SFR	Possibly contruct 650 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129
121	104932106	607	W	CALIFORNIA	ST	0.51	COM	Possibly contruct 650 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129
122	104932201	563	W	CALIFORNIA	ST	0.16	MFR	Possibly contruct 470 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129
123	104932202	559	W	CALIFORNIA	ST	0.17	SFR	Possibly contruct 470 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129
124	104932203	555	W	CALIFORNIA	ST	0.36	COM	Possibly contruct 470 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129
125	104932204	545	W	CALIFORNIA	ST	0.18	COM	Possibly contruct 470 feet of sewer in Mission Blvd & Oakland Ave and tie to MH L12129
126	104932206	535	W	CALIFORNIA	ST	0.19	VACANT	Possibly contruct 620 feet of sewer in Mission Blvd & Vine Ave and tie to CO L12504
127	104932207	527	W	CALIFORNIA	ST	0.18	SFR	Possibly contruct 620 feet of sewer in Mission Blvd & Vine Ave and tie to CO L12504
128	104932208	523	W	CALIFORNIA	ST	0.19	SFR	Possibly contruct 620 feet of sewer in Mission Blvd & Vine Ave and tie to CO L12504
129	104932209	519	W	CALIFORNIA	ST	0.19	SFR	Possibly contruct 620 feet of sewer in Mission Blvd & Vine Ave and tie to CO L12504
130	104932210	503	W	CALIFORNIA	ST	0.28	COM	Possibly contruct 620 feet of sewer in Mission Blvd & Vine Ave and tie to CO L12504
131	104932211	810	S	VINE	AV	0.31	COM	Possibly contruct 620 feet of sewer in Mission Blvd & Vine Ave and tie to CO L12504
132	104932404	535	W	CARLTON	ST	0.61	SFR	GIS shows laterals to existing sewer
133	104932405	529	W	CARLTON	ST	0.22	SFR	GIS shows laterals to existing sewer
134	104932406	521	W	CARLTON	ST	0.39	SFR	GIS shows laterals to existing sewer
135	104932414	534	W	MAITLAND	ST	0.40	SFR	GIS shows laterals to existing sewer
136	104932415	546	W	MAITLAND	ST	0.25	SFR	GIS shows laterals to existing sewer
137	104932416	558	W	MAITLAND	ST	0.19	SFR	GIS shows laterals to existing sewer
138	104932417	554	W	MAITLAND	ST	0.18	SFR	GIS shows laterals to existing sewer
139	104932419	524	W	MAITLAND	ST	0.21	SFR	GIS shows laterals to existing sewer
140	104937212	1046	E	CALIFORNIA	ST	0.70	SFR	Possibly tie to existing sewer on California Street
141	104938101	1064	E	CALIFORNIA	ST	0.67	IND	Possibly tie to existing sewer on California Street
142	104938201	1108	E	CALIFORNIA	ST	0.72	SFR	Possibly tie to existing sewer on California Street
143	104938202	1120	E	CALIFORNIA	ST	0.42	UND	Possibly tie to existing sewer on California Street
144	104938203	1124	E	CALIFORNIA	ST	0.45	SFR	Possibly tie to existing sewer on California Street
145	104938204	1128	E	CALIFORNIA	ST	0.51	COM	Possibly tie to existing sewer on California Street
146	104955209	122	W	PHILLIPS	ST	0.33	SFR	Tie to sewer in Phillips Street at MH M13127
147	104955210	130	W	PHILLIPS	ST	0.35	SFR	Tie to sewer in Phillips Street at MH M13127
148	104955211	204	W	PHILLIPS	ST	0.34	SFR	Tie to sewer in Phillips Street at MH M13127
149	104956301	228	W	RALSTON	ST	0.19	SFR	GIS shows laterals to existing sewer
150	104958222	725	W	RALSTON	ST	0.17	SFR	Requires about 250' of sewer lateral to tie to MH L12155; flat grade
151	104959122	1216	S	OAKLAND	AV	0.13	SFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
152	104959123	1224	S	OAKLAND	AV	0.19	SFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
153	104959124	1230	S	OAKLAND	AV	0.35	SFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
154	104959125	604	W	PHILLIPS	ST	0.17	SFR	GIS shows laterals to sewer in Phillips Street
155	104959126	608	W	PHILLIPS	ST	0.17	SFR	GIS shows laterals to sewer in Phillips Street
156	104959127	612	W	PHILLIPS	ST	0.17	SFR	GIS shows laterals to sewer in Phillips Street
157	104959128	618	W	PHILLIPS	ST	0.17	SFR	GIS shows laterals to sewer in Phillips Street
158	104959201	1251	S	OAKLAND	AV	0.09	SFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
159	104959202	1249	S	OAKLAND	AV	0.11	SFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St

Table 5-4 (Continued)
Septic Tanks

	Parcel No.	Address				Area (Ac)	Existing Land Use	Comments
160	104959203	1239	S	OAKLAND	AV	0.16	MFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
161	104959205	1223	S	OAKLAND	AV	0.15	SFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
162	104959206	1219	S	OAKLAND	AV	0.19	MFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
163	104959208	1217	S	OAKLAND	AV	0.14	SFR	Nearest City MH is M12127; Possibly build 600 feet sewer in Oakland Ave and Phillips St
164	104959224	520	W	PHILLIPS	ST	0.16	SFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
165	104959225	524	W	PHILLIPS	ST	0.16	SFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
166	104959226	530	W	PHILLIPS	ST	0.12	SFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
167	104959227	1229	S	BONITA	CT	0.31	SFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
168	104959228	1221	S	BONITA	CT	0.19	SFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
169	104959229	1211	S	BONITA	CT	0.24	MFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
170	104959230	1226	S	BONITA	CT	0.30	SFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
171	104959232	538	W	PHILLIPS	ST	0.20	SFR	Nearest City MH is M12127; Possibly construct 860 ft of sewer in Bonita Ct and Phillips St
172	105040129	229	E	GREVILLEA	ST	0.50	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
173	105040130	217	E	GREVILLEA	ST	0.48	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
174	105040131	211	E	GREVILLEA	ST	0.24	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
175	105040132	203	E	GREVILLEA	ST	0.25	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
176	105040133	129	E	GREVILLEA	ST	0.25	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
177	105040134	123	E	GREVILLEA	ST	0.25	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
178	105040204	124	E	GREVILLEA	ST	0.29	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
179	105040205	130	E	GREVILLEA	ST	0.28	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
180	105040206	206	E	GREVILLEA	ST	0.57	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
181	105040207	216	E	GREVILLEA	ST	0.56	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
182	105040208	230	E	GREVILLEA	ST	0.33	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
183	105040209	234	E	GREVILLEA	ST	0.24	SFR	Possibly contruct 650 feet of sewer in Grevillea St and tie to MH O13105; flat grade
184	105046102	1819	S	BON VIEW	AV	0.51	SFR	Requires about 240' of sewer lateral to tie to MH O14103; 2 ft drop; s=0.0083
185	105060108	160	W	PHILADELPHIA	ST	0.40	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
186	105060109	202	W	PHILADELPHIA	ST	0.42	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
187	105060110	208	W	PHILADELPHIA	ST	0.41	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502

Table 5-4 (Continued)
Septic Tanks

	Parcel No.	Address				Area (Ac)	Existing Land Use	Comments
188	105060111	214	W	PHILADELPHIA	ST	0.41	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
189	105060112	220	W	PHILADELPHIA	ST	0.39	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
190	105060113	226	W	PHILADELPHIA	ST	0.41	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
191	105060114	230	W	PHILADELPHIA	ST	0.42	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
192	105060115	304	W	PHILADELPHIA	ST	0.41	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
193	105060116	310	W	PHILADELPHIA	ST	0.42	SFR	Tie to IEUA sewer in Philadelphia St or construct 500 ft of sewer to tie into CO P13502
194	105060118	2151	S	FERN	AV	0.35	SFR	Possibly contruct 420 feet of sewer in Fern Ave and tie to MH P13108
195	105060119	2143	S	FERN	AV	0.32	SFR	Possibly contruct 420 feet of sewer in Fern Ave and tie to MH P13108
196	105060120	2137	S	FERN	AV	0.33	SFR	Possibly contruct 420 feet of sewer in Fern Ave and tie to MH P13108
197	105060121	2129	S	FERN	AV	0.97	SFR	Possibly contruct 420 feet of sewer in Fern Ave and tie to MH P13108
198	105064104	740	W	PHILADELPHIA	ST	0.46	SFR	Possibly tie to CO P12501 in easement west of Hickory Ave
199	105064105	752	W	PHILADELPHIA	ST	0.46	SFR	Requires about 210' of sewer lateral to tie to existing sewer in Cypress Ave; 2 ft drop; s= 0.0095
200	105104103	525	W	PHILADELPHIA	ST	2.33	SFR	Possibly tie to IEUA sewer in Philadelphia St
201	105104104	513	W	PHILADELPHIA	ST	1.17	SFR	Possibly tie to IEUA sewer in Philadelphia St
202	105104105	507	W	PHILADELPHIA	ST	1.16	AGR	Possibly tie to IEUA sewer in Philadelphia St
203	105104127	2233	S	SAN ANTONIO	AV	0.56	SFR	Requires about 240' of sewer lateral to tie to MH P12127; 4 ft drop; s=0.0167
204	105104130	545	W	PHILADELPHIA	ST	0.50	SFR	Possibly tie to IEUA sewer in Philadelphia St
205	105105103	309	W	PHILADELPHIA	ST	0.35	SFR	Tie to sewer in Philadelphia Street at CO P13501
206	105105104	301	W	PHILADELPHIA	ST	0.44	SFR	Tie to sewer in Philadelphia Street at CO P13501

5-7 Sewer Pump Stations

Magnolia Pump Station

The Magnolia Pump Station, located on the east side of Magnolia Avenue near the intersection with Monticello Street, serves a tributary area of approximately 45 gross acres. The tributary area was reduced in 2006 after the completion of two connections that diverted most of the flow to IEUA's Montclair Interceptor on Philadelphia Street. One connection was made at Oaks Avenue and one was made at Magnolia Avenue.

The Magnolia Pump Station is a wet well – dry well facility with two (2) ESSCO pumps rated at 400 GPM, and a total dynamic head of 60 feet. The as-built plans show the low water level at 804.5 feet, and the terminal manhole outlet elevation at 850.59 feet. The force main is 8 inches in diameter, and of epoxy lined asbestos cement. It extends 1,879 feet northerly from the pump station to the terminal manhole (O11123).

The pump station site is shown on Figure 5-6 and its drainage area is shown on Figure 5-7. The existing land uses and average flow estimates are shown in Tables 5-5. The ultimate average, peak dry weather and peak wet weather flows are estimated at 36 gpm, 91 gpm, and 122 gpm, respectively.

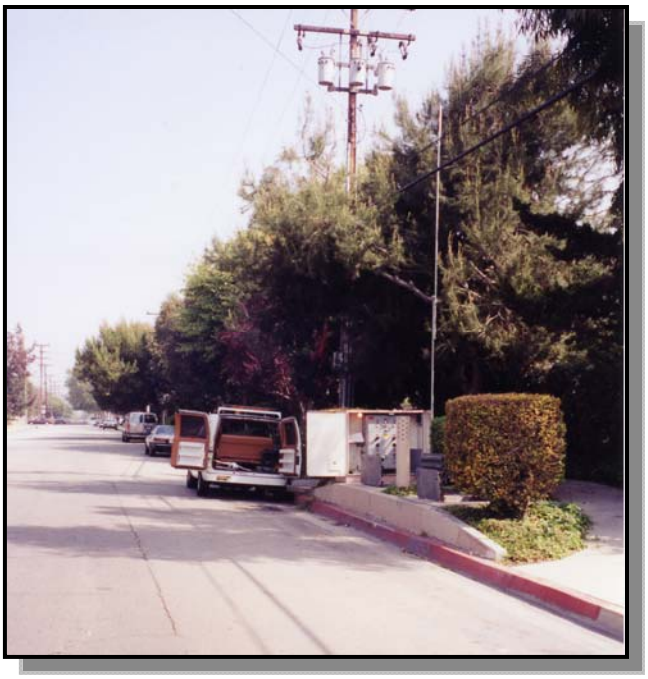


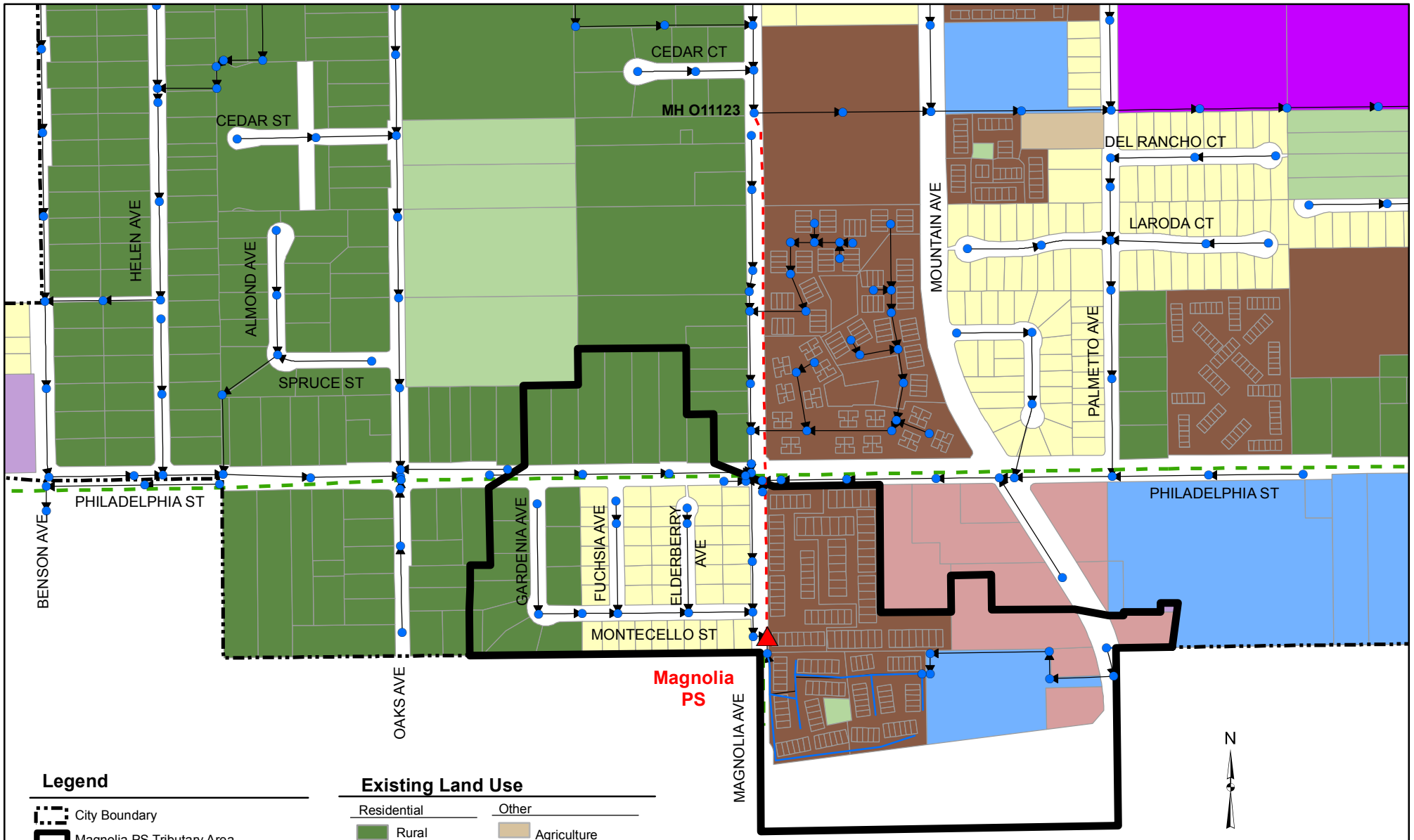
Figure 5-6 – Magnolia Pump Station

The firm capacity of the Magnolia Pump Station is 400 gpm. This is sufficient to pump the existing and ultimate wet weather flows of 115 gpm and 122 gpm, respectively.

The area to the south and west of Magnolia Pump Station is in the City of Chino. Wastewater from this area drains southerly, crosses the Pomona Freeway, and is conveyed to IEUA facilities to the south. If the City of Chino facilities that drain this area have capacity, it may be possible to divert the tributary flows to the City of Chino's system, and eliminate the Magnolia Pump Station.

Table 5–5
Existing Land Use and Estimated Flows to Magnolia Pump Station

Existing Landuse		Density (du/Ac)	Area (Ac)	Calibrated Unit Flow Factor (gpd/Ac)	Total Average Flow (mgd)
Rural Residential	RR	0 - 2	10.2	500	0.0051
Single Family Residential	SFR	2 - 5	6.9	1,200	0.0083
Multi-Family Residential	MFR	11 - 25	10.0	*2,800	0.0279
Commercial	COM	-	3.9	1,000	0.0039
Open Space	OPEN	-	0.2		
Public Facilities	PUBLIC	-	3.5	1,000	0.0035
Streets and ROW		-	10.3	-	-
		Total	**45**	**ADWF**	**0.0487 = 34 gpm**
				PDWF	**0.1241 = 86 gpm**
				PWWF	**0.1663 = 115 gpm**



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Magnolia Pump Station Tributary Area

Figure 5-7

Haven Pump Station

The Haven Pump Station, located on the north side of the Pomona Freeway about 900 feet east of Haven Avenue, serves an area of approximately 1,577 gross acres. It is a submersible pump station with four (4) Fairbanks-Morse pumps rated at 3,400 GPM and 77 feet of total dynamic head. It was constructed in 1988. The pump station has a 315 kW standby generator, and an automatic transfer switch.

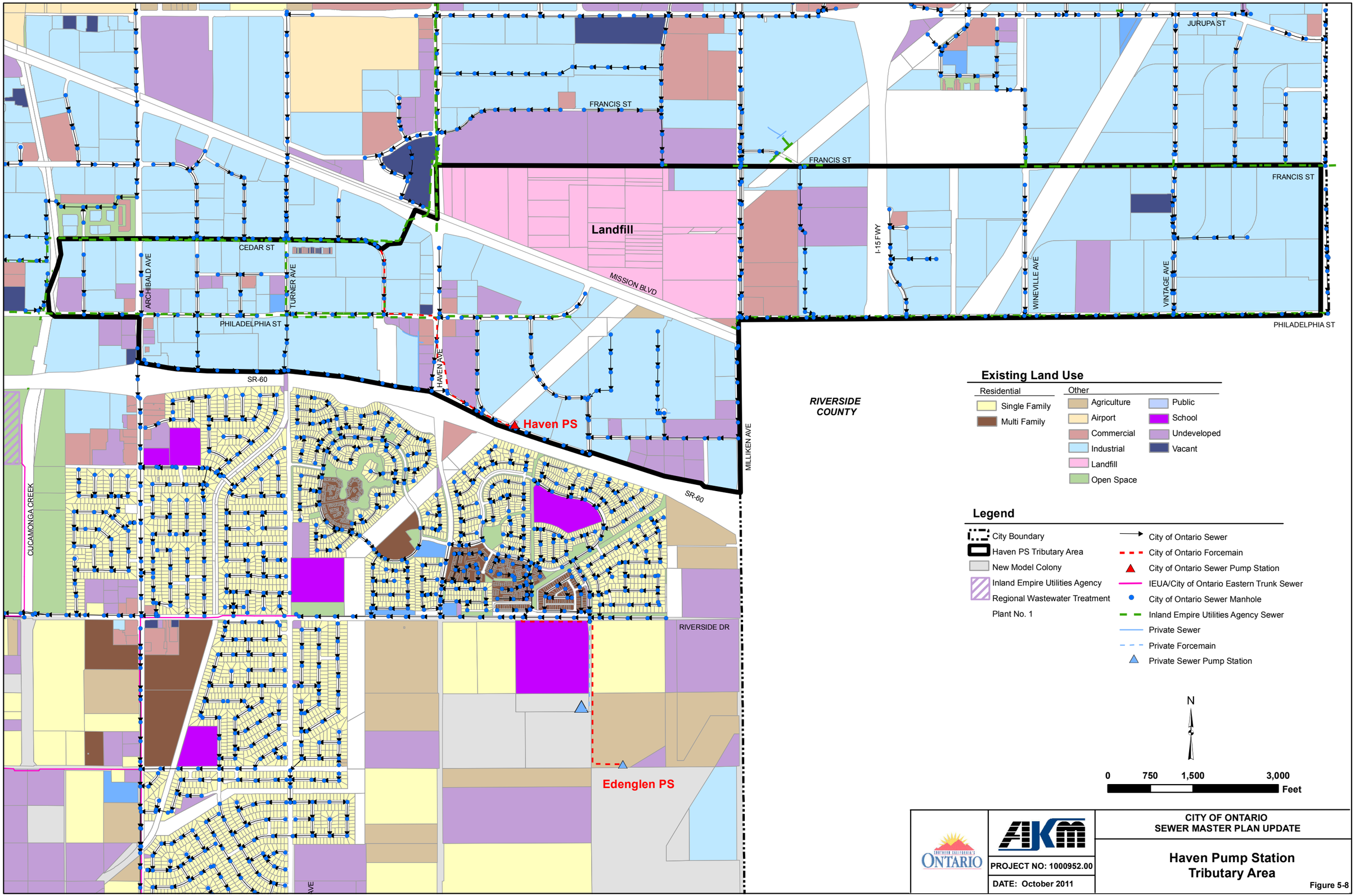
The wet well is 12 feet wide and 25'-4" long. It has an invert of elevation 788.0 feet. The 30-inch diameter VCP influent sewer enters the wet well with an invert elevation of 799.6 feet. The as-built plans show the low and high water elevations at 790.0 feet and 799.0 feet, respectively. The force main is a 24-inch diameter ductile iron pipe, which extends 5,373 feet to a 54-inch diameter IEUA Cucamonga Trunk Sewer on Cedar Street and terminates at an invert elevation of 833.5 feet. The pump station has a 24-inch diameter flow meter on the force main.

The pump station drainage area is shown on Figure 5-8.

The existing land uses and average flow estimates per the developed unit flow factors for this Master Plan are shown in Tables 5-6. The ultimate average, peak dry weather and peak wet weather flows are estimated at 1394 gpm, 2636 gpm, and 3532 gpm, respectively.

Table 5–6
Existing Land Use and Estimated Flows to Haven Pump Station

Existing Landuse		Area (Ac)	Calibrated Unit Flow Factor (gpd/Ac)	Total Average Flow (mgd)
Commercial	COM	59.2	1,000	0.0592
Industrial	IND	924.6	400	0.3698
Open Spaces	OPEN	0.9	200	0.0002
Public Facilities	PUBLIC	1.9	1,000	0.0019
Agriculture	AGR	2.0	-	-
Infrastructure	INF	74.8	-	-
Landfill	LF	206.9	-	-
Streets and ROW		157.0	-	-
Undeveloped	UND	132.8	-	-
Unknown	UNK	9.3	-	-
Vacant	VAC	7.2	-	-
	Total	**1,577**	**ADWF**	**0.4311 = 299 gpm**
			PDWF	**0.9223 = 640 gpm**
			PWWF	**1.2359 = 858 gpm**



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Haven Pump Station Tributary Area

Figure 5-8

The estimated existing average flow of 0.4311 mgd is very similar to what was measured in May 2005 during the preparation of the *New Model Colony Sewer Master Plan Addendum (March 2006).* Flow monitoring was conducted on the influent sewers to Haven Pump Station and resulted in a total average flow of 0.4269 mgd to the pump station.

The existing and ultimate average, as well as the estimated peak dry weather, and peak wet weather flows are significantly lower than the pump station's estimated firm capacity. Therefore, the City can allow development in the Haven Pump Station tributary area. The firm pumping capacity should be determined based upon field measurements. The tributary flows should be monitored as the area develops, in order to ascertain that the peak wet weather flow does not exceed the firm pumping capacity in the future.

The City plans to eliminate the Haven Pump Station and divert the tributary flows south through New Model Colony when the trunk sewer is constructed on Haven Avenue and tied to the existing Eastern Trunk Sewer on Archibald Avenue. The *New Model Colony Sewer Master Plan Addendum (March 2006)* and this New Model Colony sewer system analysis conducted for this Master Plan allows for a total average flow of 2.30 mgd to be diverted from the existing Haven Pump Station tributary area. If the average flow should ever exceed this amount, an analysis of the New Model Colony sewer system would be needed to determine the adequacy of the system downstream.

Edenglen Pump Station

The Edenglen Pump Station is located on the north side of Chino Avenue, east of Mill Creek Avenue. It is a temporary pump station serving the first phase of homes in the Brookfield / Edenglen development. The total service area is approximately 84 gross acres. Ultimately, the flows from this development will be rerouted to the south through the New Model Colony sewer system.

The temporary Edenglen Pump Station is a submersible pump station with two (2) Myers 4RXY submersible pumps with recessed impellers. The pumps are rated at 120 gpm and 98 feet of total dynamic head. It was constructed in 2007. The pump station has a 140 kW standby generator and an automatic transfer switch.

The wet well is an 8'x8' precast concrete, T-Lock lined manhole. It is 34 feet deep with an invert of elevation 737.0 feet. The 8-inch diameter VCP influent sewer enters the wet well with an invert elevation of 747.53 feet. The as-built plans show the low and high water elevations at 739.75 feet and 740.5 feet, respectively.

The forcemain is a 4-inch diameter PVC C-900 pipe, which extends 4,336 feet to a manhole on Riverside Drive, located approximately 1,218 feet west of Mill Creek Avenue. The forcemain terminates at an invert elevation of 790.19 feet. The pumped flow is then conveyed in an 8-inch gravity sewer, approximately 30 feet to the City's trunk sewer in Riverside Drive.

The pump station serves a total of 225 dwelling units with an estimated average flow of 48,000 gpd or 33 gpm (*per City Memorandum "Edenglen Lift Station Capacity" dated May 18, 2010*). The peak

wet weather flow is estimated at 164,000 gpd or 114 gpm. During the pump station start-up testing which was conducted on November 9, 2007, the pump station delivered approximately 180 gpm.

SECTION 6

ULTIMATE SEWER SYSTEM

6-1 General Description

The ultimate sewer collection system will include service to New Model Colony as shown on Figure 6-1. Approximately 140,000 feet of additional trunk sewer will be added to the City's system in New Model Colony. The New Model Colony trunk sewers are planned to range in size from 12-inches to 36-inches as shown on Figure 6-2.

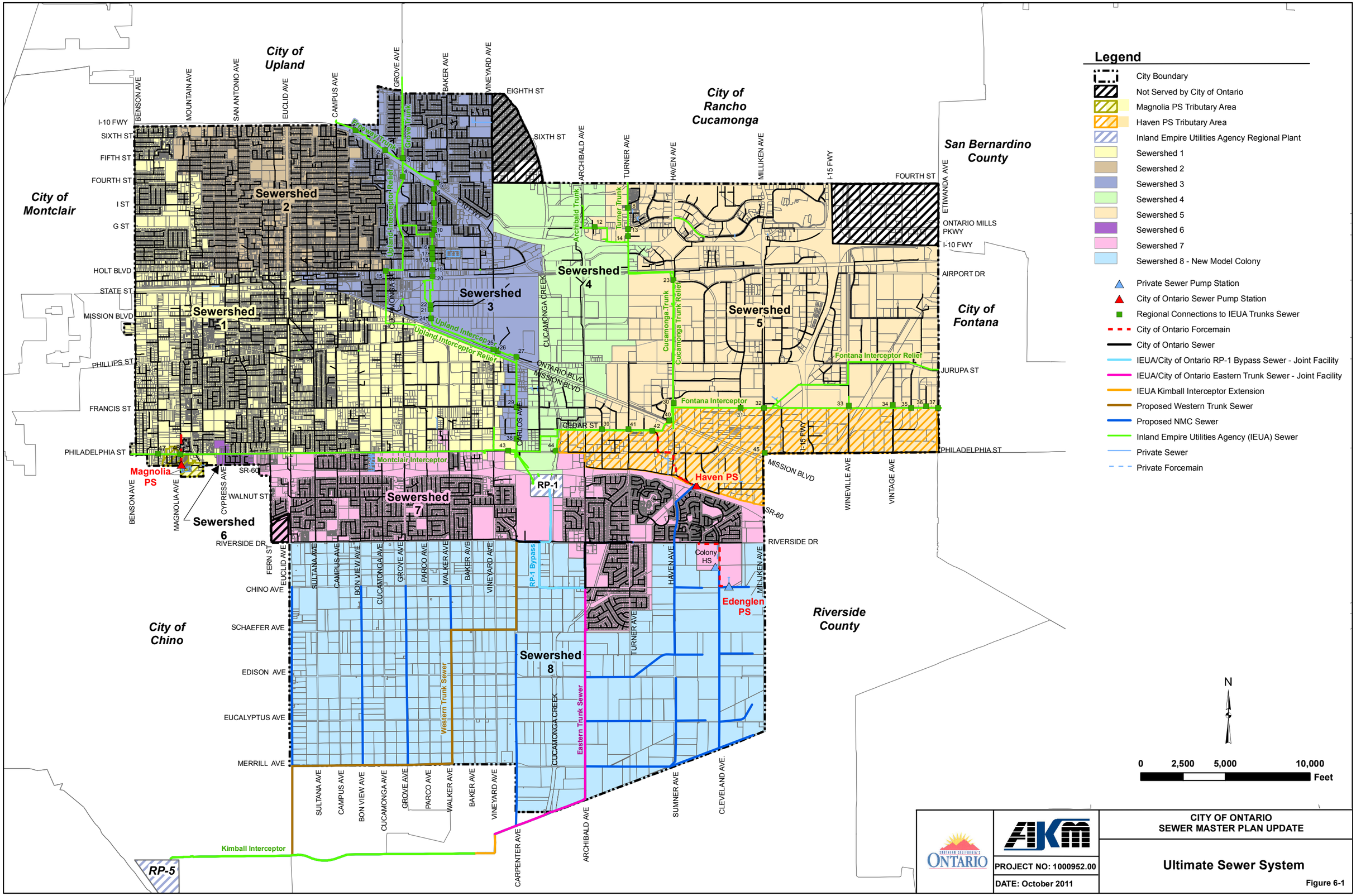
In New Model Colony, the Western Trunk Sewer is the primary sewer located west of Cucamonga Creek. It starts at the intersection of Whispering Lakes Drive/Carpenter Avenue and Riverside Drive, where it will intercept all of the Old Model Colony flows generated north of Riverside Drive and west of Whispering Lakes Drive that were originally tributary to the decommissioned Whispering Lakes Pump Station. The Western Trunk Sewer will then extend south to Schaefer Avenue (18-inch/21-inch), west to Walker Avenue (30-inch), south to Merrill Avenue (30-inch), west to Euclid Avenue (30-inch/36-inch), and south to Kimball Avenue (36-inch) where it ties into the existing IEUA Kimball Interceptor (54-inch/60-inch). The Western Trunk Sewer is currently sized to accommodate only City generated flows.

6-2 Existing and Projected Sewage Generation

The total existing average sewer load for Old Model Colony is estimated at 18.75 mgd. This estimate is based upon the calibrated unit flow factors shown in Table 4-2, which were developed through flow monitoring conducted in 2006. The calibrated unit flow factors were based on the existing users and vacancies at that time.

The ultimate average sewage generation for Old Model Colony and New Model Colony is estimated at 45.03 mgd. This estimate is based upon the ultimate unit flow factors shown in Table 4-3. The increase in ultimate flow is due to development of New Model Colony anticipated densification in land use and population per the City's 2010 General Plan and the assumption that the area will be fully occupied. Water conservation efforts were not included in the ultimate average sewage generation estimate. For planning purposes, it is believed to be better not to include water conservation efforts that are not definitive. This will prevent the undersizing of gravity sewers and pump stations.

A summary of the projected sewage generation by landuse is shown in Table 6-1. Airport sewage loads were generated based upon 90 percent of the average water use as shown in Table 6-2.


City of Upland
City of Montclair
City of Rancho Cucamonga
San Bernardino County
City of Fontana
City of Chino
Riverside County
Sewershed 1
Sewershed 2
Sewershed 3
Sewershed 4
Sewershed 5
Sewershed 6
Sewershed 7
Sewershed 8
Magnolia PS
Haven PS
Edenglen PS
Colony HS
RP-1
RP-5
Upland Interceptor
Upland Interceptor Relief
Archibald Trunk
Turner Trunk
Cucamonga Trunk
Cucamonga Trunk Relief
Fontana Interceptor
Fontana Interceptor Relief
Montclair Interceptor
RP-1 Bypass
Western Trunk Sewer
Eastern Trunk Sewer
Kimball Interceptor
I-10 FWY
I-15 FWY
SR-60
SIXTH ST
FIFTH ST
FOURTH ST
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
EIGHTH ST
AIRPORT DR
JURUPA ST
ONTARIO MILLS PKWY
ONTARIO BLVD
CEDAR ST
WALNUT ST
RIVERSIDE DR
CHINO AVE
SCHAEFER AVE
EDISON AVE
EUCALYPTUS AVE
MERRILL AVE
BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
ETIWANDA AVE
CUCAMONGA CREEK
CARLOS AVE
MAGNOLIA AVE
CYPRESS AVE
WINEVILLE AVE
VINTAGE AVE
FERN ST
SULTANA AVE
BON VIEW AVE
PARCO AVE
WALKER AVE
SUMNER AVE
CLEVELAND AVE.
CARPENTER AVE
Legend
City Boundary
Not Served by City of Ontario
Magnolia PS Tributary Area
Haven PS Tributary Area
Inland Empire Utilities Agency Regional Plant
Sewershed 1
Sewershed 2
Sewershed 3
Sewershed 4
Sewershed 5
Sewershed 6
Sewershed 7
Sewershed 8 - New Model Colony
Private Sewer Pump Station
City of Ontario Sewer Pump Station
Regional Connections to IEUA Trunks Sewer
City of Ontario Forcemain
City of Ontario Sewer
IEUA/City of Ontario RP-1 Bypass Sewer - Joint Facility
IEUA/City of Ontario Eastern Trunk Sewer - Joint Facility
IEUA Kimball Interceptor Extension
Proposed Western Trunk Sewer
Proposed NMC Sewer
Inland Empire Utilities Agency (IEUA) Sewer
Private Sewer
Private Forcemain
N
0
2,500
5,000
10,000
Feet
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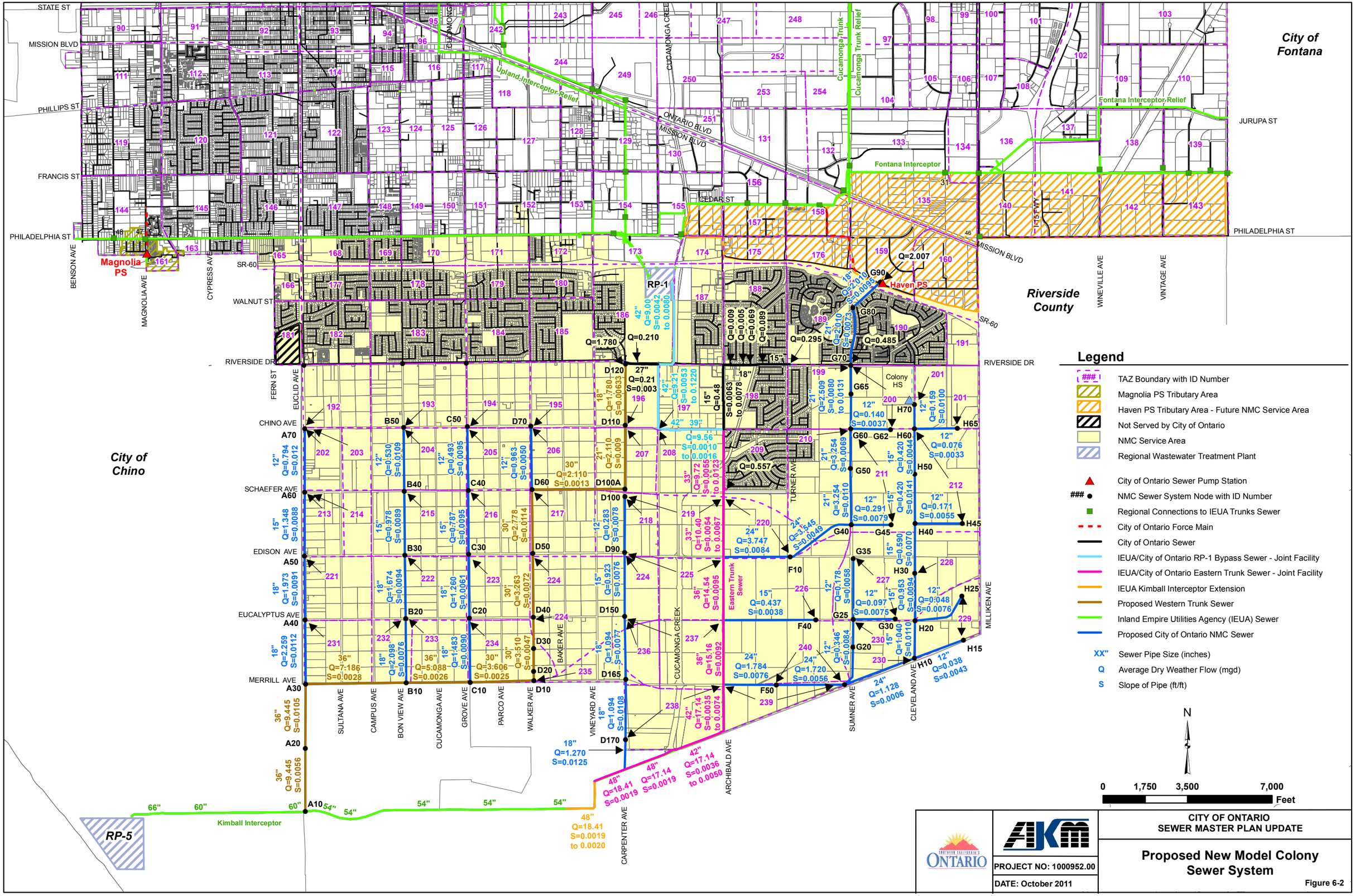
Ultimate Sewer System
Figure 6-1



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Proposed New Model Colony Sewer System

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Figure 6-2

Table 6-1
City of Ontario
Ultimate Sewage Generation

Land Use Type	OMC Sewer Loads (gpd)	NMC Sewer Loads (gpd)	Sewer Loads due to High Water Users (gpd)	Total (gpd)	Total (mgd)
Rural Residential	226,497	0	0	226,497	0.23
Low Density Residential	4,022,533	3,486,222	35,039	7,543,793	7.54
Low-Medium Density Residential	546,270	1,030,784	108,882	1,685,936	1.69
Medium Density Residential	3,100,730	5,082,309	250,186	8,433,225	8.43
High Density Residential	1,516,007	0	0	1,516,007	1.52
General Commercial	354,181	133,876	15,364	503,422	0.50
Business Park	718,599	936,539	3,155	1,658,293	1.66
Hospitality	631,304	0	0	631,304	0.63
Neighborhood Commercial	214,663	139,885	31,247	385,795	0.39
Office Commercial	1,178,265	367,181	0	1,545,446	1.55
Industrial	10,205,821	450,619	1,125,948	11,782,388	11.78
Public Facility	144,223	3,725	0	147,948	0.15
Public School	565,600		0	565,600	0.57
Airport	507,053		0	507,053	0.51
Mixed Use	4,971,008	1,791,707	2,298	6,765,013	6.77
Open Space - Non-Recreational	137,649	101,268	0	238,918	0.24
Open Space - Recreational	105,621	92,647	691,819	890,087	0.89
Total	**29,146,027**	**13,616,761**	**2,263,937**	**45,026,724**	**45.03**

Table 6-2
Ontario International Airport Sewage Load Estimates

Name	Address	Water Use (gpd)	Sewer Load (gpd)	Model	Model ID	Total Sewer Load Applied to Model ID (gpd)
L A W A	1090 S Vineyard Ave	2,330	2,097	West	L17102	4,663
Guardian Air Service	1150 S Vineyard Ave	2,851	2,566			
City Of L.A. Ontario	1152 S Vineyard Ave	-	-			
Federal Express	1801 E Avion St	3,847	3,462	West	L17100	17,182
Lsg/Sky Chefs	1902 E Avion St	6,261	5,635			
L A Dpt Apts	1903 E Avion St	49	44			
Lsg Sky-Chefs	1904 E Avion St	1,892	1,703			
L A Dpt Apts	1923 E Avion St	7,042	6,338			
Mercury Air Group	2161 E Avion St	2,793	2,514	West	M18102	2,514
General Electric	2264 E Avion St	-	-			
U S Post Office	2300 E Airport Dr	204,958	184,462	East	K19101	383,801
L A Dpt Apts	2900 E Airport Dr	221,488	199,339			
L A Dpt Apts	3102 E Airport Dr	6,726	6,053	Sewage flow directly tributary to IEUA		
L A Dpt Apts	3200 E Airport Dr	22,009	19,808			
L A Dpt Apts	3450 E Airport Dr	81,146	73,031			
		Total	**507,053**			

6-3 Cooperative Agreement between City of Ontario and IEUA

A cooperative agreement between Inland Empire Utilities Agency (IEUA) and the City of Ontario for the sewer conveyance facilities of the Eastern Trunk Sewer, Kimball Interceptor Sewer Extension, and RP-1 Outfall (i.e. Conveyances) was made effective on October 7, 2003. Amendment No. 1 to this agreement was made June 4, 2004. The initial agreement established that the facilities be owned jointly between the agencies and that the share of ownership be based on average daily wastewater flows. The average daily wastewater flow capacity in each segment of the Conveyances was revised in Amendment No. 1 and is summarized in Table 6-3. Copies of the cooperative agreement and its amendment are provided in Appendix E.

IEUA and the City agreed to temporarily divert the Whispering Lakes Pump Station flow into the Conveyances. Amendment No. 1 temporarily reallocated capacity of up to 3 mgd to the City of Ontario, to facilitate the diversion without building excess capacity. Therefore, IEUA's original average daily flow capacity of 9 mgd was reduced to 6 mgd in any reach of the Conveyances, at all times during the day. It was agreed that when the Whispering Lakes Pump Station flow was eventually diverted to the Western Trunk Sewer, IEUA will have the right to increase its RP-1 Outfall bypass by up to 3 mgd (not peaked), for a total of 9 mgd average daily capacity. The City has the

option to replace the capacity for IEUA's use in the Western Trunk Sewer and continue to utilize the Eastern Trunk Sewer.

Table 6-3
Summary of Average Daily Wastewater Flow (ADWF) Capacities for Conveyances

Location	Total ADWF (mgd)	IEUA ADWF (mgd)	City of Ontario ADWF (mgd)	Estimated Ultimate City of Ontario ADWF (mgd)	Extra City ADWF Capacity (mgd)
RP-1 Outfall					
RP-1 to Riverside Dr and Riverside Dr, west of Cucamonga Creek	20.00	20.00	0.00	0.00	0.00
West of Cucamonga Creek, Riverside Dr to Chino Ave	23.00	20.00	3.00*	0.25	0.00
Chino Ave, west of Cucamonga Creek to Archibald Ave	9.00	9.00	0.00	0.00	0.00
Eastern Trunk Sewer					
Archibald Ave, Chino Ave to Schaefer Ave	9.77	9.00	0.77	0.72	0.05
Archibald Ave, Schaefer Ave to Edison Ave	11.00	9.00	2.00	1.40	0.60
Archibald Ave, Edison Ave to Eucalyptus Ave	15.26	9.00	6.26	5.53	0.73
Archibald Ave, Eucalyptus Ave to Merrill Avee	16.19	9.00	7.19	6.16	1.03
Archibald Ave, Merrill Ave to City Boundary	18.37	9.00	9.37	8.14	1.23
Adjacent City Boundary, Archibald Ave to Cucamonga Creek	18.37	9.00	9.37	8.14	1.23
Adjacent City Boundary, Cucamonga Creek to Vineyard Ave	18.37	9.00	9.37	8.14	1.23
Kimball Interceptor Sewer Extension					
Vineyard Ave and Kimball Ave	19.26	9.00	10.26	9.41	0.85
** 3.00 mgd temporarily allocated to City of Ontario to facilitate Whispering Lakes Pump Station Diversion*					

The estimated ultimate City flows are shown in Table 6-3. These flows assume that the portion of TAZ area 197 located east of Cucamonga Creek between Riverside Drive and Chino Avenue, is tributary to the existing 15-inch City sewer in Archibald Avenue. The flows enter the Eastern Trunk Sewer at Schaefer Avenue.

The ultimate remaining capacity is also shown in Table 6-3 by reach of sewer, which was calculated under the assumption that the Whispering Lakes Pump Station flow is diverted to the Western Trunk Sewer.

SECTION 7

HYDRAULIC SEWER MODEL

7-1 Hydraulic Model Software

To perform a detailed analysis of the sewer collection system, it is essential to create a mathematical model that is capable of simulating the operating characteristics of the system. The simulations for this study were performed utilizing Info Sewer, which is a GIS based computer program with the ability to perform steady state analyses of the flows in sanitary sewer systems. The program also manages and maintains the database that stores the sewer analysis input and output results. Manning's Equation is used for depth of flow calculations in the gravity sewer pipes.

The sewer system is modeled by entering pipe diameters, lengths, grades, and roughness coefficients as well as land use classifications. The sewer model includes all of the City's existing manholes, sewer pipes (excluding laterals, private sewers, and sewers belonging to other agencies), pump stations, large point source flows, and tributary area boundaries. The model identifies points of connection to regional facilities, primarily belonging to IEUA.

The model uses the average dry weather flows and determines peak flows based upon relationships specified by the user (see Section 4). Pumped flows and measured flows can be entered at any manhole as a fixed flow.

At the completion of a modeling run, output data is created for viewing on the screen or for printing. Output data for pipes include average and peak flow rate, velocity, pipe capacity, and ratio of flow depth to pipe diameter (d/D).

The sewer model files are provided in Appendix F. The model input and results are provided in tabular form in Appendix G.

7-2 Construction of Model Geometry

Information gathered from the City sewer GIS files, atlas sheets, as-built drawings and interviews with City staff was used to create the model geometry of the existing system.

The City's existing sewer GIS information was utilized to build the geometry of the hydraulic model. Table 7-1 is a list of the information that was imported into the model from the existing GIS. Only active sewers owned by the City of Ontario were included in the hydraulic model. Regional sewers, abandoned (ABD), inactive (I), and demolished (D) sewers were <u>not</u> modeled.

The City's gravity main GIS data did not contain unique upstream and downstream node identification labels. This was resolved by combining information from the upstream atlas grid identification (UP_grid) and the upstream manhole identification (FROMID) and by combining information from the downstream atlas grid identification (DN_grid) and the downstream manhole identification (TOID) to create unique labels that would match the manhole GIS data.

In most cases, if one of the node identification numbers was labeled as "DE" (dead end), the line segment represented a sewer stub-out intended for future extension of the sewer system. These segments usually did not include invert and slope information. There were approximately 1,532 of these segments in the existing sewer GIS. These stub-outs were not included in the hydraulic model.

Table 7-1
Data Imported from GIS Files to Hydraulic Model

Node Data	Manhole Shapefile Field Title
Unique ID	FACILITYID
Rim Elevation (ft)	RIMELEVATI
Invert Elevation (ft)	INVERTELEV
Pipe Data	**Gravity Mains Shapefile Field Title**
Unique ID	FACILITYID
Upstream Node ID	UP_grid + FROMID
Upstream Invert Elevation (ft)	INELEV
Downstream Node ID	DN_grid + FROMID
Downstream Invert Elevation (ft)	OUTLEEV
Pipe Size (in)	DIAMETER
Pipe Length (ft)	PIPELENGTH

There were also approximately 450 line segments with one of the node identification numbers labeled as "FI" (fitting). These identifications represented fittings which were not actually represented with a node in the GIS. In other words, there were multiple line segments between two nodes. Research showed that many of the fittings represented lateral connections. For modeling purposes, sewer pipes do not need to be separated at lateral connections. Importing these multiple line segments into the model will cause the network to be disconnected. These areas were corrected by creating a single pipe segment between the two nodes. The remaining segments of pipe were deleted. The appropriate data was associated with the new pipe segment created.

Some manholes did not have unique IDs in the sewer GIS and had to be renamed. For example, there were two manholes on atlas O13 with identification 133. One of them was renamed as 233. The complete manhole ID is therefore O13233 in the hydraulic model.

Sometimes additional nodes were added to the model, which were not a part of the sewer GIS files, to represent the intersection of two pipes. Although there may not be a manhole at these locations, the model needs to have a node at the intersection of all pipes in order to operate properly.

7-3 Missing Information

The City's existing sewer GIS data was not 100 percent complete. Approximately 1,175 reaches were found to be missing invert elevations, the length of the pipe, and/or the slope of the pipe. Several steps were taken to fill in the data gaps with the most accurate data available:

1. Missing inverts were calculated when there was enough information available (slope, pipe length, and one invert)
2. City staff conducted survey of several of the sewers missing data (see Appendix H). It was determined that the surveyed inverts coupled with the recorded GIS length, resulted in slopes very similar to what was used during the development of the 1995 Sewer Master Plan. Therefore, City staff approved the use of the 1995 Sewer Master Plan data

for pipes where the information could not be found in the City's current sewer GIS. The 1995 Sewer Master Plan data was utilized for approximately 790 reaches.

3. There were approximately 70 pipes where data was found on as-built construction plans. If the slope was found on the as-built plans, inverts and lengths were calculated to get the appropriate slope.
4. There were approximately 112 pipes for which data could not be found on the sewer GIS, as-built plans or in the 1995 Sewer Master Plan. Data had to be assumed for these pipes. If possible, the slope of an adjacent upstream or downstream pipe was used. Sometimes the street slope was used (based on the GIS contours). If no other information was available, a minimum slope of 0.004 was assumed.

7-4 Split Manholes and Flow Patterns

From the existing sewer GIS and sewer atlas sheets, 135 split manholes (more than one pipe exiting the manhole) were identified in the collection system. Many of these split manholes are located at summits in the upstream portions of the system. Thirty-eight split manholes were identified for further investigation due to their potential significance on the hydraulic model results. As-built plans for these 38 sites were reviewed. Some of the conditions found on the plans are as follows:

1. Plan shows a plug was installed in one of the outlets and the flow is diverted in one direction. In this case, the model was set up to divert all flow in one direction toward the active outlet.
2. Flow is split into two parallel lines, but comes back together into one line a little further downstream. In this case, the model was set up to split the flows appropriately based on the as-built pipe sizes and invert elevations.
3. One of the outlets acts as an overflow because the elevation leaving the manhole is much higher than the other outlet. In this case, the model generally assumes the normal flow conditions.
4. One of the outlets may have been abandoned. In this case, the model was set up to divert the flow in one direction toward the active outlet.
5. Upon further investigation, the tributary area to the split manhole is determined to be very small. In this case, the model was set up to split the flows appropriately based on the as-built pipe sizes and invert elevations.

AKM met with the City staff to verify the flow direction at the aforementioned 38 "major" flow split locations. Field reviews of the split manholes verified many of the as built manhole information. The locations of the "major" flow splits and the results of the field investigation are shown in Table 5-3 in Section 5 of this report.

Eight of the flow monitoring sites (1A, 2A, 2B, 2C, 11A, 11B, 12A, and 12B) discussed in Subsection 4-2, were selected for the purpose of quantifying the flow downstream of a "major" flow split so it could be modeled accurately.

7-5 Model Loads (Wastewater Flows)

General

The existing land uses discussed in Sub-section 3-5 and the calibrated unit flow factors shown in Table 4-2 were utilized to determine the average wastewater flows (loads) for the existing model. The ultimate land uses discussed in Subsection 3-5 and the ultimate unit flow factors shown in Table 4-3 were utilized to apply the average loads to the ultimate model.

Peak dry weather flows are calculated in the model by a user defined relationship. The peaking formula used in the sewer model is as follows:

$$Q_{peak}\ (cfs) = 2.0 \times Q_{ave}(cfs)^{0.92}$$

The total existing average load for Old Model Colony is estimated at 18.75 mgd. The total ultimate average load for Old Model Colony and New Model Colony is estimated at 45.03 mgd. The increase in ultimate flow is due to development of New Model Colony anticipated densification in land use and population per the City's 2010 General Plan and the assumption that the area will be fully occupied

Load Distribution

The sewage loads were applied to the model manholes with the use of Traffic Area Zone (TAZ) information provided by the City's planning department. TAZ information, shown in Table 7-2, included a breakdown of the ultimate land uses in terms of number of dwelling units for residential areas, building square footage for commercial and industrial areas, and acreage for open space and public facilities. This information combined with the ultimate unit flow factors was used to calculate the sewage loads for each TAZ area. The loads were then distributed to the manholes located within each TAZ area. School loads were calculated separately and applied to appropriate nodes as described in Section 7-6. The TAZ boundaries are shown on Figure 7-1.

Load Fields

In the model, the loads were generally assigned to fields by landuse type as follows:

- Load 1: Low Density, Low Medium Density, and Medium Density Residential
- Load 2: Rural Residential
- Load 3: High Density Residential
- Load 4: General Commercial, Business Park, Hospitality, Neighborhood Commercial, Office Commercial
- Load 5: Industrial
- Load 6: Public Facility, Public School, Airport
- Load 7: Mixed Use
- Load 8: Open Space Non-Recreational, Open Space Recreational
- Load 9: Transfer Loads from OMC to NMC Model
- Load 10: High Water User

Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial				Hospitality				Business Park			Industrial					Mixed Use					Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac
1		17.5			17.5	70.0									3.8	9,976	39,905																						17.4								10.2
2		19.7			20.3	81.1							19.7	691																									10.5								18.3
3		101.0			101.0	403.9				15.0	270				1.9	4,931	19,723																													41.2
4		1.6			76.8	307.3												1.6	2,141	19,269																							44.4				35.1
5		57.9			57.9	231.7				10.9	196																												3.3								25.0
6		31.7			50.4	201.5		18.8	160	16.0	288							31.7	41,376	372,382	2.1	46,970	16,775	3,355																							43.5
7		14.4			79.5	317.9												14.4	18,838	169,540																							7.8				39.5
8		95.7			95.7	382.8																																			1.8				46.7
9		48.1			48.1	192.6				0.4	7																																			25.5
10		44.4			44.4	177.5																																			4.8				19.0
11		48.1			48.1	192.6																																			9.5				29.0
12		29.0											29.0	1,013																									3.3								13.9
13		42.9			42.9	171.5																																			9.0				9.4				19.5
14		48.4											48.4	1,694																																	10.6
15		14.6			75.1	300.4				13.7	247		14.6	511	9.5	24,780	99,120																											9.0				38.4
16		6.1			55.3	221.3		27.3	232	23.3	420				5.7	14,904	59,614	6.1	7,986	71,874													13.2	31,548	141,968	110,420	31,548					0.3								33.7
17		11.9																11.9	15,609	140,479																											9.6
18		40.8			40.8	163.1				8.7	156				2.3	5,980	23,921																											19.6			9.5					18.1
19		58.8			58.8	235.4									7.2	18,752	75,009																															20.7
20		19.2			19.2	77.0																																							58.0				11.4
21		65.3			65.3	261.2				0.5	9																																					22.9
22		3.9			56.8	227.1				22.1	398				0.4	976	3,904	3.9	5,136	46,226																								4.6								28.4
23		5.6			66.1	264.4				12.5	225				2.9	7,533	30,131	5.6	7,264	65,373	2.1	48,548	17,339	3,468																					60.5			0.5	9.3				38.2
24		99.0			99.0	396.2				9.4	170				20.3	53,125	212,500				1.4	31,953	11,412	2,282																											43.3
25		0.0			78.9	315.6		17.3	147	8.5	153		0.04	1	0.5	1,320	5,280				2.1	47,029	16,796	3,359																						0.6	9.9				36.9
26		111.3			111.3	445.2				2.0	37				0.2	411	1,642				1.2	27,843	9,944	1,989																											39.2
27		138.8			138.8	555.2				3.2	58																																	21.3								56.3
28		65.5			65.5	261.9									0.5	1,263	5,054																											20.0			9.2					32.7
29		9.0			31.0	123.9				24.3	437														9.0	78,556	117,834	196,389																							27.8
30		15.8			35.1	140.4				19.8	356							15.8	20,606	185,452																										0.7				37.7
31		200.7																																					Meredith	200.7	2,408	4,370,226	1,748,091	18.2				2.0				41.0
32		7.1						7.1	60	8.6	156																															Meredith (Part)	45.8	549	997,332	398,933	69.9								31.0
33		1.9								1.9	34																															Inland Empire	36.8	368	240,356	112,166		111.1							11.2
34		43.0																			43.0	984,425	351,580	70,316																											18.4
35		11.2								68.3	1,229		11.2	393							19.0	434,147	155,053	31,011																						6.2			7.0					26.5
36		40.9																			40.9	935,238	334,014	66,803																											20.9
37		14.4																			14.4	328,937	117,478	23,496																								1.9				6.9
38		77.6																																					Ontario Center	77.6	931	1,690,079	338,016									14.6
39		56.7																																					Ontario Center	56.7	680	1,233,940	246,788									13.0
40		35.1																																					Ontario Center	35.1	422	765,181	153,036									25.7
41		82.5																																					Ontario Center	82.5	990	1,797,700	359,540									14.2
42		60.1																																					Ontario Center	60.1	721	1,308,690	261,738									12.2
43		32.9																																					Ontario Center	32.9	395	716,424	143,285									24.7
44		198.0																																					Ontario Mills	198.0	396	1,293,687	3,234,219									44.1
45		41.5																																					Ontario Mills	41.5	83	271,130	677,825									41.3
46		12.0																12.0	15,732	141,591												85.9	205,851	926,327	720,477	205,851					23.1								24.7
47		19.8																														19.8	47,360	213,120	165,760	47,360					4.9								24.9
48		215.8																														215.8	516,929	2,326,181	1,809,252	516,929													23.8
49		58.7																														58.7	140,515	632,319	491,804	140,515													19.2
50		68.1			68.1	272.3																																											30.6
51		0.5			44.9	179.7				10.7	193		4.1	145				0.5	679	6,114																										4.8				21.5
52		15.9			15.9	63.6		12.6	107	1.3	23																																		4.5				9.1
53		19.0						11.5	98				19.0	664																											Downtown (Part)	17.0	357	118,643	118,643									21.2
54		10.6			24.9	99.7							10.6	372	0.1	227	907				1.8	41,914	14,969	2,994																			Downtown (Part)	3.2	68	22,583	22,583					4.4				22.9
55		22.6			22.6	90.4				2.1	38										7.4	168,483	60,173	12,035																											11.1
56		56.5			56.5	226.0		6.8	58	17.2	309				0.3	863	3,452				1.3	28,942	10,336	2,067																							7.0				27.5
57		28.1			28.1	112.5		2.0	17	4.1	74																																	1.4	8.6			1.4				14.5
58		12.3			19.1	76.2				25.7	462							1.4	1,830	16,466					12.3	107,229	160,843	268,072																		23.7				12.8
59		24.5																							24.5	213,254	319,881	533,135																							6.3
60		21.7																							21.7	189,213	283,819	473,032																	1.8								7.4
61		2.8			27.7	110.6				17.9	322		26.8	938				2.8	3,717	33,457																																	24.1
62		3.2			42.1	168.3				7.1	128		12.8	448				3.2	4,143	37,290																																	21.6
63		18.0											18.0	630																											Downtown (Part)	17.0	357	118,536	118,536									8.9
64		2.3						2.3	20				2.3	82																											Downtown (Part)	23.4	492	163,298	163,298									18.0
65		14.3																																							Downtown (Part)	14.3	300	99,639	99,639		2.1		15.4					14.3
66		0.3			24.3	97.4									5.8	15,071	60,283	0.3	411	3,696																																	13.6
67		17.6			17.6	70.6		16.1	137	15.1	272				1.3	3,284	13,137																									East Holt	41.3	310	899,826	359,930									27.0
68		10.5			4.4	17.5				14.7	265																										10.5	91,330	91,330		East Holt (Part)	13.6	102	296,503	118,601	1.1	4.7							11.7
69		35.2			5.1	20.3		11.5	98	16.4	295														17.2	150,268	225,402	375,669	35.2	306,889	306,889																															15.6
70		39.3																							39.3	342,150	513,226	855,376																							6.0
71		64.4																																					Multi-Modal	64.4	387	1,263,251	1,263,251	3.6								21.8
72		17.2																																					Guasti	77.4	464	1,179,987	1,011,417						17.2		3.0	28.2
73		19.4																			66.3	1,516,324	541,544	108,309																										Guasti (Part)	6.0	36	90,796	77,825						19.4		6.1	24.9

Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial				Hospitality				Business Park			Industrial					Mixed Use					Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac
74		68.9																			68.9	1,575,279	562,600	112,520																					3.0	17.1
75		36.5																36.5	47,712	429,412	23.3	531,736	189,906	37,981																					2.7	17.5
76		31.7																31.7	41,406	372,652												53.6	128,463	578,082	449,619	128,463								6.6				17.1	42.4
77		153.2																														153.2	367,029	1,651,631	1,284,602	367,029					4.1							23.0	79.8
78		29.0																											29.0	252,784	252,784	21.2	50,678	228,050	177,373	50,678												27.4	16.1
79		13.6																15.0	19,544	175,895									13.6	118,275	118,275	9.7	23,191	104,360	81,169	23,191												27.9	13.3
80		15.1																														15.1	36,279	163,256	126,977	36,279	Downtown (Part)	8.1	169	56,160	56,160						5.5	9.5
81		6.2																														6.2	14,800	66,600	51,800	14,800	Downtown (Part)	13.8	290	96,191	96,191						6.4	15.0
82		9.9																														9.9	23,677	106,546	82,869	23,677	Downtown (Part)	11.7	245	81,416	81,416				1.7		5.4	12.2
83		18.6													4.6	12,022	48,086																18.6	44,539	200,427	155,888	44,539												5.6	11.0
84		13.0																											13.0	113,010	113,010	19.7	47,263	212,684	165,421	47,263												5.9	8.8
85		23.8																											23.8	207,401	207,401	28.6	68,495	308,229	239,734	68,495												5.8	13.0
86		1.1																											18.5	161,094	161,094	1.5	3,703	16,663	12,960	3,703					0.5				1.1		10.6	6.4
87		0.3																							3.7	32,520	48,779	81,299	11.7	101,844	101,844														0.3		9.0	9.1
88		11.1																							17.2	149,419	224,128	373,547									Multi-Modal (Part)	11.7	70	230,003	230,003	0.3				15.1	21.7
89		71.9																														71.9	172,290	775,306	603,016	172,290												6.4	10.3
90		50.8													1.8	4,781	19,124												50.8	442,517	442,517	40.2	96,386	433,738	337,352	96,386													15.8
91	Incl BP Overlay	24.8			0.0	0.0		0.0	0						1.4	3,689	14,755												46.5	405,215	405,215	25.9	62,053	279,239	217,186	62,053													21.2
92	Incl BP Overlay	16.8			0.0	0.0									0.0	0	0												67.1	585,001	585,001	11.7	28,069	126,310	98,241	28,069													44.1
93	Incl BP & Ind Overlay	13.6			0.0	0.0									0.0	0	0												23.6	205,873	205,873	56.2	134,738	606,321	471,583	134,738						0.0					2.0	42.8
94		4.9																											4.9	42,392	42,392	31.9	76,336	343,511	267,175	76,336											0.1	15.6
95		14.8																														26.6	63,824	287,208	223,384	63,824									14.8		5.7	10.5
96		9.7																											9.7	84,247	84,247	24.4	58,384	262,726	204,343	58,384													13.1
97		17.9																														85.2	204,016	918,070	714,055	204,016									17.9			10.9
98		78.6																														78.6	188,244	847,099	658,855	188,244												11.6
99		58.0																														58.0	139,029	625,629	486,601	139,029												7.7
100		56.3																														56.3	134,913	607,109	472,196	134,913												10.5
101		174.4																														174.4	417,793	1,880,069	1,462,276	417,793												27.6
102		48.5																48.5	63,318	569,866												60.5	144,838	651,771	506,933	144,838					54.8							62.1
103		268.5																														268.5	643,202	2,894,409	2,251,207	643,202					24.0							19.0
104		11.1																														123.7	296,459	1,334,064	1,037,606	296,459									11.1			19.4
105		90.8																														90.8	217,643	979,393	761,750	217,643												11.9
106		54.9																														54.9	131,593	592,168	460,575	131,593								4.7				8.2
107		55.5																														55.5	133,040	598,680	465,640	133,040												10.5
108		19.0																19.0	24,840	223,560												37.8	90,619	407,785	317,166	90,619												15.2
109		88.6																														88.6	212,234	955,055	742,820	212,234												8.8
110		183.7																														183.7	440,194	1,980,873	1,540,679	440,194					31.9							14.7
111		21.1	110.6	221						30.9	557		21.1	739	3.9	10,285	41,138																												14.2				27.4
112		2.9			10.7	42.6		20.4	174	81.5	1,466		2.9	101	3.2	8,398	33,593																										4.7		1.1		4.8				28.7
113		77.3			77.3	309.1		3.4	29																																							35.2
114	Incl Ind Overlay	0.3			34.7	138.7												0.3	394	3,545												35.4	84,693	381,117	296,425	84,693												1.6	31.8
115	Incl BP & Ind Overlay	20.9			0.0	0.0																							10.4	90,605	90,605	22.3	53,426	240,419	186,992	53,426						0.0							8.7
116	Incl BP & Ind Overlay	16.7			0.0	0.0																							20.3	176,546	176,546	33.7	80,836	363,760	282,925	80,836													14.0
117		8.5																											8.5	73,974	73,974	11.5	27,580	124,111	96,531	27,580													6.7
118		88.0																														88.0	210,885	948,980	738,096	210,885					5.9							11.6
119		22.3	142.3	285	22.3	89.2				4.3	78																																		7.0				41.0
120		155.6			155.6	622.6				3.3	60				1.4	3,683	14,732																																66.0
121		78.0	36.3	73	78.0	312.2		1.1	9	8.3	150				5.1	13,284	53,137																										20.6		0.7					43.1
122		19.8			126.2	504.7		0.8	7	12.3	222				3.2	8,328	33,312																19.8	47,372	213,176	165,804	47,372									19.1			42.7
123	Incl Ind Overlay	89.4			0.0	0.0																										101.9	244,086	1,098,388	854,302	244,086												11.7
124		94.0																														94.0	225,259	1,013,667	788,408	225,259									9.5			10.6
125		50.4																											50.4	439,176	439,176	52.1	124,791	561,560	436,769	124,791													13.6
126		63.3																											63.3	551,318	551,318	38.0	91,061	409,777	318,715	91,061													15.0
127		142.5																														142.5	341,478	1,536,651	1,195,173	341,478					4.4							13.7
128		83.6																														83.6	200,329	901,480	701,151	200,329												20.2
129		133.2																														133.2	319,094	1,435,923	1,116,829	319,094												29.7
130		76.3																														76.3	182,894	823,023	640,129	182,894					7.7							16.5
131		153.0																														153.0	366,639	1,649,876	1,283,237	366,639												8.6	22.5
132		76.1																			33.3	761,112	271,826	54,365								76.1	182,231	820,039	637,808	182,231												4.2	17.2
133		230.6																														230.6	552,527	2,486,372	1,933,845	552,527													18.6
134		80.6																														80.6	193,052	868,733	675,681	193,052											0.6		3.6
135		58.2																														58.2	139,490	627,707	488,217	139,490					17.1						136.4	13.0	12.7
136		108.6																														108.6	260,145	1,170,652	910,507	260,145					13.6								18.3
137		57.1																														57.1	136,867	615,904	479,036	136,867					6.5			0.9					21.6
138		119.8																														119.8	287,006	1,291,528	1,004,522	287,006					30.9								8.5
139		131.5																														131.5	315,015	1,417,568	1,102,553	315,015													19.9
140		126.7																														126.7	303,562	1,366,027	1,062,465	303,562					7.7								15.8
141		126.5																														126.5	303,150	1,364,176	1,061,026	303,150					84.7								31.3
142		138.1																														138.1	330,766	1,488,446	1,157,680	330,766					12.8								7.9
143		149.2																														149.2	357,373	1,608,181	1,250,807	357,373													14.1
144		29.8	124.3	249						29.8	536				4.2	10,919	43,678																												19.3							29.4
145		89.5			89.5	357.9				23.5	423																																		4.7			45.6				35.6

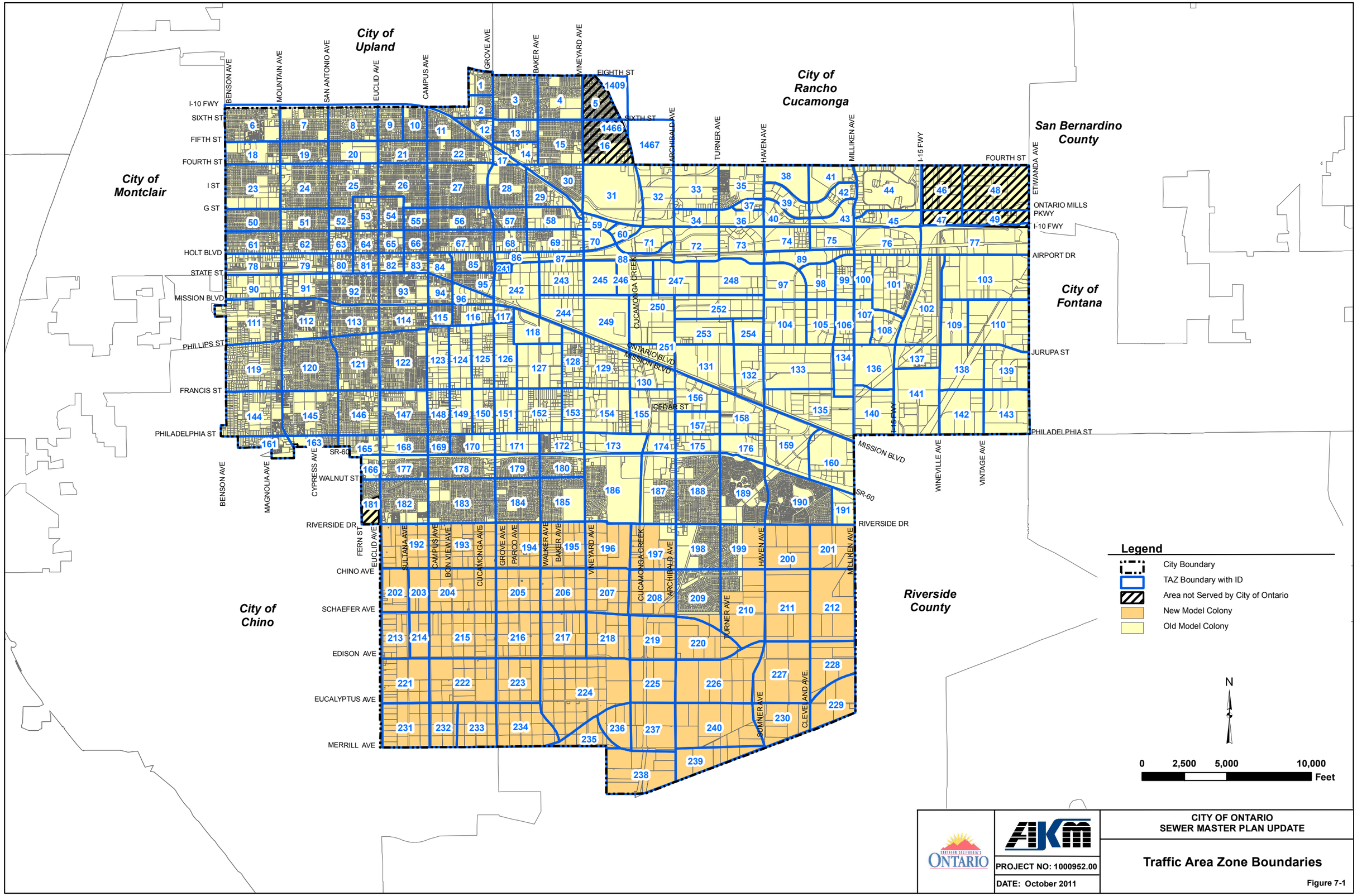
Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial					Hospitality				Business Park			Industrial					Mixed Use					Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Ac
146		72.5			72.5	290.0				35.0	629																										Euclid & Francis (Part)	10.4	157		182,048									31.1
147		0.5			98.2	392.9				21.9	395				1.0	2,576	10,303	0.5	630	5,666																							9.7							39.6
148		34.3			18.6	74.4				10.8	194																					34.3	82,199	369,894	287,696	82,199													16.3
149		57.5																														57.5	137,771	619,972	482,200	137,771						4.8		8.6					9.4
150		35.1																											35.1	305,522	305,522	35.7	85,567	385,052	299,485	85,567													9.0
151		41.2																											41.2	359,182	359,182	29.0	69,493	312,717	243,224	69,493													11.1
152		113.0																														113.0	270,810	1,218,643	947,833	270,810					24.0			4.6					18.1
153		50.4																														50.4	120,689	543,101	422,412	120,689					18.0								11.5
154		127.4																														127.4	305,206	1,373,425	1,068,220	305,206					16.8								20.4
155		135.8																														135.8	325,396	1,464,283	1,138,887	325,396					9.8								16.0
156		95.2																														95.2	227,962	1,025,829	797,867	227,962													17.9
157		66.1																														66.1	158,361	712,624	554,263	158,361								1.9					12.7
158		112.6																														112.6	269,668	1,213,504	943,837	269,668													17.5
159		126.1																			22.3	510,864	182,451	36,490								126.1	302,003	1,359,015	1,057,012	302,003					16.1								44.1
160		147.0																														147.0	352,186	1,584,835	1,232,649	352,186					9.6								32.3
161		6.8	17.0	34	6.8	27.2				11.7	210				12.3	32,196	128,782																																19.6
163		31.3			31.3	125.4									2.7	7,022	28,088																																9.3
165		12.8	22.5	45	1.8	7.2				7.2	130							12.8	16,740	150,657																														16.0
166	Incl Com Overlay	1.7			0.0	0.0				8.4	152				11.1	29,087	116,349	5.3	6,877	61,896																															12.3
168		5.9			15.1	60.5		24.9	212	2.8	51							5.9	7,758	69,820																															25.7
169		23.4			23.4	93.6																																												13.8
170		17.6			6.6	26.5				32.3	582							17.6	22,995	206,953																																18.6
171		5.9			0.0	0.0		56.3	479									5.9	7,693	69,237																																13.3
172		28.8			13.6	54.5															13.9	317,268	113,310	22,662								28.8	69,085	310,883	241,798	69,085													19.6
173		28.7				0.0															28.7	655,392	234,068	46,814																												13.4
174		3.7				0.0												3.7	4,840	43,564												27.3	65,486	294,688	229,201	65,486					5.0	0.6							10.5
175		6.4				0.0												6.4	8,356	75,200												48.2	115,530	519,883	404,354	115,530													12.7
176		58.1				0.0															7.5	171,882	61,386	12,277								58.1	139,179	626,306	487,127	139,179													17.9
177		1.7			44.1	176.4				2.7	49				6.3	16,455	65,819	1.7	2,247	20,219																															38.3
178		66.5			66.5	265.9									15.3	39,990	159,960																																46.0
179		49.5			49.5	198.0				0.01	0				2.5	6,580	26,322																																32.2
180		15.0			27.6	110.5				12.4	223							15.0	19,555	175,993																																29.1
181		8.9			23.5	94.0				16.6	300							8.9	11,670	105,032																															1.9							17.3
182		82.4			82.4	329.6				36.4	654				8.5	22,344	89,375																															1.1							43.5
183		147.6			147.6	590.5																																											11.6			20.5				60.3
184		108.5			108.5	434.0																																												9.5				41.1
185		70.0			70.0	280.1		54.8	465																																												34.7
186		13.8			62.6	250.2				2.8	50				5.0	12,970	51,879	13.8	17,969	161,723																															3.9	143.4		34.2				44.8
187		36.9			47.0	187.9					0				13.2	34,373	137,492	36.9	48,215	433,937																															16.2	36.0		15.9				32.9
188		5.5			151.4	605.5				2.8	51				0.7	1,854	7,416	5.5	7,174	64,566																															10.0			11.5				71.9
189		109.7			109.7	438.7				17.2	310																																							22.8	13.8	8.2		17.3				55.4
190		3.3			126.1	504.3				23.6	424							3.3	4,291	38,622																															18.8	8.6			13.8				62.8
191		0.3			0.3	1.1																																																8.6
192	NMC	15.2			58.9		265	19.9	169	58.8		1,294			9.4	24,525	98,099	15.2	19,804	178,232																																					6.9
193	NMC	199.9			199.9		900	20.3	172			0			0.1	301	1,206																																						3.3
194	NMC	101.8			101.8		458	21.4	181	28.8		633			9.5	24,827	99,307																																						2.3
195	NMC	156.2			156.2		703								9.2	23,993	95,970																																						2.8
196	NMC	161.8			161.8		728																																															3.4
197	NMC (Part)	116.1			116.1		522			14.5	262				4.4	11,569	46,277																																						14.1
198		61.2			61.2	244.8	275			41.3		908			8.4	22,042	88,170																																						34.7
199	NMC (Part)	103.3			103.3	172.4	271								8.9	23,315	93,262																																						27.1
200	NMC	86.5			86.5		389	0.0	0																																														23.0
201	NMC	46.5			23.9		108			28.9		636						18.4	23,988	215,892									46.5	404,981	404,981																			14.4							27.2
202	NMC	30.5			30.5		137	0.2	2	61.3		1,349																																											4.2
203	NMC	69.9			69.9		315																																															0.0
204	NMC	188.3			188.3		847	25.4	216						8.6	22,413	89,652																																						0.0
205	NMC	105.4			105.4		474	38.0	323						0.3	861	3,444																																						0.0
206	NMC	139.3			139.3		627								9.7	25,286	101,144																																						0.0
207	NMC	141.4			141.4		637								0.3	736	2,942																																						4.4
208	NMC	58.2			58.2		262	0.1	1																																														16.6
209	NMC (Part)	109.8			109.8	387.6	58																																																48.6
210	NMC (Part)	128.9			137.6	89.6	518			29.7		653			14.7	38,423	153,693																																						30.2
211	NMC	32.7						32.7	278	64.4		1,417																																							NMC East (Part)	78.7	591	360,113	411,558	35.1	24.8					25.7
212	NMC	150.9										0																	150.9	1,314,957	1,314,957																			NMC East (Part)	75.5	566	345,282	394,608	11.0						22.4
213	NMC	0.2			0.2		1			43.9		967									41.0	937,216	334,720	66,944																											NMC West (Part)	1.1	12	20,623	3,437	13.3						6.1
214	NMC	1.5			1.5		7	23.4	199	36.6		804																																						NMC West (Part)	0.9	9	16,264	2,711	9.6						0.0
215	NMC	8.4			141.2		635	28.3	240	48.9		1,076						8.4	10,994	98,946																															NMC West (Part)	0.0	0	840	140	21.9						0.0
216	NMC	10.9			83.8		377	32.4	275	27.3		600						10.9	14,217	127,950																																	10.5							0.0
217	NMC	115.5			115.5		520			37.1		816																																					NMC West (Part)	6.0	63	109,728	18,288	11.8						0.0
218	NMC	105.0			105.0		473			27.0		593																																					NMC West (Part)	4.1	43	74,747	12,458	9.7	3.8					7.7
219	NMC	97.8			97.8		440	12.6	107			0																																							17.6	9.3			10.9				14.4
220	NMC	106.4			106.4		479			14.3		315																																								4.6			17.4				22.6
221	NMC	1.8						1.8	15	0.0		0									0.7	15,071	5,383	1,077																											NMC West	162.3	1,704	2,969,427	494,905							6.1

Table 7-2
General Plan Land Use Buildout by TAZ - Units, Sq. Ft. and Acres

General			Rural Residential		Low Density Residential			Low Medium Density Residential		Medium Density Residential			High Density Residential		Neighborhood Commercial			General Commercial			Office Commercial				Hospitality				Business Park			Industrial					Mixed Use					Open Space Non-Recrea-tion	Open Space - Parkland	Open Space - Water	Public Facility	Public School	Airport	Land Fill	Rail	ROW
2010 TAZ	Special Planning Area / Note	Ac	Ac	Units (2 du/ac)	Ac	OMC Units (4 du/ac)	NMC Units (4.5 du/ac)	Ac	OMC & NMC Units (8.5 du/ac)	Ac	OMC Units (18 du/ac)	NMC Units (22 du/ac)	Ac	OMC & NMC Units (35 du/ac)	Ac	Office (20% at 0.3 FAR)	Commer-cial (80% at 0.3 FAR)	Ac	Office (10% at 0.3 FAR)	Commer-cial (90% at 0.3 FAR)	Ac	Office (70% at 0.75 FAR)	Commer-cial (25% at 0.75 FAR)	Lodging (5% at 0.75 FAR)	Ac	Office (20% at 1.0 FAR)	Commer-cial (30% at 1.0 FAR)	Lodging (50% at 1.0 FAR)	Ac	Office (50% at 0.40 FAR)	Industrial (50% at 0.40 FAR)	Ac	Office (10% at 0.55 FAR)	Industrial (45% at 0.55 FAR)	Mfg. (35% at 0.55 FAR)	Ware-house (10% at 0.55 FAR)	Name	Ac	Multi-Family Units	Office	Commer-cial										
222	NMC	12.6						5.7	49	139.0		3,057						12.6	16,412	147,704																NMC West (Part)	3.8	40	70,034	11,672		77.0								0.0
223	NMC	4.2						0.2	2	95.6		2,103						19.3	25,248	227,229									4.2	36,279	36,279										38.8								0.0
224	NMC	88.6			0.04		0.2			93.7		2,061						47.1	1,076,378	384,421	76,884								88.6	771,482	771,482						NMC West (Part)	137.4	1,443	2,513,483	418,914		72.8								2.5
225	NMC	81.9								81.9		1,801			11.5	30,043	120,172																						11.4	38.9		2.5						10.1
226	NMC	47.8			47.8		215			65.1		1,433																												117.9			63.7					11.7
227	NMC	89.4			89.4		402			36.5		802																										NMC East (Part)	49.3	370	225,685	257,926	27.8	21.0	26.7		0.0				13.9
228	NMC	41.7			41.7		187			39.4		866																										NMC East (Part)	60.2	451	275,253	314,575	2.4	6.3			0.3				5.3
229	NMC	104.6			104.6		471																																	0.3	4.4			11.6				13.6
230	NMC	93.4			93.4		420																																	3.8		24.3		21.6				13.0
231	NMC	19.6						74.7	635									42.9	56,015	504,138	24.1	551,596	196,999	39,400					19.6	170,399	170,399																		7.1
232	NMC	25.8						73.1	621																				25.8	224,542	224,542																	0.2
233	NMC	45.6						92.1	783																				45.6	397,306	397,306																	0.4
234	NMC	163.3						3.1	26									18.8	24,575	221,176									163.3	1,422,665	1,422,665																	0.3
235	NMC	70.6																											70.6	615,349	615,349	5.9	14,215	63,968	49,753	14,215												0.4
236	NMC	53.5								0.03		1									0.3	7,108	2,539	508					53.5	465,913	465,913	36.8	88,247	397,110	308,864	88,247												0.0
237	NMC	70.9								0.8		17			12.0	31,434	125,737				11.7	268,480	95,886	19,177				70.9	617,454	617,454	50.7	121,585	547,132	425,547	121,585					13.6							13.6
238	NMC	28.5																											28.5	248,237	248,237	175.2	419,695	1,888,628	1,468,933	419,695					12.1							7.9
239	NMC	83.1			83.1		374																																	16.3	5.9							19.3
240	NMC	228.7			228.7		1,029																																	13.6	8.5			10.3				28.5
241		0.4																														8.9	21,313	95,907	74,594	21,313							0.4				2.4
242		129.5																											2.1	18,657	18,657	8.1	19,440	87,480	68,040	19,440									129.5		6.6	10.9
243		119.7																																										119.7			1.1
244		98.8																																										98.8		6.2	4.4
245		90.9																																										90.9			1.2
246		101.3																																										101.3			0.0
247		124.2																																										124.2			0.0
248		177.1																																										177.1			2.5
249		164.8																																										164.8		6.5	5.1
250		124.5																														53.2	127,423	573,404	445,981	127,423								124.5			1.9
251		7.0																														43.4	104,021	468,096	364,075	104,021								7.0		6.6	5.9
252		167.5																																										167.5			0.9
253		14.2																														98.5	236,004	1,062,016	826,012	236,004								14.2			6.8
254		8.7																														49.8	119,331	536,988	417,657	119,331								8.7			4.8
1409		0.0			0.00	0.01																																		7.1								0.0
1466		0.0			0.03	0.1																																		3.9								1.0
1467		0.0			0.03	0.1																										0.03	61	276	215	61					5.8								
Total		**15,264**	**453**	**906**	**7,470**	**17,214**	**14,526**	**800**	**6,803**	**1,955**	**15,381**	**24,201**	**241**	**8,422**	**277**	**723,999**	**2,895,998**	**552**	**720,943**	**6,488,490**	**526**	**12,020,135**	**4,292,905**	**858,581**	**145**	**1,262,607**	**1,893,911**	**3,156,519**	**1,357**	**11,822,416**	**11,822,416**	**6,748**	**16,165,750**	**72,745,877**	**56,580,127**	**16,165,750**		**1,822**	**17,041**	**26,696,318**	**14,363,430**	**1,243**	**991**	**59**	**99**	**627**	**1,422**	**137**	**247**	**4,879**

Note: TAZ acres assume the areas within the Business Park, Industrial and Commercial Overlay areas will be developed accordingly and transition from their current underlying designations. Also ROW extends beyond the city limits since some TAZ boundaries extend outside the Ontario City Limits.



CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

Traffic Area Zone Boundaries

PROJECT NO: 1000952.00

DATE: October 2011

Figure 7-1

7-6 Schools

The City's existing land use map and general plan map were used to designate land uses for the model. Schools are identified as public facilities on the City's maps. It is most appropriate to base the load upon the estimated number of students attending each school. Therefore, the school loads were calculated individually based upon the number of students. The public elementary school unit flow factor recommended is 15 gpd/student. The public junior high school and high school unit flow factor recommended is 20 gpd/student. These are typical factors used for planning purposes, based upon review of water use records and accounting for irrigation. The calculated flows were then manually input into the model at the appropriate node. A list of the schools and estimated average sewage generation is shown in Table 7-3.

Table 7-3
School Loads

Model	Model Node ID	School Name	Address	Area (ac)	Number of Students	Unit Flow Factor (gpd/stu)	Average Sewage Generation (gpd)
High Schools							
North	F17120	Valley View High	1801 East Sixth St	18.00	822	20	16,440
North	F17FI	Gibson High	1800 East Seventh Street	13.00	109	20	2,180
North	H13110 & G13153	Chaffey High	1245 North Euclid Ave	31.10	3,407	20	68,140
East	H18100	Bernt High	2230 East Fourth St	2.04	321	20	6,420
West	O12133	Ontario High	901 West Francis St	36.82	2,690	20	53,800
South	R14502	Woodcrest High	2725 South Campus Ave	1.80	542	20	10,840
South	R21100	Colony High	3850 East Riverside Dr	37.90	2,323	20	46,460
Middle Schools							
North	H12179 & H12115	Danks Middle	1020 North Vine Ave	9.27	1,113	20	22,260
North	I16143	Wiltsey Middle	1450 East G St	15.05	1,027	20	20,540
West	M10101	Oaks Middle	1221 South Oaks Ave	14.31	1,010	20	20,200
West	M13157	De Anza Middle	1450 South Sultana Ave	9.46	951	20	19,020
South	R20141	Yokley Middle	2947 South Turner Ave	16.87	1,257	20	25,140
Elementary Schools							
North	F14141	Edison Elementary	515 East Sixth St	4.90	527	15	7,905
North	F17116	Arroyo Elementary	1700 East Seventh St	8.42	708	15	10,620
West	G10501	El Camino Elementary	1525 West Fifth St	9.48	820	15	12,300
North	G12115	Hawthorne Elementary	705 West Hawthorne St	7.26	853	15	12,795
North	G14143	Berlyn Elementary	1320 North Berlyn Ave	9.63	961	15	14,415
North	G16116	Vineyard Elementary	1500 East Sixth St	9.33	646	15	9,690
West	H11131	Elderberry Elementary	950 North Elderberry Ave	9.32	847	15	12,705
North	H15180	Del North Elementary	850 Del Norte Ave	9.28	787	15	11,805
North	H17100	Corona Elementary	1140 North Corona Ave	8.95	699	15	10,485
North	I13116	Central Elementary	415 East G St	4.42	580	15	8,700
North	J14100	Lincoln Elementary	440 North Allyn	7.00	372	15	5,580
North	J16105	Mariposa Elementary	1605 East D St	10.06	836	15	12,540
West	M13108	Euclid Elementary	1120 South Euclid Ave	4.94	634	15	9,510
West	N10140	Vista Grande Elementary	1390 West Francis St	7.05	613	15	9,195
West	O12501	Haynes Elementary	715 West Francis St	8.93	922	15	13,830
West	O13102	Sultana Elementary	1845 South Sultana Ave	7.93	960	15	14,400
West	P14103	Bon View Elementary	2121 South Bon View Ave	8.65	793	15	11,895
South	Q19123	Ontario Center Elementary	8776 Archibald Ave	11.48	772	15	11,580
South	Q19500	Mountain View Elementary	2947 South Turner Ave. A	16.87	588	15	8,820
South	Q21148	Creek View Elementary	3742 Lytle Creek North Loop	14.08	736	15	11,040
South	R14109	Liberty Elementary	2730 South Bon View Ave	9.55	766	15	11,490
South	R15132	Dickey Elementary	2840 Parco Ave	9.44	791	15	11,865
South	T19106	Ranch View Elementary	3300 Old Archibald Rd	10.02	733	15	10,995
			Total	**412.61**	**32,516**		**565,600**

7-7 High Water Users

High water users will typically contribute large volumes of sewage to the local sewer system. Irrigation uses are excluded because this water does not contribute to the sewer system. For this study, the City provided water use records for its entire service area over a one year period. The high water users were initially considered to be those customers with an average water use of 14,400 gpd (10 gpm) or more. Low density residential users were generally excluded from this analysis assuming that a high water use in a low density residential would be due to irrigation or the use of a swimming pool. In these instances, the water would not be contributing to the local sewer system on a continuous basis.

For the existing sewer model, a total of 92 high water users were identified and are listed in Table 7-4. The land uses associated with each of the high water users were typically either commercial, industrial, or multi-family residential. These land use types typically have minimum amounts of landscape irrigation needs and primarily use the water indoors. Therefore, the sewage generation was estimated by taking 90 percent of the recorded average water use. The difference between the sewage flow estimated by water use records and the sewage flow estimated by unit flow factor and land use was then manually added to the hydraulic model at the appropriate node.

For the ultimate sewer model, a total of 17 high water users were identified and are listed in Table 7-5. The reason for the lower number of identified high water users is that the ultimate unit flow factors and land use resulted in higher sewage estimates. Therefore, less locations resulted in a higher sewage estimate based on water use compared to based on unit flow factors and land use.

7-8 Pump Stations

The City recently decommissioned four sewage pump stations, namely Turner Pump Station, Riverside-Archibald Pump Station, Archibald Ranch Pump Station, and Whispering Lakes Pump Station. The flows tributary to these pump stations have been diverted to the newly constructed Eastern Trunk Sewer which flows south through New Model Colony to the IEUA Kimball Interceptor Sewer on Kimball Avenue. The sewers tributary to these four pump stations were modeled up until the decommissioned pump station location in the OMC models and the flows are added at the same location represented in the NMC model.

Currently the City operates three pump stations, namely Magnolia Pump Station, Haven Pump Station, and Edenglen Pump Station.

The Magnolia Pump Station is located on the east side of Magnolia Avenue near the intersection with Monticello Street. Its tributary area is shown on Figure 5-7. The existing average flow to the station is about 34 gpm. The ultimate average flow is expected to be approximately 36 gpm. Sewage collected at the Magnolia Pump Station is pumped to a gravity sewer on Magnolia Avenue, located approximately 850 feet north of Philadelphia Street and is conveyed south to the RP-1. Since this outflow point from the Magnolia Pump Station is the City's gravity system, the pump station flows were included as a part of the hydraulic model and analysis. The tributary loads to Magnolia Pump Station were transferred in the model to the outflow point (MH O11123).

Table 7-4
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	(1) Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	(2) Sewer Load by UFF (mgd)	(3) Extra Sewer Load added to Model (mgd)
1	Alumin Art Plating	803 W State St	West	K12137	0.0185	IND	400	0.72	0.0003	0.0182
2	Ap-Transpark Llc	2910 E Inland Empire Bl	East	I19129	0.0417	COM	1000	14.52	0.0145	0.0272
3	Bedford-Prop Inv	1555 S Dupont Av	East	M22137	0.0231	COM	1000	20.93	0.0209	0.0022
4	Bericap	1671 S Champagne Av B	East	N25101	0.0139	IND	400	15.72	0.0063	0.0076
5	BMW Of America	1150 S Milliken Av	East	L22113	0.0160	IND	400	22.00	0.0088	0.0072
6	Casa Partners III L.P.	1661 E G St	East	H19109	0.0869	MFR	2800	5.73	0.0160	0.0709
7	Chem Lab	5180 E Airport Dr	East	K24107	0.0362	IND	400	9.52	0.0038	0.0324
8	Cintas Corporation	2150 S Proforma Av	East	O18129	0.1671	IND	400	6.18	0.0025	0.1646
9	Clement Pappas	1755 E Acacia St	West	M17121	0.0993	IND	400	8.84	0.0035	0.0958
10	Coastal Ontario LLC	1701 E D St	North	J16104	0.0900	MFR	2800	15.03	0.0421	0.0479
11	Coca Cola USA	1650 S Vintage Av	East	N25100	0.1133	IND	400	24.83	0.0099	0.1034
12	Colony Terrace Lp	2550 E Riverside Dr	South	S19104	0.0747	MFR	2800	14.53	0.0407	0.0341
13	Crothall Healthcare Inc	5410 E Francis St	East	O24100	0.1299	IND	400	37.97	0.0152	0.1147
14	Crown Toyota	1201 S Kettering Dr	East	L24103	0.0272	COM	1000	3.59	0.0036	0.0236
15	Culligan Water	1925 S Burgundy Pl	East	O23104	0.0437	IND	400	1.67	0.0007	0.0431
16	Dairy Fresh Products	601 S Rockefeller Av	East	K23113	0.0368	IND	400	12.90	0.0052	0.0316
17	Danco Metal Surfacing	1750 E Monticello Ct	South	P17152	0.0167	IND	400	0.70	0.0003	0.0165
18	Dba Guasti Plaza(4)	2700 E Guasti Rd	East	J19107	0.0178	VACANT	0	1.45	0.0000	0.0178
19	Dominos Pizza Dist Corp	301 S Rockefeller Av	East	K23101	0.0156	IND	400	2.78	0.0011	0.0144
20	Doubletree Hotel Ontario	222 N Vineyard Av	North	J17101	0.0741	COM	1000	13.59	0.0136	0.0605
21	DS Hotel Investment	1801 E G St	North	I17111	0.0264	COM	1000	5.61	0.0056	0.0208
22	Erp Operating Part	1005 N Center Av	East	H20105	0.0670	SFR	1200	17.34	0.0208	0.0462
23	Estancia Apartments	1720 E D St	North	J16119	0.0449	MFR	2800	9.51	0.0266	0.0183
24	F H Gasoline	506 N Euclid Av	West	I13151	0.0186	COM	1000	0.36	0.0004	0.0182
25	Fairfield Ontario Towne LLC	950 N Duesenberg Dr	East	H21115	0.0573	MFR	2800	18.29	0.0512	0.0061
26	Fern Creek(4)	2530 S Fern Av	South	P13118	0.0133	VACANT	0	7.86	0.0000	0.0133
27	Fresh Start Bakeries	1220 S Baker Av	West	M17110	0.0304	IND	400	9.34	0.0037	0.0267
28	Fruit Growers Supply	225 S Wineville Av	East	K24107	0.0506	COM	1000	26.73	0.0267	0.0239

Table 7-4 (Continued)
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	(1) Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	(2) Sewer Load by UFF (mgd)	(3) Extra Sewer Load added to Model (mgd)
29	Golden State Alliance	902 E Holt Bl	North	J14183	0.0185	COM	1000	0.80	0.0008	0.0177
30	Grove Apts	227 W H St	West	I13120	0.0158	MFR	2800	2.45	0.0069	0.0090
31	Grove Manor	720 S Cypress Av	West	I12143	0.0447	MFR	2800	1.34	0.0038	0.0410
32	H K Realty	109 W Belmont St	West	M13107	0.0162	IND	1000	0.22	0.0002	0.0160
33	Harris Place Apts	451 E Riverside Dr	South	R13139	0.0230	LMDR	1200	8.08	0.0097	0.0133
34	Hirchag,Frances	647 W Cedar St	West	O12129	0.0136	SFR	1200	0.21	0.0003	0.0134
35	Howard Packaging Inc.	620 S Magnolia Av #D	West	K11135	0.0186	COM	1000	0.64	0.0006	0.0180
36	Inland Christian Hm	1950 S Mountain Av	West	O11109	0.0303	MFR	2800	8.74	0.0245	0.0059
37	Inland Framing & Development(4)	607 W Holt Bl	West	J12173	0.0363	VACANT	0	0.73	0.0000	0.0363
38	Innkeepers Hospitality	700 N Haven Av	East	I21119	0.0467	COM	1000	7.75	0.0077	0.0390
39	J.D. Heiskell NCO	5355 E Airport Dr	East	J25101	0.0172	COM	1000	9.15	0.0092	0.0081
40	John Laing Homes	948 N Turner Av	East	H20120	0.0816	SFR	1200	0.16	0.0002	0.0814
41	Jomar Table Linens Inc	4000 E Airport Dr	East	K22106	0.0174	IND	400	9.44	0.0038	0.0136
42	K Mart Dist Center	5600 E Airport Dr	East	J25107	0.0352	IND	400	34.80	0.0139	0.0213
43	Kaiser Permanente	2295 S Vineyard Ave	South	P17156	0.0330	COM	1000	27.85	0.0279	0.0051
44	Kendred Hospital	555 N Campus Av	North	I14168	0.0149	COM	1000	4.51	0.0045	0.0103
45	La Terraza Apartments	551 E Riverside Dr	South	R14140	0.0319	MFR	2800	8.72	0.0244	0.0074
46	Lighthouse Transport LLC	2019 S Business Pw A	East	O19146	0.1848	IND	400	4.92	0.0020	0.1829
47	Mervyn's #996	1015 S Vintage Av	East	L25114	0.0224	IND	400	31.87	0.0127	0.0096
48	Mid Cities	1360 E D St	North	J16124	0.0281	MFR	2800	4.38	0.0123	0.0158
49	Mission Woods Inc.	1309 W Mission Bl	West	L11122	0.0382	MFR	2800	1.50	0.0042	0.0340
50	Mountain Gate Apts	1072 E Nocta St	North	J15140	0.0272	COM	1000	0.13	0.0001	0.0271
51	Mountain Shadows Owners	1300 N Elderberry Av	West	G11103	0.0634	SFR	1200	2.40	0.0029	0.0605
52	Mountain Village/CMS	1812 S Mountain Av	West	N11154	0.1889	SFR	1200	1.48	0.0018	0.1871
53	New Country 693	251 E Riverside Dr	South	R13137	0.0275	COM	1000	2.71	0.0027	0.0248
54	Ontario Convention Center	2000 E Convention Center Wy	North	J17108	0.0379	PUBLIC	1000	17.26	0.0173	0.0206
55	Ontario Inn,Llc	3201 E Centrelake Dr	East	J20105	0.0162	COM	1000	2.35	0.0024	0.0139
56	Ontario Marriot	2158 E Holt Bl	North	J17144	0.0161	COM	1000	10.30	0.0103	0.0058

Table 7-4 (Continued)
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	(1) Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	(2) Sewer Load by UFF (mgd)	(3) Extra Sewer Load added to Model (mgd)
57	Ontario-Hosp Suites	3400 E Shelby St	East	I20129	0.0185	COM	1000	3.26	0.0033	0.0152
58	Palm Village Gardens	1358 N San Diego Av	North	G17117	0.0150	SFR	1200	3.03	0.0036	0.0114
59	Pama Mgt #500	1348 E Nocta St	North	J16124	0.0159	MFR	2800	2.17	0.0061	0.0099
60	Park Vista	1031 S Palmetto Av	West	L11124	0.0709	SFR	1200	4.74	0.0057	0.0652
61	Philadlephia 103 Partners	926 W Philadelphia St # 99	South	P12129	0.0275	SFR	1200	0.02	0.0000	0.0275
62	Pick-A-Part	2025 S Milliken Av	East	O22105	0.0136	IND	400	26.13	0.0105	0.0032
63	Plaza Continental	3700 E Inland Empire Bl	East	I21161	0.0160	COM	1000	3.84	0.0038	0.0122
64	Plaza Continental	3750 E Inland Empire Bl	East	I21105	0.0156	COM	1000	3.43	0.0034	0.0122
65	Plott Nursing Home LLC	800 E Fifth St	North	G14501	0.0237	COM	1000	3.65	0.0037	0.0200
66	Propak California Corp	5772 E Jurupa St	East	M25125	0.0844	IND	400	16.75	0.0067	0.0777
67	Rama Foods	2131 S Parco Av	West	O16155	0.0170	IND	400	1.10	0.0004	0.0166
68	Red Roof Inn #216	1818 E Holt Bl	North	J17151	0.0129	COM	1000	1.93	0.0019	0.0110
69	Regis Contractors L P	955 N Duesenberg Dr	East	H21104	0.2311	MFR	2800	11.13	0.0312	0.1999
70	Residence Inn	2025 E Convention Center Wy	North	J17102	0.0307	COM	1000	4.95	0.0050	0.0257
71	Rezvani,Bob	4350 E Mills Circle	East	I23102	0.0139	COM	1000	1.48	0.0015	0.0124
72	RREEF Management Company	3281 E Guasti Rd	East	J20110	0.0228	COM	1000	6.67	0.0067	0.0161
73	S K Investments	1233 E Holt Bl	North	J15148	0.0133	COM	1000	1.20	0.0012	0.0121
74	Samoa Village#2	2300 S Sultana Av	South	P13117	0.0458	MFR	2800	10.02	0.0281	0.0177
75	Security Capital	2800 E Riverside Dr	South	S19108	0.1407	MFR	2800	20.87	0.0584	0.0823
76	Sheraton Ontario Airport	429 N Vineyard Av	North	I17126	0.0207	COM	1000	3.59	0.0036	0.0171
77	Sir James LP	3351 E Honeybrook Wy	South	R20124	0.1875	MFR	2800	7.36	0.0206	0.1669
78	Sunkist	620 E Sunkist St	West	K14160	0.0236	IND	400	11.05	0.0044	0.0192
79	Superior Quality Foods	2355 E Francis St	East	N18115	0.0137	IND	400	1.75	0.0007	0.0130
80	Ta Operation Corporation	4327 E Guasti Rd	East	J23106	0.0357	COM	1000	31.81	0.0318	0.0039
81	Taing Family Trust	2200 S Mountain Av	South	P11124	0.0134	COM	1000	0.77	0.0008	0.0127
82	The Casitas Apts	1900 S Campus Av	West	O14113	0.0873	MFR	2800	14.72	0.0412	0.0461
83	The Mills Mgmt Corp	4320 E Fourth St	East	H23113	0.2347	COM	1000	1.82	0.0018	0.2329

Table 7-4 (Continued)
Point Source Loadings for High Water Users – Existing Model

No.	Customer Name	Cutomer Address	Model	Model Node ID	[1] Sewage Generation Estimate based on Water Use (mgd)	Existing Land Use	Calibrated UFF (gpd/ac)	Area (ac)	[2] Sewer Load by UFF (mgd)	[3] Extra Sewer Load added to Model (mgd)
84	Total Logistic Control, LLC	104 S Wanamaker Av	East	K23100	0.0384	IND	400	8.80	0.0035	0.0349
85	Travelcenter Of	4265 E Guasti Rd	East	J22110	0.0421	IND	400	34.17	0.0137	0.0284
86	Trio Glen Community Assoc.	1754 E Flora St	North	I17124	0.0133	SFR	1200	0.03	0.0000	0.0133
87	Unifirst Corp	700 S Etiwanda Av	East	K26100	0.0572	IND	400	4.26	0.0017	0.0554
88	Vargas-Montoya,Jaime	5505 E Jurupa St	East	M25121	0.0240	IND	400	2.36	0.0009	0.0230
89	WCOT Centrelake LLC	3401 E Centrelake Dr	East	J20104	0.0175	IND	400	3.59	0.0014	0.0161
90	Wishy Washy Inc.	658 W Holt Bl	West	J12163	0.0131	COM	1000	3.90	0.0039	0.0092
91	Wong,Thomas	405 N Vineyard Av	North	J17105	0.0247	COM	1000	1.30	0.0013	0.0234
92		1053 W Philadelphia St	South	P11122	0.0185	COM	1000	1.40	0.0014	0.0171
									Total	**3.4266**

[1] Sewage Generation Estimate = 90% x Water Use (mgd)

[2] Sewer Load by UFF = Area (ac) x Unit Flow Factor (gpd/ac) / 1,000,000gpd/mgd

[3] Extra Sewer Load = Sewage Generation Estimate - Sewer Load by UFF

[4] Establised Land Use type prior to selection of High Water Users.

[5] Extra sewer load is considered an unpeakable or constant load due to 24 hour operation

Table 7-5
Point Source Loadings for High Water Users – Ultimate Model

No.	Name	Customer Address	(1) Sewage Generation Estimate based on Water Use (mgd)	Model	Model Node IDs		TAZ	Ultimate Land Use	(2) Estimated Sewer Load by Land Use and UFF (mgd)	(3) Total Extra Sewer Load added to Model (mgd)	(3) Extra Sewer Load added to Model at each Manhole (mgd)
1	Mountain Village/CMS and Inland Christian Hm	1812 S Mountain Av and 1950 S Mountain Av	0.2192	West	N11154	O11122	144	MDR	0.1126	0.1066	0.0266
					O11109	O11123					
2	Hirchag,Frances	647 W Cedar St	0.0136	West	O12129		145	LDR	0.0021	0.0116	0.0116
3	Grove Manor	720 S Cypress Av	0.0447	West	K12101	K12154	91	LMDR	0.0000	0.0447	0.0064
					K12102	K12159					
					K12151	L12100					
					K12152						
4	Mountain Shadows Owners	1300 N Elderberry Av	0.0634	West	F10118	G10127	6	LMDR	0.0384	0.0250	0.0018
					G10106	G10129					
					G10113	G11103					
					G10114	G11104					
					G10116	G11115					
					G10121	G11124					
					G10125	G11136					
5	Trio Glen Community Assoc.	1751 E Flora St and 1754 E Flora St	0.0418	North	I16140	I17115	58	LDR	0.0183	0.0235	0.0020
					I16141	I17119					
					I16142	I17126					
					I16149	I17127					
					I16150	I17131					
					I17114	J17106					
6	Pama Mgt #500	1348 E Nocta St	0.0159	North	J16123	J16137	68	BP	0.0128	0.0031	0.0010
					J16124						
7	F H Gasoline	506 N Euclid Av	0.0186	North	I13130	I13151	54	MU	0.0163	0.0023	0.0006
					I13142	J13104					

Table 7-5 (Continued)
Point Source Loadings for High Water Users – Ultimate Model

No.	Name	Customer Address	(1) Sewage Generation Estimate based on Water Use (mgd)	Model	Model Node IDs		TAZ	Ultimate Land Use	(2) Estimated Sewer Load by Land Use and UFF (mgd)	(3) Total Extra Sewer Load added to Model (mgd)	(3) Extra Sewer Load added to Model at each Manhole (mgd)
8	Sir James LP	3351 E Honeybrook Wy	0.1875	South	Q20157	R20109	189	MDR	0.0651	0.1224	0.0111
					Q20165	R20118					
					Q20171	R20119					
					R20101	R20123					
					R20105	R20124					
					R20108						
9	Colony Terrace Lp	2550 E Riverside Dr	0.0747	South	R18126	R18127	197	MDR	0.0549	0.0198	0.0099
10		1053 W Philadelphia St	0.0185	South	P11122	P11137	163	NC	0.0035	0.0150	0.0075
11	Country Meadows	1855 E Riverside Dr	0.1509	South	Q17175	R17140	185	LMDR	0.1117	0.0392	0.0039
					Q17182	R17152					
					R17110	R17153					
					R17119	R17154					
					R17130	R17155					
12	New Country 693	251 E Riverside Dr	0.0275	South	R13100	R13137	182	NC	0.0112	0.0163	0.0033
					R13133	R13142					
					R13134						
13	Ta Operation Corporation	4327 E Guasti Rd	0.0357	East	J22108	J23108	76	GC	0.0290	0.0067	0.0013
					J23106	J23109					
					J23107						
14	Travelcenter Of	4265 E Guasti Rd	0.0421	East	J22107	J22111	75	GC	0.0334	0.0087	0.0022
					J22110	J22113					
15	Lighthouse Transport LLC	2019 S Business Pw A	0.1848	East	O19144	P19100	157	IND	0.1109	0.0739	0.0062
					O19146	P19101					
					O19147	P19103					
					O19149	P19114					
					O19150	P19115					
					O20146	P20100					

Table 7-5 (Continued)
Point Source Loadings for High Water Users – Ultimate Model

No.	Name	Customer Address	(1) Sewage Generation Estimate based on Water Use (mgd)	Model	Model Node IDs		TAZ	Ultimate Land Use	(2) Estimated Sewer Load by Land Use and UFF (mgd)	(3) Total Extra Sewer Load added to Model (mgd)	(3) Extra Sewer Load added to Model at each Manhole (mgd)
16	Coca Cola USA	1650 S Vintage Av	0.1133	East	M25123	N25104	138	IND	0.1004	0.0129	0.0032
					N25100	N25109					
17	The Casitas Apts	1900 S Campus Av	0.0000	West	O13105	O13125	147	MDR	0.0859	0.0014	0.0002
					O13107	O13501					
					O13116	O14113					
					O13117	O14152					
									Total	**0.5330**	

(1) Sewage Generation Estimate = 90% x Water Use (mgd)

(2) Sewer Load by UFF = Area (ac) x Unit Flow Factor (gpd/ac) / 1,000,000 (gpd/mgd)

(3) Extra Sewer Load = Sewage Generation Estimate - Sewer Load by UFF

Haven Pump Station is located on the north side of the Pomona Freeway about 900 feet east of Haven Avenue. Its tributary area is shown on Figure 5-8. The existing average flow to the station is about 299 gpm. The ultimate average flow is estimated at about 1,394 gpm. Sewage collected at the Haven Pump Station is currently pumped northeast to the Inland Empire Utilities Agency (IEUA) collector on Cedar Street. Since the outflow point from the Haven Pump Station is not a City sewer facility, the data from the pump station will not affect the model of the existing sewer system. The sewers tributary to this pump station were modeled up to the pump station location. However, the pump station and forcemain were not included in the hydraulic model. For the ultimate conditions, the tributary flows to Haven Pump Station were transferred to manhole G90 in the NMC Model.

The Edenglen Pump Station is located on the north side of Chino Avenue, east of Mill Creek Avenue. It is a temporary lift station serving the first phase of homes in the Brookfield / Edenglen development. The pump station serves a total of 225 dwelling units with an estimated average flow of 48,000 gpd or 33 gpm (*per City Memorandum "Edenglen Lift Station Capacity" dated May 18, 2010*). The peak wet weather flow is estimated at 164,000 gpd or 114 gpm. During the pump station start-up testing which was conducted on November 9, 2007, the pump station delivered approximately 180 gpm. The tributary flows to Edenglen Pump Station were transferred in the existing system model to manhole R21218 in Riverside Drive. Ultimately, the flows from this development will be rerouted to the south through the New Model Colony sewer system.

7-9 Holt Boulevard Trunk Sewer

The Holt Trunk Sewer Project was constructed in two phases from Cucamonga Avenue to San Antonio Avenue. Phase A consists of a sewer on Holt Boulevard from Lemon Avenue to Cucamonga Avenue, intercepting all wastewater flow from north of Holt Boulevard and conveying it east to the existing IEUA Upland Interceptor Relief on Cucamonga Avenue. Phase B is a continuation of Phase A, extending the sewer on Holt Boulevard west from Lemon Avenue to the alley located just west of San Antonio Avenue. Essentially, all flows generated north of Holt Boulevard are intercepted by the new sewer and conveyed east to the existing IEUA Upland Interceptor Relief on Cucamonga Avenue. The area tributary to the Holt Boulevard sewer is shown on Figure 5-1 as Sewershed 2.

7-10 Siphons

It should be noted that the Info Sewer model does not include a detailed hydraulic analysis of the siphons in the existing sewer system. The model calculates an average slope using the inverts at the upstream and downstream end of the siphon. The hydraulic analysis results are based upon this calculated slope. If a siphon is in need of replacement, a detailed hydraulic analysis should be performed during the preliminary design phase of the project to size the siphon and determine the hydraulic grade lines in the adjacent portions of the system.

At the request of City staff, a detailed hydraulic analysis was performed on the siphon located south of Philadelphia Street and west of Haven Avenue. This siphon, referred to as the Archibald Trunk Siphon, was constructed in 2001 but identified as a part of the City's sewer system after the last

Sewer Master Plan was completed in 1995. The siphon was constructed by the San Bernardino County Flood Control District (SBCFCD) as a part of the Easterly Basin and West Cucamonga Channel project. It was designed and constructed to go underneath Cucamonga Channel. At the point of crossing, Cucamonga Channel is a concrete rectangular channel with a width of 43'-4" and a height that varies from 10'-1" to 11'-8". The siphon has 3 pipes, including an 8-inch, a 12-inch, and a 24-inch pipe. Under current conditions, the 8-inch pipe is gated and a metal core fiberglass stop log section is installed as a weir structure to divert the flow from the 24-inch pipe. Therefore, only the 12-inch pipe is in operation under normal conditions. At certain high flows, the sewage can overtop the weir and will be conveyed in the 24-inch pipe as well. At the downstream end of the siphon, the flow enters a 33-inch IEUA trunk sewer and is then conveyed southeast to the headworks of IEUA's RP-1 treatment plant.

The detailed hydraulic analysis performed on the Archibald Trunk Siphon showed that the existing 12-inch pipe could handle the existing average flow, the existing peak dry weather flow, and the ultimate average flow. Under ultimate peak dry weather flow conditions, the 8-inch pipe would be needed in addition to the 12-inch pipe to convey the flow through the siphon without overtopping the weir in the upstream manhole. The capacity of the 24-inch pipe could then be reserved for extreme wet weather flow conditions. The detailed siphon analysis and results are included in Appendix I of this report.

Section 8

SYSTEM ANALYSIS

8-1 Hydraulic Analysis

Gravity System

The analysis of the sewer collection system was based upon the calculated existing and ultimate peak dry weather flows. The hydraulic analysis results can be found in Appendix G of this report. Pipes that exceed the following criteria are considered hydraulically deficient: Peak Dry Weather d/D > 0.64.

The hydraulic deficiencies, based upon the criteria above, are listed in Table 8-1. The locations of these deficiencies are shown on Figure 8-1. The total length of sewer found to be capacity deficient per the developed criteria discussed in Section 4 is 45,724 feet. This is about 2.4 percent (45,724 / 1,931,134) of the total existing system length.

The Holt Trunk Sewer Project was constructed in two phases from Cucamonga Avenue to San Antonio Avenue. Phase A consists of a sewer on Holt Boulevard from Lemon Avenue to Cucamonga Avenue, intercepting all wastewater flow from north of Holt Boulevard and conveying it east to the existing IEUA Upland Interceptor Relief on Cucamonga Avenue. Phase B is a continuation of Phase A, extending the sewer on Holt Boulevard west from Lemon Avenue to the alley located just west of San Antonio Avenue. Essentially, all flows generated north of Holt Boulevard are intercepted by the new sewer and conveyed east to the existing IEUA Upland Interceptor Relief on Cucamonga Avenue. The area tributary to the Holt Boulevard sewer is shown on Figure 5-1 as Sewershed 2.

Pump Stations

The City currently owns and operates three sewer pump stations, namely Magnolia Pump Station, Haven Pump Station, and Edenglen Pump Station. Detailed descriptions of each pump station can be found in Section 5-7.

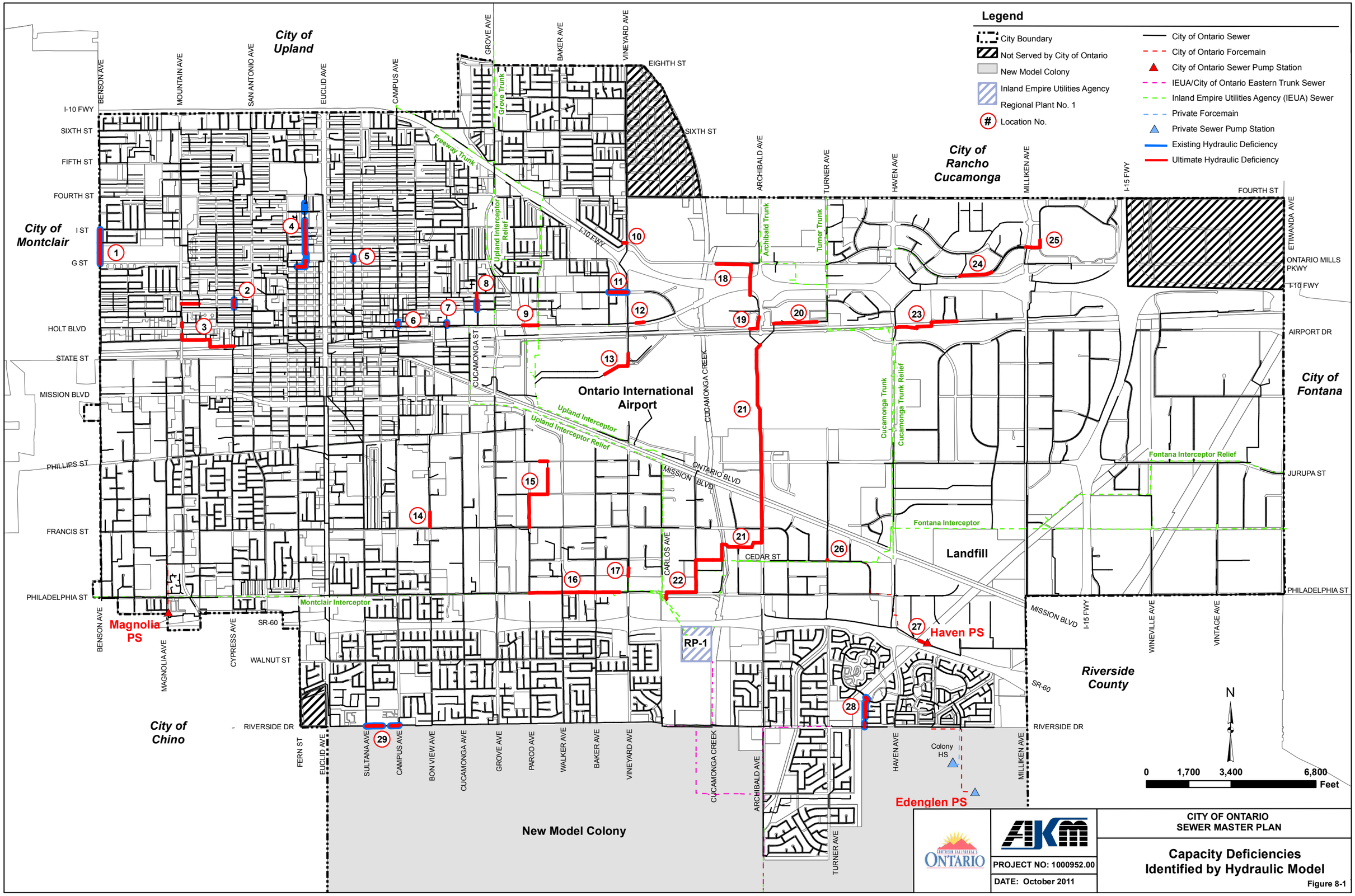
The Magnolia Pump Station is a wet well – dry well facility with two pumps, each rated at 400 gpm. The firm capacity of the Magnolia Pump Station is therefore 400 gpm. This is sufficient to pump the existing and ultimate wet weather flows of 115 gpm and 122 gpm, respectively.

Table 8-1
Hydraulic Deficiencies

General Information									Existing Conditions					Ultimate Conditions				
Model	*Location Number	Pipe ID	U/S MH ID	D/S MH ID	Diameter (in)	Length (ft)	Slope	Full Flow (mgd)	PDWF (mgd)	ADWF (mgd)	PDWF Vel (ft/s)	PDWF d/D	PDWF Water Depth (ft)	PDWF (mgd)	ADWF (mgd)	PDWF Vel (ft/s)	PDWF d/D	PDWF Water Depth (ft)
West	1	I101005	H10135	I10108	8	527	0.0183	1.0603	0.9343	0.4372	5.30	0.73	0.49	0.8267	0.3828	5.20	0.66	0.44
West	1	I101011	I10108	I10111	8	395	0.0184	1.0616	0.9667	0.4538	5.33	0.75	0.50	0.8527	0.3959	5.23	0.68	0.45
West	1	I101012	I10111	I10112	8	444	0.0184	1.0612	1.0734	0.5084	4.76	1.00	0.67	0.8527	0.3959	5.23	0.68	0.45
North	2	J121052	J12119	J12123	8	181	0.0079	0.6966	1.1462	0.5460	5.08	1.00	0.67	0.9372	0.4387	4.15	1.00	0.67
North	2	J121053	J12123	J12125	8	136	0.0079	0.6954	1.1462	0.5460	5.08	1.00	0.67	0.9372	0.4387	4.15	1.00	0.67
West	3	J111044	J11132	J11133	8	350	0.0050	0.5541	0.2846	0.1201	2.47	0.51	0.34	0.4162	0.1816	2.70	0.65	0.43
West	3	J111043	J11133	J11134	8	356	0.0050	0.5541	0.2846	0.1201	2.47	0.51	0.34	0.4162	0.1816	2.70	0.65	0.43
West	3	J111061	J11163	J11164	12	165	0.0022	1.0779	0.5734	0.2572	2.16	0.52	0.52	0.9032	0.4214	2.38	0.70	0.70
West	3	K111009	J11173	K11114	12	226	0.0027	1.1907	0.5818	0.2613	2.33	0.49	0.49	0.9139	0.4269	2.59	0.66	0.66
West	3	K111016	K11114	K11112	12	271	0.0014	0.8531	0.5818	0.2613	1.81	0.61	0.61	0.9184	0.4292	1.81	1.00	1.00
West	3	K111017	K11112	K11110	12	276	0.0015	0.9006	0.5818	0.2613	1.89	0.58	0.58	0.9230	0.4315	1.82	1.00	1.00
West	3	K111024	K11110	K11109	12	276	0.0015	0.9007	0.5860	0.2633	1.89	0.59	0.59	0.9276	0.4338	1.83	1.00	1.00
West	3	K111029	K11109	K11108	12	118	0.0015	0.9016	0.5860	0.2633	1.89	0.59	0.59	0.9321	0.4361	1.84	1.00	1.00
West	3	K111028	K11108	K11107	12	164	0.0015	0.8833	0.5925	0.2665	1.87	0.60	0.60	0.9448	0.4426	1.86	1.00	1.00
West	3	K111026	K11107	K11117	12	283	0.0016	0.9097	0.5985	0.2694	1.91	0.59	0.59	0.9559	0.4482	1.88	1.00	1.00
West	3	K121004	K11117	K12128	12	559	0.0015	0.8954	0.6014	0.2709	1.89	0.60	0.60	0.9559	0.4482	1.88	1.00	1.00
West	3	K121021	K12128	K12126	12	286	0.0015	0.9056	0.6089	0.2745	1.91	0.60	0.60	0.9686	0.4547	1.91	1.00	1.00
West	3	K121041	K12126	K12125	12	98	0.0015	0.9015	0.6089	0.2745	1.91	0.60	0.60	0.9710	0.4559	1.91	1.00	1.00
North	4	H131048	H13126	H13139	8	325	0.0030	0.4300	0.3754	0.1623	2.15	0.72	0.48	0.2665	0.1118	2.01	0.57	0.38
North	4	H131039	H13154	H13161	8	325	0.0030	0.4278	0.4363	0.1911	1.93	1.00	0.67	0.3303	0.1412	2.09	0.66	0.44
North	4	H131075	H13161	I13102	8	320	0.0030	0.4289	0.4806	0.2123	2.13	1.00	0.67	0.3940	0.1711	2.16	0.75	0.50
North	4	I131036	I13102	I13113	8	320	0.0030	0.4289	0.4986	0.2210	2.21	1.00	0.67	0.4097	0.1785	2.16	0.78	0.52
North	4	I131035	I13113	I13120	8	320	0.0020	0.3502	0.5881	0.2644	2.61	1.00	0.67	0.4722	0.2083	2.09	1.00	0.67
North	4	I131028	I13120	I13122	8	57	0.0053	0.5691	0.6064	0.2733	2.69	1.00	0.67	0.5111	0.2270	2.85	0.74	0.49
North	4	I131027	I13122	I13131	8	297	0.0098	0.7761	0.6064	0.2733	3.81	0.67	0.44	0.5111	0.2270	3.67	0.59	0.39
North	4	I131033	I13131	I13132	8	62	0.0060	0.6066	0.6091	0.2746	2.70	1.00	0.67	0.5272	0.2347	3.03	0.72	0.48
North	4	I131059	I13132	I13137	8	190	0.0075	0.6770	0.6091	0.2746	3.40	0.74	0.49	0.5597	0.2505	3.35	0.69	0.46
North	4	I131060	I13137	I13FI	8	46	0.0075	0.6773	0.6140	0.2771	3.40	0.75	0.50	0.5760	0.2585	3.37	0.71	0.47
North	4	I131062	I13FI	I13145	8	351	0.0075	0.6778	0.6140	0.2771	3.40	0.75	0.50	0.5760	0.2585	3.37	0.71	0.47
North	5	I131014	I13124	I13129	8	172	0.0033	0.4468	0.4903	0.2169	2.17	1.00	0.67	0.4051	0.1763	2.24	0.75	0.50
North	6	J141077	J14163	J14170	8	28	0.0170	1.0219	0.7853	0.3620	4.99	0.66	0.44	0.6671	0.3032	4.83	0.59	0.39
North	6	J141084	J14170	J14186	8	85	0.0140	0.9265	0.9471	0.4438	4.20	1.00	0.67	0.7986	0.3687	4.62	0.72	0.48
North	7	J151033	J15145	J15155	8	130	0.0081	0.7051	0.5426	0.2422	3.45	0.66	0.44	0.6052	0.2727	3.51	0.71	0.48
North	8	J151018	J15114	J15125	8	326	0.0041	0.4987	0.3636	0.1567	2.41	0.63	0.42	0.4447	0.1951	2.50	0.74	0.49
North	8	J151045	J15125	J15137	8	333	0.0041	0.4988	0.4209	0.1838	2.48	0.70	0.47	0.5141	0.2284	2.28	1.00	0.67
North	9	J161027	J16135	J16137	10	330	0.0026	0.7296	0.4483	0.1968	2.18	0.57	0.47	0.6982	0.3186	2.36	0.78	0.65
North	9	J161047	J16137	J16133	10	303	0.0026	0.7250	0.4483	0.1968	2.16	0.57	0.47	0.7089	0.3239	2.34	0.80	0.67
North	10	I171011	I17103	I17104	8	153	0.0040	0.4978	0.3575	0.1539	2.40	0.63	0.42	0.4951	0.2192	2.52	0.81	0.54
North	11	J171006	J17103	J17105	8	361	0.0060	0.6074	0.5949	0.2677	3.07	0.80	0.53	0.5859	0.2633	3.07	0.79	0.53
North	11	J171007	J17105	J17104	8	361	0.0060	0.6088	0.6426	0.2911	2.85	1.00	0.67	0.6224	0.2812	2.76	1.00	0.67
North	12	J171057	J17127	J17128	12	326	0.0009	0.6886	0.3653	0.1576	1.38	0.52	0.52	0.6383	0.2890	1.54	0.76	0.76
North	13	K171005	K17104	K17107	15	294	0.0061	3.2733	1.9494	0.9725	4.31	0.56	0.69	2.7355	1.4055	4.62	0.70	0.87
North	13	K171006	K17107	K17108	18	237	0.0024	3.3402	1.9494	0.9725	3.04	0.55	0.82	2.7355	1.4055	3.26	0.69	1.03
North	13	K171024	K17108	K17109	18	373	0.0020	3.0329	1.9494	0.9725	2.82	0.58	0.87	2.7355	1.4055	3.01	0.74	1.11
North	13	K171022	K17109	K17110	18	204	0.0019	2.9770	1.9494	0.9725	2.78	0.59	0.89	2.7355	1.4055	2.96	0.76	1.13
North	13	K171020	K17110	K17111	18	419	0.0019	2.9930	1.9494	0.9725	2.79	0.59	0.88	2.7355	1.4055	2.97	0.75	1.13
West	14	N141086	N14135	N14145	8	326	0.0060	0.6072	0.2127	0.0875	2.45	0.41	0.27	0.5104	0.2266	3.02	0.70	0.47
West	14	N141085	N14145	N14151	8	254	0.0060	0.6058	0.2154	0.0887	2.46	0.41	0.27	0.5296	0.2359	3.03	0.72	0.48
West	15	M161010	M16105	M16104	8	322	0.0023	0.3778	0.0687	0.0256	1.27	0.29	0.19	0.3521	0.1514	1.90	0.76	0.51
West	15	M161017	M16108	M16109	8	296	0.0050	0.5537	0.1000	0.0385	1.86	0.29	0.19	0.4396	0.1927	2.72	0.67	0.45
West	15	M161016	M16109	M16110	8	296	0.0050	0.5537	0.1000	0.0385	1.86	0.29	0.19	0.4402	0.1930	2.72	0.67	0.45
West	15	N161002	M16110	N16100	8	296	0.0050	0.5537	0.1091	0.0424	1.91	0.30	0.20	0.4825	0.2132	2.77	0.72	0.48
West	15	N161013	N16100	N16103	8	114	0.0050	0.5539	0.1091	0.0424	1.91	0.30	0.20	0.4825	0.2132	2.77	0.72	0.48
West	15	N161012	N16104	N16105	8	326	0.0050	0.5537	0.1091	0.0424	1.91	0.30	0.20	0.5238	0.2331	2.79	0.77	0.52
West	15	N161011	N16105	N16108	8	326	0.0050	0.5537	0.1175	0.0459	1.95	0.31	0.21	0.5238	0.2331	2.79	0.77	0.52
West	15	N161017	N16108	N16999	8	292	0.0050	0.5537	0.1343	0.0531	2.02	0.34	0.22	0.6368	0.2882	2.82	1.00	0.67
West	15	N161037	N16112	N16119	8	152	0.0050	0.5537	0.1354	0.0536	2.03	0.34	0.22	0.7093	0.3241	3.14	1.00	0.67
West	15	N161038	N16506	N16112	8	204	0.0050	0.5533	0.1354	0.0536	2.03	0.34	0.22	0.7093	0.3241	3.14	1.00	0.67
West	15	N169998	N16998	N16506	8	62	0.0050	0.5537	0.1343	0.0531	2.02	0.34	0.22	0.6933	0.3161	3.07	1.00	0.67
West	15	N169999	N16999	N16998	8	296	0.0050	0.5537	0.1343	0.0531	2.02	0.34	0.22	0.6530	0.2962	2.89	1.00	0.67
West	15	P161023	P16103	P16102	36	327	0.0005	9.5622	6.3458	3.5080	2.24	0.60	1.79	7.5140	4.2153	2.32	0.67	2.00
West	16	P161022	P16104	P16103	36	327	0.0005	9.5677	6.3458	3.5080	2.24	0.59	1.78	7.5140	4.2153	2.32	0.67	2.00
West	16	P161009	P16112	P16111	36	323	0.0005	9.6287	6.3437	3.5068	2.25	0.59	1.78	7.4829	4.1963	2.33	0.66	1.99
West	16	P161010	P16111	P16109	36	330	0.0005	9.8101	6.3437	3.5068	2.28	0.59	1.76	7.4985	4.2058	2.37	0.65	1.96
West	16	P161011	P16109	P16107	36	323	0.0005	9.6202	6.3458	3.5080	2.25	0.59	1.78	7.4985	4.2058	2.33	0.66	1.99
West	16	P161012	P16107	P16105	36	312	0.0005	9.8189	6.3458	3.5080	2.29	0.59	1.76	7.5140	4.2153	2.37	0.66	1.97
West	16	P161021	P16105	P16104	36	340	0.0005	9.9525	6.3458	3.5080	2.31	0.58	1.74	7.5140	4.2153	2.39	0.65	1.95
West	16	P171018	P17131	P17130	36	325	0.0005	9.8928	6.3609	3.5171	2.30	0.58	1.75	7.5345	4.2278	2.38	0.65	1.96
West	16	P171020	P17130	P17128	36	330	0.0005	9.5168	6.3609	3.5171	2.23	0.60	1.79	7.5345	4.2278	2.31	0.67	2.01
West	16	P171003	P16102	P17132	36	326	0.0005	9.8646	6.3458	3.5080	2.29	0.58	1.75	7.5140	4.2153	2.38	0.65	1.96
West	16	P171015	P17132	P17131	36	323	0.0005	9.6191	6.3609	3.5171	2.25	0.59	1.78	7.5315	4.2260	2.33	0.67	2.00
West	17	O171057	O17142	O17152	8	347	0.0033	0.4510	0.1246	0.0489	1.71	0.36	0.24	0.4035	0.1755	2.26	0.74	0.49
East	18	I181015	I18109	I18110	15	346	0.0028	2.2279	0.0402	0.0143	1.08	0.09	0.12	1.9892	0.9941	3.18	0.74	0.92
East	18	I181026	I18110	I18111	15	346	0.0028	2.2279	0.0402	0.0143	1.08	0.09	0.12	2.0717	1.0390	3.19	0.76	0.95
East	18	I181002	I18111	I19120	15	345	0.0028	2.2306	0.0402	0.0143	1.08	0.09	0.12	2.1540	1.0840	3.20	0.79	0.99
East	18	I191027	I19120	I19121	15	347	0.0028	2.2138	0.0402	0.0143	1.07	0.09	0.12	2.2359	1.1289	2.82	1.00	1.25
East	18	I191029	I19121	I19122	15	216	0.0020	1.8894	0.3108	0.1322	1.76	0.27	0.34	2.4284	1.2348	3.06	1.00	1.25
East	18	I191022	I19122	I19123	15	283	0.0020	1.8804	0.3108	0.1322	1.75	0.27	0.34	2.5095	1.2798	3.16	1.00	1.25
East	18	J191006	I19123	J19102	15	735	0.0020	1.8791	0.3108	0.1322	1.75	0.28	0.34	2.5095	1.2798	3.16	1.00	1.25
East	19	J191021	J19114	J19118	15	229	0.0091	3.9950	0.4604	0.2026	3.36	0.23	0.29	3.0659	1.5910	5.55	0.66	0.82
East	19	J191022	J19118	J19132	15	228	0.0090	3.9764	0.4604	0.2026	3.35	0.23	0.29	3.0899	1.6045	5.54	0.66	0.83
East	19	J191052	J19132	J19133	15	204	0.0086	3.8917	0.4604	0.2026	3.29	0.23	0.29	3.1138	1.6180	5.45	0.68	0.85
East	19	J191051	J19133	J19134	15	95	0.0082	3.7931	0.4604	0.2026	3.24	0.24	0.29	3.1377	1.6315	5.34	0.69	0.87
East	20	J191047	J19116	J19119	8	297	0.0044	0.5223	0.0920	0.0352	1.74	0.28	0.19	0.5099	0.2264	2.64	0.80	0.53
East	20	J191046	J19119	J19121	8	313	0.0045	0.5235	0.0920	0.0352	1.75	0.28	0.19	0.5742	0.2576	2.54	1.00	0.67
East	20	J191035	J19121	J19123	8	354	0.0048	0.5397	0.0920	0.0352	1.78	0.28	0.19	0.6379	0.2888	2.83	1.00	0.67
East	20	J191034	J19123	J19125	8	380	0.0042	0.5079	0.0920	0.0352	1.71	0.29	0.19	0.7010	0.3200	3.11	1.00	0.67
East	20	J191036	J19125	J19126	8	80	0.0054	0.5741	0.0920	0.0352	1.87	0.27	0.18	0.7637	0.3512	3.38	1.00	0.67
East	20	J191004	J20131	J19116	8	303	0.0045	0.5231	0.0920	0.0352	1.75	0.28	0.19	0.4448	0.1952	2.60	0.71	0.47
East	21	K191006	K19105	K19106	18	9	0.0056	5.0738	0.4604	0.2026	2.76	0.20	0.31	3.8109	2.0153	4.88	0.65	0.97
East	21	K191002	K19108	K19109	18	217	0.0035	4.0055	0.5335	0.2378	2.44	0.25	0.37	4.4178	2.3665	3.87	1.00	1.50
East	21	K191003	K19109	K19111	18	221	0.0038	4.1717	0.5335	0.2378	2.51	0.24	0.36	4.4178	2.3665	3.87	1.00	1.50
East	21	K191004	K19111	K19112	18	253	0.0038	4.1713	0.5335	0.2378	2.51	0.24	0.36	4.4178	2.3665	3.87	1.00	1.50
East	21	K191009	K19112	K19115	18	285	0.0035	4.0322	0.5335	0.2378	2.45	0.25	0.37	4.4178	2.3665	3.87	1.00	1.50

Table 8-1
Hydraulic Deficiencies

General Information									Existing Conditions					Ultimate Conditions				
Model	*Location Number	Pipe ID	U/S MH ID	D/S MH ID	Diameter (in)	Length (ft)	Slope	Full Flow (mgd)	PDWF (mgd)	ADWF (mgd)	PDWF Vel (ft/s)	PDWF d/D	PDWF Water Depth (ft)	PDWF (mgd)	ADWF (mgd)	PDWF Vel (ft/s)	PDWF d/D	PDWF Water Depth (ft)
East	21	K191028	K19115	K19116	18	119	0.0035	4.0440	0.5335	0.2378	2.45	0.25	0.37	4.4178	2.3665	3.87	1.00	1.50
East	21	K191027	K19116	K19118	18	215	0.0035	4.0205	0.5335	0.2378	2.44	0.25	0.37	4.4178	2.3665	3.87	1.00	1.50
East	21	L191002	K19118	L19100	15	651	0.0128	4.7421	0.5335	0.2378	3.96	0.23	0.28	4.4178	2.3665	6.79	0.76	0.96
East	21	L191014	L19100	L19101	15	419	0.0120	4.5820	0.5335	0.2378	3.86	0.23	0.29	4.4178	2.3665	6.58	0.79	0.99
East	21	L191005	L19101	L19102	15	205	0.0120	4.5865	0.5335	0.2378	3.86	0.23	0.29	4.4178	2.3665	6.59	0.79	0.99
East	21	L191006	L19102	L19103	15	436	0.0132	4.8115	0.5335	0.2378	4.00	0.22	0.28	4.4178	2.3665	6.88	0.75	0.94
East	21	L191007	L19103	L19104	15	339	0.0084	3.8450	0.5335	0.2378	3.41	0.25	0.31	4.4178	2.3665	5.57	1.00	1.25
East	21	L191001	L19104	M19100	15	318	0.0085	3.8645	0.5335	0.2378	3.42	0.25	0.31	4.4561	2.3888	5.62	1.00	1.25
East	21	M191008	M19100	M19102	15	331	0.0085	3.8570	0.5649	0.2530	3.47	0.26	0.32	4.4944	2.4111	5.67	1.00	1.25
East	21	M191011	M19102	M19104	15	326	0.0085	3.8657	0.5649	0.2530	3.48	0.26	0.32	4.5326	2.4334	5.71	1.00	1.25
East	21	M191014	M19104	M19106	15	329	0.0113	4.4513	0.5649	0.2530	3.85	0.24	0.30	4.5708	2.4557	5.76	1.00	1.25
East	21	M191018	M19106	M19108	15	343	0.0130	4.7681	0.5649	0.2530	4.04	0.23	0.29	4.6019	2.4739	6.85	0.79	0.99
East	21	M191019	M19108	M19110	15	326	0.0129	4.7628	0.5964	0.2684	4.10	0.24	0.30	4.6331	2.4921	6.84	0.80	1.00
East	21	M191002	M19110	N19101	15	351	0.0130	4.7662	0.5964	0.2684	4.10	0.24	0.30	4.6642	2.5103	6.85	0.80	1.00
East	21	N191010	N19101	N19105	15	272	0.0132	4.8022	0.5964	0.2684	4.12	0.24	0.30	4.6953	2.5285	6.90	0.80	1.00
East	21	N191011	N19105	N19107	15	61	0.0158	5.2628	0.5964	0.2684	4.40	0.23	0.28	4.6953	2.5285	7.50	0.74	0.92
East	21	N191021	N19107	N19108	15	242	0.0129	4.7570	0.5964	0.2684	4.10	0.24	0.30	4.6953	2.5285	6.84	0.81	1.01
East	21	N191022	N19108	N19109	15	363	0.0129	4.7609	0.5964	0.2684	4.10	0.24	0.30	4.7172	2.5413	6.84	0.81	1.01
East	21	N191023	N19109	N19110	15	326	0.0073	3.5768	0.6143	0.2772	3.37	0.28	0.35	4.7390	2.5541	5.97	1.00	1.25
East	21	N191024	N19110	N19112	15	319	0.0130	4.7688	0.6143	0.2772	4.14	0.24	0.30	4.7609	2.5669	6.85	0.82	1.02
East	21	N191003	N19118	O19102	15	314	0.0115	4.4926	0.6570	0.2982	4.04	0.26	0.32	4.8491	2.6186	6.11	1.00	1.25
East	21	O181012	O18103	O18102	18	177	0.0016	2.7564	0.6938	0.3164	2.01	0.34	0.51	4.9224	2.6617	4.31	1.00	1.50
East	21	O181025	O18105	O18103	18	121	0.0016	2.6973	0.6938	0.3164	1.98	0.35	0.52	4.9218	2.6613	4.31	1.00	1.50
East	21	O181079	O18106	O18105	18	387	0.0016	2.7246	0.6938	0.3164	1.99	0.34	0.52	4.9218	2.6613	4.31	1.00	1.50
East	21	O181015	O18108	O18118	18	311	0.0016	2.7311	0.6938	0.3164	2.00	0.34	0.52	4.9477	2.6766	4.33	1.00	1.50
East	21	O181013	O18116	O18115	18	356	0.0016	2.7228	0.7024	0.3206	2.00	0.35	0.52	4.9966	2.7054	4.37	1.00	1.50
East	21	O181014	O18117	O18116	18	356	0.0016	2.7477	0.7024	0.3206	2.01	0.34	0.52	4.9724	2.6911	4.35	1.00	1.50
East	21	O181075	O18118	O18117	18	356	0.0016	2.7224	0.7024	0.3206	2.00	0.35	0.52	4.9482	2.6769	4.33	1.00	1.50
East	21	O191028	O19102	O19107	15	253	0.0079	3.7157	0.6638	0.3015	3.54	0.29	0.36	4.8491	2.6186	6.11	1.00	1.25
East	21	O191017	O19106	O19114	18	186	0.0016	2.7348	0.6638	0.3015	1.97	0.34	0.50	4.8733	2.6329	4.27	1.00	1.50
East	21	O191016	O19107	O19106	18	322	0.0016	2.7105	0.6638	0.3015	1.96	0.34	0.51	4.8733	2.6329	4.27	1.00	1.50
East	21	O191006	O19113	O18106	18	250	0.0016	2.7230	0.6638	0.3015	1.97	0.34	0.50	4.8976	2.6471	4.29	1.00	1.50
East	21	O191018	O19114	O19113	18	291	0.0016	2.7358	0.6638	0.3015	1.97	0.34	0.50	4.8976	2.6471	4.29	1.00	1.50
East	22	O181016	O18102	O18108	18	310	0.0016	2.7332	0.6938	0.3164	2.00	0.34	0.52	4.9471	2.6762	4.33	1.00	1.50
East	22	O181027	O18115	O18124	18	40	0.0047	4.6784	0.8005	0.3696	3.06	0.28	0.42	5.1429	2.7916	4.50	1.00	1.50
East	22	O181084	O18124	O18130	18	287	0.0048	4.7244	0.8022	0.3705	3.08	0.28	0.42	5.1791	2.8129	4.53	1.00	1.50
East	22	O181098	O18130	O18135	18	75	0.0046	4.6377	0.8022	0.3705	3.04	0.28	0.42	5.1791	2.8129	4.53	1.00	1.50
East	22	O181087	O18135	O18148	18	235	0.0050	4.8021	0.8101	0.3744	3.13	0.28	0.42	5.2947	2.8812	4.64	1.00	1.50
East	22	O181004	O18148	P18101	18	369	0.0022	3.1915	0.8291	0.3840	2.35	0.35	0.52	5.3127	2.8919	4.65	1.00	1.50
East	22	P181019	P18101	P18108	18	263	0.0022	3.1952	0.8321	0.3855	2.35	0.35	0.52	5.3308	2.9026	4.67	1.00	1.50
East	22	P181016	P18105	P18133	18	249	0.0014	2.5515	0.8367	0.3878	2.00	0.39	0.59	5.3849	2.9346	4.71	1.00	1.50
East	22	P181011	P18106	P18105	18	251	0.0014	2.5805	0.8321	0.3855	2.01	0.39	0.59	5.3668	2.9239	4.70	1.00	1.50
East	22	P181007	P18108	P18107	18	333	0.0014	2.5828	0.8321	0.3855	2.02	0.39	0.59	5.3308	2.9026	4.67	1.00	1.50
East	22	P181008	P18107	P18106	18	336	0.0014	2.5730	0.8321	0.3855	2.01	0.39	0.59	5.3488	2.9132	4.68	1.00	1.50
East	22	P181060	P18133	P18132	18	74	0.0112	7.1908	0.8367	0.3878	4.21	0.23	0.35	5.3849	2.9346	6.91	0.65	0.97
East	23	J211031	J21115	J21116	8	342	0.0032	0.4461	0.2131	0.0877	1.95	0.49	0.32	0.3826	0.1657	2.22	0.71	0.48
East	23	J211030	J21116	J21117	8	199	0.0018	0.3283	0.2131	0.0877	1.55	0.59	0.39	0.3826	0.1657	1.70	1.00	0.67
East	23	J211036	J21117	J21118	8	139	0.0055	0.5794	0.2222	0.0918	2.40	0.43	0.29	0.5367	0.2393	2.92	0.76	0.51
East	23	J211029	J21118	J21120	8	340	0.0032	0.4454	0.2396	0.0996	2.01	0.52	0.35	0.5367	0.2393	2.38	1.00	0.67
East	23	J211028	J21120	J21122	8	135	0.0032	0.4419	0.2396	0.0996	2.00	0.52	0.35	0.5367	0.2393	2.38	1.00	0.67
East	23	J211027	J21122	J21123	8	326	0.0032	0.4444	0.2396	0.0996	2.01	0.52	0.35	0.5986	0.2695	2.65	1.00	0.67
East	23	J211017	J21123	J21124	8	254	0.0032	0.4419	0.2396	0.0996	2.00	0.52	0.35	0.6599	0.2996	2.93	1.00	0.67
East	23	J211042	J21124	J21132	8	67	0.0027	0.4048	0.2396	0.0996	1.87	0.55	0.37	0.6599	0.2996	2.93	1.00	0.67
East	23	J211016	J21125	J21126	8	326	0.0033	0.4465	0.2396	0.0996	2.01	0.52	0.35	0.7812	0.3599	3.46	1.00	0.67
East	23	J211041	J21126	J21127	8	158	0.0032	0.4449	0.2396	0.0996	2.01	0.52	0.35	0.7812	0.3599	3.46	1.00	0.67
East	23	J211019	J21128	J21125	8	198	0.0027	0.4050	0.2396	0.0996	1.87	0.55	0.37	0.7208	0.3298	3.19	1.00	0.67
East	23	J211043	J21132	J21128	8	198	0.0027	0.4088	0.2396	0.0996	1.88	0.55	0.37	0.6599	0.2996	2.93	1.00	0.67
East	24	I211103	I21143	I21145	18	27	0.0015	2.6191	1.1438	0.5448	2.22	0.46	0.69	2.5661	1.3112	2.61	0.80	1.20
East	24	I221135	I22151	I22154	12	272	0.0027	1.1884	0.6846	0.3118	2.42	0.54	0.54	0.9985	0.4700	2.62	0.70	0.70
East	24	I221130	I22154	I22159	12	344	0.0026	1.1735	0.6846	0.3118	2.40	0.55	0.55	1.0315	0.4869	2.61	0.73	0.73
East	24	I221129	I22159	I22160	12	310	0.0026	1.1799	0.6846	0.3118	2.41	0.55	0.55	1.0645	0.5039	2.63	0.74	0.74
East	24	I221002	I22160	I21143	12	310	0.0026	1.1808	0.6846	0.3118	2.41	0.55	0.55	1.0974	0.5208	2.64	0.76	0.76
East	25	I221050	I22115	I22114	10	319	0.0044	0.9404	0.6650	0.3022	2.89	0.62	0.52	0.7979	0.3683	2.99	0.71	0.59
East	25	I231007	I23100	I23102	10	347	0.0044	0.9426	0.6295	0.2847	2.86	0.60	0.50	0.7979	0.3683	3.00	0.71	0.59
East	25	I221008	I23102	I22115	10	250	0.0052	1.0246	0.6547	0.2970	3.08	0.58	0.48	0.7979	0.3683	3.21	0.66	0.55
East	26	O201020	O20118	O20119	10	9	0.0078	1.2522	0.2136	0.0879	2.65	0.28	0.23	0.9895	0.4654	3.94	0.67	0.56
East	27	Q211020	Q21105	Q21107	18	283	0.0007	1.7654	0.9878	0.4645	1.59	0.53	0.80	1.5197	0.7419	1.74	0.72	1.07
East	27	Q211028	Q21107	Q21106	18	66	0.0006	1.6830	0.9878	0.4645	1.53	0.55	0.83	1.5197	0.7419	1.67	0.74	1.12
South	28	R201064	R20119	R20122	10	129	0.0032	0.8012	0.6598	0.2996	2.54	0.69	0.58	0.6045	0.2724	2.50	0.65	0.54
South	28	R201051	R20122	R20129	10	245	0.0052	1.0272	0.8081	0.3735	3.23	0.67	0.56	0.7812	0.3599	3.21	0.65	0.54
South	28	R201050	R20129	R20138	10	237	0.0052	1.0235	0.8099	0.3744	3.22	0.67	0.56	0.7859	0.3623	3.20	0.66	0.55
South	28	R201049	R20138	R20146	10	237	0.0052	1.0228	0.8158	0.3773	3.22	0.68	0.56	0.8002	0.3695	3.21	0.67	0.55
South	28	R201044	R20150	R20161	10	144	0.0040	0.9004	0.8428	0.3909	2.90	0.77	0.64	0.8524	0.3957	2.91	0.78	0.65
South	29	R141060	R14150	R14148	12	26	0.0016	0.9106	0.5607	0.2510	1.89	0.57	0.57	0.7181	0.3284	1.99	0.67	0.67
South	29	R141016	R14153	R14150	12	320	0.0011	0.7740	0.5607	0.2510	1.66	0.63	0.63	0.7181	0.3284	1.73	0.76	0.76
South	29	R141017	R14156	R14155	12	321	0.0011	0.7737	0.5607	0.2510	1.66	0.63	0.63	0.6254	0.2826	1.70	0.68	0.68
South	29	R141018	R14155	R14154	12	321	0.0011	0.7628	0.5607	0.2510	1.64	0.64	0.64	0.6564	0.2979	1.69	0.72	0.72
*Corresponds to Figure 8-1					**Total**	**45,724**												


Legend
City Boundary
Not Served by City of Ontario
New Model Colony
Inland Empire Utilities Agency
Regional Plant No. 1
Location No.
City of Ontario Sewer
City of Ontario Forcemain
City of Ontario Sewer Pump Station
IEUA/City of Ontario Eastern Trunk Sewer
Inland Empire Utilities Agency (IEUA) Sewer
Private Forcemain
Private Sewer Pump Station
Existing Hydraulic Deficiency
Ultimate Hydraulic Deficiency
City of Upland
City of Montclair
City of Rancho Cucamonga
City of Fontana
City of Chino
Riverside County
Ontario International Airport
Landfill
New Model Colony
RP-1
Magnolia PS
Haven PS
Edenglen PS
Colony HS
Freeway Trunk
Grove Trunk
Upland Interceptor Relief
Upland Interceptor
Upland Interceptor Relief
Archibald Trunk
Turner Trunk
Cucamonga Trunk
Cucamonga Trunk Relief
Fontana Interceptor Relief
Fontana Interceptor
Montclair Interceptor
BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
I-15 FWY
ETIWANDA AVE
I-10 FWY
SIXTH ST
EIGHTH ST
FOURTH ST
FIFTH ST
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
ONTARIO MILLS PKWY
AIRPORT DR
JURUPA ST
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
CEDAR ST
ONTARIO BLVD
CUCAMONGA ST
CUCAMONGA CREEK
CARLOS AVE
WINEVILLE AVE
VINTAGE AVE
SR-60
WALNUT ST
RIVERSIDE DR
CYPRESS AVE
MAGNOLIA AVE
FERN ST
SULTANA AVE
BON VIEW AVE
PARCO AVE
WALKER AVE
1
2
3
4
5
6
7
8
9
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11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
N
0
1,700
3,400
6,800
Feet
CITY OF ONTARIO
SEWER MASTER PLAN
Capacity Deficiencies
Identified by Hydraulic Model
PROJECT NO: 1000952.00
DATE: October 2011
Figure 8-1

The Haven Pump Station is a submersible pump station with four pumps rated at 3,400 gpm each. The estimated existing peak wet weather flow from the fully occupied tributary area is 858 gpm. The estimated ultimate peak wet weather flow is 3,532 gpm. Assuming one pump is for stand-by purposes, the firm capacity of the station is 10,200 gpm, which is significantly greater than the ultimate peak wet weather flows.

The Edenglen Pump Station is a submersible pump station with two pumps rated at 132 gpm each. The pump station serves a total of 225 dwelling units with an estimated average flow of 48,000 gpd or 33 gpm (*per City Memorandum "Edenglen Lift Station Capacity" dated May 18, 2010*). The peak wet weather flow is estimated at 164,000 gpd or 114 gpm. During the pump station start-up testing which was conducted on November 9, 2007, the pump station delivered approximately 180 gpm.

8-2 Condition Assessment

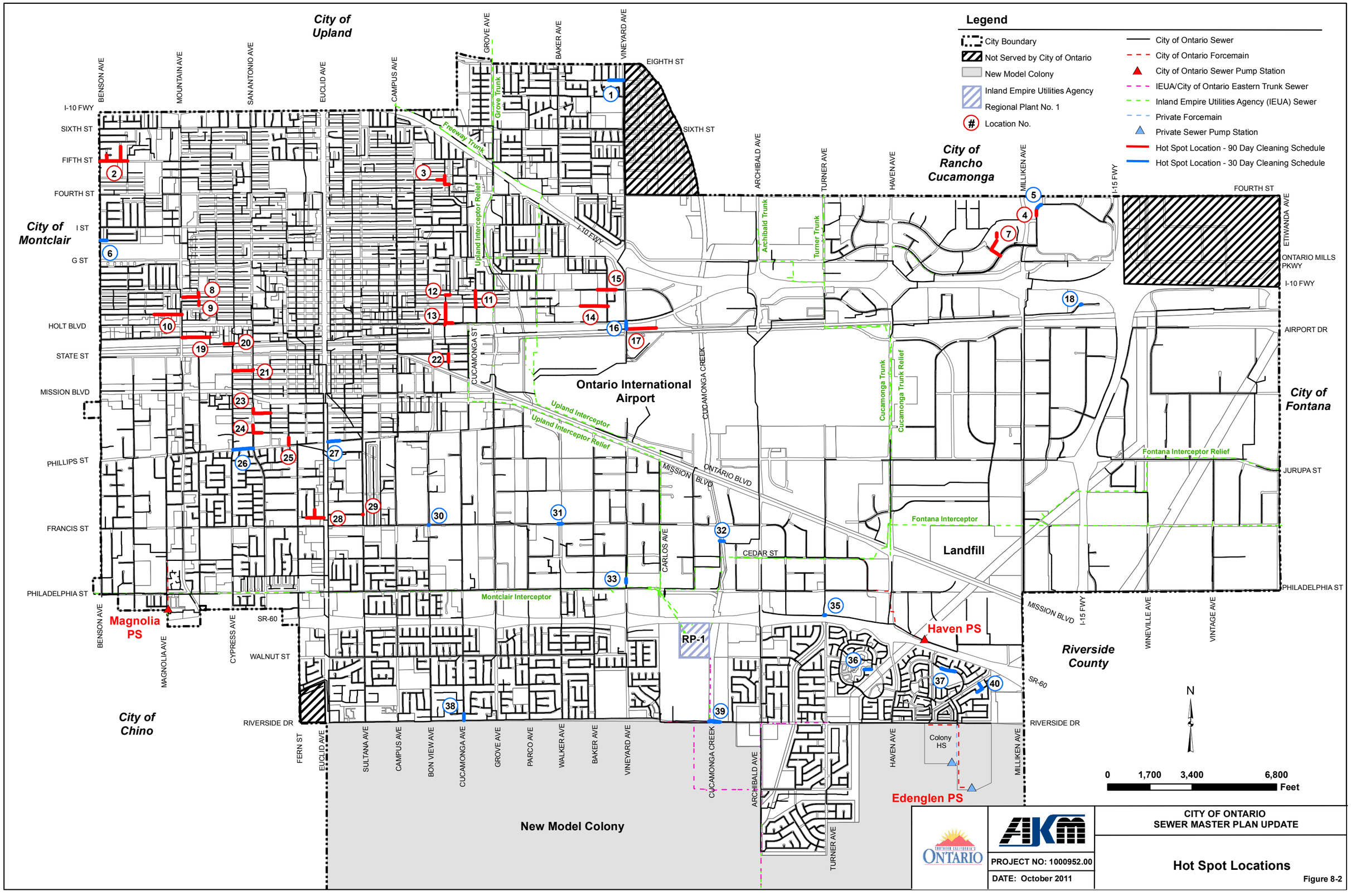
Condition assessment of the existing sewer system was not a part of the scope of work for this master plan. Per the General Waste Discharge Requirements, discussed in Sub-section 2-5, the City's Operation and Maintenance Plan must have been completed and certified by November 2, 2008. One of the elements specified as a part of the O&M Program is as follows:

> "*Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan."*

The City has currently completed video inspections of about 1.6 million feet of its existing sewer system. It is planned to have the remaining footage completed in FY 2010-2011. The City plans to budget yearly for sewer condition evaluation and repairs.

8-3 'Hot Spots'

Hot Spots are areas of the system with reoccurring problems that require maintenance and cleaning on a quarterly basis minimum. Currently, there are 102 reaches with a total length of 23,247 feet that are considered to be Hot Spots in the existing system. Operations staff reports that the causes of the hot spots are grease, roots, sags, and some hydraulic issues where flow in a low flow sewer is restricted from merging properly into sewers carrying flows with high velocities. The 'Hot Spot' locations as reported by City staff are shown on Figure 8-2 and listed in Table 8-2.



CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

PROJECT NO: 1000952.00

DATE: October 2011

Hot Spot Locations

Figure 8-2

Table 8-2
Hot Spot Locations

Location No*	Pipe ID	U/S MH ID	D/S MH ID	Location	Dia (in)	Length (ft)	Material	Slope	Year of Const.	Schedule
1	E17CL1010	E17110	E17108	Olive St, between Sacramento Ave and Vineyard Ave	8	283	VCP	0.0060	1973	30 Day
	E17CL1012	E17108	E17109		8	308	VCP	0.0060	1973	
2	G10CL1021	G10115	G10130	Helen Ave north of Fifth St	8	571	VCP	0.0170	1958	90 Day
	G10CL1019	G10129	G10130	Fifth St east of Helen Ave	8	278	VCP	0.0040	1958	
	G10CL1014	G10130	G10131	Fifth St, between Benson Ave and Helen Ave	8	319	VCP	0.0040	1958	
	G10CL1013	G10131	G10132		8	226	VCP	0.0040	1955	
	G10CL1012	G10132	G10133		8	271	VCP	0.0040	1955	
	G10CL1007	G10124	G10132	Jasmine Ave north of Fifth St	8	236	VCP	0.0116	1955	
3	G15CL1001	G14173	G15181	Easement west of Council Ave, between Princeton St and Harvard Pl	8	317	VCP	0.0400	1950	90 Day
	G15CL1087	G15177	G15181		8	155	VCP	0.0100	1946	
	G15CL1009	G15181	H15108		8	177	VCP	0.0051	1946	
	H15CL1007	H15108	H15107	Harvard Pl west of Council Ave	8	168	VCP	0.0153	1946	
4	H23CL1013	H23113	H23129	Mills Cir north of Concours Dr	10	109	VCP	0.0067	1995	90 Day
	H23CL1012	H23129	H23117		10	83	VCP	0.0067	1995	
5	H23CL1019	H23111	H23126	Mills Cir west of Gurnee Ave	10	111	VCP	0.0032	1995	30 Day
	H23CL1018	H23126	H23128		10	150	VCP	0.0032	1995	
6	I10CL1006	I10110	I10108	H St, Benson Ave to Jasmine Ave	8	273	VCP	0.0040	1955	30 Day
7	I22CL1104	I22100	I22108	Easement north of Ferrari Ln, between Concours St and Inland Empire Blvd	8	296	PVC	0.0080	2000	90 Day
	I22CL1100	I22108	I22122		8	296	PVC	0.0080	2000	
	I22CL1099	I22122	I22124		8	131	VCP	0.0690	2000	
	I22CL1083	I22124	I22129	Ferrari Ln, west of Inland Empire Blvd	8	220	VCP	0.0040	1987	
	I22CL1091	I22129	I22132		8	220	VCP	0.0040	1995	
8	J11CL1078	J11127	J11126	Easement south of D St and east of Mountain Ave	8	320	VCP	0.0040	1952	90 Day
	J11CL1076	J11126	J11124		8	320	VCP	0.0040	1952	
	J11CL1029	J11115	J11124		8	177	VCP	0.0050	1952	
9	J11CL1085	J11132	J11139	Easement south of Hollowell St and east of Mountain Ave	8	158	VCP	0.0072	1952	90 Day
10	J11CL1047	J11153	J11152	Stoneridge Ct west of Mountain Ave	12	21	VCP	0.0015	1954	90 Day
	J11CL1075	J11154	J11153		12	35	VCP	0.0015	1954	
	J11CL1074	J11155	J11154		12	318	VCP	0.0015	1954	
	J11CL1048	J11156	J11155		12	362	VCP	0.0015	1954	
	J11CL1034	J11157	J11156		12	360	VCP	0.0015	1954	
11	J15CL1018	J15114	J15125	Virginia Ave from D St to Nocta St	8	326	VCP	0.0040	1954	90 Day
	J15CL1045	J15125	J15137		8	333	VCP	0.0040	1954	
12	J15CL1043	J15122	J15123	Easement south of D St and east of Allyn Ave	8	176	VCP			90 Day
13	J15CL1036	J15134	J15141	Easement from north of Nocta St to Holt Blvd, east of Allyn Ave	8	336	VCP			90 Day
	J15CL1035	J15141	J15145		8	328	VCP			
	J15CL1033	J15145	J15155		8	131	VCP			
	J15CL1030	J15155	J15157	Holt Blvd east of Bon View Ave	10	76	VCP	0.0170	1987	
	J15CL1031	J15156	J15155		10	286	VCP	0.0025	1954	
14	J17CL1004	J16118	J17154	Easement east of Corona Ave, north of Holt Blvd	8	309	ABS_Tr	0.0060	1986	90 Day
	J16CL1057	J16119	J16118		8	184	VCP	0.0060	1986	
	J17CL1025	J17154	J17117		8	156	ABS_Tr	0.0060	1986	
		J17117	J17155			205				
		J17155	J17156			179				
15	J17CL1006	J17103	J17105	D St west of Corona Ave	8	361	AC	0.0060	1963	90 Day
	J17CL1009	J17106	J17103	D St east of Corona Ave	8	380	ABS_Tr	0.0050	1986	
16	J17CL1063	J17131	J17148	Intersection of Vineyard Ave and Holt Blvd	15	319	VCP	0.0139	1957	30 Day
17	J17CL1074	J17144	J17145	Airport Dr east of Vineyard Ave	8	300	ABS_Tr	0.0039	1985	90 Day
	J17CL1073	J17145	J17146		8	296	ABS_Tr	0.0039	1985	
	J17CL1072	J17146	J17147		8	309	ABS_Tr	0.0039	1985	
	J17CL1071	J17147	J17148		8	283	ABS_Tr	0.0039	1985	
18	J23IS1007	J23103	J23104	New Guasti Rd east of Milliken Ave	6	59	DIP		1986	30 Day
	J23IS1008	J23103	J23104		6	59	DIP		1986	

Corresponds to Figure 8-2

****Hot Spots Information as of November 2010***

Table 8-2 (continued)
Hot Spot Locations

Location No*	Pipe ID	U/S MH ID	D/S MH ID	Location	Dia (in)	Length (ft)	Material	Slope	Year of Const.	Schedule
19	K11CL1028	K11108	K11107	Brooks St east of Mountain Ave	12	164	VCP	0.0015	1954	90 Day
	K11CL1029	K11109	K11108		12	118	VCP	0.0015	1954	
	K11CL1024	K11110	K11109		12	276	VCP	0.0015	1954	
	K11CL1017	K11112	K11110		12	276	VCP	0.0015	1954	
	K11CL1016	K11114	K11112		12	271	VCP	0.0015	1954	
20	K12CL1041	K12126	K12125	Easement west of San Antonio Ave, north of State St	12	98	VCP	0.0015	1954	90 Day
	K12CL1021	K12128	K12126		12	286	VCP	0.0015	1954	
21	K12CL1076	K12150	K12149	Easement north of Sunkist St, from Cypress Ave to San Antonio Ave	8	56	VCP	0.0056	1951	90 Day
	K12CL1075	K12151	K12150		8	296	VCP	0.0050	1951	
	K12CL1074	K12152	K12151		8	296	VCP	0.0050	1951	
	K12CL1073	K12153	K12152		8	163	VCP	0.0050	1951	
22	K15CL1024	K15130	K15136	Garfield Ave from State St to Washington St	10	226	VCP		1987	90 Day
23	L12CL1052	L12CL13	L12CL14	San Antonio Ave north of Maitland St	12	191	VCP	0.0050	1934	90 Day
	L12CL1066	L12CL14	L12CL14	Maitland St east of San Antonio Ave	12	351	VCP	0.0050	1934	
	L12CL1051	L12CL14	L12CL14		12	351	VCP	0.0050	1934	
24	L12CL1027	L12CL15	M12100	San Antonio Ave north of Belmont St	8	295	VCP	0.0170	1957	90 Day
	M12CL1070	M12101	M12100	Belmont St east of San Antonio Ave	8	352	VCP	0.0060	1964	
25	M12CL1098	M12112	M12116	Vine Ave north of Phillips St	12	310	VCP	0.0050	1934	90 Day
26	M12CL1062	M12124	M12125	Phillips St from Cypress Ave to San Antonio Ave	8	194	VCP	0.0040	1962	30 Day
	M12CL1060	M12128	M12124		8	316	VCP	0.0040	1962	
	M12CL1059	M12131	M12128		8	299	VCP	0.0040	1966	
27	M13CL1171	M13119	M13122	Phillips St east of Euclid Ave	8	306	VCP	0.0040	1957	30 Day
	M13CL1168	M13122	M13123		8	172	VCP		1957	
28	N13CL1033	N13136	N13152	Laurel Ave north of Maple St	8	326	VCP	0.0100	1957	90 Day
	N13CL1038	N13148	N13150	Maple St west of Euclid Ave	8	167	VCP	0.0040	1957	
	N13CL1039	N13150	N13152		8	327	VCP	0.0040	1957	
	N13CL1040	N13152	N13151		8	373	VCP	0.0040	1957	
29	N13CL1088	N13142	N13141	Maple St west of Sultana Ave	8	15	VCP	0.0366	1991	90 Day
30	N14IS1089	N14160	N14159	Francis St at Bon View Ave	24	21	VCP		1991	30 Day
	N14IS1090	N14160	N14159		24	21	VCP		1991	
31	N16IS1035	N16118	N16117	Francis St west of Cucamonga Channel	15	156	VCP		1991	30 Day
	N16IS1036	N16118	N16117		24	156	VCP		1991	
32	O18CL1012	O18103	O18102	Easement south of Francis St at Cucamonga Creek	18	177	AC	0.0016	1965	30 Day
33	P17IS1011	O17156	P17102	Vineyard Ave north of Philadelphia St	24	176	VCP		1991	30 Day
	P17IS1012	O17156	P17102		18	176	VCP		1991	
34	P18CL1061			Siphon Golf Course		165				90 Day
35	P20CL1038	P20127	P20126	60 Frwy and Turner Ave	10	70	DIP		1988	30 Day
	P20CL1039	P20127	P20126		16	70	DIP		1988	
36	Q20CL1070	Q20166	Q20167	Ashegate Way west of Tahoe Dr	8	290	VCP	0.0050	1985	30 Day
37	Q21CL1015	Q21143	Q21148	Lytle Creek Lp west Silverado Creek Pl	8	246	VCP	0.0052	1982	30 Day
	Q21CL1012	Q21148	Q21150	Lytle Creek Lp east Silverado Creek Pl	8	337	VCP	0.0052	1982	
38	R15CL1065	R15160	R15173	Cucamonga Ave north of Riverside Dr	8	267	ABS_Tr	0.0072	1977	30 Day
39	R18CL1037	R18117	R18116	Riverside Dr at Cucamonga Creek	10	212	VCP	0.0032	1965	30 Day
	R18CL1039	R18118	R18117		10	254	VCP	0.0032	1965	
	R18CL1055	R18118	R18113		10	216	VCP		1988	
	R18CL1056	R18113	R18109	2400 E Riverside Dr	10	107	VCP		1988	
	R18CL1054	R18109	R18107		10	96	VCP		1988	
40	R22CL1004	R22104	R22107	Boise Creek Pl northwest of Yuba River Dr	8	255	VCP	0.0052	1986	30 Day
	R22CL1011	R22107	R22111	Yuba River Dr southwest of Boise Creek Pl	8	250	VCP	0.0052	1986	
				Total		**23,247**				

Corresponds to Figure 8-2; Location No. 34 is not mapped or shown on Figure 8-2

Hot Spots Information as of November 2010

8-4 Sanitary Sewer Overflow (SSO) History

There were a total of 34 sanitary sewer overflows responded to by the City of Ontario crews between January 2007 and September 2010. The details of these spills are shown in Table 8-3. The total number of reported spills over the past four years is as follows:

10 spills in 2007 (1.64 spills per 100 miles, excluding 4 on private property)

7 spills in 2008 (0.55 spills per 100 miles, excluding 5 on private property)

11 spills in 2009 (1.36 spills per 100 miles, excluding 6 on private property)

6 spills in 2010 (0.82 spills per 100 miles, excluding 3 on private property)

A sewer collection system with less than three (3) spills from the publicly owned system (excludes private property spills that do not result from a blockage in the public system) per 100 miles per year is considered an adequate system. For the Old Model Colony sewer system (365.7 miles), this is an average of eleven (3 x 3.657) spills per year. Per the provided documentation, the City has an excellent record with minimal spills.

Table 8-3
Sanitary Sewer Overflow Summary
Calendar Year 2007 thru September 2010

	Date	Time	Location	Property Type	Reason for Overflow	Overflow from
Calendar Year 2007						
1	02/06/07	10.00 am	1351 N Grove Ave		Grease	City sewer
2	04/03/07	8.00 pm	Cucamonga Ave & I St		Construction Accident	City sewer
3	05/08/07	3.40 am	948 Holt Blvd		Construction Accident	City sewer
4	05/16/07	1.00 am	1112 Cypress Ave		Grease	Private Property
5	05/17/07	11.00 am	700 Holt Blvd	Restaurant	Flood Damage	Private Property
6	05/31/07	3.00 pm	1650 Miliken Av		Debris	Private Property
7	07/16/07	9.30 am	1007 D St		Unknown	City sewer
8	07/31/07	10:00	1007 W "D"		Rocks and debris in sewer main	Manhole
9	10/20/07	11:10	800 N Vineyard		Debris blockage in sewer main	Manhole
10	12/16/07	8:00	1351 N Grove	Apartments	Pipe structural problem/failure and grease	Private cleanout
Calendar Year 2008						
1	01/23/08	7:30	655 E "G"		Root intrusion	Manhole
2	06/09/08	12:30	121 N Fern	Apartments	Blockage in upper lateral	Illegal drain connection
3	07/06/08	22:00	1855 E Riverside	Trailer Park	Grease blockage in private sewer system of trailer park	Private cleanout
4	11/17/08	10:30	1221 E Fourth	Restaurant & store	Failure to maintain septic tank	Private cleanout connected to private septic tank
5	11/18/08	18:30	Nocta St	Apartments	Construction defect in upper lateral	Private cleanout
6	11/29/08	10:45	1855 E Riverside	Trailer Park	Gease blockage in upper lateral	Private cleanout
7	12/16/08	12:00	2425 E Riverside	Westwind Park	Pipe structural problem/failure	Tree planter near restroom

Table 8-3 (Continued)
Sanitary Sewer Overflow Summary
Calendar Year 2007 thru September 2010

	Date	Time	Location	Property Type	Reason for Overflow	Overflow from
Calendar Year 2009						
1	01/23/09	11:40	2665 E Riverside		Grease blockage in sewer main	Manhole
2	04/22/09	11:00	1200 S San Antonio	Apartments	Blockage in upper lateral	Private cleanout
3	05/30/09		1800-2000 Holt		Grease, rags, and debris blockage in sewer main	4 manholes
4	07/11/09	14:10	1351 N Grove	Apartments	Debris blockage in upper lateral	Private cleanout
5	08/14/09	15:00	1220-1228 E Sixth	Strip mall	Debris and grease created blockage; end of lateral was uncapped and paved over	Sewage coming up out of ground along edge of asphalt alleyway behind building
6	09/02/09	11:00	1047-1055 N Mountain	Strip mall	Rags and grease in private lateral. 17 feet of sag in lower lateral	2 private cleanouts in parking lot
7	11/04/09	8:15	4405 E Airport		Rags and grease in upper lateral. Chunks of asphalt in lower lateral	Private cleanout in parking lot
8	12/14/09	10:30	2151 E Philadelphia		Large rock in syphon	Manhole
9	12/14/09	7:50	Olive & San Diego		Stick of lumber in sewer main	Manhole and private cleanout
10	12/23/09	12:01	1216 S Euclid		Gease blockage in upper lateral	Private cleanout
11	12/31/09	9:45	926 E Philadelphia		Debris blockage in upper lateral	Private cleanout
Calendar Year 2010						
1	01/03/10	13:00	1409 E Fourth	Restaurant	Gease blockage in upper lateral	Private cleanout
2	01/05/10	12:00	608 W Emporia		Grease blockage in sewer main	2 Manholes
3	02/20/10	9:00	904 W Rosewood		Root intrusion	Manhole
4	03/18/10	19:00	2400 S Sultana		Contractor failed to remove test plug after making connection to existing sewerline	Manhole
5	08/21/10	9:30	854 & 864 W "B"		Illegal dumping of hauled waste	Side door at 864 West B, front door at 854 West B
6	09/06/10	18:00	1320 N Sultana	Home	Broken pipe	Basement

8-5 Maintenance Program

A comprehensive maintenance program is an important tool in assuring reliable system operation. This not only includes regular inspections and preventative maintenance, but also good record keeping. Accurate records are the backbone of any maintenance operation. They can be used for many purposes including: scheduling regular maintenance activities; allocating manpower; budgeting; pinpointing persistent problems; tracking equipment performance and maintenance history; and the identification of equipment which may be showing signs of failure.

Preventative Maintenance

Preventative maintenance is a crucial element of the maintenance program. The preventative maintenance program (PMP) consists of cleaning, inspection, condition assessment, and rehabilitation tasks. Currently, the City has a documented preventative maintenance program. The City should review and update the PMP annually as a part of the City's Operation and Maintenance Plan that is required by the Statewide WDR.

Sewer inspection includes CCTV inspection and condition assessment of the collection system, visual inspection of manholes and their flow channels, ground surface inspection of rights of way and easements, and odor and corrosion monitoring. Condition assessment includes, review of the inspection data, and formulation of maintenance, rehabilitation, and replacement projects. Following the completion of the initial CCTV inspection program, the City should develop a continuing inspection plan based upon the knowledge gained from the initial program. Each spill site must be CCTV inspected to pinpoint the cause of the spill, and implementation of corrective measures for preventing repeat spills.

Preventative maintenance activities that the City does currently conduct include the following:

1. The entire sewer system is cleaned once every 14 to 15 months. The City owns 3 hydro-jet machines.
2. All of the system manholes are inspected once every 14 to 15 months.
3. Sewer pump stations are inspected daily
4. Sewer pump station maintenance is conducted monthly
5. The City has a Fats, Oil, and Grease (FOG) program in place that requires the installation of grease interceptors and periodic inspections of the interceptors.

Maintenance activities that are currently planned include the following:

1. The City has recently contracted with a consultant for CCTV inspection of the entire sewer system.
2. Currently, operations staff uses RootX on the laterals on an as-needed basis.

Maintenance Staff Recommendations

The City currently has about 365.7 miles of pipe. In order to comply with the WDR requirements and the City's regular preventative maintenance program, the City must quantify the number of employees and equipment necessary to perform these tasks.

The City's current staffing for the wastewater collections system includes 7 employees. Each has a California Water Environment Association (CWEA) certification: 4 with Grade 1, 1 with Grade 2, and 2 with Grade 4. Training of these staff members is as follows:

a. Safety – bi-weekly
b. Confined space entry – annually

c. Record keeping – as needed
d. Pump Station operation and maintenance – annually
e. Gas sampling – annually
f. CCTV inspection and/or pipeline assessment – as needed
g. Lockout-tagout – annually

Minimum staff recommendations are as follows:

1. Two cleaning crews consisting of three employees each is needed to run the hydro-jet machines and clean the sewers on a routine basis.
2. A separate crew consisting of three employees is needed to televise sewers on a routine basis following cleaning, perform hot spot cleaning, conduct flow monitoring, and performing emergency repairs. As an alternative, the City can contract out the CCTV inspection services and flow monitoring services.
3. A pump station maintenance crew consisting of two employees to keep up with the sewer pump station maintenance work.
4. One full time staff member is recommended to ensure that the City can complete all elements of the waste discharge requirements, including the Fats Oil and Grease (FOG) enforcement and source pollution control enforcement.

Section 9

CAPITAL IMPROVEMENT PROGRAM

9-1 General

The primary goal of the Capital Improvement Program (CIP) is to provide the City of Ontario with a long-range planning tool for implementing its sewer infrastructure improvements in an orderly manner and a basis for financing of these improvements. To accomplish this goal, the program is phased based upon the implementation cost of the facilities, the quantity of work the City can reasonably administer each year, and the funds available for these projects.

9-2 Capital Improvement Project Priorities

The capital improvement projects were selected primarily with consideration of the health and safety of the public and protection of the environment by minimizing the possibility of overflows. The projects that will eliminate the capacity deficiencies in the gravity collection system are prioritized based upon the hydraulic analyses conducted during this study. As the City completes CCTV inspection of the system, severe and major defects identified should be incorporated into the CIP and addressed. When the CCTV inspection is completed and a full condition assessment has been conducted, the capital improvement project priorities should be reevaluated.

For this study, the gravity sewer projects were prioritized as follows:

1. Facilities identified with capacity deficiencies under existing peak dry weather conditions. **Flow monitoring is recommended prior to project implementation.**

2. Facilities that have calculated ultimate capacity deficiencies but are currently considered adequate under existing peak dry weather conditions. **Flow monitoring is recommended prior to project implementation.** When the measured peak flows exceed the pipe capacity (d/D = 0.64 during peak dry weather conditions), the projects should be reprioritized.

In some cases, larger sewers are given higher priorities than small sewers because they serve larger areas and a spill would be expected to be larger in quantity. When segments of sewers with lower priorities are located in the same vicinity as a higher priority project, an exception is made to include these lower priority sewers in that project to provide a more economically feasible Capital Improvement Program.

9-3 Capital Improvement Program

Old Model Colony

The Capital Improvement Program is developed based upon the results of the hydraulic analyses and the priorities of Sub-section 9-2. The recommended improvement project locations in Old Model Colony are illustrated on Figure 9-1 and are listed in detail in Table 9-1 by priority, along with cost estimates. These estimates are based upon recent information for similar projects in the Southern California area, and include contingencies for this planning level study.

The cost estimates presented in Table 9-1 reflect replacement of the existing facilities. Replacement costs are generally more conservative and will therefore allow the City more flexibility for each project. Preliminary design studies should be conducted utilizing detailed utility information to identify and evaluate project alternatives such as parallel pipes and/or diversions prior to final design. The pipe ID numbers and upstream and downstream manhole ID numbers given in Table 9-1 correspond to the City's sewer GIS and atlas maps.

The construction costs are based upon the following:

8-18 inch diameter pipe	$40 / diameter inch / ft
21 inch diameter pipe and greater	$35 / diameter inch / ft

Old Model Colony is largely occupied and there are many existing utilities to consider. Therefore, the costs of replacing sewer facilities will be generally higher than in an area that is undeveloped such as New Model Colony. The total costs shown in Table 9-1 include engineering, administration and contingency costs. Contingency costs are estimated at 15 percent of the construction costs. Engineering and administration costs are estimated at 15 percent of the construction plus contingency costs.

The recommended CIP has been based upon the best information currently available. It should be updated as new information becomes available from sources such as CCTV inspections and from maintenance crew observations. The project priorities may be revised to correspond to changed conditions, such as impending facility failures, or to take advantage of concurrent construction such as street paving projects or adjacent infrastructure work.

Some of the projects recommended are small and it may not be feasible to implement them as a single project. Therefore, several projects should be combined and bid as a package. Some of the projects may be broken down into smaller components to fit the City's budgetary and other obligations.

The Old Model Colony CIP shown in Table 9-1 includes about $44.6 million dollars in gravity collection system projects. The City has currently completed video inspections of about 1.6 million feet of its existing sewer system. It is planned to have the remaining footage completed in FY 2010-2011. The City plans to budget yearly for sewer condition evaluation and repairs.

Hydraulic Deficiencies not Addressed

There is one location shown as hydraulically deficient in Section 8 (see Figure 8-1).

1. Location 37 on Figure 8-1

   This sewer is located just upstream of Haven Pump Station. Ultimately, the sewage tributary to Haven Pump Station will be diverted south to New Model Colony sewer. When this happens, the identified sewer reach will not need to be upsized. It was therefore left out of the Capital Improvement Program.

New Model Colony

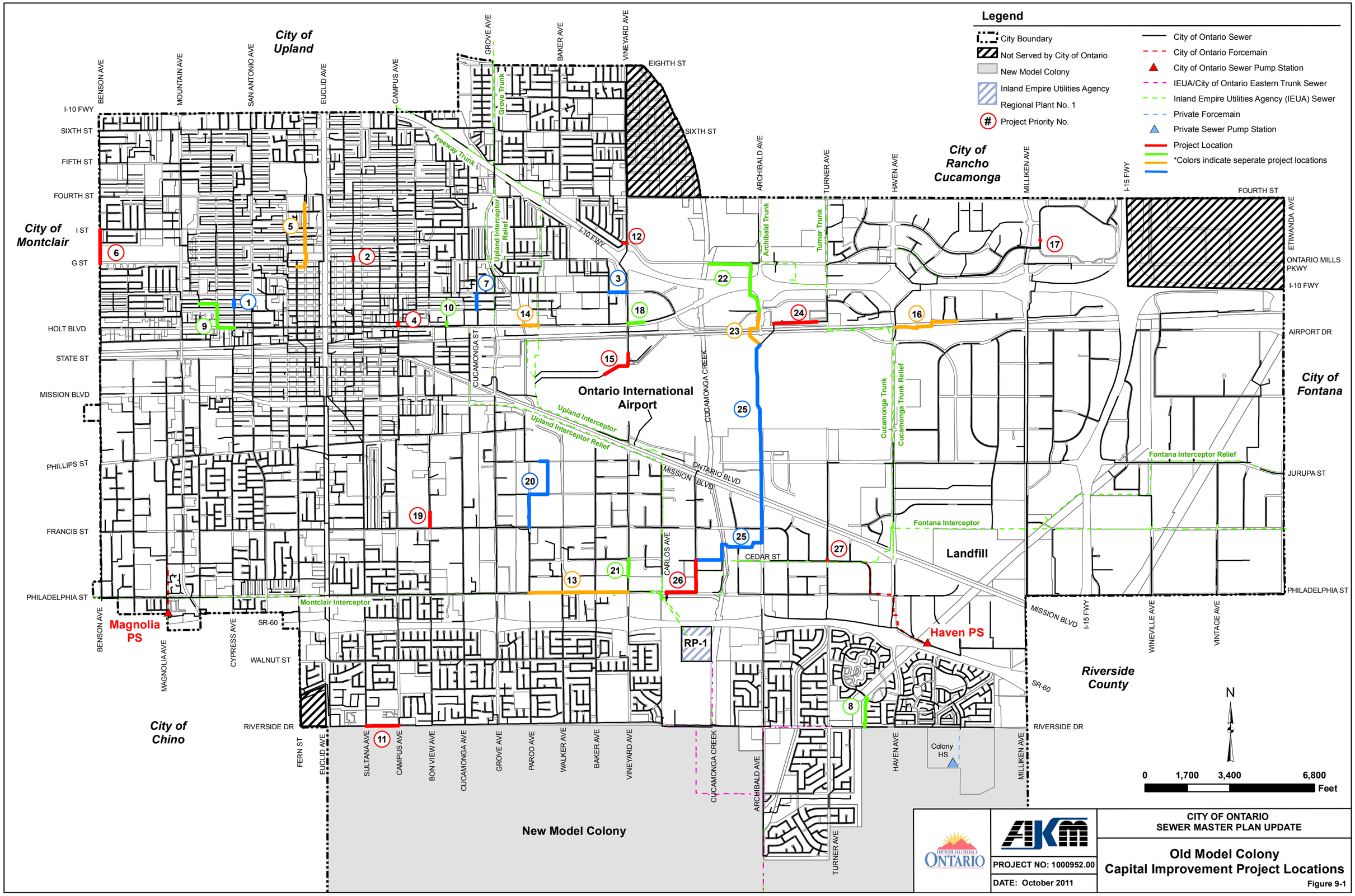
The proposed pipes for New Model Colony are shown on Figure 9-2 and are listed in Table 9-2.

Cost estimates are based on the following:

8-18 inch diameter pipe	$21 / diameter inch / ft
21 inch diameter pipe and greater	$17 / diameter inch / ft

The total costs shown in Table 9-2 include engineering, administration and contingency costs. Contingency costs are estimated at 10 percent of the construction costs. Engineering and administration costs are estimated at 15 percent of the construction plus contingency costs.

The New Model Colony CIP shown in Table 9-2 includes about $59.7 million dollars in gravity collection system projects.


Legend
City Boundary
Not Served by City of Ontario
New Model Colony
Inland Empire Utilities Agency
Regional Plant No. 1
Project Priority No.
City of Ontario Sewer
City of Ontario Forcemain
City of Ontario Sewer Pump Station
IEUA/City of Ontario Eastern Trunk Sewer
Inland Empire Utilities Agency (IEUA) Sewer
Private Forcemain
Private Sewer Pump Station
Project Location
*Colors indicate seperate project locations
City of Upland
City of Montclair
City of Rancho Cucamonga
City of Fontana
City of Chino
Riverside County
Ontario International Airport
Landfill
New Model Colony
Magnolia PS
Haven PS
RP-1
Colony HS
Grove Trunk
Freeway Trunk
Upland Interceptor Relief
Archibald Trunk
Turner Trunk
Upland Interceptor
Upland Interceptor Relief
Cucamonga Trunk
Cucamonga Trunk Relief
Fontana Interceptor Relief
Fontana Interceptor
Montclair Interceptor
BENSON AVE
MOUNTAIN AVE
SAN ANTONIO AVE
EUCLID AVE
CAMPUS AVE
GROVE AVE
BAKER AVE
VINEYARD AVE
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
I-15 FWY
ETIWANDA AVE
I-10 FWY
SIXTH ST
EIGHTH ST
FOURTH ST
FIFTH ST
I ST
G ST
HOLT BLVD
STATE ST
MISSION BLVD
ONTARIO BLVD
AIRPORT DR
JURUPA ST
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
CEDAR ST
WALNUT ST
SR-60
RIVERSIDE DR
CUCAMONGA ST
CUCAMONGA CREEK
CARLOS AVE
MAGNOLIA AVE
CYPRESS AVE
FERN ST
SULTANA AVE
BON VIEW AVE
PARCO AVE
WALKER AVE
WINEVILLE AVE
VINTAGE AVE
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23
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1,700
3,400
6,800
Feet
CITY OF ONTARIO
SEWER MASTER PLAN UPDATE
Old Model Colony
Capital Improvement Project Locations
Figure 9-1
PROJECT NO: 1000952.00
DATE: October 2011

Table 9-1
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Construction Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
1	North	J121052	J12119	J12123	Easement north and south of Hollowell St, east of Boulder Ave	8	12	181	0.0079	480	86,736	13,010	14,962	114,708	100	0
	North	J121053	J12123	J12125		8	12	136	0.0079	480	65,136	9,770	11,236	86,142	100	0
							Subtotal	**316**		**Subtotal**	**151,872**	**22,781**	**26,198**	**200,851**		
2	North	I131014	I13124	I13129	Cherry Ave north of G St	8	10	172	0.0033	400	68,800	10,320	11,868	90,988	100	0
							Subtotal	**172**		**Subtotal**	**68,800**	**10,320**	**11,868**	**90,988**		
3	North	J171006	J17103	J17105	D St between Corona	8	12	361	0.0060	480	173,280	25,992	29,891	229,163	100	0
	North	J171007	J17105	J17104	Ave and Vineyard Ave	8	12	361	0.0060	480	173,112	25,967	29,862	228,941	100	0
							Subtotal	**722**		**Subtotal**	**346,392**	**51,959**	**59,753**	**458,103**		
4	North	J141077	J14163	J14170	Campus Ave north of	8	12	28	0.0170	480	13,248	1,987	2,285	17,520	100	0
	North	J141084	J14170	J14186	Holt Blvd	8	12	85	0.0140	480	40,800	6,120	7,038	53,958	100	0
							Subtotal	**113**		**Subtotal**	**54,048**	**8,107**	**9,323**	**71,478**		
5	North	H131048	H13126	H13139	Easement west of Euclid Ave from north of J St to easement south of G St	8	10	325	0.0030	400	130,000	19,500	22,425	171,925	100	0
	North	H131038	H13139	H13154		8	10	345	0.0060	400	138,000	20,700	23,805	182,505	100	0
	North	H131039	H13154	H13161		8	10	325	0.0030	400	130,000	19,500	22,425	171,925	100	0
	North	H131075	H13161	I13102		8	10	320	0.0030	400	128,000	19,200	22,080	169,280	100	0
	North	I131036	I13102	I13113		8	10	320	0.0030	400	128,000	19,200	22,080	169,280	100	0
	North	I131035	I13113	I13120		8	10	320	0.0020	400	128,000	19,200	22,080	169,280	100	0
	North	I131028	I13120	I13122		8	10	57	0.0053	400	22,720	3,408	3,919	30,047	100	0
	North	I131027	I13122	I13131		8	10	297	0.0098	400	118,920	17,838	20,514	157,272	100	0
	North	I131033	I13131	I13132		8	10	62	0.0060	400	24,664	3,700	4,255	32,618	100	0
	North	I131059	I13132	I13137		8	10	190	0.0075	400	76,000	11,400	13,110	100,510	100	0
	North	I131060	I13137	I13FI		8	10	46	0.0075	400	18,556	2,783	3,201	24,540	100	0
	North	I131062	I13FI	I13145		8	10	351	0.0075	400	140,400	21,060	24,219	185,679	100	0
							Subtotal	**2,958**		**Subtotal**	**1,183,260**	**177,489**	**204,112**	**1,564,861**		
6	West	I101005	H10135	I10108	Benson Ave between I St and G St	8	12	527	0.0183	480	252,912	37,937	43,627	334,476	100	0
	West	I101011	I10108	I10111		8	12	395	0.0184	480	189,600	28,440	32,706	250,746	100	0
	West	I101012	I10111	I10112		8	12	444	0.0184	480	213,024	31,954	36,747	281,724	100	0
							Subtotal	**1,366**		**Subtotal**	**655,536**	**98,330**	**113,080**	**866,946**		
7	North	J151018	J15114	J15125	Virginia Ave between D St and Nocta St	8	10	326	0.0041	400	130,200	19,530	22,460	172,190	80	20
	North	J151045	J15125	J15137		8	10	333	0.0041	400	133,120	19,968	22,963	176,051	80	20
							Subtotal	**658**		**Subtotal**	**263,320**	**39,498**	**45,423**	**348,241**		
8	South	R201064	R20119	R20122	Deer Creek Lp west of Laurel Tree Dr	10	15	129	0.0032	600	77,268	11,590	13,329	102,187	100	0
	South	R201051	R20122	R20129	Laurel Tree Dr between Deer Creek Lp and Riverside Dr	10	15	245	0.0052	600	146,718	22,008	25,309	194,035	100	0
	South	R201050	R20129	R20138		10	15	237	0.0052	600	142,014	21,302	24,497	187,814	100	0
	South	R201049	R20138	R20146		10	15	237	0.0052	600	142,200	21,330	24,530	188,060	100	0
	South	R201042	R20146	R20151		10	15	233	0.0120	600	139,800	20,970	24,116	184,886	99	1
	South	R201043	R20151	R20150		10	15	32	0.0076	600	19,200	2,880	3,312	25,392	99	1
	South	R201044	R20150	R20161		10	15	144	0.0040	600	86,544	12,982	14,929	114,454	99	1
							Subtotal	**1,256**		**Subtotal**	**753,744**	**113,062**	**130,021**	**996,826**		
9	North		J11132		Hollowell St, west of Boulder Ave		12	720		480	345,600	51,840	59,616	457,056	69	31
	North				Boulder Ave, Hollowell St to Holt Blvd		12	950		480	456,000	68,400	78,660	603,060	70	30
	North			J12198	Holt Blvd, east of Boulder Ave		12	680		480	326,400	48,960	56,304	431,664	70	30
							Subtotal	**2,350**		**Subtotal**	**1,128,000**	**169,200**	**194,580**	**1,491,780**		
10	North	J151033	J15145	J15155	Easement north of Holt Blvd, east of Allyn Ave	8	10	130	0.0081	400	51,800	7,770	8,936	68,506	89	11
							Subtotal	**130**		**Subtotal**	**51,800**	**7,770**	**8,936**	**68,506**		
11	South	R141017	R14156	R14155	Riverside Dr between Sultana Ave and Campus Ave	12	15	321	0.0011	600	192,360	28,854	33,182	254,396	89	11
	South	R141018	R14155	R14154		12	15	321	0.0011	600	192,366	28,855	33,183	254,404	84	16
	South	R141019	R14154	R14153		12	15	227	0.0016	600	136,200	20,430	23,495	180,125	80	20
	South	R141016	R14153	R14150		12	15	320	0.0011	600	192,240	28,836	33,161	254,237	76	24
	South	R141060	R14150	R14148		12	15	26	0.0016	600	15,420	2,313	2,660	20,393	76	24
							Subtotal	**1,214**		**Subtotal**	**728,586**	**109,288**	**125,681**	**963,555**		
12	North	I171011	I17103	I17104	Plaza Serena St Granada Ct to Vineyard Ave	8	12	153	0.0040	480	73,646	11,047	12,704	97,397	70	30
							Subtotal	**153**		**Subtotal**	**73,646**	**11,047**	**12,704**	**97,397**		
13	West	P161009	P16112	P16111	Philadelphia St between Parco Ave and Vineyard Ave	36	42	323	0.0005	1470	474,075	71,111	81,778	626,964	85	15
	West	P161010	P16111	P16109		36	42	330	0.0005	1470	485,100	72,765	83,680	641,545	85	15
	West	P161011	P16109	P16107		36	42	323	0.0005	1470	474,810	71,222	81,905	627,936	85	15
	West	P161012	P16107	P16105		36	42	312	0.0005	1470	458,640	68,796	79,115	606,551	85	15
	West	P161021	P16105	P16104		36	42	340	0.0005	1470	499,065	74,860	86,089	660,013	85	15
	West	P161022	P16104	P16103		36	42	327	0.0005	1470	479,955	71,993	82,792	634,740	85	15
	West	P161023	P16103	P16102		36	42	327	0.0005	1470	480,690	72,104	82,919	635,713	85	15
	West	P171003	P16102	P17132		36	42	326	0.0005	1470	479,749	71,962	82,757	634,468	85	15
	West	P171015	P17132	P17131		36	42	323	0.0005	1470	475,016	71,252	81,940	628,208	85	15
	West	P171018	P17131	P17130		36	42	325	0.0005	1470	477,015	71,552	82,285	630,852	85	15
	West	P171020	P17130	P17128		36	42	330	0.0005	1470	485,100	72,765	83,680	641,545	85	15
	West	P171021	P17128	P17126		36	42	309	0.0006	1470	453,789	68,068	78,279	600,136	85	15
							Subtotal	**3,893**		**Subtotal**	**5,723,004**	**858,451**	**987,218**	**7,568,673**		
14	North	J161027	J16135	J16137	Holt Blvd west of Imperial Ave	10	15	330	0.0026	600	197,700	29,655	34,103	261,458	62	38
	North	J161047	J16137	J16133		10	15	303	0.0026	600	181,800	27,270	31,361	240,431	61	39
							Subtotal	**633**		**Subtotal**	**379,500**	**56,925**	**65,464**	**501,889**		
15	North	K171005	K17104	K17107	Vineyard Ave south of Airport Dr	15	18	294	0.0061	720	211,968	31,795	36,564	280,328	69	31
	North	K171006	K17107	K17108		18	21	237	0.0024	735	173,982	26,097	30,012	230,091	69	31
	North	K171024	K17108	K17109	Easement west of	18	21	373	0.0020	735	274,008	41,101	47,266	362,376	69	31
	North	K171022	K17109	K17110	Vineyard Ave, south of	18	21	204	0.0019	735	149,859	22,479	25,851	198,189	69	31
	North	K171020	K17110	K17111	Airport Dr	18	21	419	0.0019	735	307,965	46,195	53,124	407,284	69	31
							Subtotal	**1,527**		**Subtotal**	**1,117,782**	**167,667**	**192,817**	**1,478,267**		

Table 9-1
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Construction Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
16	East	J211031	J21115	J21116	Guasti Rd between	8	12	342	0.0032	480	164,160	24,624	28,318	217,102	53	47
	East	J211030	J21116	J21117	Sequoia Ave and	8	12	199	0.0018	480	95,606	14,341	16,492	126,439	53	47
	East	J211036	J21117	J21118	Guasti Rd west of	8	15	139	0.0055	600	83,292	12,494	14,368	110,154	38	62
	East	J211029	J21118	J21120	Ponderosa Ave	8	15	340	0.0032	600	204,000	30,600	35,190	269,790	42	58
	East	J211028	J21120	J21122	Easement east of Haven Ave	8	15	135	0.0032	600	81,000	12,150	13,973	107,123	42	58
	East	J211027	J21122	J21123		8	15	326	0.0032	600	195,600	29,340	33,741	258,681	37	63
	East	J211017	J21123	J21124		8	15	254	0.0032	600	152,610	22,892	26,325	201,827	33	67
	East	J211042	J21124	J21132		8	15	67	0.0027	600	40,422	6,063	6,973	53,458	33	67
	East	J211043	J21132	J21128		8	15	198	0.0027	600	118,884	17,833	20,507	157,224	33	67
	East	J211019	J21128	J21125		8	15	198	0.0027	600	118,884	17,833	20,507	157,224	30	70
	East	J211016	J21125	J21126		8	15	326	0.0033	600	195,600	29,340	33,741	258,681	28	72
	East	J211041	J21126	J21127		8	15	158	0.0032	600	94,800	14,220	16,353	125,373	28	72
							Subtotal	**2,683**		**Subtotal**	**1,544,858**	**231,729**	**266,488**	**2,043,075**		
17	East	Proposed1	I23100	I23101	Mills Cir north of Mall Dr	-	15	40	0.1292	-	100,000	15,000	17,250	132,250	66	34
							Subtotal	**40**		**Subtotal**	**100,000**	**15,000**	**17,250**	**132,250**		
18	North	J171057	J17127	J17128	Holt Blvd east of	12	15	326	0.0009	600	195,600	29,340	33,741	258,681	55	45
	North	J171056	J17128	J17131	Vineyard Ave	12	15	326	0.0051	600	195,600	29,340	33,741	258,681	50	50
							Subtotal	**652**		**Subtotal**	**391,200**	**58,680**	**67,482**	**517,362**		
19	West	N141086	N14135	N14145	Bonview Ave north of	8	12	326	0.0060	480	156,480	23,472	26,993	206,945	39	61
	West	N141085	N14145	N14151	Francis St	8	12	254	0.0060	480	121,920	18,288	21,031	161,239	38	62
							Subtotal	**580**		**Subtotal**	**278,400**	**41,760**	**48,024**	**368,184**		
20	West	M161010	M16105	M16104	Acacia St west of Walker St	8	12	322	0.0023	480	154,685	23,203	26,683	204,571	17	83
	West	M161013	M16104	M16108	Easement between Acacia St and Locust St	8	12	296	0.0189	480	142,080	21,312	24,509	187,901	20	80
	West	M161017	M16108	M16109		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	M161016	M16109	M16110		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	N161002	M16110	N16100		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	20	80
	West	N161013	N16100	N16103		8	12	114	0.0050	480	54,677	8,202	9,432	72,310	20	80
	West	N161016	N16103	N16104	Locust St east of Parco Ave	8	12	90	0.0037	480	43,200	6,480	7,452	57,132	18	82
	West	N161012	N16104	N16105		8	12	326	0.0050	480	156,480	23,472	26,993	206,945	18	82
	West	N161011	N16105	N16108		8	12	326	0.0050	480	156,480	23,472	26,993	206,945	20	80
	West	N161017	N16108	N16999	Parco Ave between Locust St and Francis St	8	12	292	0.0050	480	140,160	21,024	24,178	185,362	18	82
	West	N169999	N16999	N16998		8	12	296	0.0050	480	142,080	21,312	24,509	187,901	18	82
	West	N169998	N16998	N16506		8	12	62	0.0050	480	29,760	4,464	5,134	39,358	17	83
	West	N161038	N16506	N16112		8	12	204	0.0050	480	98,078	14,712	16,919	129,709	17	83
	West	N161037	N16112	N16119		8	12	152	0.0050	480	72,960	10,944	12,586	96,490	17	83
							Subtotal	**3,369**		**Subtotal**	**1,616,880**	**242,532**	**278,912**	**2,138,324**		
21	West	O171058	O17121	O17142	Vineyard Ave south of Cedar St	8	12	349	0.0048	480	167,520	25,128	28,897	221,545	27	73
	West	O171057	O17142	O17152		8	12	347	0.0033	480	166,454	24,968	28,713	220,136	28	72
	West	O171047	O17152	O17153		8	12	95	0.0444	480	45,600	6,840	7,866	60,306	27	73
							Subtotal	**791**		**Subtotal**	**379,574**	**56,936**	**65,477**	**501,987**		
22	East	I181015	I18109	I18110	Inland Empire Blvd west of Archibald Ave	15	18	346	0.0028	720	249,120	37,368	42,973	329,461	1	99
	East	I181026	I18110	I18111		15	18	346	0.0028	720	249,120	37,368	42,973	329,461	1	99
	East	I181002	I18111	I19120		15	18	345	0.0028	720	248,530	37,279	42,871	328,680	1	99
	East	I191027	I19120	I19121		15	18	347	0.0028	720	249,710	37,457	43,075	330,242	1	99
	East	I191029	I19121	I19122	Easement between Inland Empire Blvd and Guasti Rd	15	21	216	0.0020	735	158,760	23,814	27,386	209,960	11	89
	East	I191022	I19122	I19123		15	21	283	0.0020	735	207,638	31,146	35,817	274,601	10	90
	East	J191006	I19123	J19102		15	21	735	0.0020	735	540,225	81,034	93,189	714,448	10	90
	East	J191016	J19102	J19103		15	21	104	0.0171	735	76,440	11,466	13,186	101,092	10	90
	East	J191027	J19103	J19105		15	21	323	0.0170	735	237,405	35,611	40,952	313,968	10	90
	East	J191018	J19105	J19106		15	21	233	0.0170	735	171,255	25,688	29,541	226,485	9	91
	East	J191017	J19106	J19107		15	21	54	0.0170	735	39,690	5,954	6,847	52,490	9	91
	East	J191019	J19107	J19111		15	21	113	0.0136	735	83,055	12,458	14,327	109,840	11	89
							Subtotal	**3,445**		**Subtotal**	**2,510,948**	**376,642**	**433,138**	**3,320,728**		
23	East	J191020	J19111	J19114	Easement south of Guasti Rd	15	21	223	0.0097	735	163,905	24,586	28,274	216,764	13	87
	East	J191021	J19114	J19118		15	21	229	0.0091	735	168,668	25,300	29,095	223,063	13	87
	East	J191022	J19118	J19132		15	21	228	0.0090	735	167,808	25,171	28,947	221,926	13	87
	East	J191052	J19132	J19133		15	21	204	0.0086	735	149,675	22,451	25,819	197,946	13	87
	East	J191051	J19133	J19134		15	21	95	0.0082	735	69,825	10,474	12,045	92,344	12	88
	East	J191003	J19134	K19101		18	21	284	0.0061	735	208,740	31,311	36,008	276,059	12	88
	East	K191008	K19101	K19104		18	21	298	0.0059	735	219,030	32,855	37,783	289,667	10	90
	East	K191007	K19104	K19105		18	21	125	0.0058	735	91,875	13,781	15,848	121,505	10	90
	East	K191006	K19105	K19106		18	21	9	0.0056	735	6,615	992	1,141	8,748	10	90
	East	K191005	K19106	K19108		18	21	85	0.0059	735	62,475	9,371	10,777	82,623	10	90
							Subtotal	**1,780**		**Subtotal**	**1,308,616**	**196,292**	**225,736**	**1,730,645**		
24	East	J191004	J20131	J19116	Old Guasti Rd west of Turner Ave	8	12	303	0.0045	480	145,200	21,780	25,047	192,027	18	82
	East	J191047	J19116	J19119		8	12	297	0.0044	480	142,416	21,362	24,567	188,345	16	84
	East	J191046	J19119	J19121		8	12	313	0.0045	480	150,384	22,558	25,941	198,883	14	86
	East	J191035	J19121	J19123		8	12	354	0.0048	480	169,776	25,466	29,286	224,529	12	88
	East	J191034	J19123	J19125		8	12	380	0.0042	480	182,544	27,382	31,489	241,414	11	89
	East	J191036	J19125	J19126		8	12	80	0.0054	480	38,400	5,760	6,624	50,784	10	90
							Subtotal	**1,727**		**Subtotal**	**828,720**	**124,308**	**142,954**	**1,095,982**		

Table 9-1
Old Model Colony Capital Improvement Projects

Project No.	Model	Pipe ID	U/S MH ID	D/S MH ID	Street Location	Existing Pipe Size (in)	Replace-ment Pipe Size (in)	Length (ft)	Existing Slope	Unit Cost ($/ft)	Construction Cost ($)	Contingency Cost ($)	Eng, Admin, Contingency Cost ($)	Total Cost ($)	% Existing Develop-ment	% Ultimate Develop-ment
25	East	K191002	K19108	K19109	Archibald Ave south of Airport Dr to south of Francis St	18	21	217	0.0035	735	159,208	23,881	27,463	210,553	10	90
	East	K191003	K19109	K19111		18	21	221	0.0038	735	162,435	24,365	28,020	214,820	10	90
	East	K191004	K19111	K19112		18	21	253	0.0038	735	185,955	27,893	32,077	245,925	10	90
	East	K191009	K19112	K19115		18	21	285	0.0035	735	209,475	31,421	36,134	277,031	10	90
	East	K191028	K19115	K19116		18	21	119	0.0035	735	87,465	13,120	15,088	115,672	10	90
	East	K191027	K19116	K19118		18	21	215	0.0035	735	158,025	23,704	27,259	208,988	10	90
	East	L191002	K19118	L19100		15	21	651	0.0128	735	478,257	71,739	82,499	632,495	10	90
	East	L191014	L19100	L19101		15	21	419	0.0120	735	307,965	46,195	53,124	407,284	10	90
	East	L191005	L19101	L19102		15	21	205	0.0120	735	150,624	22,594	25,983	199,200	10	90
	East	L191006	L19102	L19103		15	21	436	0.0132	735	320,460	48,069	55,279	423,808	10	90
	East	L191007	L19103	L19104		15	21	339	0.0084	735	249,165	37,375	42,981	329,521	10	90
	East	L191001	L19104	M19100		15	21	318	0.0085	735	233,730	35,060	40,318	309,108	10	90
	East	M191008	M19100	M19102		15	21	331	0.0085	735	243,285	36,493	41,967	321,744	10	90
	East	M191011	M19102	M19104		15	21	326	0.0085	735	239,610	35,942	41,333	316,884	10	90
	East	M191014	M19104	M19106		15	21	329	0.0113	735	241,815	36,272	41,713	319,800	10	90
	East	M191018	M19106	M19108		15	21	343	0.0130	735	252,105	37,816	43,488	333,409	10	90
	East	M191019	M19108	M19110	Archibald Ave south of Airport Dr to south of Francis St	15	21	326	0.0129	735	239,610	35,942	41,333	316,884	11	89
	East	M191002	M19110	N19101		15	21	351	0.0130	735	257,985	38,698	44,502	341,185	11	89
	East	N191010	N19101	N19105		15	21	272	0.0132	735	199,949	29,992	34,491	264,433	11	89
	East	N191011	N19105	N19107		15	21	61	0.0158	735	45,107	6,766	7,781	59,654	11	89
	East	N191021	N19107	N19108		15	21	242	0.0129	735	177,583	26,638	30,633	234,854	11	89
	East	N191022	N19108	N19109		15	21	363	0.0129	735	267,077	40,062	46,071	353,209	11	89
	East	N191023	N19109	N19110		15	21	326	0.0073	735	239,610	35,942	41,333	316,884	11	89
	East	N191024	N19110	N19112		15	21	319	0.0130	735	234,480	35,172	40,448	310,099	11	89
	East	N191033	N19112	N19118		15	21	25	0.0332	735	18,375	2,756	3,170	24,301	11	89
	East	N191003	N19118	O19102		15	21	314	0.0115	735	231,011	34,652	39,849	305,511	11	89
	East	O191028	O19102	O19107		15	21	253	0.0079	735	185,654	27,848	32,025	245,527	12	88
	East	O191016	O19107	O19106	Easement between Archibald Ave and west side of Cucomonga Creek	18	30	322	0.0016	1050	337,764	50,665	58,264	446,693	11	89
	East	O191017	O19106	O19114		18	30	186	0.0016	1050	195,153	29,273	33,664	258,090	11	89
	East	O191018	O19114	O19113		18	30	291	0.0016	1050	305,550	45,833	52,707	404,090	11	89
	East	O191006	O19113	O18106		18	30	250	0.0016	1050	262,500	39,375	45,281	347,156	11	89
	East	O181079	O18106	O18105		18	30	387	0.0016	1050	406,350	60,953	70,095	537,398	12	88
	East	O181025	O18105	O18103		18	30	121	0.0016	1050	127,050	19,058	21,916	168,024	12	88
	East	O181012	O18103	O18102		18	30	177	0.0016	1050	185,703	27,855	32,034	245,592	12	88
	East	O181016	O18102	O18108	Easement west of Cucamonga Creek	18	30	310	0.0016	1050	325,647	48,847	56,174	430,668	12	88
	East	O181015	O18108	O18118		18	30	311	0.0016	1050	326,162	48,924	56,263	431,349	12	88
	East	O181075	O18118	O18117	Easement between Cucamonga Creek and Hellman Ave	18	30	356	0.0016	1050	374,189	56,128	64,548	494,864	12	88
	East	O181014	O18117	O18116		18	30	356	0.0016	1050	373,800	56,070	64,481	494,351	12	88
	East	O181013	O18116	O18115		18	30	356	0.0016	1050	374,094	56,114	64,531	494,739	12	88
							Subtotal	**11,281**		**Subtotal**	**9,369,981**	**1,405,497**	**1,616,322**	**12,391,799**		
26	East	O181027	O18115	O18124	Hellman Ave between Cedar St and Philadelphia St	18	30	40	0.0047	1050	42,000	6,300	7,245	55,545	13	87
	East	O181084	O18124	O18130		18	30	287	0.0048	1050	301,350	45,203	51,983	398,535	13	87
	East	O181098	O18130	O18135		18	30	75	0.0046	1050	78,750	11,813	13,584	104,147	13	87
	East	O181087	O18135	O18148		18	30	235	0.0050	1050	246,855	37,028	42,582	326,466	13	87
	East	O181004	O18148	P18101		18	30	369	0.0022	1050	386,925	58,039	66,745	511,708	13	87
	East	P181019	P18101	P18108		18	30	263	0.0022	1050	276,423	41,463	47,683	365,569	13	87
	East	P181007	P18108	P18107	Philadelphia St west of Hellman Ave	18	30	333	0.0014	1050	350,070	52,511	60,387	462,968	13	87
	East	P181008	P18107	P18106		18	30	336	0.0014	1050	352,800	52,920	60,858	466,578	13	87
	East	P181011	P18106	P18105		18	30	251	0.0014	1050	263,025	39,454	45,372	347,851	13	87
	East	P181016	P18105	P18133		18	30	249	0.0014	1050	261,450	39,218	45,100	345,768	13	87
	East	P181060	P18133	P18132		18	30	74	0.0112	1050	77,700	11,655	13,403	102,758	13	87
							Subtotal	**2,512**		**Subtotal**	**2,637,348**	**395,602**	**454,943**	**3,487,893**		
27	East	O201020	O20118	O20119	Turner Ave north of Cedar St	10	15	9	0.0078	-	100,000	15,000	17,250	132,250	19	81
							Subtotal	**9**		**Subtotal**	**100,000**	**15,000**	**17,250**	**132,250**		
							Total	**46,329**		**Total**	**33,745,815**	**5,061,872**	**5,821,153**	**44,628,841**		

STATE ST
MISSION BLVD
PHILLIPS ST
FRANCIS ST
PHILADELPHIA ST
BENSON AVE
MAGNOLIA AVE
CYPRESS AVE
SR-60
WALNUT ST
RIVERSIDE DR
FERN ST
EUCLID AVE
CHINO AVE
SCHAEFER AVE
EDISON AVE
EUCALYPTUS AVE
MERRILL AVE
CUCAMONGA CREEK
ONTARIO BLVD
MISSION BLVD
CEDAR ST
SULTANA AVE
CAMPUS AVE
BON VIEW AVE
CUCAMONGA AVE
GROVE AVE
PARCO AVE
WALKER AVE
BAKER AVE
VINEYARD AVE
CARPENTER AVE
ARCHIBALD AVE
TURNER AVE
HAVEN AVE
MILLIKEN AVE
SUMNER AVE
CLEVELAND AVE.
I-15 FWY
WINEVILLE AVE
VINTAGE AVE
JURUPA ST

City of Fontana

City of Chino

Riverside County

Upland Interceptor Relief
Cucamonga Trunk
Cucamonga Trunk Relief
Fontana Interceptor Relief
Fontana Interceptor

Magnolia PS
Haven PS
RP-1
RP-5

Colony HS

Walker Ave Trunk Sewer
Haven Ave Trunk Sewer
Cleveland Ave Trunk Sewer
Edison Ave Trunk Sewer
Euclid Ave Trunk Sewer
Bon View Ave Trunk Sewer
Grove Ave Trunk Sewer
Western Trunk Sewer
Carpenter Ave Trunk Sewer
Eastern Trunk Sewer
Eucalyptus Ave Trunk Sewer
Merrill Ave Trunk Sewer
Bellgrave Ave Trunk Sewer
Kimball Interceptor

A70 B50 C50 D70
A60 B40 C40 D60
A50 B30 C30 D50
A40 B20 C20 D40
A30 B10 C10 D10
A20
A10
D120 D110 D100A D100 D90 D150 D165 D170
E680 E620 E560 E380
F10 F40 F50
G90 G80 G70 G65 G60 G50 G40 G35 G25 G20 G10
H70 H60 H50 H40 H30 H20 H10

Legend

- City Boundary
- Magnolia PS Tributary Area
- Haven PS Tributary Area - Future NMC Service Area
- Not Served by City of Ontario
- NMC Service Area
- Regional Wastewater Treatment Plant
- Manholes
- Regional Connections to IEUA Trunks Sewer
- City of Ontario Sewer Pump Station
- City of Ontario Force Main
- City of Ontario Sewer
- IEUA/City of Ontario RP-1 Bypass Sewer - Joint Facility
- IEUA/City of Ontario Eastern Trunk Sewer - Joint Facility
- IEUA Kimball Interceptor Extension
- Proposed Western Trunk Sewer
- Inland Empire Utilities Agency (IEUA) Sewer
- Proposed City of Ontario NMC Sewer
- Private Forcemain
- Private Sewer Pump Station

N

0 1,750 3,500 7,000 Feet

CITY OF ONTARIO
SEWER MASTER PLAN UPDATE

Proposed New Model Colony Capital Improvement Projects

Figure 9-2

PROJECT NO: 1000952.00
DATE: April 2012

Table 9-2
New Model Colony Proposed Sewer System

Pipe ID	U/S MH ID	D/S MH ID	Street Location	Proposed Pipe Size (in)	Length (ft)	Estimated Slope	Unit Cost ($/ft)	Cons. Cost ($)	Contingency Cost ($)	Engineering & Admin. Cost ($)	Total Cost ($)	% OMC	% NMC
D120	D120	D110	Carpenter Ave	18	2,528	0.0063	378	955,673	95,567	157,686	1,208,926	100	0
D110	D110	D100A		21	2,650	0.0094	357	946,082	94,608	156,104	1,196,794	84	16
D100A	D100A	D60	Schaefer Ave	30	3,852	0.0013	510	1,964,483	196,448	324,140	2,485,071	84	16
D60	D60	D50		30	2,640	0.0114	510	1,346,187	134,619	222,121	1,702,926	64	36
D50	D50	D40		30	2,639	0.0072	510	1,346,141	134,614	222,113	1,702,868	55	45
D40	D40	D30	Walker Ave	30	1,291	0.0047	510	658,242	65,824	108,610	832,676	51	49
D30	D30	D20		30	950	0.0056	510	484,372	48,437	79,921	612,731	51	49
D20	D20	D10		30	376	0.0121	510	191,727	19,173	31,635	242,535	51	49
D10	D10	C10		30	2,636	0.0025	510	1,344,288	134,429	221,807	1,700,524	49	51
C10	C10	B10	Merrill Ave	36	2,651	0.0026	612	1,622,386	162,239	267,694	2,052,319	35	65
B10	B10	A30		36	4,170	0.0028	612	2,552,029	255,203	421,085	3,228,317	25	75
A30	A30	A20		36	2,655	0.0105	612	1,624,780	162,478	268,089	2,055,347	19	81
A20	A20	A10	Euclid Ave	36	2,521	0.0056	612	1,542,828	154,283	254,567	1,951,678	19	81
Western Trunk Sewer				**Subtotal**	**31,558**			**16,579,219**	**1,657,922**	**2,735,571**	**20,972,713**		
F40	F40	E620	Eucalyptus Ave	15	3,900	0.0044	315	1,228,500	122,850	202,703	1,554,053	0	100
Eucalyptus Avenue Trunk Sewer				**Subtotal**	**3,900**			**1,228,500**	**122,850**	**202,703**	**1,554,053**		
G40	G40	F10		27	2,960	0.0025	459	1,358,640	135,864	224,176	1,718,680	68	32
F10	F10	E680	Edison Ave	30	2,762	0.0020	510	1,408,450	140,845	232,394	1,781,689	64	36
Edison Avenue Trunk Sewer				**Subtotal**	**5,722**			**2,767,090**	**276,709**	**456,570**	**3,500,368**		
G90	G90	G80		18	1,556	0.0095	378	588,092	58,809	97,035	743,936	100	0
G80	G80	G70		21	2,419	0.0111	357	863,549	86,355	142,486	1,092,390	100	0
G70	G70	G65		21	2,620	0.0078	357	935,340	93,534	154,331	1,183,205	94	6
G65	G65	G60	Haven Ave	21	1,440	0.0131	357	513,982	51,398	84,807	650,187	94	6
G60	G60	G50		21	2,632	0.0092	357	939,624	93,962	155,038	1,188,624	73	27
G50	G50	G40		21	1,304	0.0086	357	465,528	46,553	76,812	588,893	73	27
Haven Avenue Trunk Sewer				**Subtotal**	**11,970**			**4,306,115**	**430,612**	**710,509**	**5,447,236**		
H70	H70	H60		12	1,016	0.0100	252	255,947	25,595	42,231	323,773	0	100
H60	H60	H50		12	1,325	0.0116	252	333,900	33,390	55,094	422,384	0	100
H50	H50	H40		12	1,328	0.0088	252	334,656	33,466	55,218	423,340	0	100
H40	H40	H30	Cleveland Ave	15	2,665	0.0086	315	839,475	83,948	138,513	1,061,936	0	100
H30	H30	H20		15	1,263	0.0079	315	397,845	39,785	65,644	503,274	0	100
H20	H20	H10		18	1,560	0.0076	378	589,664	58,966	97,295	745,925	0	100
H10	H10	G10		24	2,879	0.0009	408	1,174,434	117,443	193,782	1,485,659	0	100
G10	G10	F50	Merrill Ave	24	2,829	0.0033	408	1,154,127	115,413	190,431	1,459,971	0	100
F50	F50	E560		24	2,190	0.0032	408	893,536	89,354	147,433	1,130,323	0	100
G35	G35	G25		12	2,521	0.0058	252	635,168	63,517	104,803	803,487	0	100
G25	G25	G20	Sumner Ave	12	1,149	0.0084	252	289,456	28,946	47,760	366,162	0	100
G20	G20	G10		12	1,694	0.0094	252	426,888	42,689	70,437	540,013	0	100
Cleveland, Bellgrave, Merrill Ave Trunk Sewer				**Subtotal**	**22,417**			**7,325,095**	**732,510**	**1,208,641**	**9,266,246**		
D70	D70	D60	Walker Ave	12	2,624	0.0050	252	661,305	66,130	109,115	836,550	0	100
Walker Avenue Trunk Sewer				**Subtotal**	**2,624**			**661,305**	**66,130**	**109,115**	**836,550**		
C50	C50	C40		12	2,643	0.0095	252	666,146	66,615	109,914	842,674	0	100
C40	C40	C30	Grove Ave	15	2,643	0.0095	315	832,632	83,263	137,384	1,053,280	0	100
C30	C30	C20		18	2,632	0.0061	378	994,870	99,487	164,153	1,258,510	0	100
C20	C20	C10		18	2,670	0.0090	378	1,009,395	100,939	166,550	1,276,884	0	100
Grove Avenue Trunk Sewer				**Subtotal**	**10,589**			**3,503,042**	**350,304**	**578,002**	**4,431,349**		
B50	B50	B40		12	2,647	0.0109	252	667,161	66,716	110,082	843,959	0	100
B40	B40	B30	Bon View Ave	15	2,635	0.0089	315	830,130	83,013	136,972	1,050,115	0	100
B30	B30	B20		18	2,628	0.0094	378	993,375	99,337	163,907	1,256,619	0	100
B20	B20	B10		18	2,655	0.0076	378	1,003,554	100,355	165,586	1,269,495	0	100
Bon View Avenue Trunk Sewer				**Subtotal**	**10,566**			**3,494,220**	**349,422**	**576,546**	**4,420,189**		
A70	A70	A60		12	2,646	0.0120	252	666,785	66,679	110,020	843,484	0	100
A60	A60	A50	Euclid Ave	15	2,627	0.0088	315	827,558	82,756	136,547	1,046,860	0	100
A50	A50	A40		18	2,646	0.0091	378	1,000,082	100,008	165,014	1,265,104	0	100
A40	A40	A30		18	2,669	0.0112	378	1,008,784	100,878	166,449	1,276,112	0	100
Euclid Avenue Trunk Sewer				**Subtotal**	**10,588**			**3,503,210**	**350,321**	**578,030**	**4,431,560**		
D100	D100	D90		12	2,322	0.0078	252	585,144	58,514	96,549	740,207	0	100
D150	D90	D150		15	2,637	0.0076	315	830,566	83,057	137,043	1,050,667	0	100
D160	D150	D165	Carpenter Ave	18	2,615	0.0077	378	988,297	98,830	163,069	1,250,196	0	100
D170	D165	D170		18	2,494	0.0108	378	942,732	94,273	155,551	1,192,556	0	100
D180	D170	E380		18	1,237	0.0125	378	467,586	46,759	77,152	591,496	0	100
Carpenter Avenue Trunk Sewer				**Subtotal**	**11,304**			**3,814,325**	**381,433**	**629,364**	**4,825,122**		
				Total	**121,238**		**Total**	**47,182,122**	**4,718,212**	**7,785,050**	**59,685,384**		

9-4 Old Model Colony Capital Improvement Project Descriptions

Project No. 1 through 11 - The first eleven projects consist of facilities identified with existing dry weather capacity deficiencies. Flow monitoring is recommended prior to project implementation.

Project No. 1 (Easement between Boulder Avenue and San Antonio Avenue, north and south of Hollowell Street)

Project No. 1 encompasses two sections of pipe in an easement located between Boulder Avenue and San Antonio Avenue (Manhole J12119 to Manhole J12125). There is about 316 feet of 8-inch pipe north and south of Hollowell Street that was shown to surcharge in the hydraulic model and flow monitoring data. It is recommended to replace this sewer with 12-inch pipe.

The estimated cost for Project No. 1 is $200,800.

Project No. 2 (Cherry Avenue north of G Street)

Project No. 2 is 172 feet of 8-inch sewer located on Cherry Avenue, north of G Street (Manhole I13124 to Manhole I13129). The existing hydraulic model showed this sewer to be surcharged under peak dry weather conditions.

It should be noted that the invert and slope information used in the analysis was obtained from data generated during the City's development of its 1995 Sewer Master Plan. The City's GIS did not have invert information for these reaches and as-built plans were not located. It is recommended that the inverts be verified through survey and that the reach be flow monitored prior to design and implementation of a replacement sewer.

The recommended replacement size is 10-inches. The estimated cost for Project No. 2 is $91,000.

Project No. 3 (D Street, Corona Avenue to Vineyard Avenue)

Project No. 3 is 722 feet of 8-inch sewer located on D Street from Corona Avenue to Vineyard Avenue (Manhole J17103 to Manhole J17104). The existing hydraulic model showed this sewer to be surcharged under peak dry weather conditions. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 3 is $458,100.

Project No. 4 (Campus Avenue, north of Holt Boulevard)

Project No. 4 is 113 feet of 8-inch sewer located on Campus Avenue north of Holt Boulevard (Manhole J14163 to Manhole 14186). The existing hydraulic model showed this sewer to be surcharged under peak dry weather conditions. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 4 is $71,500.

Project No. 5 (Easement between Vine Avenue and Euclid Avenue, north of J Street to easement south of G Street to Fern Avenue)

Project No. 5 is located in an easement between Vine Avenue and Euclid Avenue. The existing 8-inch sewer starts at Manhole H13126, north of J Street and continues south past G Street before turning west to Manhole I13145 on Fern Avenue. The system hydraulic model showed existing peak dry weather depth to diameter ratios from 0.67 to full. The total length of pipe is approximately 2,958 feet. It is recommended to replace the existing 8-inch sewer with 10-inch pipe.

The estimated cost for Project No. 5 is $1,564,900.

Project No. 6 (Benson Avenue, I Street to G Street)

Project No. 1 is located in Benson Avenue between I Street (Manhole H10135) and G Street (Manhole I10112).

The hydraulic model showed the 8-inch sewers in Benson Avenue to surcharge under existing peak dry weather conditions. The total length of the project is approximately 1,366 feet. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 6 is $866,900.

Project No. 7 (Virginia Avenue, D Street to Nocta Street)

Project No. 7 includes 658 feet of sewer on Virginia Avenue from D Street to Nocta Street (Manhole J15114 to Manhole J15137). The hydraulic model showed this 8-inch sewer with depth to diameter ratios ranging from 0.63 to 0.70 under existing peak dry weather conditions. The recommended replacement pipe size is 10-inches.

The estimated cost for Project No. 7 is $348,200.

Project No. 8 (Deer Creek Loop and Laurel Tree Drive)

Project No. 8 is 1,256 feet of sewer located in Deer Creek Loop and Laurel Tree Drive, from Deer Creek Loop to Riverside Drive (Manhole R20119 to Manhole R20161). The hydraulic model showed depth to diameter ratios ranging from 0.52 to 0.77 under existing peak dry weather conditions in the existing 10-inch sewer. The recommended replacement pipe size is 15-inches.

The estimated cost for Project No. 8 is $996,800.

Project No. 9 (Easements and Boulder Avenue south of Hollowell Street)

The Old Model Colony Sewer Master Plan study completed in November of 2008, identified deficient sewers in sewers in the vicinity of Mountain Avenue, Brooks Street and easements, east of Cypress Avenue. One of the existing manholes in Brooks Street is very shallow and was known to surcharge. The City had a smart manhole cover installed at this location and operations constructed an overflow pipe to the adjacent sewer in Brooks Street to prevent any overflows.

In April 2010, the Brooks Street Sewer Feasibility Study was completed (see Appendix J). This study examined the effects of diverting flows at various locations upstream of the capacity deficient Brooks Street sewer. Several alternatives were modeled. The City ultimately diverted flow south in Benson Avenue just north of Stoneridge Court (Manhole J10141). This alleviated the flow to Brooks Street and flow monitoring resulted in a maximum depth to diameter ratio of about 0.54. The City also attempted to divert flow south at Hollowell Street east of Mountain Avenue (Manhole J11132), but were unable to do it due to surcharging in the existing downstream sewers.

The diversion in Benson Avenue was implemented in the existing hydraulic model and the analysis for this master plan study. Existing conditions did not result in capacity deficiencies in the Brooks Street area. Ultimate conditions revealed deficiencies in Hollowell Street, Mountain Avenue, Brooks Street, and State Street. The depth to diameter ratio of these sewers were calculated to range from 0.65 to full under ultimate peak dry weather conditions.

Several alternatives were looked at that included diversion of flows an upsizing pipes in various locations. Per discussions with City staff, the recommendation of this master plan is to divert the flow at Manhole J11132 (Hollowell St east of Mountain Ave) to the east. The flow would be conveyed in a new 12-inch sewer that will convey flow east to Boulder Avenue, south to Holt Boulevard, and then east to the upstream end of the recently constructed Holt Trunk Sewer. Per the hydraulic model, 0.1816 mgd average dry weather flow would be diverted to the upstream end of the Holt Trunk Sewer. With this extra flow added to the Holt Trunk Sewer, the maximum peak dry weather d/D ratio is expected to be 0.52. It is therefore concluded that the Holt Trunk Sewer has sufficient capacity to carry the diverted flow.

The total length of pipe of Project No. 9 is estimated at approximately 2,350 feet. A preliminary look at as-built sewer drawings revealed about 16 feet of drop between manhole J11132 and the first manhole of the Holt Trunk Sewer (J12198). On average, this would result in a slope of about 0.0068.

The estimated cost for Project No. 9 is $1,491,800.

Project No. 10 (Easement north of Holt Boulevard and east of Allyn Avenue)

Project No. 10 includes 130 feet of pipe from Manhole J15145 to Manhole J15155. Flow monitoring data showed an existing peak dry weather depth to diameter ratio of 0.66. It is recommended to replace the existing 8-inch pipe with 10-inch pipe.

The estimated cost for Project No. 10 is $68,500.

Project No. 11 (Riverside Drive, Sultana Avenue to Campus Avenue)

Project No. 11 is 1,214 feet of 12-inch sewer located on Riverside Drive from Sultana Avenue to Campus Avenue (Manhole R14156 to Manhole R14148). The hydraulic model showed depth to diameter ratios ranging from 0.67 to 0.76 under ultimate peak dry weather conditions. The recommended replacement pipe size is 15-inches.

The estimated cost for Project No. 11 is $963,600.

Project No. 12 through 27 - The remaining projects consist of facilities that have calculated ultimate capacity deficiencies but are currently considered adequate under existing peak dry weather conditions. Flow monitoring is recommended prior to project implementation. When the measured peak flows exceed the pipe capacity (d/D = 0.64 during peak dry weather conditions), the projects should be reprioritized.

These projects are highly dependent on new developments and redevelopment up to General Plan density levels. As new development and redevelopment projects are implemented, the depths and flows in the downstream sewers should be evaluated to determine whether or not the projects will cause capacity deficiencies. Flow monitoring is highly recommended for detailed project studies.

The order in which these projects are constructed are dependent on the timing of new development projects and redevelopment projects.

Project No. 12 (Plaza Serena Street, Granada Court to Vineyard Avenue)

Project No. 12 is 153 feet of 8-inch sewer located on Plaza Serena Street from Granada Court to Vineyard Avenue (Manhole I17103 to Manhole I17104). The hydraulic model showed a depth to diameter ratio of 0.81 under ultimate peak dry weather conditions. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 12 is $97,400.

Project No. 13 (Philadelphia Street, Parco Avenue to Vineyard Avenue)

Project No. 13 is 3,893 feet of sewer located on Philadelphia Street from Parco Avenue to Vineyard Avenue (Manhole P16112 to Manhole P17126). The hydraulic model showed depth to diameter ratios ranging from 0.62 to 0.65 under ultimate peak dry weather conditions in the existing 36-inch sewer. The recommended replacement pipe size is 42-inches. It should be noted that further studies may be necessary to identify and evaluate alternative projects such as parallel pipes and/or diversions.

The estimated cost for Project No. 13 is $7,568,700.

Project No. 14 (Holt Boulevard, west of Imperial Avenue)

Project No. 14 is 633 feet of 10-inch sewer located on Holt Boulevard west of Imperial Avenue (Manhole J16135 to Manhole J16133). The hydraulic model showed depth to diameter ratios of 0.78 to 0.80 under ultimate peak dry weather conditions. The recommended replacement pipe size is 15-inches.

The estimated cost for Project No. 14 is $501,900.

Project No. 15 (Vineyard Avenue south of Airport Drive and Easement)

Project No. 15 is 1,527 feet of 15-inch and 18-inchsewer located in Vineyard Avenue south of Airport Drive (Manhole K17104 to Manhole K17108) and in an adjacent easement (Manhole K17108 to Manhole K17111). The hydraulic model showed a depth to diameter ratio ranging from

0.69 to 0.76 under ultimate peak dry weather conditions. It is recommended to replace the sewer with 294 feet of 18-inch pipe and 1,233 feet of 21-inch pipe.

The estimated cost for Project No. 15 is $1,478,300.

Project No. 16 (Guasti Road and Easement east of Haven Avenue)

Project No.16 is 2,683 feet of 8-inch sewer located on Guasti Road and an easement east of Haven Avenue (Manhole J21115 to Manhole J21127). The hydraulic model showed depth to diameter ratios ranging from 0.71 to full under ultimate peak dry weather conditions. It is recommended to replace the sewer with 541 feet of 12-inch pipe and 2,142 feet of 15-inch pipe.

The estimated cost for Project No. 16 is $2,043,100.

Project No. 17 (Mills Circle north of Mall Drive)

Project No. 17 is a proposed 15-inch sewer connection between existing Manhole I123100 and Manhole I123101. The project is located on Mills Circle north of Mall Drive. It would tie together an existing 10-inch and an existing 15-inch sewer in Mills Circle, diverting some of the flow to the 15-inch sewer and eliminating downstream deficiencies identified in the 10-inch sewer.

The estimated cost for Project No. 17 is set at $132,300. The unit cost was not implemented in this case due to the short length of pipe.

Project No. 18 (Holt Boulevard east of Vineyard Avenue)

Project No. 18 is 652 feet of 12-inch sewer located Holt Boulevard east of Vineyard Avenue (Manhole J17127 to Manhole J17131). The hydraulic model showed a depth to diameter ratio of 0.76 under ultimate peak dry weather conditions. The recommended replacement pipe size is 15-inches.

The estimated cost for Project No. 18 is $517,400.

Project No. 19 (Bonview Avenue north of Francis Street)

Project No. 19 includes 580 feet of 8-inch sewer on Bonview Avenue north of Francis Street (Manhole N14135 to Manhole N14151). The hydraulic model showed a depth to diameter ratio ranging from 0.70 to 0.72 under ultimate peak dry weather conditions. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 19 is $368,200.

Project No. 20 (Acacia Street, Easement to Locust Street, Locust Street, Parco Avenue)

Project No. 20 is located on Acacia Street, an easement, Locust Street, and Parco Avenue (Manhole M16105 to Manhole N16119). It includes about 3,369 feet of pipe. The hydraulic model showed depth to diameter ratios ranging from 0.41 to full under ultimate peak dry weather conditions in the existing 8-inch sewer. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 20 is $2,138,300.

Project No. 21 (Vineyard Avenue south of Cedar Street)

Project No. 21 is 791 feet of 8-inch sewer located on Vineyard Avenue south of Cedar Street (Manhole O17121 to Manhole O17153). The hydraulic model showed a depth to diameter ratio of 0.74 under ultimate peak dry weather conditions. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 21 is $502,000.

Project No. 22 (Easements and Inland Empire Boulevard)

Project No. 22 is 3,445 feet of 15-inch sewer located in Inland Empire Boulevard and adjacent easements (Manhole I18109 to Manhole J19111). The hydraulic model showed depth to diameter ratios ranging from 0.49 to full under ultimate peak dry weather conditions. The recommended replacement includes 1384 feet of 18-inch sewer, and 2061 feet of 21-inch sewer.

The estimated cost for Project No. 22 is $3,320,700.

Project No. 23 (Easement south of Guasti Road)

Project No. 23 is 1,780 feet of 15-inch sewer located in an easement south of Guasti Road (Manhole J19111 to Manhole K19108). The hydraulic model showed depth to diameter ratios ranging from 0.55 to 0.69 under ultimate peak dry weather conditions. The recommended replacement pipe size is 21-inches.

The estimated cost for Project No. 23 is $1,730,600.

Project No. 24 (Old Guasti Road west of Turner Avenue)

Project No. 24 is 1,727 feet of 8-inch sewer located on Old Guasti Road west of Turner Avenue (Manhole J20131 to Manhole J19126). The hydraulic model showed depth to diameter ratios ranging from 0.71 to full under ultimate peak dry weather conditions. The recommended replacement pipe size is 12-inches.

The estimated cost for Project No. 24 is $1,096,000.

Project No. 25 (Archibald Avenue, Easement from Archibald Avenue to Hellman Avenue)

Project No. 25 includes 11,281 feet of 15-inch and 18-inch sewer on Archibald Avenue and an easement from Archibald Avenue to Hellman Avenue (Manhole K191002 to Manhole O18115). The hydraulic model showed depth to diameter ratios ranging from 0.66 to full under ultimate peak dry weather conditions. It is recommended to replace the sewer with 7,858 feet of 21-inch pipe and 3,423 feet of 30-inch pipe.

The estimated cost for Project No. 25 is $12,391,800.

This project requires replacement or parallel pipe to be constructed across the airport runway, which may not be logistically feasible. A feasibility study should be conducted prior to design of

improvements. Alternative possiblities include connections to IEUA's Archibald Trunk Sewer in Archibald Avenue at Inland Empire Boulevard. This alternative may require a lift station.

Project No. 26 (Hellman Avenue and Philadelphia Street)

Project No. 26 is 2,512 feet of sewer located on Hellman Avenue and Philadelphia Street (Manhole O18115 to Manhole P187104A). The hydraulic model showed these 18-inch sewers to surcharge under ultimate peak dry weather conditions. The recommended replacement pipe size is 30-inches.

The estimated cost for Project No. 26 is $3,487,900.

Project No. 27 (Turner Avenue, north of Cedar Avenue)

Project No. 27 is 9 feet of 10-inch sewer located on Turner Avenue north of Cedar Avenue (Manhole O20118 to Manhole O20119). The hydraulic model showed a depth to diameter ratio of 0.67 under ultimate peak dry weather conditions.

The City's existing GIS shows a 10-inch and a 15-inch sewer upstream of this project location. Both sewers converge an Manhole O20118 into one 10-inch sewer just before discharging flow to a regional IEUA trunk sewer. It is recommended that the pipe size of this reach be verified prior to project implementation.

The recommended replacement pipe size is 15-inches. The estimated cost for Project No. 27 is set at $132,300. The unit cost was not implemented in this case due to the short length of pipe.

9-5 New Model Colony Capital Improvement Project Descriptions

Western Trunk Sewer

The Western Trunk Sewer is a gravity sewer that will extend from the intersection of Riverside Drive and Carpenter Avenue to IEUA's Kimball Interceptor. The general alignment of this trunk sewer is shown on Figure 9-2. It begins at the intersection of Riverside Drive and Carpenter Avenue; travels south in Carpenter Avenue to Schaefer Avenue; west to Walker Avenue; south to Merrill Avenue; west to Euclid Avenue; and south to the connection with IEUA's Kimball Interceptor at Kimball Avenue. The stub-out at the Kimball Interceptor is 36 inches in diameter and has an invert elevation of 578.6 feet amsl. The estimated pipe sizes of the Western Trunk Sewer range from 18-inches to 36-inches in diameter. The total length of pipe is about 31,558 linear feet. Approximately 1,770 acres of the existing City service area is tributary to the Western Trunk Sewer.

The estimated cost of this project is approximately $20,972,700.

Eucalyptus Avenue Trunk Sewer

The Eucalyptus Avenue Trunk Sewer consists of 3,900 feet of 15-inch diameter pipe in Eucalyptus Avenue, east of Archibald Avenue. This project will tie into the Eastern Trunk Sewer at Archibald Avenue.

The estimated cost of this project is approximately $1,554,100.

Edison Avenue Trunk Sewer

The Edison Trunk Sewer is 5,722 feet of 12-inch, 27-inch, and 30-inch diameter pipe in Edison Avenue extending east from Archibald Avenue. This project will outlet into the Eastern Trunk Sewer at the intersection of Edison Avenue and Archibald Avenue.

The estimated cost of this project is approximately $3,500,400.

Haven Avenue Trunk Sewer

The Haven Pump Station can be eliminated from the City's system by constructing a gravity sewer from the pump station south to Edison Avenue and west to Archibald Avenue. At Archibald Avenue, the sewer will tie into the Eastern Trunk Sewer. The flows generated east of Haven Avenue and currently tributary to the Turner Pump Station will be intercepted at the intersection of Haven Avenue and Riverside Drive and diverted to the Haven Trunk Sewer upon its construction.

The Haven Trunk Sewer consists of 11,970 feet of 12-inch to 21-inch diameter pipe in Haven Avenue and Chino Avenue. The estimated cost of this project is approximately $5,447,200.

Cleveland, Bellgrave, Merrill Avenue Trunk Sewer

The Cleveland, Bellgrave, Merrill Avenue Trunk Sewer consists of 22,417 feet of 12-inch to 24-inch diameter pipe. This project will outlet into the Eastern Trunk Sewer at the intersection of Merrill Avenue and Archibald Avenue.

The estimated cost of this project is approximately $9,266,200.

Walker Avenue Trunk Sewer

The Walker Avenue Trunk Sewer consists of 2,624 feet of 12-inch diameter pipe in Walker Avenue, north of Schaefer Avenue. This project will tie into the Western Trunk Sewer at Schaefer Avenue.

The estimated cost of this project is approximately $836,600.

Grove Avenue Trunk Sewer

The Grove Avenue Trunk Sewer consists of 10,589 feet of 12-inch to 18-inch diameter pipe in Grove Avenue, from Chino Avenue to Merrill Avenue. This project will tie into the Western Trunk Sewer at Merrill Avenue.

The estimated cost of this project is approximately $4,431,300.

Bon View Avenue Trunk Sewer

The Bon View Avenue Trunk Sewer consists of 10,566 feet of 12-inch to 18-inch diameter pipe in Bon View Avenue, from Chino Avenue to Merrill Avenue. This project will tie into the Western Trunk Sewer at Merrill Avenue.

The estimated cost of this project is approximately $4,420,200.

Euclid Avenue Trunk Sewer

The Euclid Avenue Trunk Sewer consists of 10,588 feet of 12-inch to 18-inch diameter pipe in Euclid Avenue, from Chino Avenue to Merrill Avenue. This project will tie into the Western Trunk Sewer at Merrill Avenue.

The estimated cost of this project is approximately $4,431,600.

Carpenter Avenue Trunk Sewer

The Carpenter Avenue Trunk Sewer consists of 11,304 feet of 12-inch to 18-inch diameter pipe in Carpenter Avenue, from Schaefer Avenue to the Eastern Trunk Sewer.

The estimated cost of this project is approximately $4,825,100.