CITY OF TRACY

ENGINEER'S REPORT
BENEFIT DISTRICT NO. 2023-1
(TRACY HILLS WATER DISTRIBUTION & STORAGE SYSTEM)

Prepared under the provisions of the
City of Tracy Municipal Code Chapter 12.60

September 21, 2023

PREPARED BY

Harris & Associates

www.WeAreHarris.com

2000185017

TABLE OF CONTENTS

INTRODUCTION

AGENCY: **CITY OF TRACY**

PROJECT: **BENEFIT DISTRICT NO. 2023-1**

TO: **CITY ENGINEER**

ENGINEER'S "REPORT" PURSUANT TO

THE PROVISIONS OF

CHAPTER 12.60 OF THE CITY OF TRACY MUNICIPAL CODE

The purpose of Benefit District No. 2023-1 (Tracy Hills Water Distribution & Storage System), (hereinafter "District") is to provide financing for the construction of public improvements within the Tracy Hills Specific Plan Area within the City of Tracy ("City"), including but not limited to the construction of a 3.91 million gallon storage tank and accompanying pump station in the City's Pressure Zone 4, a 2.57 million gallon storage tank in Zone 5, a 2.76 million gallon storage tank in Zone 6 and accompanying pump station, a pressure reducing station serving the Zone 5 and 6 distribution lines and associated water main lines from the John Jones Water Treatment Plant ("JJWTP") to the respective tanks ("Public Improvements"). Two additional booster pump stations have been or will be constructed at the JJWTP to serve Zone 4 and Zone 5/6 tanks. The proposed Public Improvements will serve the water distribution and storage needs of the residences, and businesses located within the District.

Pursuant to the provisions of Chapter 12.60 of the City of Tracy Municipal Code, and the determination of the City Engineer that the District complies with the requirements of Chapter 12.60, adopted by the City Council of the CITY OF TRACY, State of California, (the "Acts") we have prepared this report for formation of a Benefit District. The report consists of five (5) parts as stated below.

PART I

Part I describes the general nature, location, and extent of the Public Improvements that have been constructed or will be constructed, and shown on the plans for the Public Improvements as approved by the City Engineer and made a part hereof. Said plans and specifications are on file in the Office of the City Engineer.

PART II

Part II contains an estimate of the cost of the Public Improvements, including incidental costs and other expenses in connection therewith as set forth herein and attached hereto.

PART III

Part III consists of a description of the method of calculating the fair share benefit amount allocated to parcels within the District.

PART IV

Part IV describes the timing of payment of the fair share benefit for each subdivision of land within the District under the provisions of City of Tracy Municipal Code Chapter 12.60. This part also describes how the Improvements will be constructed and paid for by Tracy Hills.

PART V

Part V contains a map showing the boundaries of the District which includes each of the parcels that receive a fair share benefit from the Public Improvements to be funded by the fair share benefit fees, and a diagram showing the District. The Benefit Diagram is filed in the office of the City Engineer and made a part hereof. A reduced copy of the Benefit Diagram is included in Appendix A of this report.

PART I – DESCRIPTION OF IMPROVEMENTS

The following provides a description of the Public Improvements constructed or proposed to be constructed under the provisions of the City of Tracy Municipal Code to be included in the District as shown on the Plans as approved by the City Engineer on file in the Office of the City Engineer. The Public Improvements constructed or to be constructed as part of the project include:

- Zone 4 Water Storage Tank and Pump Station – Construction of a 3.91 million gallon storage tank and accompanying booster pump station located in Zone 4.
- Zone 5 Water Storage Tank – Construction of a 2.57 million gallon storage tank located in Zone 6 at the same site as the new Zone 6 storage tank.
- Zone 6 Water Storage Tank and Booster Pump Station – Construction of a 2.76 million gallon storage tank and associated booster pump station in Zone 6 adjacent to the Zone 5 storage tank.
    - The pump station accompanying the Zone 6 Water Storage Tank will be excluded from the District as the pump station only benefits Zone 6 and as such will bear all of the costs.
- Zone 4 Water Line – Construction of a 20-inch diameter pipeline and bridges to connect the Zone 4 water storage tank to the John Jones Water Treatment Plant.
- Zone 5/6 Water Line – Construction of a 16-inch diameter pipeline to connect the Zone 5/6 water storage tanks to the John Jones Water Treatment Plant.
- A Pressure Reducing Station located on Criseldo Mina Drive.

Costs include all planning, design, construction administration and general administration services, the acquisition of all necessary rights of way, easements, or other property interests required for the construction of the Improvements described above, the acquisition of licenses, franchises and permits and the construction of all auxiliary work necessary and/or convenient to the accomplishment thereof, in accordance with the final plans and specifications approved by the City of Tracy prior to the start of construction. The construction of the Public Improvements may be phased as necessary and convenient for the City.

The City will inspect the work to ensure conformance to City ordinances, rules, warrants, regulations, standards, and specifications where applicable.

The following provides a description of the Public Improvements that the Developer is funding but will be constructed by the City as part of a larger Capital Improvement Project under the provisions of the City of Tracy Municipal Code and are to be included in the District. The Public Improvements to be funded as part of the Benefit District that were constructed by the City are as follows:

- Zone 4 JJWTP Pump Station – A payment for the construction of a new booster pump station located onsite at the John Jones Water Treatment Plant to be constructed by the City.

- Zone 5/6 JJWTP Pump Station – A payment for the construction of a new booster pump station located onsite at the John Jones Water Treatment Plant to be constructed by the City.

The City will construct the improvements in compliance with City ordinances, rules, warrants, regulations, standards, and specifications where applicable.

PART II– COST ESTIMATE

The estimated cost by major work category for the construction of the Public Improvements described in Part I is shown below. Detailed costs for of the major components A through E of the Improvements can be found in Appendix B.

Table 1: Cost Estimate by Major Work Category

Item	Description	Amount
A. Zone 4 Water Storage Tank and Pump Station (1)		
1.	Site Work	$559,342
2.	Tank, Pump Station and Pumps	$9,839,665
5.	Soft Costs	$1,614,138
	Subtotal:	**$12,013,145**
B. Zone 5 Water Storage Tank (2)		
1.	Site Work	$1,586,995
2.	Tank	$3,908,924
3.	Pump Station	$2,537,660
4.	Soft Costs (3)	$1,348,770
	Subtotal:	**$9,382,349**
C. Zone 6 Water Storage Tank and Pump Station (2)		
1.	Site Work	$591,660
2.	Tank	$3,908,924
3.	Pump Station and Pumps (4)	$0
	Subtotal:	**$4,500,584**
D. Zone 4 Water Line (1)		
1.	Water Line and Bridges	$4,843,805
2.	Soft Costs	$6,070
	Subtotal:	**$4,849,875**
E. Zone 5/6 Water Line (2)		
1.	16" Water Line	$429,531
2.	Zone 5/6 Feed Line Water Line 16"	$5,901,156
3.	Pressure Reducing Station	$354,000
	Subtotal:	**$6,684,687**
	Subtotal Construction Costs:	**$37,430,639**
	5% Construction Management	$1,871,532
	Total Construction Costs	**$39,302,171**
F. Zone 4 JJWTP Pump Station (1)(5)		
1.	City Payment	$3,173,775
2.	PG&E	$45,586
	Subtotal:	**$3,219,361**
G. Zone 5/6 JJWTP Pump Station (2)(5)		
1.	City Payment	$3,531,080
	Subtotal:	**$3,531,080**
	Grand Total:	**$46,052,612**

Notes:
(1) Actual cost provided by Tracy Hills.
(2) Engineer's Estimate provided by Tracy Hills.
(3) Includes Soft Costs for Items C & E.
(4) Not inlcuded in Benefit District because this improvement only benefits Zone 6.
(5) Developer has made a payment to the City for the cost of the Zone 4 and 5/6 Pump Stations at the JJWTP. The City will construct these improvements as part of the JJWTP expansion.

PART III – METHOD OF APPORTIONMENT AND FAIR SHARE BENEFIT ROLL

The Public Improvements are to be funded by the payment of fair share benefits at the time of development and must be based on the benefit that the properties receive from the improvements. There is no specific method or formula that must be used to apportion the costs to properties in any fair share benefit proceedings.

The responsibility for recommending an apportionment of the costs to properties that specially benefit from the improvements rests with the Developer and is required to be reviewed by the City Engineer. The City Engineer has appointed Harris and Associates to prepare the Benefit District report, which analyzes the facts and evaluates the apportionment of the fair share obligations to each benefitting parcel. As presented in this Report, Harris and Associates evaluated and apportioned the fair share benefits to each parcel within the District in an amount that does not exceed the reasonable cost of the proportional benefit each parcel will receive from the Improvements.

The approval of the fair share benefit fees rests with the City Engineer. The City Engineer renders their decision after hearing testimony and evidence presented at a hearing with the benefitting property owners. The City Engineer shall order the establishment of the District if it is determined that the lands other than the subdividers are benefitted by the improvements, and it is economically feasible to form such a district.

As provided in Section 12.60.030 of the City of Tracy Municipal Code, "The City shall endeavor to collect the reimbursement fee from those owners within the benefit area at the time of the issuance of building permit. However, by entering into a reimbursement agreement, the City shall not be deemed an insurer or guarantor for the collection or payment to the applicant of any reimbursement charge or otherwise guarantee the collection and payment over to the applicant of any reimbursement charge."

As provided in Section 12.60.020(e) of the City of Tracy Municipal Code, "The term of the benefit district shall be not more than ten years after the date of the establishment of the district. If full reimbursement has not been made by the end of the term, or any extension granted under subsection (f), the subdivider will not be entitled to further reimbursements."

The following sections set forth the methodology used to apportion the costs of the Improvements to each parcel based upon the benefits received.

WEST YOST TECHNICAL MEMORANDUM

The Developer provided a "Peer Review and Hydraulic Evaluation for Tracy Hills Phases 2, 3 and 4" detailing the total water demands and required improvements for the Tracy Hills Specific Plan Area. This Hydraulic Evaluation evaluated the development of 4,642 units of Low Density Residential, 2,384 units of Medium Density Residential, 125 units of High Density Residential, 218.2 acres of Industrial, 44.5 acres of Commercial, 45.5 acres of Office, 61.8 acres of Institutional (which consists of school sites), and 124.3 acres of Parks. These

assumptions served as the basis for the Coleman Engineering hydraulic evaluation study dated December 2020 that determined the recommended pump station and storage tank sizes and West Yost's subsequent peer review and reevaluation dated July 13, 2021. The findings of the West Yost technical memorandum, hereafter referred to as Technical Memorandum, is provided in Appendix C of this Report.

FAIR SHARE BENEFITS

A fair share benefit is provided to parcels within the District from the construction of the Public Improvements. The parcels within the District are primarily zoned as residential but also include land zoned for industrial and commercial development that will be developed in accordance with the Tracy Hills Specific Plan. A majority of the parcels within the District that are not owned by the Developer are currently vacant. All of the developed parcels are owned by the Developer or have a private agreement to reimburse the Developer for their fair share benefit of the Public improvements.

As previously described, the parcels within the District will be served by the water distribution and storage system as shown on the plans as referenced in Part I of this report. While the improvements are constructed in three pressure zones, each of the zones are interconnected to ensure redundancy and the ability to relieve excess pressure in each respective zones and therefore all parcels benefit from all of the included improvements. These improvements are required to be constructed as a condition of development in accordance with the vested tentative tract map and the Amended Tracy Hills Environmental Impact Report because the project is the first to move forward. The fair share benefit received by each parcel is based upon each parcel's estimated annual potable water demand. Parcels within the District receive the following benefit as a result of the construction of the proposed Public Improvements.

- Tracy Hills Water Distribution Benefit. The construction of the Zone 4, Zone 5 and Zone 6 Water Tanks, Pump Stations, Distribution Lines from the JJWTP and Pressure Reducing Station will benefit parcels within the District by providing reliable potable water supply necessary for development and as a secondary factor adequate water flow for fire suppression activities. These improvements will enhance the development of parcels located within the District to their highest and best use. The costs related to the construction of the Zone 4, Zone 5 and Zone 6 water improvements have been allocated to parcels within the District based upon the percentage of potable water demand expressed in acre-feet per year.

ALLOCATION METHODOLOGY

To measure and describe demand, water engineers and planners commonly conduct calculations of annual potable water demand. This annual potable water demand is developed for each of the various land uses included in the Tracy Hills Specific Plan. Different factors are evaluated when determining the total potable water demand for each land use and are as follows: The total acres of land assumed to need potable water, the total landscaped areas for non-residential land uses, and the number of dwelling units to be constructed for residential land uses. Once the acres and dwelling units have been established the factors are multiplied by the unit potable water use factor to determine the annual potable water use for each respective land use.

The City's Water System Master Plan (last updated in 2020 but not yet accepted by City Council) contains policy direction about water demand for various land uses in the City.

The analysis conducted for the Technical Memorandum evaluated projected water demand for the planned land uses in each Phase of the Development. The City has already identified the Pressure Zones and Phases of development for the Tracy Hills area, and the Technical Memorandum uses these assumptions as a baseline for the analysis of water demand to each Pressure Zone and Phase. Tracy Hills Phase 1, the KT Project, and Phase 5 will be served by the City's Pressure Zone 4 (Zone 4) water system. Because Phases 2, 3, and 4 are located at higher elevations than the areas served by Zone 4, Zone 4 facilities cannot provide water service at adequate pressure. As a result, two new pressure zones, Zone 5, and Zone 6, must be developed to serve these Phases while maintaining the adequate pressure for fire suppression at acceptable velocities. New storage tanks (Zone 5/6 Tanks) will be constructed at sufficient elevation to serve Zone 5 via gravity flow. A new Zone 5 booster pump station (Zone 5 BPS) will be constructed at the John Jones Water Treatment Plant (JJWTP) to fill these tanks from the JJWTP's Clearwells. Zone 6 will be supplied as a hydropneumatic or closed pressure zone by a new booster pump station (Zone 6 BPS) constructed at the same site as the Zone 5/6 Tanks. A pressure reducing station at Criseldo Mina Drive will be constructed as part of the Zone 5 distribution system to allow flow from Zone 5 into Zone 4 when the Zone 4 emergency storage capacity stored in the Zone 5/6 tanks is needed.

For the purposes of this evaluation, estimated annual potable water demand (in acre-feet per year) was used to determine the fair share allocation of the Water Distribution and Storage System improvements. The total potable water demand for the Project was calculated in the Technical Memorandum (See Table 2 below). The acreage of each of the parcels within the District was used to determine the percentage of the total Tracy Hills water demand that is attributable to that parcel or phase, which may consist of multiple parcels. (Table 3).

Table 2: Potable Water Demand Calculations by Zone and Phase

Phase/Project	Annual Potable Water Use (af/yr) (1)	Average Day Demand (GPM)	Maximum Day Demand (GPM) (2)	Peak Hour Demand (GPM) (3)
Pressure Zone 4				
Phase 1	1,150	713	1,212	2,068
KT Project	111	69	117	200
Rodgers Vieira (Phase 5)	433	268	456	778
Other Phase 5	752	466	793	1,353
Zone 4 Total	**2,446**	**1,517**	**2,578**	**4,399**
Pressure Zone 5				
Phase 2	847	525	893	1,524
Phase 3	469	291	495	844
Phase 4	134	83	141	241
Zone 5 Total	**1,451**	**899**	**1,529**	**2,608**
Pressure Zone 6				
Phase 3	279	173	294	501
Phase 4	37	23	39	67
Zone 6 Total	**316**	**196**	**333**	**567**
Tracy Hills Total	**4,213**	**2,612**	**4,440**	**7,575**

Notes:

(1) Demand calculations are shown in full in West Yost Technical Memorandum dated July 13, 2021 and revised November 30, 2022.

(2) Maximum Daily Demand is 1.7 times the average day demand, per the 2020 City of Tracy Water System Master Plan.

(3) Peak Hour Demand is 2.9 times the average day demand, per the 2020 City of Tracy Water System Master Plan.

Table 3: Potable Water Demand Spread

Project /Owner [1]	Annual Potable Water Use (af/yr) [2]	% Allocation	Cost Allocation
Tracy Hills [3,4]	2,917	69.23%	$ 31,882,223.27
Kaabipour/Tseng (KT) [4]	111	2.64%	$ 1,215,788.96
Rodgers Vieira [5]	433	10.28%	$ 4,734,208.51
Tseng [6]	295	7.00%	$ 3,223,682.84
Integral (26.6 AC) [4]	74	1.76%	$ 810,525.97
Sandhu [5]	300	7.12%	$ 3,278,945.97
AKT	34	0.81%	$ 373,026.16
Shergill	13	0.31%	$ 142,763.10
Miscellaneous (23.2 AC)	36	0.85%	$ 391,447.20
Total	**4,213**	**100.00%**	**$ 46,052,611.98**

Notes:

(1) See Benefit Exhibit for Tracy Hill Specific Plan Area Backbone Water System, dated December 20, 2022.

(2) Detailed demand calculations of the peer review and hydraulic evaluation for Tracy Hills Phases 2, 3 and 4 prepared by West Yost in a Techincal Memorandum dated July 13, 2021 and revised November 30, 2022.

(3) Tracy Hills to include Phases 1, 2, 3, and 4.

(4) These parcels are owned by the Developer or have already been developed and thus have paid their fair share through private agreements.

(5) The Sandu Parcel has been subdivided into four parcels and one parcel has been sold to RLP III Tracy Hills.

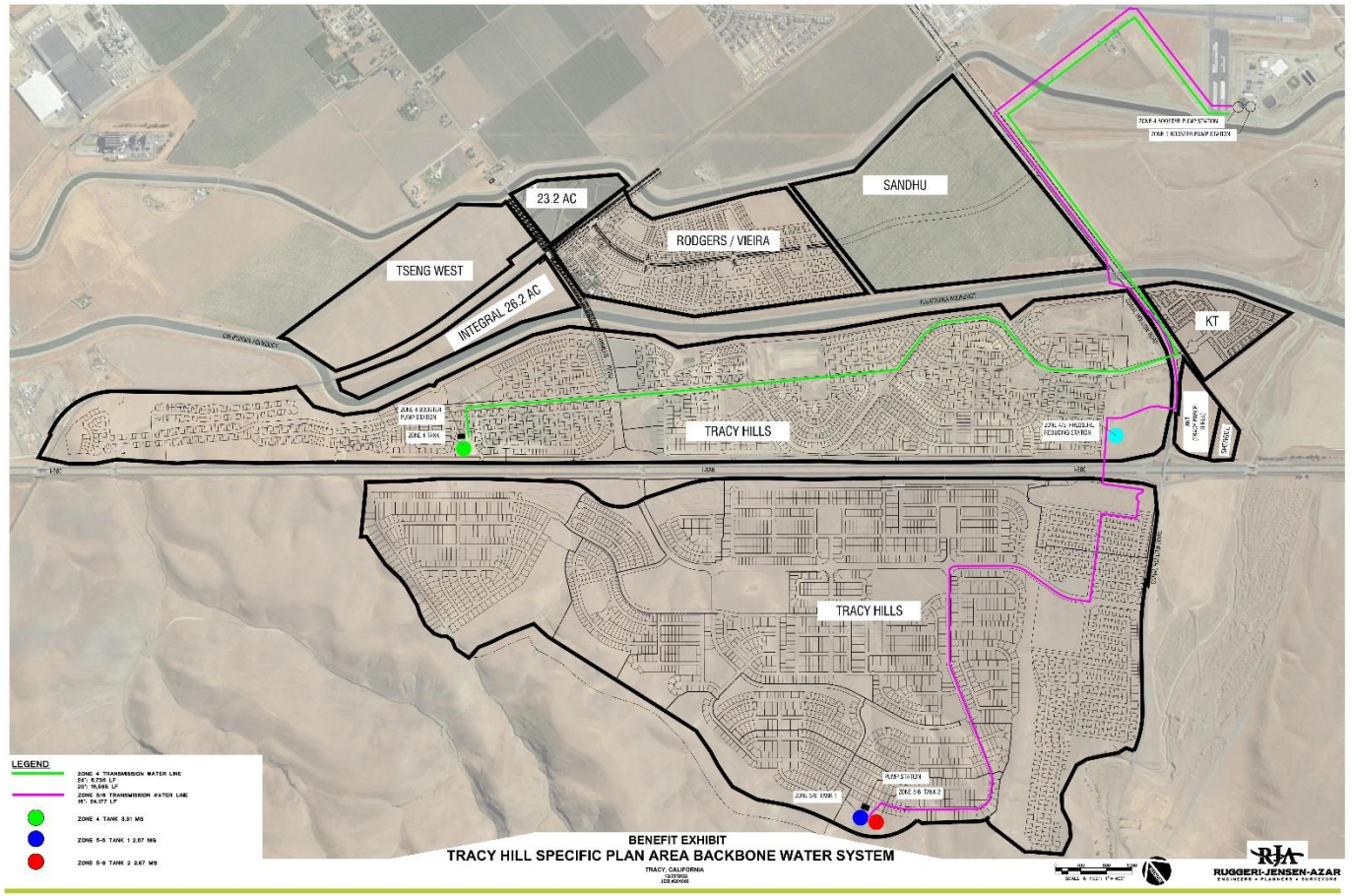
(6) The fair share for these parcels will be paid through a private agreement.

The total project costs as identified in Part II of this report are allocated to the parcels within the boundaries of the benefit district based on the Fair Share percentages as shown in Table 3. The Tracy Hills Phase 1, 2, 3, 4, and portions of Phase 5 owned by the Developer, and the KT Project parcels will be developed by the Developer as part of the proposed Tracy Hills Project or have a separate agreement for the construction of these improvements and as such will not have any outstanding fair share fees as part of this District. The Fair Share Obligation of each parcel is shown in Exhibit 1. Exhibit 2 details the Fair Share Obligation by Assessor's Parcel Number, including City Administration, for all parcels that will have their Fair Share Obligation collected at the time of building permit issuance. The parcels which are owned by the Developer or have a private agreement with the Developer to pay their fair share obligation are not included in Exhibit 2 as they have either met their fair share obligation already through either the construction of the improvements or through the private agreement.

Figure 1 on the following page illustrates the Improvements to be funded by the District.

Harris & Associates

FIGURE 1 - DIAGRAM SHOWING THE IMPROVEMENTS CONTSTRUCTED OR TO BE CONSTRUCTED



Harris & Associates

EXHIBIT 1 – FAIR SHARE COST SPREAD

Item	Description	Amount	Tracy Hills (6)	Kaabipour/Tseng (KT) (6)	Rodgers Vieira (5)	Tseng (6)	Integral (26.6 AC) (6)	Sandhu 253-020-200	Sandhu 253-020-210	Sandhu 253-020-220	RLP III Tracy Hills 253-020-230	AKT	Shergill	Cardenas 240-140-260	Spatafore 240-140-270
A. Zone 4 Water Storage Tank and Pump Station (1)															
	Subtotal:	**$12,013,145**													
	Construction Management 5%	**$600,657**													
	Subtotal:	**$12,613,802**	$8,732,535.32	$333,004.38	$1,296,698.87	$882,966.16	$222,002.92	$19,286.12	$41,910.22	$345,434.82	$491,471.55	$102,171.80	$39,102.79	$4,719.07	$102,498.25
B. Zone 5 Water Storage Tank (2)															
	Subtotal:	**$9,382,349**													
	Construction Management 5%	**$469,117**													
	Subtotal:	**$9,851,466**	$6,820,170.05	$260,078.71	$1,012,730.73	$689,602.63	$173,385.81	$15,062.59	$32,732.17	$269,786.97	$383,842.66	$79,796.88	$30,539.55	$3,685.63	$80,051.83
C. Zone 6 Water Storage Tank and Pump Station (2)(3)															
	Subtotal:	**$4,500,584**													
	Construction Management 5%	**$225,029**													
	Subtotal:	**$4,725,613**	$3,271,542.02	$124,756.19	$485,793.04	$330,792.92	$83,170.79	$7,225.32	$15,701.17	$129,413.11	$184,124.06	$38,277.47	$14,649.40	$1,767.95	$38,399.77
D. Zone 4 Water Line (1)															
	Subtotal:	**$4,849,875**													
	Construction Management 5%	**$242,494**													
	Subtotal:	**$5,092,368**	$3,525,446.70	$134,438.53	$523,495.48	$356,465.79	$89,625.69	$7,786.08	$16,919.74	$139,456.87	$198,413.94	$41,248.18	$15,786.34	$1,905.16	$41,379.98
E. Zone 5/6 Water Line (2)															
	Subtotal:	**$6,684,687**													
	Construction Management 5%	**$334,234**													
	Subtotal:	**$7,018,921**	$4,859,198.89	$185,299.51	$721,545.06	$491,324.46	$123,533.01	$10,731.72	$23,320.85	$192,216.40	$273,478.20	$56,853.26	$21,758.65	$2,625.92	$57,034.91
F. Zone 4 JJWTP Pump Station (1)															
	Subtotal:	**$3,219,361**	$2,228,763.62	$84,991.13	$330,950.31	$225,355.27	$56,660.75	$4,922.31	$10,696.55	$88,163.69	$125,435.96	$26,076.82	$9,980.02	$1,204.43	$26,160.14
G. Zone 5/6 JJWTP Pump Station (2)															
	Subtotal:	**$3,531,080**	$2,444,566.68	$93,220.51	$362,995.02	$247,175.60	$62,147.01	$5,398.91	$11,732.26	$96,700.26	$137,581.46	$28,601.75	$10,946.35	$1,321.05	$28,693.13
	Grand Total: (3)	**$46,052,612**	**$31,882,223.27**	**$1,215,788.96**	**$4,734,208.51**	**$3,223,682.84**	**$810,525.97**	**$70,413.05**	**$153,012.97**	**$1,261,172.13**	**$1,794,347.83**	**$373,026.16**	**$142,763.10**	**$17,229.19**	**$374,218.01**

Notes:

(1) Actual cost provided by Tracy Hills.

(2) Engineer's Estimate provided by Tracy Hills.

(3) Zone 6 Pumps not inlcuded in Benefit District because this improvement only benefits Zone 6.

(4) Includes Soft Costs for Items C & E.

(5) The fair share for these parcels will be paid through a private agreement.

(6) These parcels are owned by the Developer or have already been developed and thus have paid their fair share through private agreements.

EXHIBIT 2 – FAIR SHARE BENEFIT ROLL

Development	APN	Property Owner	Acres	Cost Allocation	Waterline Contributions (1)	City Administration (15%) (2)	Total Fair Share Benefit
Sandhu	253-020-200-000	SANDHU FAMILY ENTERPRISES	4.16	$ 70,413.05	$ 18,517.79	$ 7,784.29	$ 59,679.54
Sandhu	253-020-210-000	SANDHU FAMILY ENTERPRISES LLC	9.04	$ 153,012.97	$ 40,240.59	$ 16,915.86	$ 129,688.23
Sandhu	253-020-220-000	SANDHU FAMILY ENTERPRISES LLC	74.51	$ 1,261,172.13	$ 331,673.27	$ 139,424.83	$ 1,068,923.69
RLP III Tracy Hills	253-020-230-000	RLP III TRACY HILLS LLC	106.01	$ 1,794,347.83	$ 471,892.14	$ 198,368.35	$ 1,520,824.04
AKT	253-030-150-000	TRACY PARCEL THREE LLC	16.97	$ 373,026.16	$ -	$ 55,953.92	$ 428,980.08
Shergill	253-030-040-000	SHERGILL, HARRY	6.63	$ 142,763.10	$ -	$ 21,414.46	$ 164,177.56
Misc (23.2 AC)	240-140-260-000	CARDENAS JOSEPH A ETAL	1	$ 17,229.19	$ -	$ 2,584.38	$ 19,813.57
Misc (23.2 AC)	240-140-270-000	SPATAFORE, MARGARET TR	21.72	$ 374,218.01	$ -	$ 56,132.70	$ 430,350.71
						Total Benefit District Obligations	**$ 3,392,086.71**

Notes:

(1) Sandhu and RLP III Tracy Hills Water Line contribution is provided through a private agreement with Tracy Hills and as such are removed from the benefit district.

(2) City administration costs per the City of Tracy Municipal Code Chapter 12.60.20.

PART IV– PAYMENT OF FAIR SHARE BENEFIT

It is anticipated that the Improvements, with the exception of the pumps at the JJTP which will be paid for by Tracy Hills but constructed by the City, will be or have been constructed by Tracy Hills, the owner of the identified Phase 1, 2, 3, 4 and portions of Phase 5, and dedicated to the City upon completion and acceptance by the City.

Under the provisions of the City of Tracy Municipal Code Chapter 12.60.020, fair share benefit fees will be remitted to Tracy Hills pursuant to the following conditions as detailed in the City of Tracy Municipal Code Chapter 12.60.20:

a) The City Engineer shall determine the limits of the benefit areas.
b) The City shall collect a reimbursement fee, including an amount attributable to interest, from the remaining properties within the benefit area at the time the owner of any such property secures a City building permit.
c) The reimbursement fees shall be based upon the calculations and engineering data approved by the City Engineer. The actual reimbursement shall be adjusted to reflect the actual project construction costs, plus fifteen (15%) percent which the City shall withhold to cover the costs of the administration of the district. The project construction costs may also include design, contract administration and other related costs when they are added costs specifically due to oversizing. The actual construction costs shall be verified by the City.
d) Disbursements by the City to the subdividers shall be made semiannually after the formation of the district, but no sooner than the City's receipt of the reimbursement fees from others.
e) The term of the benefit district shall not be more than ten years after the date of the establishment of the district. If full reimbursement has not been made by the end of the term, or any extension granted under subsection (f). The subdivider will not be entitled to further reimbursements.
f) The subdivider may apply for one or more extensions for up to a total of ten (10) additional years. If circumstances have changed, the City shall re-evaluate the scope and boundaries of the benefit district before granting such an extension. The applicant is responsible for the costs of re-evaluation and reasonable City administrative costs for processing and administering the extended benefit district.

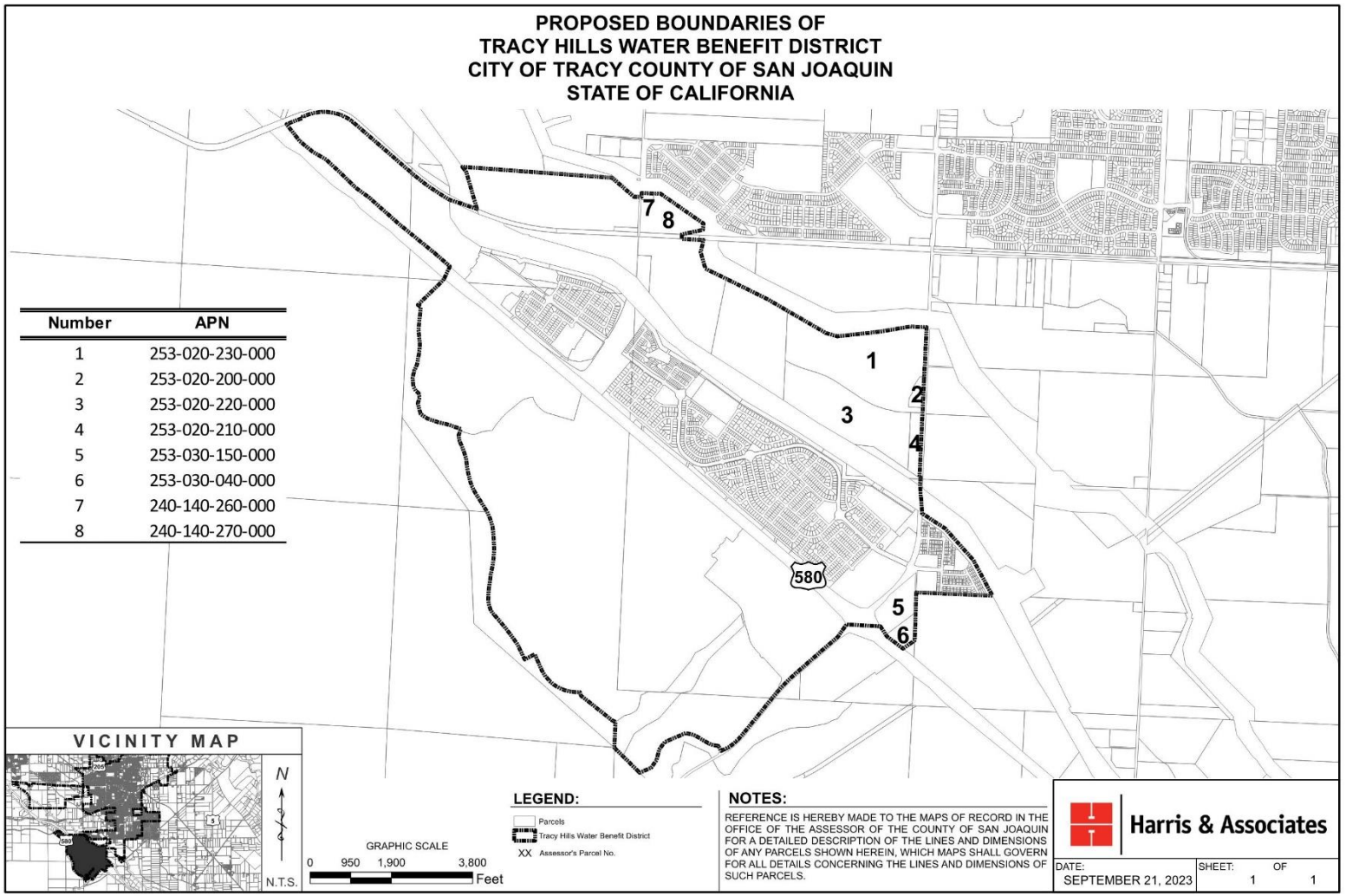
PART V – BENEFIT DIAGRAM OF BENEFIT DISTRICT

A reduced copy of the Benefit Diagram is provided in Appendix A. Full-sized copies of the Benefit Diagram that show the parcels within the boundaries of the District are on file in the Office of the City Clerk, of the City of Tracy.

The Benefit Diagram shows the exterior boundaries of the District and the identification number assigned to each parcel of land corresponding to its number as it appears in the Fair Share Benefit Roll contained in Part III, Exhibit 2.

Harris & Associates

APPENDIX A – BENEFIT DIAGRAM



APPENDIX B – DETAILED COST TABLES BY COMPONENT

Component A

Item	Description		Amount
	Zone 4 Water Storage Tank & Pump Station (1)		
	Construction Costs		
1.	Site Work		
	Independent Construction Company		$559,342
2.	Water Storage Tank, Pumps and Pump Station		
	Mozingo Construction Inc.		$9,839,665
		Subtotal:	**$10,399,007**
	Soft Costs		
5.	City of Tracy		$237,974
6.	Pacific, Gas & Electric		$204,453
7.	Smith Manus		$390,100
8.	Rugerri-Jensen-Azar		$781,611
		Subtotal:	**$1,614,138**
		Grand Total:	**$12,013,145**

Notes:
(1) Actual cost provided by Tracy Hills.

Component B

Item	Description	Amount
	Zone 5 Water Storage Tank (1)	
	Construction Costs	
1.	Site Work	
	Mobilization / Demobilization	$126,446
	Clearing / Grubbing, Site Preparation And Grading	$30,923
	Drainage Ditch	$16,532
	10-Inch RCP Storm Drain. Excavation, Installation And Backfill.	$19,260
	15-Inch RCP Storm Drain. Excavation, Installation And Backfill.	$27,927
	18-Inch RCP Storm Drain. Excavation, Installation And Backfill.	$20,544
	24-Inch RCP Storm Drain. Excavation, Installation And Backfill.	$40,018
	12-Inch Zinc Coated Dip Water Main. Excavation, Installation And Backfill.	$112,318
	18-Inch Zinc Coated Dip Water Main. Excavation, Installation And Backfill.	$231,070
	Rock Excavation Including Imported Fill	$47,935
	Fittings, Valves, Hydrants, Appurtenances, Etc.	$14,445
	48-Inch Diameter Manhole	$17,655
	Drainage Pipping, Inlets And Accessories	$72,760
	5-Inch Asphalt Paving Over 8-Inch Agg. Base	$247,104
	6-Inch Gravel Driveway	$11,937
	4-Inch Future Tank Location Gravel	$67,070
	Tubular Steel Perimeter Fence	$143,273
	Driveway Gate And Appurtenances	$42,030
	Non Expansive Fill	$113,155
	Grading Tank And Building	$139,252
	PG&E Access Road	$45,341
	Subtotal:	**$1,586,995**
2.	Water Storage Tank	
	Project Contingency	$348,820
	2.67 Prestressed Concrete Water Storage Tank Support	$72,974
	2.67 Prestressed Concrete Water Storage Tank	$3,370,000
	D.M. Alegre Markup For DN Tank Contract	$117,130
	Subtotal:	**$3,908,924**
3.	Pump Station	
	Chemical Dosing System, Tank Mixer, Chem Tanks, Chem Tubing And Conduits, Etc.	$264,598
	Booster Pump Station(Foundation Fill & Compaction, Concrete Slab & Footing Foundation, CMU Walls, Steel Trusses, Steel Roof, Drywall, Etc.	$950,647
	Site And Building Water Piping, Valves And Appurtenances	$60,455
	Lab Room Equipment	$13,803
	Temporary Potable Water Pump And Pressure Tank	$11,530
	Chemical Sump And Pipe Manifold Vault Grating	$16,687
	Painting And Coating	$170,379
	Start Up And Training	$16,050
	Punch List And Closeout	$10,700
	General Electric	$514,561
	Controls And Instruments	$214,000
	Transformer, Main Switchboard, Load Bank And Site Electrical Including Housekeeping Pads	$294,250
	Subtotal:	**$2,537,660**

Item	Description	Amount
	Zone 5 Water Storage Tank (1)	
	Soft Costs	
1.	Zone 5 Water Tank Construction Support Services	$215,000
2.	Zone 5 Water Tank - Control / Gps Set Up (Staking)	$3,500
3.	Zone 5 Water Tank - Grading (Staking)	$18,000
4.	Zone 5 Water Tank - Storm Drain / Sewer (Staking)	$5,000
5.	Zone 5 Water Tank - Water Lines / Water Vaults (Staking)	$7,500
6.	Zone 5 Water Tank - Joint Trench (Staking)	$12,000
7.	Zone 5 Water Tank - Curb And Finish Grading (Staking)	$6,000
8.	Zone 5 Water Tank - Pump Station Building (Staking)	$6,000
9.	Zone 5 Water Tank - Water Tank (Staking)	$6,000
10.	Zone 5 Water Tank - Fencing (Staking)	$3,000
11.	Zone 5 Water Tank - As Requested Miscellaneous Staking (T&E)	$15,000
12.	Zone 5 Water Tank - As Requested Re- Staking (T&E)	$10,000
13.	Co #1 Zone 5/6 Water Tank & Booster Pump Station	$21,100
14.	Co #2 Zone 4/5 Temporary Jumper Connection	$15,500
15.	Zone 5 Wtr Tank Fa Fees	$415,421
16.	BB Zone 5/6 Wt Fees	$42,027
17.	7010 Zone 5 Off-Site Water - Electric	$2,500
18.	7010 Zone 5 Water Feed Line - Electric	$1,500
19.	7010 Zone 5 Water Feed Line - Electric	$1,500
20.	Zone 5 Waterline Prd	$1,068
21.	So County Fire - Water Storage Tank Permit	$540
22.	7010 BB Zone 5/6 Wt Pc Fees	$24,697
23.	7010 BB Zone 5/6 Wtr Tank Ea	$2,500
24.	T & O Services During Underground Utility Installation & Roadway Construction	$112,500
25.	TH Zone 5 Wtr Line SWPP - Task 1: Site Monitoring Services (Estimated 5 Monthly Inspection and 30 storm related inspections at $350/visit)	$12,250
26.	TH Zone 5 Wtr Line SWPP - Task 2: Reporting (Est. one AC at $1K and opne NOT at $2K)	$3,000
27.	TH Zone 5 Wtr Line SWPP - Task 3: Consultation (As needed. T&E)	$2,000
28.	Zone 5 On-Site Water Main Improvements - Improvement Plans	$72,520
29.	Zone 5 On-Site Water Main Improvements - Preliminary Opinion of Cost	$6,500
30.	Zone 5 On-Site Water Main Improvements - Plat and Legal Descriptions	$15,000
31.	Zone 5 On-Site Water Main Improvements - Project Meetings and Coordination	$5,900
32.	Zone 5 On-Site Water Main Improvements - Misc. Exhibits	$10,000
33.	Zone 5 On-Site Water Main Improvements - Bid Support	$5,000
34.	Zone 5 On-Site Water Main Improvements -Construction Consultation	$10,000
35.	Zone 5 On-Site Water Main Improvements - Record Drawings	$4,000
36.	Zone 5 On-Site Water Main Improvements - Reimbursables	$2,000
37.	Zone 5 Off-Site Water Main Improvements - Design Survey	$12,000
38.	Zone 5 Off-Site Water Main Improvements - Final Engineering	$34,250
39.	Zone 5 On-Site Water Main Improvements - Preliminary Opinion of Cost	$3,900
40.	Zone 5 On-Site Water Main Improvements - Plat and Legal Descriptions	$1,950
41.	Zone 5 On-Site Water Main Improvements - Caltrans Encroachment Permit	$15,000
42.	Zone 5 On-Site Water Main Improvements - Agency Coordination	$5,250
43.	Zone 5 On-Site Water Main Improvements - Project Meetings and Coordination	$6,000
44.	Zone 5 On-Site Water Main Improvements - Misc. Exhibits	$2,000
45.	Zone 5 On-Site Water Main Improvements - Bid Support	$5,000
46.	Zone 5 On-Site Water Main Improvements -Construction Consultation	$10,000
47.	Zone 5 On-Site Water Main Improvements - Record Drawings	$4,000
48.	Zone 5 On-Site Water Main Improvements - Reimbursables	$3,897
49.	Zone 5 Off-Site Water Main Improvements - FFA Coordination	$6,500
50.	Zone 5 Wtr Airport to I580 - Control / GPS Set Up	$3,500
51.	Zone 5 Wtr Airport to I580 - Domestic Water	$39,000
52.	Zone 5 Wtr Airport to I580 - Sewer	$5,000
53.	Zone 5 Wtr Airport to I580 - As Requested Miscellaneous Staking (T&E)	$10,000
54.	Zone 5 Wtr Airport to I580 - As Requested Re- Staking (T&E)	$12,000
55.	Zone 5 Wtr I580 to Tank - Control / GPS Set Up	$3,500
56.	Zone 5 Wtr I580 to Tank - Domestic Water	$45,000
57.	Zone 5 Wtr I580 to Tank - As Requested Miscellaneous Staking (T&E)	$15,000
58.	Zone 5 Wtr I580 to Tank - As Requested Re- Staking (T&E)	$10,000
	Subtotal:	**$1,348,770**
	Grand Total:	**$9,382,349**

Notes:
(1) Engineer's Estimate provided by Tracy Hills.

Component C

Item	Description	Quantity	Unit	Unit Price	Scheduled Value
	Zone 6 Water Storage Tank & Pump Station (1)				
	Construction Costs				
1.	**Site Work**				
	Mobilization / Demobilization	1	LS	$126,446	$126,446
	Clearing / Grubbing, Site Preparation And Grading	1	LS	$30,923	$30,923
	Rock Excavation Including Imported Fill	100	CY	$479	$47,935
	5-Inch Asphalt Paving Over 8-Inch Agg. Base	3120	SY	$79	$247,104
	Grading Tank And Building	1	LS	$139,252	$139,252
				Subtotal:	**$591,660**
2.	**Water Storage Tank**				
	Project Contingency	1	LS	$348,820	$348,820
	2.67 Prestressed Concrete Water Storage Tank Support	1	LS	$72,974	$72,974
	2.67 Prestressed Concrete Water Storage Tank	1	LS	$3,370,000	$3,370,000
	D.M. Alegre Markup For DN Tank Contract	1	LS	$117,130	$117,130
				Subtotal:	**$3,908,924**
3.	**Pump Station (2)**				
	Booster Pump Station(BPS Manifold w/ Valves, Appurtenances, And Supports, 7.5 HP Vertical In-Line Centrifugal Pumps&Motors, 30 HP Horizontal Split-Case Pumps And Motors, City Communication @ WTP)	1	LS	$450,000	$450,000
	Painting And Coating	1	LS	$170,379	$170,379
	Start Up And Training	1	LS	$16,050	$16,050
	Punch List And Closeout	1	LS	$10,700	$10,700
	General Electric	1	LS	$125,000	$125,000
	Controls And Instruments	1	LS	$214,000	$214,000
	Transformer, Main Switchboard, Load Bank & Site Electrical Including Housekeeping Pads	1	LS	$175,000	$175,000
				Subtotal:	**$1,161,129**
				Grand Total:	**$5,661,713**

Notes:

(1) Engineer's Estimate provided by Tracy Hills.

(2) Not inlcuded in Benefit District because this improvement only benefits Zone 6.

Component D

Item	Description	Amount
	Zone 4 Water Line (1)	
	Construction Costs	
1.	Zone 4 Waterline from Water Treatment Plant to the Delta Mendota Canal	$852,000
2.	Zone 4 Waterline - Delta Mendoa Canal Bridge Crossing	$437,000
3.	Zone 4 Waterline From Delta Mendota Canal to Corral Hollow Road	$328,909
4.	Zone 4 Waterline Corral Hollow Road to California Aqueduct	$611,074
5.	Zone 4 Waterline - California Aqueduct Bridge Crossing	$586,625
6.	Zone 4 Waterline California Aqueduct to Spine Road	$515,490
7.	Zone 4 Waterline from Corral Hollow Road to Second Roundabout	$822,108
8.	Zone 4 Waterline from Second Roundabout to End	$690,599
	Subtotal:	**$4,843,805**
	Soft Costs	
9.	Zone 4 Waterline - California Aqueduct Bridge Crossing	$6,070
	Subtotal:	**$6,070**
	Grand Total:	**$4,849,875**

Notes:

(1) Actual cost provided by Tracy Hills.

Component E

Item	Description	Amount
	Zone 5/6 Water Line	
	Construction Costs	
1.	**Water Line Installed as Part of Phase 1A (1)**	
	Water Line	$412,550
	CCO #3 - 16" Gate Valve Delete	-$24,040
	CCO #3 - 16" DIP Water Added R	$41,021
	Subtotal:	**$429,531**
2.	**Water Line Installed as Part of Phase 2A (2)**	
	Traffic Control	$28,400.00
	12" DIP Water Main	$25,824.00
	16" DIP Water Main STA 103+67 to 137+95	$740,448.00
	16" DIP Water Main STA 144+50 to 179+10	$972,260.00
	16" DIP Water Main STA 12+55 to 22+06	$214,926.00
	16" DIP Water Main STA 7+83 to 13+63	$147,900.00
	16" Butterfly Values	$69,000.00
	16" Blowoff	$9,300.00
	Temp Blow-off	$2,300.00
	ARV	$36,400.00
	Connect to Existing	$68,600.00
	Jack & Bore 16" DIP Water Main with 24" Casing	$389,322.00
	Cathodic Protection	$92,530.00
	DIP - Scrap Metal Surcharge	$36,300.00
	18" FES	$1,600.00
	24" FES	$3,400.00
	Regrade Slopes	$14,720.00
	8" Water Main	$58,480.00
	12" Water Main	$34,800.00
	16" Water Main	$1,587,600.00
	18" Water Main	$878,664.00
	18" Butterfly Valve	$58,800.00
	16" Butterfly Valve	$144,900.00
	12" Butterfly Valve	$14,800.00
	8" Gate Valve	$36,000.00
	16" Blowoff	$9,300.00
	12" Temp Blowoff	$6,900.00
	ARV	$36,400.00
	6" Fire Hydrant Stub	$72,800.00
	Cathodic Protection	$102,250.00
	"CCO #1 - POTHOLE FOR ZONE 5 WATER LINE PER EWO 9002"	$6,232.00
	Subtotal:	**$5,901,156.00**
3.	**Pressure Reducing Station**	
	PRS Vault	$354,000.00
	Subtotal:	**$354,000.00**
	Grand Total:	**$6,684,687**

Notes:
(1) Actual cost provided by Tracy Hills.
(2) Engineer's Estimate provided by Tracy Hills.

APPENDIX C – WEST YOST TECHNICAL MEMORANDUM

Attachment A

WEST YOST
Water. Engineered.

6800 Koll Center Parkway
Suite 150
Pleasanton CA 94566

925.426.2580 phone
530.756.5991 fax
westyost.com

TECHNICAL MEMORANDUM

DATE: July 13, 2021

Project No.: 404-60-21-70
SENT VIA: EMAIL

TO: Paul Verma, City of Tracy

CC: Robert Armijo, City of Tracy
Al Gali, City of Tracy

FROM: Roger Chu, PE, RCE #87591

REVIEWED BY: Amy Kwong, PE, RCE #73213
Jim Connell, PE, RCE #63052

SUBJECT: Peer Review and Hydraulic Evaluation for Tracy Hills Phases 2, 3, and 4

This Technical Memorandum (TM) summarizes the findings and conclusions of West Yost's technical evaluation of the potable water system facilities to serve the proposed Tracy Hills Phase 2, 3, and 4 developments (Project) located in the Tracy Hills Specific Plan area. It should be noted that water demands from Phase 5 are accounted for in the facility sizing for proposed tanks and booster pump stations, but on-site pipelines were not evaluated because the specific locations of the proposed land uses for Phase 5 are not available.

This TM also serves as a peer review of the evaluation prepared by Coleman Engineering in December 2020[1] (December 2020 TM) to determine the recommended pump station and storage tank sizes for the Project. This TM compares the results of West Yost's analysis with those documented in the December 2020 TM and presents West Yost's recommendations for facility sizing based on the most recent City of Tracy (City) standards.

This TM is submitted in accordance with West Yost's January 2021 Scope of Work for engineering services to the City. The scope of this evaluation does not include review of water supply availability or water treatment plant capacity for the Project, as these items are discussed in other documents, such as the City's Water System Master Plan. In addition, this evaluation does not determine the adequacy of any private pipelines to serve the Project.

The following sections summarize West Yost's findings and conclusions:

- Project Description
- Estimated Water Demand for the Project
- Storage and Pumping Capacity Evaluation and Peer Review of December 2020 TM
- Hydraulic Evaluation Findings
- Summary of Evaluation and Recommendations

[1] *Phases 2-4 Water System Analysis*, prepared by Coleman Engineering, dated December 15, 2020.

PROJECT DESCRIPTION

The Tracy Hills Specific Plan area consists of approximately 2,732 developable acres in the southwestern portion of the City and consists of five development phases. Phase 1, which is currently under development, is located south of the California Aqueduct, north of Interstate 580, and west of South Corral Hollow Road. A 37-acre area known as the Kaabipour/Tseng Project (KT Project) is located southeast of the intersection of South Corral Hollow Road and the California Aqueduct, and is expected to develop simultaneously with portions of Phase 1. Phase 1 and the KT Project have been the subject of previous hydraulic evaluations.[2]

Phases 2, 3, and 4 (the Project) are shown on Figure 1A and consist primarily of low-density residential neighborhoods with associated amenities such as parks, schools, a residence club, and a welcome center. The Project is bounded by Interstate 580 to the northeast, by South Corral Hollow Road to the southeast, and by undeveloped Tracy foothills on every other side.

Phase 5 consists primarily of land located north of the California Aqueduct, south of the Delta-Mendota Canal (DMC), and west of South Corral Hollow Road as shown on Figure 1A. This phase is projected to develop as a mix of industrial land use and medium-density residential neighborhoods. In addition, an area of approximately 24 acres southwest of the KT Project (AKT parcels) will develop as commercial land use and is considered part of Phase 5 for the purposes of this evaluation. As noted previously, water demands from Phase 5 are accounted for in facility sizing, but on-site pipeline alignments and sizing will be evaluated at a later date.

Phase 1, the KT Project, and Phase 5 will be served by the City's Pressure Zone 4 (Zone 4) water system. Because the Project is located at higher elevations than the areas served by Zone 4, Zone 4 facilities cannot provide water service at adequate pressure. Therefore, two new pressure zones, Zone 5 and Zone 6, will be developed to serve the Project. New storage tanks (Zone 5/6 Tanks) will be constructed at sufficient elevation to serve Zone 5 via gravity flow. A new Zone 5 booster pump station (Zone 5 BPS) will be constructed at the John Jones Water Treatment Plant (JJWTP) to fill these tanks from the JJWTP's existing Clearwell #2 and future Clearwell #3. Zone 6 will be supplied as a hydropneumatic or closed pressure zone by a new booster pump station (Zone 6 BPS) constructed at the same site as the Zone 5/6 Tanks. It was previously recommended in other planning studies that several pressure regulating stations (PRS) be constructed in the Project to allow flow from Zone 6 into Zone 5 under emergency conditions. However, because Zone 6 is no longer planned to be served by gravity from a dedicated Zone 6 storage tank, these PRS would not provide significant benefit to Zone 5, and it is recommended that they be removed from future plans. In addition, the timing of development in Zone 6 is uncertain so Zone 5 should not rely on supply that may need to come from Zone 6.

The Zone 5/6 Tanks are located in the Zone 6 service area but will be filled (and serve Zone 5) via a proposed single 16-inch diameter Zone 5 transmission main, which is called out on Figure 1B. Also called out on Figure 1B is the proposed single 12-inch diameter Zone 6 pipeline serving Phase 4, which consists exclusively of low-density residences. This Zone 6 pipeline is required because higher elevation residences in Phase 4 cannot be served adequately by Zone 5. All other proposed pipelines in Zone 6 were initially assumed to be a minimum of 8-inches in diameter.

[2] *Peer Review and Hydraulic Evaluation for Tracy Hills Phase 1B and 1C*, West Yost Associates, May 2020. *Hydraulic Evaluation of Kaabipour/Tseng Project*, West Yost Associates, November 2019.

Storage requirements for Zone 4 will only be partially provided for by the Zone 4 Tank (formerly called the "At-Grade Tank") located in Phase 1. Additional storage capacity for Zone 4 developments in Phase 5 will be provided by the Zone 5/6 Tanks. A new PRS on Criseldo Mina Drive will allow flow from Zone 5 into Zone 4 when the Zone 4 emergency storage capacity stored in the Zone 5/6 Tanks is needed.

ESTIMATED WATER DEMAND FOR THE PROJECT

Water demands were estimated for Tracy Hills using the unit water demand factors adopted in the 2020 Citywide Water System Master Plan Update (2020 WSMP). At buildout, the total potable water demand for the entire Tracy Hills area is projected to be 4,213 acre-feet per year (af/yr). Of this total demand, the Project's water demand is estimated to be 1,766 af/yr. Attachment 1 provides detailed demand calculations for all phases of the Tracy Hills development, including the projected land use and annual potable water use for the Project.

Table 1 summarizes the estimated average day, maximum day, and peak hour water demands for the Project. The average day demand (ADD) for the Project is approximately 1,095 gallons per minute (gpm). Maximum day demands (MDD) and peak hour demands (PHD) were calculated using the City's peaking factors (adopted in the 2020 WSMP) of 1.7 and 2.9 times the ADD, respectively, resulting in a MDD of about 1,862 gpm and a PHD of about 3,176 gpm.

This evaluation assumes potable water will be used to meet all Tracy Hills water demands. It is not known when the City will construct infrastructure to deliver recycled water to Tracy Hills, so potable water will be used to meet non-potable water demands in the interim. Once the City's recycled water system is extended to supply Tracy Hills, potable water demands are expected to decrease.

Table 1. Tracy Hills Potable Water Demands by Pressure Zone and Phase

Phase / Project	Annual Potable Water Use, af/yr[(a)]	Average Day Demand, gpm	Maximum Day Demand, gpm[(b)]	Peak Hour Demand, gpm[(c)]
Pressure Zone 4				
Phase 1	1,150	713	1,212	2,068
KT Project	111	69	117	200
Rodgers Vieira (Phase 5)	433	268	456	778
Other Phase 5	752	466	793	1,353
Zone 4 Total	**2,447**	**1,517**	**2,579**	**4,399**
Pressure Zone 5				
Phase 2	847	525	893	1,524
Phase 3	469	291	495	844
Phase 4	134	83	141	241
Zone 5 Total	**1,451**	**899**	**1,529**	**2,608**
Pressure Zone 6				
Phase 3	279	173	294	501
Phase 4	37	23	39	67
Zone 6 Total	**316**	**196**	**333**	**567**
Tracy Hills Total	**4,213**	**2,612**	**4,440**	**7,575**
Phases 2, 3, 4 Total	**1,766**	**1,095**	**1,862**	**3,176**

(a) Calculated in Attachment 1 tables.
(b) Maximum day demand is 1.7 times the average day demand, per the 2020 WSMP.
(c) Peak hour demand is 2.9 times the average day demand, per the 2020 WSMP.

STORAGE AND PUMPING CAPACITY EVALUATION AND PEER REVIEW OF DECEMBER 2020 TM

West Yost reviewed the water demand calculations and facility sizing determinations made in the December 2020 TM for consistency with the updated demand factors and system performance criteria documented in the 2020 WSMP. The methodology used in the December 2020 TM to calculate demands and size the Project facilities was based on information from the City's older 2012 WSMP. As a result, West Yost found that storage tank sizes recommended in the December 2020 TM are significantly larger than those calculated by West Yost using more recent factors and standards.

The December 2020 TM recommended a total storage volume of 8.5 million gallons (MG) at the Zone 5/6 Tanks site, to be stored in three manifolded tanks. Table 2 shows the updated storage capacity requirements for Tracy Hills using the 2020 WSMP criteria. West Yost found that approximately 9.2 MG of storage is required for all of Tracy Hills. After accounting for the Zone 4 Tank (3.9 MG), which is currently under construction, approximately 5.3 MG of additional storage is required at the Zone 5/6 Tanks site to meet the needs of the Project and future Zone 4 development. In summary, there are several reasons for the difference in required storage capacity calculations:

- The 2020 WSMP reduced the emergency storage requirement from 2 times an ADD to 1.5 times an ADD.
- The 2020 WSMP reduced the City's maximum day peaking factor from 2 times an ADD to 1.7 times an ADD. This change affects the operational storage requirement, which is based on MDD.
- The 2020 WSMP reduced most of the City's water demand factors by 10 to 15 percent compared to the 2012 WSMP.
- Because Zone 6 is a small pressure zone and will be served by the same storage tanks as Zone 5, West Yost recommended that Zone 6 not require additional fire flow storage capacity beyond that required for Zone 5.
- West Yost included unaccounted-for-water (UAFW) in the storage capacity calculations, while the December 2020 TM did not.
- West Yost used slightly different land use assumptions, including an alternate methodology for projecting demands for landscaped areas.

As a result of the reduced storage capacity required in the Zone 5/6 Tanks, it was determined that only two Zone 5/6 tanks will be required, rather than the three tanks recommended in the December 2020 TM. Table 3 shows how the storage requirements for the various phases and projects of Tracy Hills will be allocated between the Zone 4 Tank and the two Zone 5/6 Tanks. The information presented in Table 3 is based on current expectations for the timing of these developments and is subject to change.

It is recommended that at least one of the Zone 5/6 Tanks be placed into service before any water service connections are served by Zone 5. Because the Zone 5 BPS will not be equipped with variable frequency drives (VFDs), the pumps will over-pressurize the Zone 5 system if demands are low and a storage tank is not in service. Although the planned PRS at Criseldo Mina Drive would be capable of discharging water from Zone 5 into Zone 4 to relieve high Zone 5 pressures, water could potentially cascade down through Zones 4 and 3 to Zone 2 and disrupt the normal operations of the booster pump stations supplying the respective zones. In addition to creating considerable complexity for the City's operators, this condition could result in hydraulic transients in several pressure zones as the pumps abruptly stop or start in response to the cascading flow from Zone 5. Therefore, it is recommended that potable water service in Zone 5 should not commence until the Zone 5 BPS can discharge water into a Zone 5/6 Tank to protect the City's existing water system.

Table 2. Tracy Hills Required Potable Water Storage Capacity Evaluation

Phase / Project	Required Storage Capacity, MG				
	Operational[a]	Emergency[b]	Fire Flow[c]	Total Required Storage	Provided by Storage Tank(s)[d]
Pressure Zone 4					
Phase 1	0.52	1.54	0.96[e]	3.02	Zone 4 Tank and Zone 5/6 Tanks #1 and #2
KT Project	0.05	0.15	-	0.20	Zone 4 Tank
Rodgers Vieira (Phase 5)	0.20	0.58	-	0.78	Zone 4 Tank
Other Phase 5	0.34	1.01	-	1.35	Zone 4 Tank and Zone 5/6 Tank #2
Zone 4 Total	**1.11**	**3.28**	**0.96**	**5.35**	**NA**
Pressure Zone 5					
Phase 2	0.39	1.13	0.72[f]	2.24	Zone 5/6 Tank #1
Phase 3	0.21	0.63	-	0.84	Zone 5/6 Tank #2
Phase 4	0.06	0.18	-	0.24	Zone 5/6 Tank #2
Zone 5 Total	**0.66**	**1.94**	**0.72**	**3.32**	**NA**
Pressure Zone 6					
Phase 3	0.13	0.37	0[g]	0.50	Zone 5/6 Tank #2
Phase 4	0.02	0.05	-	0.07	Zone 5/6 Tank #2
Zone 6 Total	**0.14**	**0.42**	**0**	**0.57**	**NA**
Total	**1.92**	**5.64**	**1.68**	**9.24**	**NA**

(a) Based on 30 percent of a maximum day demand, per the 2020 WSMP.

(b) Based on 1.5 times the average day demand, per the 2020 WSMP.

(c) Fire flow storage requirements are shared by all developments within each pressure zone. However, for the purposes of determining the required timing for construction of storage facilities, fire flow storage requirements are attributed to the first phase or project assumed to develop within each pressure zone.

(d) Planned distribution of project storage requirements amongst storage tanks provided by Ruggeri-Jensen-Azar on May 13, 2021. Refer to Table 3 for additional details.

(e) Based on the storage required for an Industrial or Institutional fire flow of 4,000 gpm for 4 hours. Recommended storage volumes do not include the volume associated with the 500-gpm sprinkler flow.

(f) Per discussions with the City and PJHM Architects, the required fire flow for schools in Zone 5 is 3,500 gpm. It was assumed that the fire flow requirement for other Institutional and Public land uses within Zone 5 would also be 3,500 gpm. Since recommended storage volumes do not include the volume associated with the 500-gpm sprinkler flow, this storage requirement is based on a fire flow of 3,000 gpm for 4 hours.

(g) Based on the storage required for a Single Family Residential fire flow of 1,500 gpm for 2 hours, 0.18 MG of fire flow storage capacity is required for Zone 6. However, because Zone 6 is small and Zone 5 and Zone 6 will be served by the same storage tanks, additional fire flow storage capacity beyond that provided for Zone 5 is not required.

Table 3. Proposed Storage Tank Capacity Allocation[a,b]

Phase / Project	Required Storage Capacity, MG
Zone 4 Tank	
Phase 1A	2.19
Phase 1B - Single Family Residential	0.40
KT Project	0.20
Rodgers Vieira	0.78
Sandhu - Portion	0.34
Zone 4 Tank Total	**3.91**
Zone 5/6 Tank #1	
Phase 1C	0.33
Phase 2	2.24
Zone 5/6 Tank #1 Total	**2.57**
Zone 5/6 Tank #2	
Phase 1B - High-Density Residential and Commercial	0.10
Phase 3	1.34
Phase 4	0.31
Sandhu - Portion	0.20
Tseng, Integral, AKT, and 23.2 Miscellaneous acres	0.81
Zone 5/6 Tank #2 Total	**2.76**
Total	**9.24**

(a) Planned distribution of project storage requirements amongst storage tanks provided by Ruggeri-Jensen-Azar on May 13, 2021.
(b) Based on current expectations for the timing of developments and is subject to change.

As shown in Table 4, West Yost determined the pumping capacity required in each pressure zone for buildout of Tracy Hills and compared that with the estimated capacity of the existing and proposed BPS capacities.

Table 4. Tracy Hills Required Potable Water Pumping Capacity Evaluation

Phase / Project	Pumping Capacity from Supply Sources, gpm[a]	Maximum Day Demand plus Fire Flow, gpm[b]	Peak Hour Demand, gpm	Required Pumping Capacity for Peak Flows, gpm[c]
Pressure Zone 4				
Phase 1	1,212	5,712[d]	2,068	-
KT Project	117	117	200	-
Rodgers Vieira (Phase 5)	456	456	778	-
Other Phase 5	793	793	1,353	-
Zone 4 Total	**2,579**	**7,079**	**4,399**	**7,079**
Pressure Zone 5				
Phase 2	893	NA[e]	NA[e]	-
Phase 3[f]	788	NA[e]	NA[e]	-
Phase 4[f]	180	NA[e]	NA[e]	-
Zone 5 Total	**1,862**	**NA[e]**	**NA[e]**	**1,862**
Pressure Zone 6				
Phase 3	294	1,794[g]	501	-
Phase 4	39	39	67	-
Zone 6 Total	**333**	**1,833**	**567**	**1,833**

(a) Maximum day water demands should be met through firm treated water pumping capacity. Treated water pumping capacity for Zones 4, 5, and 6 are provided by the Zone 4 BPS and Zone 5 BPS at the JJWTP, and the Zone 6 BPS, respectively.

(b) Fire flow pumping requirements are shared by all developments within each pressure zone. However, for the purposes of determining the required timing for construction of pumping facilities, fire flow pumping requirements are attributed to the first phase or project assumed to develop within each pressure zone.

(c) Required pumping capacity for maximum flows is the higher of maximum day demand plus fire flow, peak hour demand, and required pumping capacity from supply sources. Includes pumping capacity from supply sources and supply from local storage.

(d) Includes a 4,500-gpm Institutional fire flow.

(e) Zone 5 peak demands will be supplied by gravity flow from the Zone 5/6 Tanks.

(f) Equal to maximum day demands for Zone 5 and Zone 6. The Zone 5 BPS must supply Zone 6 demands from the JJWTP to the Zone 5/6 Tanks.

(g) Includes a 1,500-gpm Single Family Residential fire flow.

Zone 4 requires a firm treated water pumping capacity of 2,579 gpm for a MDD condition, and a total firm pumping capacity of 7,079 gpm for a MDD plus fire flow condition. The Zone 4 BPS at the JJWTP will have a firm capacity of 3,675 gpm once the fourth pump is installed, which is sufficient to meet the Zone 4 MDD. For reliability, it is assumed that the MDD plus fire flow condition will be met by flow from the Zone 4 Tank BPS only. The Zone 4 Tank BPS will have an initial firm pumping capacity of 5,900 gpm, with space for an additional future pump to increase the firm capacity to 8,200 gpm. It is recommended that the sizing for the final pump at the Zone 4 Tank BPS be reevaluated as Zone 4 continues to develop.

Zone 5 requires a firm treated water pumping capacity of 1,862 gpm for a MDD condition. This total accounts for demands for both Zone 5 and Zone 6, since supply for Zone 6 must first be conveyed from the JJWTP into the Zone 5/6 Tanks before being pumped into Zone 6. The Zone 5 BPS at the JJWTP will have a firm capacity of 2,410 gpm, which is sufficient to meet the Zone 5 MDD. Peak hour and fire flow demands for Zone 5 will be provided by gravity flow from the Zone 5/6 Tanks.

Zone 6 requires a total pumping capacity of 1,833 gpm for a MDD plus fire flow condition. As noted in the December 2020 TM, there are multiple pump configurations which could meet the needs of Zone 6, and the pump lineup will change if a hydropneumatic tank is used to control pump cycling and operations rather than, or in addition to, VFDs. The December 2020 TM suggested a possible pump lineup consisting of three 100-gpm jockey pumps, two 600-gpm low flow pumps, and two 2,000-gpm high flow pumps, all equipped with VFDs. West Yost suggests that the City consider a lineup of two 100-gpm jockey pumps and four 600-gpm low flow pumps as a less costly alternative that can still provide 1,833 gpm during a MDD plus fire flow demand condition with the largest pump out of service. This alternative lineup would also be easier to maintain since the Zone 6 BPS would have fewer pump models and each 600-gpm pump could be easily exercised to meet peak hour demands.

Based on the planned maximum service elevation of 579 feet above mean sea level (ft msl) in Zone 6 and a base elevation of 572 ft msl for the Zone 5/6 Tanks, West Yost determined that the Zone 6 BPS should have a design head of approximately 100 ft. This preliminary design head should be confirmed during design of the Zone 6 BPS.

HYDRAULIC EVALUATION FINDINGS

The hydraulic evaluation of the Project is based on system performance and operational criteria developed in the 2020 WSMP. These criteria are provided in Attachment 2 for reference. The City's existing developer hydraulic model[3] was updated to include the water demands and proposed water system infrastructure for the Project. As noted above, water demands from Phase 5 are accounted for in the facility sizing only. Proposed infrastructure for the Project is based on:

- Tracy Hills Phase 2 - 4 Yield Study (dated November 10, 2020) – referenced for land use and acreages[4]
- Vesting Tentative Map - Tract 4057 (dated May 12, 2021) – referenced for Phase 2 pipeline alignments and diameters
- December 2020 TM – referenced for Phase 3 and Phase 4 pipeline alignments
- Communication with design engineer (Ruggeri-Jensen-Azar) – referenced for Zone 5/6 Tanks design and site grading/layout
- Tracy Hills Phase 2-4 Grades (dated May 6, 2021) – referenced for Project elevations
- John Jones Water Treatment Plant Tracy Hills Zone 5 Booster Pump Station Basis of Design Draft TM (May 2021) – referenced for Zone 5 BPS design parameters

[3] The City's developer hydraulic model includes all previously evaluated development projects and is separate from the 2020 WSMP model.

[4] Subsequent revisions to the Yield Study slightly reduced the total number of units projected and adjusted the acreage of non-residential land uses. Water demands used in this evaluation were based on the older November 10, 2020 Yield Study to be conservative.

Where pipeline diameter information was not provided in the above sources, West Yost assumed 8-inch diameter pipes will serve residential land uses and 12-inch diameter pipes will serve public facilities and provide backbone loops.

Based on these sources, significant updates were made to the Zone 5 and Zone 6 water system infrastructure from what was previously represented in the City's 2020 WSMP hydraulic model, including changes to the alignments and diameters of the transmission and distribution pipelines, updates to water service elevations, and new locations for the Zone 5/6 Tanks, Zone 6 BPS, and Criseldo Mina Drive PRS to reflect more current information. This updated model was then used to simulate PHD and MDD plus fire flow conditions to determine the adequacy of the proposed infrastructure to serve the Project. Results from this hydraulic evaluation are discussed below.

Peak Hour Demand Evaluation

Figure 2 shows system pressures and pipeline velocities during a PHD condition. While no distribution pipelines exceed the maximum pipeline velocity limit of 8 feet per second (fps), pressure at one junction at the northwest edge of the Project (Phase 4, Zone 5) is approximately 31 pounds per square inch (psi). This area is located at too high of an elevation to meet the recommended minimum pressure (40 psi) while being served by gravity from the Zone 5/6 Tanks during a PHD condition.

As a result, West Yost recommends reconfiguring the pressure zone boundary in this area so that this high-elevation area is served by the Zone 6 BPS. Figure 3 shows the proposed pipeline changes, which increase service pressures at the aforementioned location (as well as other locations where pressures were just above 40 psi when served by Zone 5) to greater than 90 psi. It should be noted that the proposed re-zoning increases the Zone 6 water demands minimally (approximately 16 residences will be re-zoned) and would not impact the sizing of the Zone 6 BPS.

Figure 4 shows system pressures and pipeline velocities with the recommended re-zoning. Distribution pipeline velocities remain below the maximum pipeline velocity limit of 8 fps, and pressures at all junctions are above 40 psi.

Pressure reducing valves (PRVs) should be installed on any customer service laterals where system pressures exceed 80 psi. As shown on Figure 4, a large portion of Zone 5, and some portions of Zone 6, will experience pressures exceeding 80 psi during a PHD condition. However, the condition with the highest pressure in Zone 5 will be when the Zone 5 BPS is filling the Zone 5/6 Tanks. PRVs should be installed on all Zone 5 service laterals at an elevation of 440 ft or less to avoid high pressures while the tanks are being filled. Based on the preliminary Zone 6 BPS design head of 100 ft, PRVs should also be installed on all Zone 6 service laterals at an elevation of 490 ft or less to avoid high pressures during low flow conditions (this recommended elevation may be subject to change when the Zone 6 BPS is designed).

Maximum Day Demand Plus Fire Flow Evaluation

To meet fire flow requirements, the water system must be able to provide the required flow rate during an MDD condition, while maintaining 20 psi residual system pressure (primary criterion) and pipeline velocities below 12 fps (secondary criterion). Figure 5 shows the fire flow requirements for the Project. Most locations are single family residential and require a fire flow of only 1,500 gpm. Per discussions with the City and PJHM Architects, who is designing the schools for the Project, the maximum fire flow requirement for schools will be 3,500 gpm (including 500 gpm for sprinklers). It was assumed that community parks and the welcome center would also have a fire flow requirement of 3,500 gpm. Lastly, it was determined that the fire flow requirement for the residence club, which will be served by Zone 6,

will be no greater than 1,500 gpm because it will have a floor area no greater than 10,000 square feet and be fully sprinklered.[5]

Figure 6 shows whether sufficient fire flow is available using these criteria. Although most evaluated locations meet or exceed the minimum fire flow requirement, the proposed system cannot deliver sufficient fire flow to the Phase 3 public facilities within Zone 5 or to Phase 4 locations in both Zone 5 and Zone 6. The identified fire flow deficiencies in Zone 5 are due to high head loss in the proposed 16-inch diameter pipeline connecting the Zone 5/6 Tanks to the Zone 5 distribution system. Although the proposed 16-inch diameter pipeline is adequately sized to fill the Zone 5/6 Tanks, it is not adequate to deliver a 3,500-gpm fire flow to the northern portions of the Zone 5 system during a MDD condition. In addition, locations in the northern-most portion of Zone 5 with only a 1,500-gpm fire flow requirement are deficient because Phase 4 locations in Zone 5 are served by a single 8-inch diameter pipeline. The identified fire flow deficiencies in Zone 6 are due to high head loss in the proposed 8-inch diameter pipelines connecting the Phase 3 and Phase 4 portions of Zone 6.

To improve fire flows, West Yost recommends the following (as shown on Figure 7):

- Upsizing approximately 5,000 ft of Zone 5 pipeline that connects the Zone 5/6 Tanks to the Zone 5 distribution system from 16-inch diameter to 18-inch diameter.
- Upsizing approximately 670 ft of Zone 5 pipeline serving Phase 4 from 8-inch diameter to 12-inch diameter.
- Upsizing approximately 2,700 ft of Zone 6 pipeline serving Phase 4 from 8-inch diameter to 12-inch diameter. This is in addition to the 3,500 ft of 12-inch diameter pipeline previously recommended in the December 2020 TM.

With the recommended improvements listed above, the system can provide sufficient fire flow to all locations within the Project, as shown on Figure 8.

SUMMARY OF EVALUATION AND RECOMMENDATIONS

West Yost performed a peer review of the December 2020 TM and provided updated recommendations for facility sizing and predesign parameters based on the 2020 WSMP criteria. The key findings from the peer review are:

- The recommended storage capacity for the Zone 5/6 Tanks is 5.3 MG, significantly less than the 8.5 MG recommended in the December 2020 TM. Due to the reduction in required storage capacity, only two tanks are needed at the Zone 5/6 Tank site.
- Services should not be connected to Zone 5 prior to construction of at least one Zone 5/6 Tank due to potential for increased operational complexity of the existing water system and hydraulic transient concerns.
- An alternative Zone 6 BPS lineup to that suggested in the December 2020 TM is two 100-gpm pumps and four 600-gpm pumps. This lineup would be less costly and easier for the City to maintain.

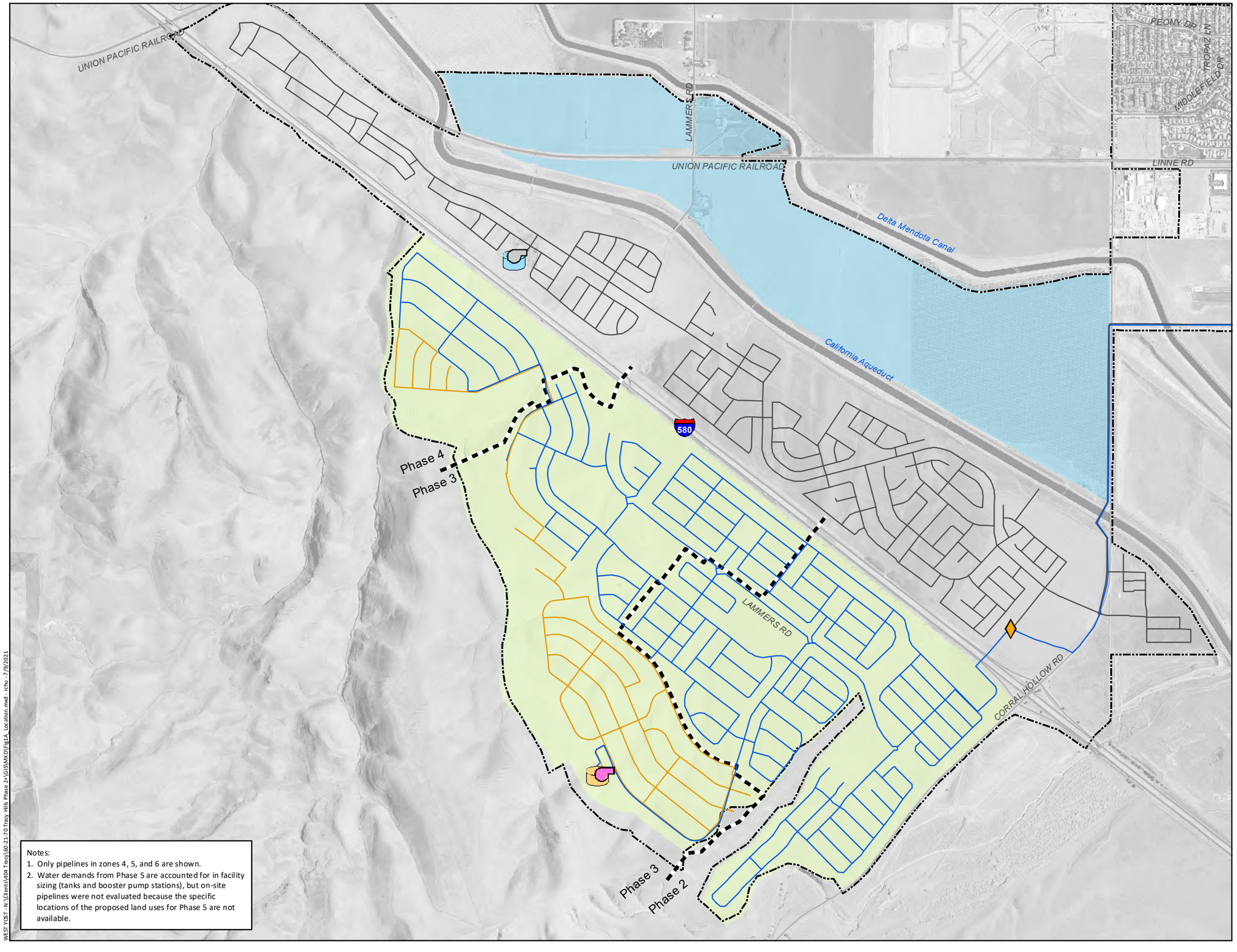
[5] Per the 2019 California Fire Code, assuming a Type V building with a maximum of 10,000 square feet, the required fire flow is 2,750 gpm if not sprinklered. The City allows a 50 percent reduction in fire flow requirement for sprinklered buildings, resulting in a requirement of 1,375 gpm.

- The preliminary design head of the Zone 6 BPS is 100 ft. This should be confirmed during design.
- Because Zone 6 is no longer planned to be served by gravity from a dedicated Zone 6 storage tank, proposed PRS to supply Zone 5 are recommended to be removed from future plans.

West Yost performed a hydraulic evaluation of the proposed Zone 5 and Zone 6 systems. Under both PHD and MDD plus fire flow conditions, the Project's proposed water system infrastructure requires some improvements to deliver adequate flows and pressures to customer service locations. West Yost recommends the following improvements to the proposed water system infrastructure:

- Reconfigure the Phase 4 distribution system so that some high elevation locations are served by Zone 6 instead of Zone 5, as shown on Figure 3.
- Upsize approximately 5,000 ft of Zone 5 pipeline that connects the Zone 5/6 Tanks to the Zone 5 distribution system from 16-inch diameter to 18-inch diameter.
- Upsize approximately 670 ft of Zone 5 pipeline serving Phase 4 from 8-inch diameter to 12-inch diameter.
- Upsize approximately 2,700 ft of Zone 6 pipeline serving Phase 4 from 8-inch diameter to 12-inch diameter. This is in addition to the 3,500 ft of 12-inch diameter pipeline previously recommended in the December 2020 TM.
- Install PRVs on customer service laterals at an elevation of 440 ft or less in Zone 5.
- Install PRVs on customer service laterals at an elevation of 490 ft or less in Zone 6. This is based on the preliminary Zone 6 BPS design head of 100 ft and this recommended elevation may be subject to change when the Zone 6 BPS is designed.

The hydraulic evaluation performed for the proposed Project is based on the various assumptions stated above. If any of these items are modified in any way, other than as described in this TM, additional hydraulic evaluation will be required.



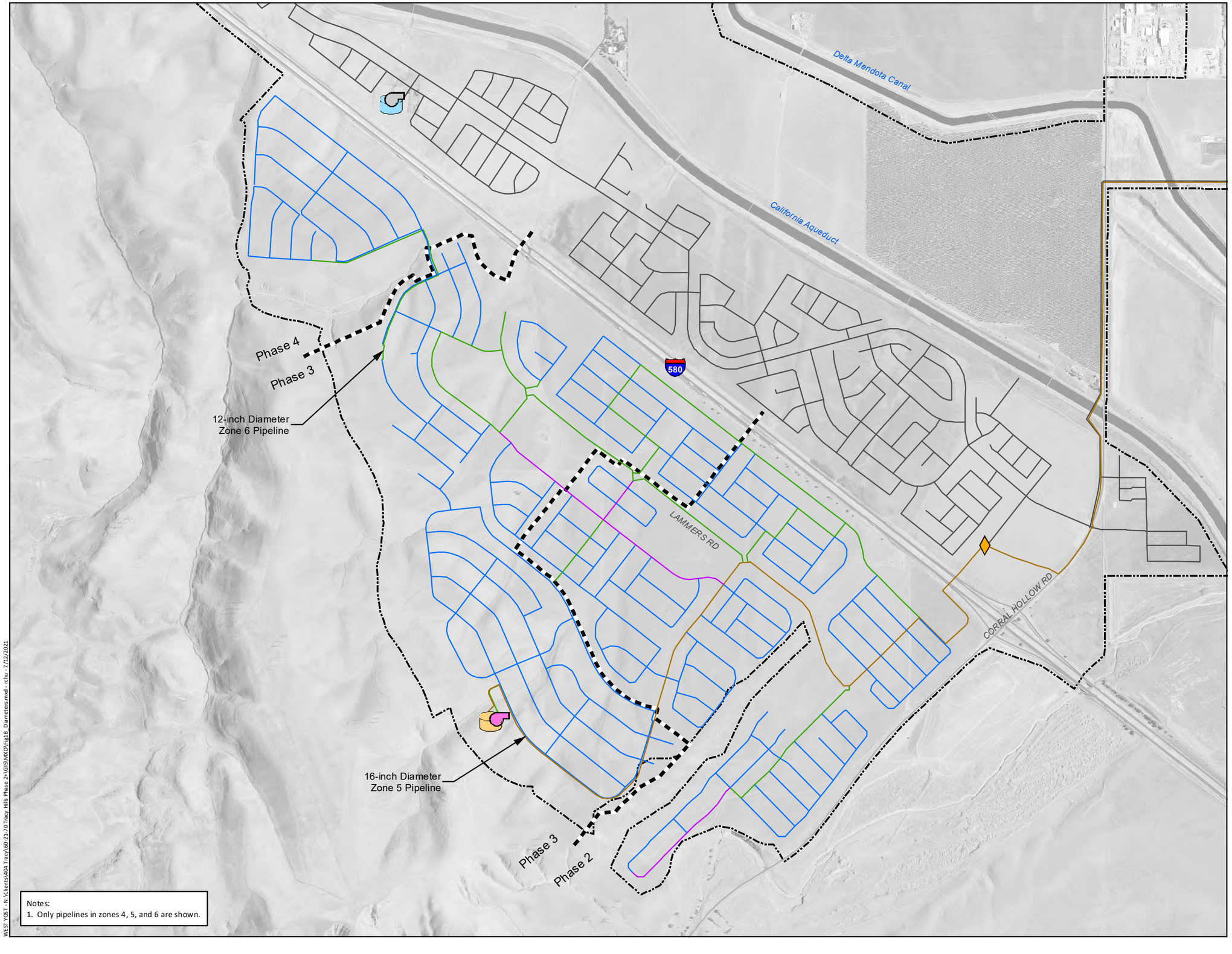
Notes:
1. Only pipelines in zones 4, 5, and 6 are shown.
2. Water demands from Phase 5 are accounted for in facility sizing (tanks and booster pump stations), but on-site pipelines were not evaluated because the specific locations of the proposed land uses for Phase 5 are not available.

WEST YOST

Figure 1A

Proposed Potable Water System Pressure Zones

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation



N

0 625 1,250

Scale in Feet

Proposed Project Pipeline Diameter

- 8 Inches
- 10 Inches
- 12 Inches
- 16 Inches

Pipeline Zone

- Zone 4
- Criseldo Mina Pressure Regulating Station
- Zone 4 Booster Pump Station
- Zone 6 Booster Pump Station
- Zone 4 Tank
- Zone 5/6 Tanks
- City Limit
- Development Phase Boundary

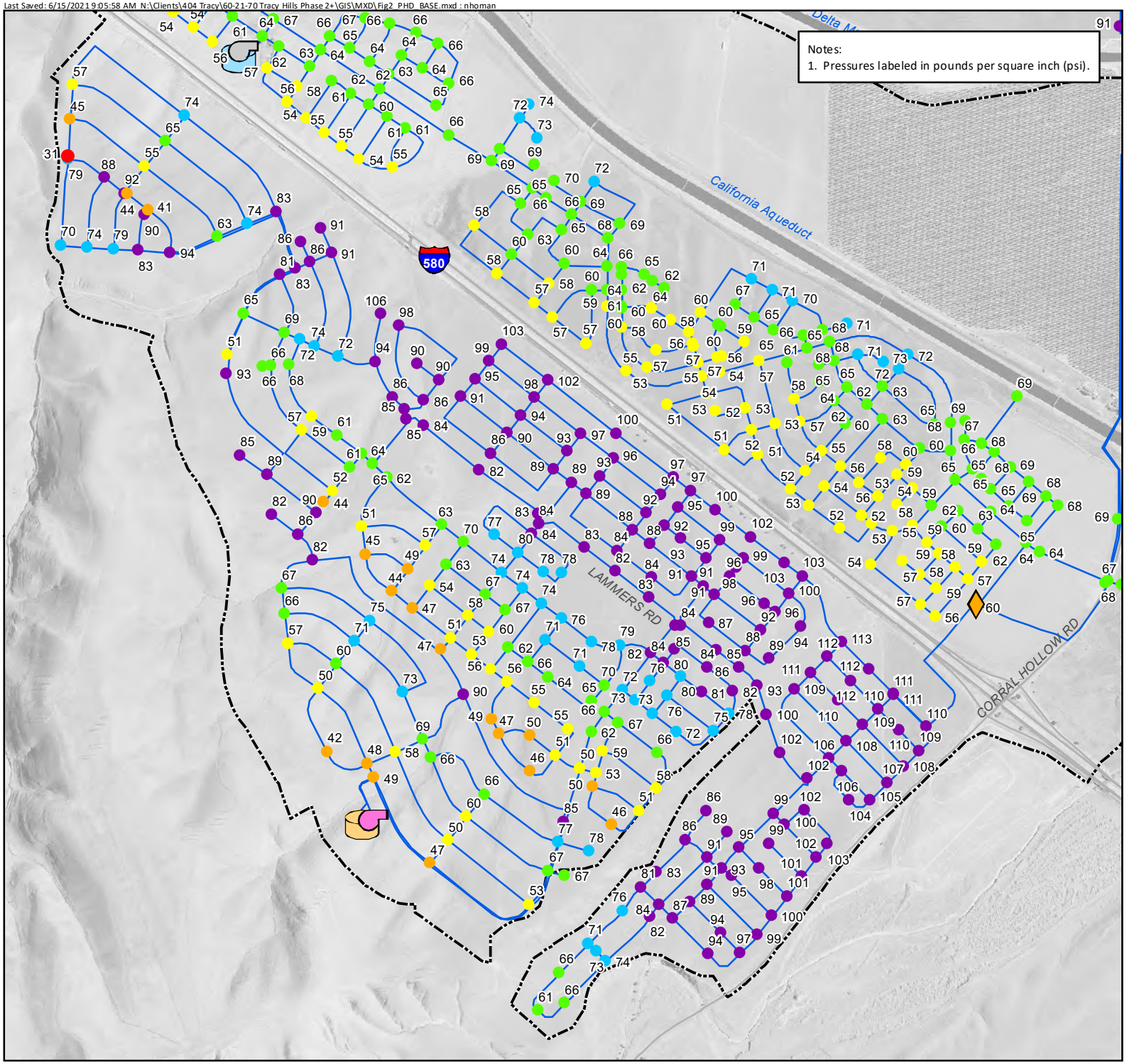
WEST YOST

Figure 1B

Proposed Potable Water System Pipeline Diameters

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation

Last Saved: 6/15/2021 9:05:58 AM N:\Clients\404 Tracy\60-21-70 Tracy Hills Phase 2+\GIS\MXD\Fig2_PHD_BASE.mxd : nhoman



N

0 750 1,500

Scale in Feet

Pipeline Velocity

- Less than or Equal to 8 fps
- Greater than 8 fps

Peak Hour Pressure

- Less than 40 psi
- 40 to 50 psi
- 50 to 60 psi
- 60 to 70 psi
- 70 to 80 psi
- Greater than 80 psi
- Criseldo Mina PRS
- Zone 4 Booster Pump Station
- Zone 6 Booster Pump Station
- Zone 4 Tank
- Zone 5/6 Tanks
- City Limit

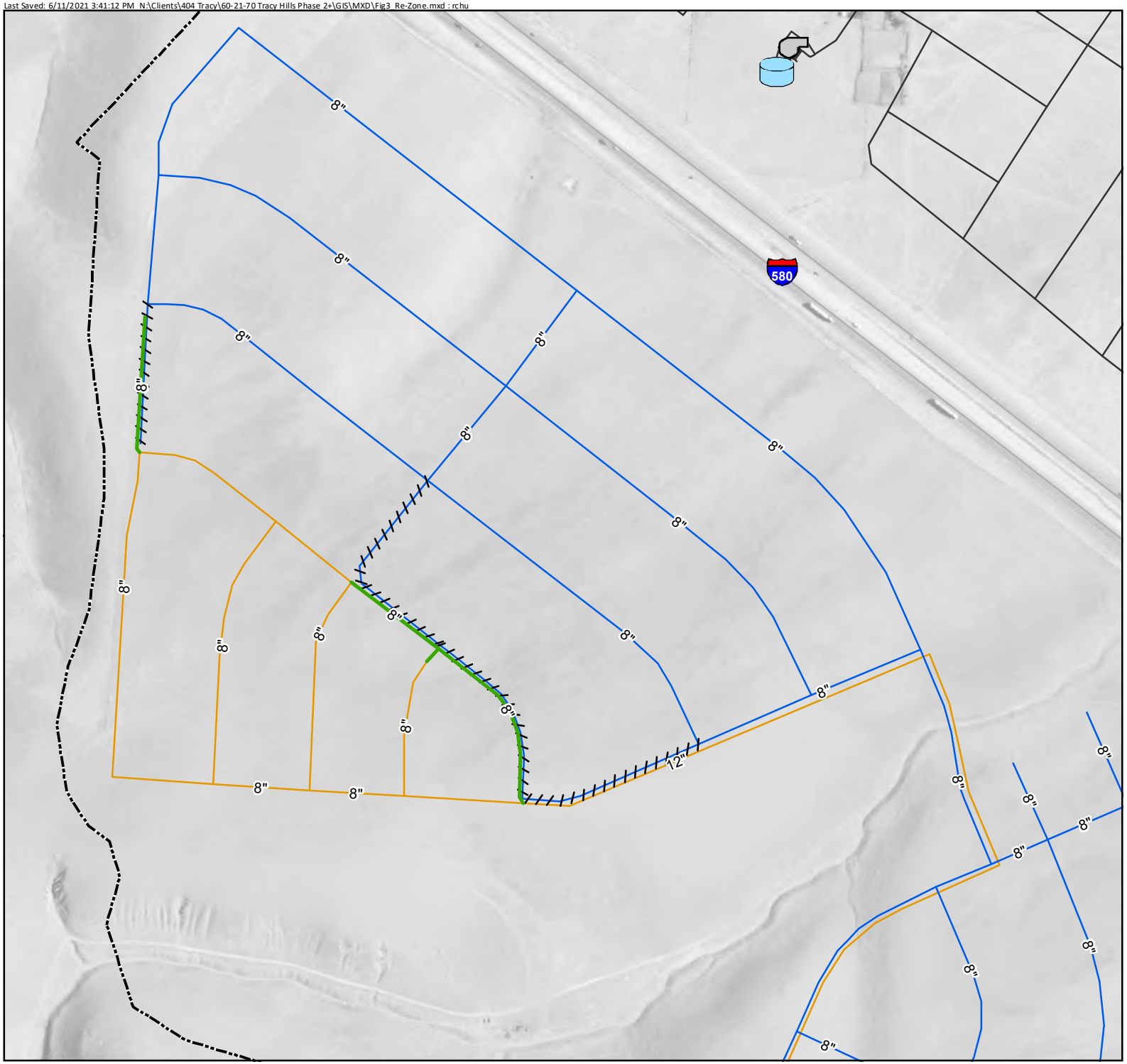
WEST YOST

Figure 2

Peak Hour Results
Proposed Zoning

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation

Last Saved: 6/11/2021 3:41:12 PM N:\Clients\404 Tracy\60-21-70 Tracy Hills Phase 2+\GIS\MXD\Fig3_Re-Zone.mxd : rchu

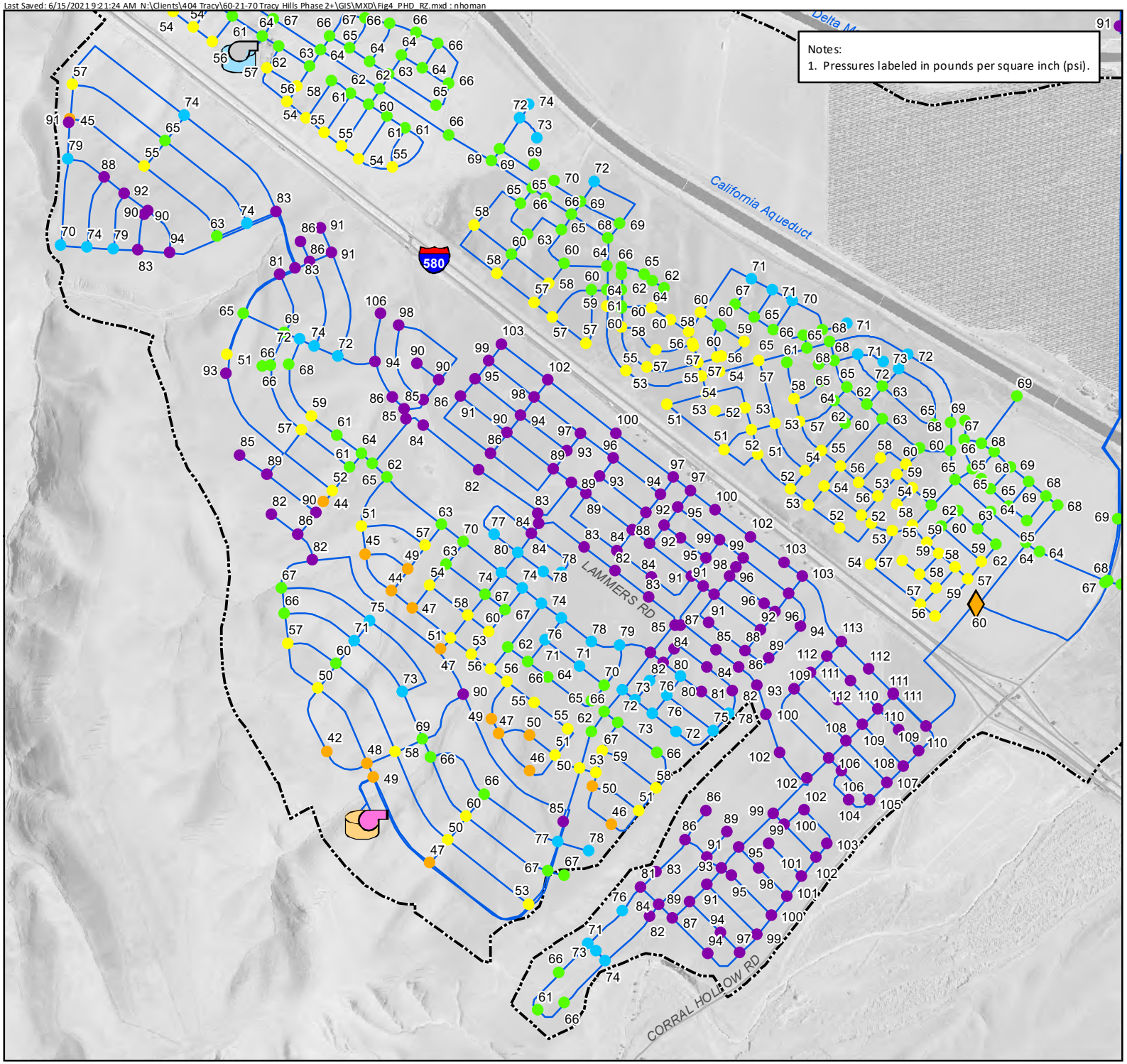


WEST YOST

Figure 3

Recommended Re-Zoning

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation



N

0 750 1,500

Scale in Feet

Pipeline Velocity

- Less than or Equal to 8 fps
- Greater than 8 fps

Peak Hour Pressure

- Less than 40 psi
- 40 to 50 psi
- 50 to 60 psi
- 60 to 70 psi
- 70 to 80 psi
- Greater than 80 psi
- Criseldo Mina PRS
- Zone 4 Booster Pump Station
- Zone 6 Booster Pump Station
- Zone 4 Tank
- Zone 5/6 Tanks
- City Limit

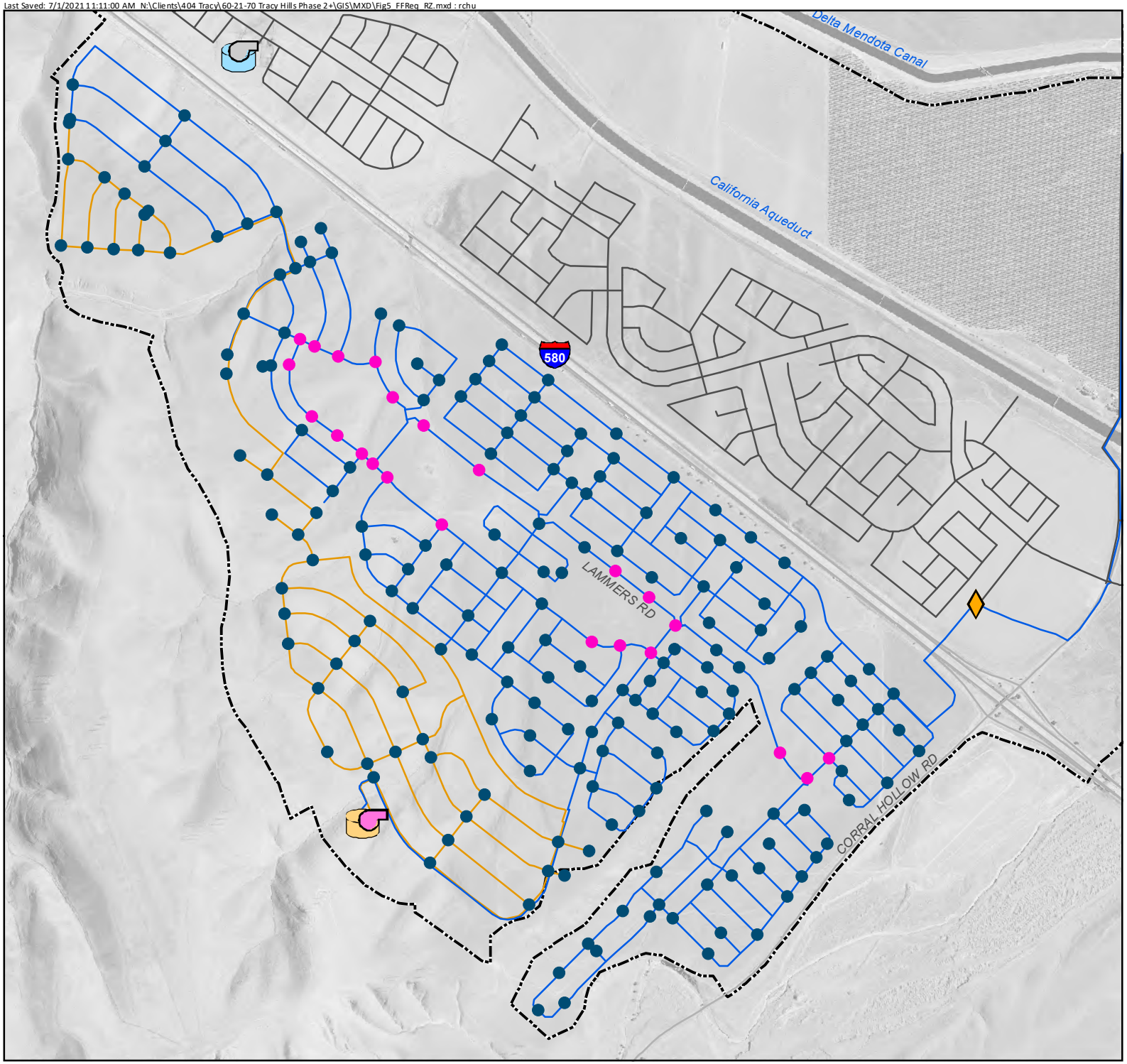
WEST YOST

Figure 4

Peak Hour Results Re-Zoned

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation

Last Saved: 7/1/2021 11:11:00 AM N:\Clients\404 Tracy\60-21-70 Tracy Hills Phase 2+\GIS\MXD\Fig5_FFReq_RZ.mxd : rchu



N

0 750 1,500

Scale in Feet

Pipeline Zone (Re-Zoned)

- Zone 4
- Zone 5
- Zone 6

Fire Flow Requirement

- 1,500 gpm
- 3,500 gpm
- Criseldo Mina PRS
- Zone 4 Booster Pump Station
- Zone 6 Booster Pump Station
- Zone 4 Tank
- Zone 5/6 Tanks
- City Limit

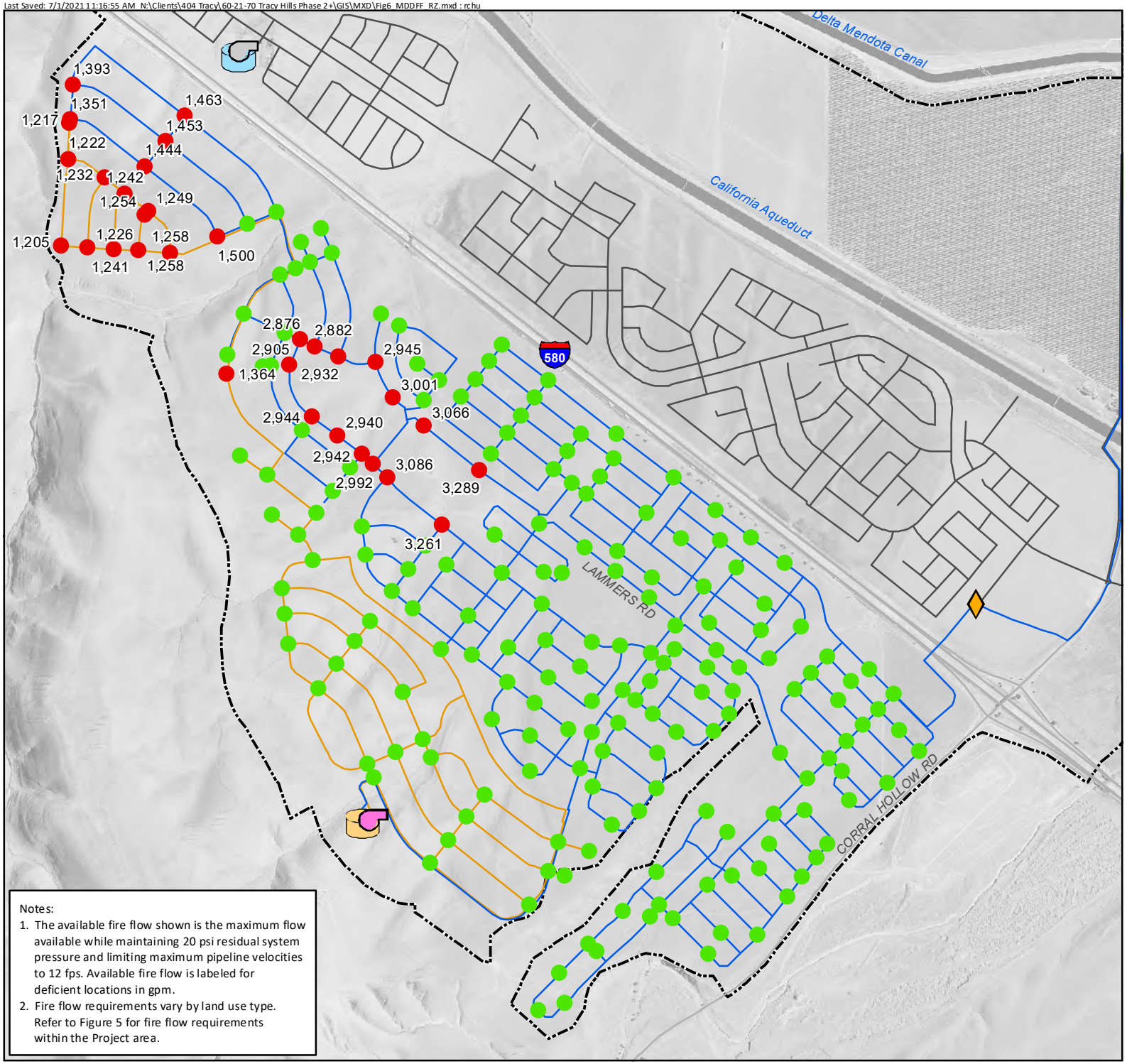
WEST YOST

Figure 5

Fire Flow Requirements

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation

Last Saved: 7/1/2021 11:16:55 AM N:\Clients\404 Tracy\60-21-70 Tracy Hills Phase 2+\GIS\MXD\Fig6_MDDFF_RZ.mxd : rchu



Notes:
1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities to 12 fps. Available fire flow is labeled for deficient locations in gpm.
2. Fire flow requirements vary by land use type. Refer to Figure 5 for fire flow requirements within the Project area.

N

0 750 1,500

Scale in Feet

Pipeline Zone (Re-Zoned)

- Zone 4
- Zone 5
- Zone 6

Available Fire Flow

- Does not Meet Requirements
- Meets Requirements
- Criseldo Mina PRS
- Zone 4 Booster Pump Station
- Zone 6 Booster Pump Station
- Zone 4 Tank
- Zone 5/6 Tanks
- City Limit

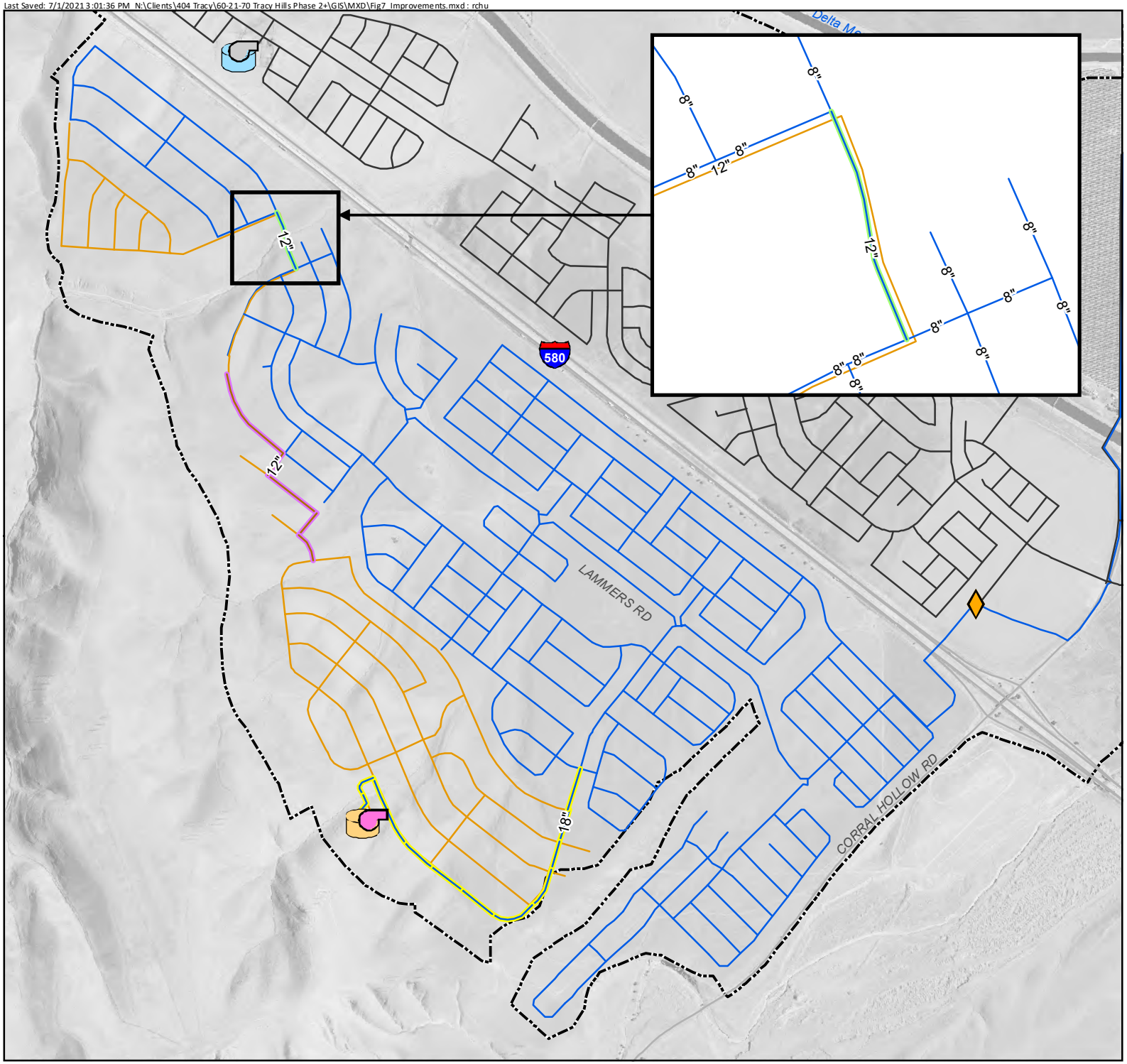
WEST YOST

Figure 6

Fire Flow Results Re-Zoned

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation

Last Saved: 7/1/2021 3:01:36 PM N:\Clients\404 Tracy\60-21-70 Tracy Hills Phase 2+\GIS\MXD\Fig7_Improvements.mxd : rchu



N

0 750 1,500

Scale in Feet

Zone 5 Pipeline Improvement

- Upsize to 12-in Diameter
- Upsize to 18-in Diameter

Zone 6 Pipeline Improvement

- Upsize to 12-in Diameter

Pipeline Zone (Re-Zoned)

- Zone 4
- Zone 5
- Zone 6
- Criseldo Mina PRS
- Zone 4 Booster Pump Station
- Zone 6 Booster Pump Station
- Zone 4 Tank
- Zone 5/6 Tanks
- City Limit

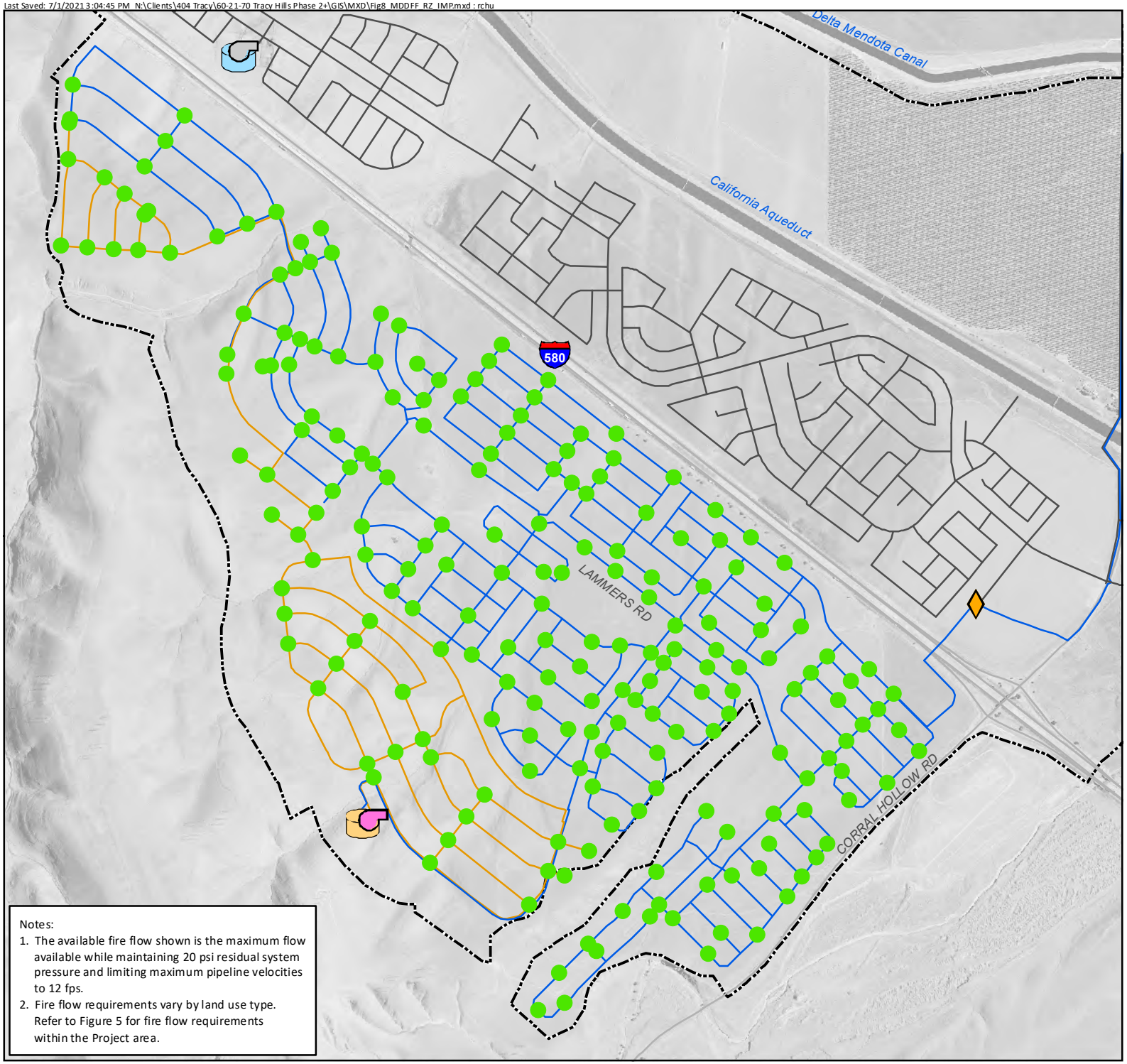
WEST YOST

Figure 7

Recommended Pipeline Improvements

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation

Last Saved: 7/1/2021 3:04:45 PM N:\Clients\404 Tracy\60-21-70 Tracy Hills Phase 2+\GIS\MXD\Fig8_MDDFF_RZ_IMP.mxd : rchu



N

0 750 1,500

Scale in Feet

Pipeline Zone (Re-Zoned)

- Zone 4
- Zone 5
- Zone 6

Available Fire Flow

- Does not Meet Requirements
- Meets Requirements
- Criseldo Mina PRS
- Zone 4 Booster Pump Station
- Zone 6 Booster Pump Station
- Zone 4 Tank
- Zone 5/6 Tanks
- City Limit

Notes:

1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities to 12 fps.
2. Fire flow requirements vary by land use type. Refer to Figure 5 for fire flow requirements within the Project area.

WEST YOST

Figure 8

Fire Flow Results Re-Zoned with Improvements

City of Tracy
Tracy Hills Phases 2-4
Hydraulic Evaluation

Attachment 1

Detailed Demand Calculations

Table A-1. Phase 1 Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a,d)]	Unit Potable Water Use Factor[(e)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density	Unknown[(f)]	Unknown[(f)]		1,505	365	gpd/du	615.3
Residential – Medium Density	45.3	38.5		502	264	gpd/du	148.5
			6.8		2.4	af/ac/yr	16.3
Residential - High Density	7.0	6.0		125	187	gpd/du	26.2
			1.1		2.4	af/ac/yr	2.5
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial	10.6	9.0			1.8	af/ac/yr	16.2
			1.6		1.9	af/ac/yr	3.0
Office	45.5	38.7			1.5	af/ac/yr	58.0
			6.8		1.9	af/ac/yr	13.0
Institutional	18.6	15.8			1.5	af/ac/yr	23.7
			2.8		1.9	af/ac/yr	5.3
Parks	27.9		27.9		4.0	af/ac/yr	111.6
UAFW[(g)]							110.4
			Total	**2,132**			**1,150**

(a) From *Peer Review and Hydraulic Evaluation for Tracy Hills Phase 1B and 1C* , West Yost Associates, May 2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Dwelling unit counts for Phase 1 were adjusted from the data presented in the *Peer Review and Hydraulic Evaluation for Tracy Hills Phase 1B and 1C* to reflect the most recent plans.

(e) Based on the 2020 WSMP.

(f) Not given. Low density residential acreage is not required to calculate water demands for Phase 1.

(g) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-2. Kaabipour/Tseng Project Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a,d)]	Unit Potable Water Use Factor[(e)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density		0.0			365	gpd/du	0.0
Residential – Medium Density	24.1	20.5		214	264	gpd/du	63.3
			3.6		2.4	af/ac/yr	8.7
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial	10.3	8.8			1.8	af/ac/yr	15.8
			1.5		1.9	af/ac/yr	2.9
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Parks	2.5		2.5		4.0	af/ac/yr	10.0
UAFW[(f)]							10.7
			Total	**214**			**111**

(a) From *Hydraulic Evaluation of Kaabipour/Tseng Project* , West Yost Associates, November 2019.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Dwelling unit counts for Kaabipour/Tsent were adjusted from the data presented in the *Hydraulic Evaluation of Kaabipour/Tseng Project* to reflect the most recent plans.

(e) Based on the 2020 WSMP.

(f) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-3. Phase 2, Zone 5 Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a)]	Unit Potable Water Use Factor[(d)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density	Unknown[(e)]	Unknown[(e)]		1,489	365	gpd/du	608.8
Residential – Medium Density		0.0			264	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial		0.0			1.8	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional	19.1	16.2			1.5	af/ac/yr	24.3
			2.9		1.9	af/ac/yr	5.4
Parks	31.9		31.9		4.0	af/ac/yr	127.6
UAFW[(f)]							81.4
			Total	**1,489**			**847**

(a) From Tracy Hills Phase 2-4 Yield Study prepared by RJA, dated November 10th, 2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Based on the 2020 WSMP.

(e) Not given on Yield Study. Low density residential acreage is not required to calculate water demands for Phase 2-4.

(f) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-4. Phase 3, Zone 5 Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a)]	Unit Potable Water Use Factor[(d)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density	Unknown[(e)]	Unknown[(e)]		711	365	gpd/du	290.7
Residential – Medium Density		0.0			264	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial		0.0			1.8	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional	19.4	16.5			1.5	af/ac/yr	24.8
			2.9		1.9	af/ac/yr	5.5
Parks	25.9		25.9		4.0	af/ac/yr	103.4
UAFW[(f)]							45.1
			Total	**711**			**469**

(a) From Tracy Hills Phase 2-4 Yield Study prepared by RJA, dated November 10th, 2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Based on the 2020 WSMP.

(e) Not given on Yield Study. Low density residential acreage is not required to calculate water demands for Phase 2-4.

(f) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-5. Phase 4, Zone 5 Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a)]	Unit Potable Water Use Factor[(d)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density	Unknown[(e)]	Unknown[(e)]		257	365	gpd/du	105.1
Residential – Medium Density		0.0			264	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial		0.0			1.8	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Parks	4.0		4.0		4.0	af/ac/yr	16.0
UAFW[(f)]							12.9
			Total	**257**			**134**

(a) From Tracy Hills Phase 2-4 Yield Study prepared by RJA, dated November 10th, 2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Based on the 2020 WSMP.

(e) Not given on Yield Study. Low density residential acreage is not required to calculate water demands for Phase 2-4.

(f) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-6. Phase 3, Zone 6 Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a)]	Unit Potable Water Use Factor[(d)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density	Unknown[(e)]	Unknown[(e)]		598	365	gpd/du	244.5
Residential – Medium Density		0.0			264	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial		0.0			1.8	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional	4.7	4.0			1.5	af/ac/yr	6.0
			0.7		1.9	af/ac/yr	1.3
Parks			0.0		4.0	af/ac/yr	0.0
UAFW[(f)]							26.7
			Total	**598**			**279**

(a) From Tracy Hills Phase 2-4 Yield Study prepared by RJA, dated November 10th, 2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Based on the 2020 WSMP.

(e) Not given on Yield Study. Low density residential acreage is not required to calculate water demands for Phase 2-4.

(f) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-7. Phase 4, Zone 6 Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a)]	Unit Potable Water Use Factor[(d)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density	Unknown[(e)]	Unknown[(e)]		82	365	gpd/du	33.5
Residential – Medium Density		0.0			264	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial		0.0			1.8	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Parks			0.0		4.0	af/ac/yr	0.0
UAFW[(f)]							3.6
			Total	**82**			**37**

(a) From Tracy Hills Phase 2-4 Yield Study prepared by RJA, dated November 10th, 2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Based on the 2020 WSMP.

(e) Not given on Yield Study. Low density residential acreage is not required to calculate water demands for Phase 2-4.

(f) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-8. Total Potable Water Demands for Phases 2, 3, and 4

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(a)]	Unit Potable Water Use Factor[(d)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0		0	429	gpd/du	0.0
Residential – Low Density	Unknown[(e)]	Unknown[(e)]		3,137	365	gpd/du	1,282.6
Residential – Medium Density		0.0		0	264	gpd/du	0.0
			0.0	0	2.4	af/ac/yr	0.0
Residential - High Density		0.0		0	187	gpd/du	0.0
			0.0	0	2.4	af/ac/yr	0.0
Industrial		0.0		0	1.3	af/ac/yr	0.0
			0.0	0	1.9	af/ac/yr	0.0
Commercial		0.0		0	1.8	af/ac/yr	0.0
			0.0	0	1.9	af/ac/yr	0.0
Office		0.0		0	1.5	af/ac/yr	0.0
			0.0	0	1.9	af/ac/yr	0.0
Institutional	43.2	36.7		0	1.5	af/ac/yr	55.0
			6.5	0	1.9	af/ac/yr	12.3
Parks	61.8		61.8	0	4.0	af/ac/yr	247.0
UAFW[(f)]							169.6
			Total	**3,137**			**1,766**

(a) From Tracy Hills Phase 2-4 Yield Study prepared by RJA, dated November 10th, 2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Based on the 2020 WSMP.

(e) Not given on Yield Study. Low density residential acreage is not required to calculate water demands for Phase 2-4.

(f) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-9. Rodgers-Vieira Potable Water Demands

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Dwelling Units, du[(d)]	Unit Potable Water Use Factor[(e)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density		0.0			365	gpd/du	0.0
Residential – Medium Density	137.6	114.4		900	264	gpd/du	266.1
			23.3		2.4	af/ac/yr	55.8
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial		0.0			1.3	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Commercial		0.0			1.8	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Parks[(f)]	17.4		17.4		4.0	af/ac/yr	69.4
UAFW[(g)]							41.6
			Total	**900**			**433**

(a) Total gross acreage from ALTA/ACSM Land Title Survey Lands of Rodgers + Rodgers-Vieira prepared by RJA, dated 11/5/2020.

(b) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(c) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(d) Dwelling unit counts from *Phases 2-4 Water System Analysis* , prepared by Coleman Engineering, dated December 15, 2020.

(e) Based on the 2020 WSMP.

(f) Consistent with assumptions in the 2020 WSMP, for future development areas without detailed land use plans, it is assumed that park area will be 11.2 percent of the gross acreage for residential land use of the very low density, low density, and medium density types.

(g) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-10. Total Potable Water Demands for Phase 5[a]

Land Use Designation	Total Area[b], gross acres	Potable Water Use Area[c], acres	Landscaped Area[d], acres	Dwelling Units, du[e]	Unit Potable Water Use Factor[f]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0			429	gpd/du	0.0
Residential – Low Density		0.0			365	gpd/du	0.0
Residential – Medium Density	255.0	212.0		1,668	264	gpd/du	493.3
			43.1		2.4	af/ac/yr	103.4
Residential - High Density		0.0			187	gpd/du	0.0
			0.0		2.4	af/ac/yr	0.0
Industrial	218.2	185.5			1.3	af/ac/yr	241.1
			32.7		1.9	af/ac/yr	62.2
Commercial	23.6	20.1			1.8	af/ac/yr	36.1
			3.5		1.9	af/ac/yr	6.7
Office		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Institutional		0.0			1.5	af/ac/yr	0.0
			0.0		1.9	af/ac/yr	0.0
Parks[g]	32.2		32.2		4.0	af/ac/yr	128.7
UAFW[h]							113.8
			Total	**1,668**			**1,185**

(a) Includes demands for development of the following tracts: Rodgers-Vieira, Tseng, Integral, Sandhu, AKT, and 23.2 miscellaneous acres. Includes demands from Table A-9.

(b) From annotations on Land Use Concept for Tracy Hills Specific Plan provided by RJA on March 8, 2021.

(c) Consistent with the 2020 WSMP; 85 percent of gross acres for select land use types are assumed to use potable water.

(d) Consistent with the 2020 WSMP; 15 percent of gross acres for select land use types are assumed to be landscaped. Landscaping demands are assumed to be met with potable water until the City's recycled water system can serve Tracy Hills.

(e) Dwelling unit counts from *Phases 2-4 Water System Analysis* , prepared by Coleman Engineering, dated December 15, 2020.

(f) Based on the 2020 WSMP.

(g) Consistent with assumptions in the 2020 WSMP, for future development areas without detailed land use plans, it is assumed that park area will be 11.2 percent of the gross acreage for residential land use of the very low density, low density, and medium density types.

(h) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Table A-11. Total Tracy Hills Potable Water Demands, All Phases

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(a)], acres	Landscaped Area[(a)], acres	Dwelling Units, du[(a)]	Unit Potable Water Use Factor[(b)]	Water Use Factor Units	Annual Potable Water Use, af/yr
Residential - Very Low Density		0.0		0	429	gpd/du	0.0
Residential – Low Density	Unknown[(c)]	Unknown[(c)]		4,642	365	gpd/du	1,897.9
Residential – Medium Density	324.4	270.9		2,384	264	gpd/du	705.0
			53.5	0	2.4	af/ac/yr	128.4
Residential - High Density	7.0	6.0		125	187	gpd/du	26.2
			1.1	0	2.4	af/ac/yr	2.5
Industrial	218.2	185.5		0	1.3	af/ac/yr	241.1
			32.7	0	1.9	af/ac/yr	62.2
Commercial	44.5	37.8		0	1.8	af/ac/yr	68.1
			6.7	0	1.9	af/ac/yr	12.7
Office	45.5	38.7		0	1.5	af/ac/yr	58.0
			6.8	0	1.9	af/ac/yr	13.0
Institutional	61.8	52.5		0	1.5	af/ac/yr	78.7
			9.3	0	1.9	af/ac/yr	17.6
Parks	124.3		124.3	0	4.0	af/ac/yr	497.3
UAFW[(d)]							404.5
			Total	**7,151**			**4,213**

(a) Sum from Tables A-1, A-8, and A-10.

(b) Based on the 2020 WSMP.

(c) Not given. Low density residential acreage is not required to calculate water demands.

(d) Unaccounted-for-water (UAFW) is equal to 9.6 percent.

Attachment 2

Planning and Modeling Criteria

Planning and modeling criteria used to evaluate the proposed Project are based on the system performance and operational criteria developed in the 2020 Citywide Water System Master Plan update (2020 WSMP). The criteria used to evaluate the existing water system and the proposed pipelines for the Project are listed as follows:

- Residual pressure at the flowing hydrant (during an assumed maximum day demand plus fire flow condition) and throughout the water system must be equal to or greater than 20 pounds per square inch (psi) during the simulated fire condition.
- Minimum allowable service pressure is 40 psi during all other non-fire demand conditions.
- Maximum allowable service pressure is 80 psi. A pressure reducing valve (PRV) will be required on all water services with a static pressure greater than 80 psi and should conform with the requirements from the Uniform Plumbing Code.
- Maximum allowable distribution pipeline velocity is 12 feet per second (fps) during the simulated fire flow demand condition.
- Maximum allowable transmission and distribution pipeline velocity is 6 fps and 8 fps, respectively, during a non-fire demand condition.
- Maximum allowable head loss rate is 10 feet per 1,000 feet (ft/kft) during the simulated fire demand condition.
- Maximum head losses in distribution system pipelines should be limited to 7 ft/kft during a non-fire demand condition.
- New and required pipelines will be modeled with a roughness coefficient (C-factor) of 130.
- Available fire flow demand must meet a minimum flow of 1,500 gpm, 2,500 gpm, 3,500 gpm, or 4,500 gpm depending on land use during a maximum day demand condition. These required fire flow demands assume that buildings are sprinklered.
- The 2020 WSMP hydraulic model of the City's existing water distribution system was used as the basis for evaluation.[1]

[1] This existing system hydraulic model was updated to include projected water demands from new and planned developments such as Valpico and MacDonald Apartments; Sierra Hills (Aspire I) Apartments; I 205 Parcels M1 and M2 and Infill Parcels 7 and 13; Grant Line Road Apartments; Rocking Horse; Aspire II Development; Ellis Specific Plan Phases 1, 2, and 3; Marriott TownePlace Suites; Larch Clover Interim Annexation; IPC Buildings 3, 4, and 12; IPC Building 25; IPC Buildings 22, 23, and Thermo Fisher; Tracy Village Specific Plan; Avenues Specific Plan; IPC Buildings 9, 10, and 14; NEI Specific Plan; Tracy Hills Phases 1A, 1B, and 1C; IPC Building 19A; Costco Depot; West Parkway Village; KT Project; IPC Prologis Sales Office Building; IPC Building 2; Tracy Alliance Project; IPC Building 16; and IPC Building 8. City staff also requested West Yost to incorporate the following developments, which were evaluated by Black Water Consulting Engineers, Inc., into the City's hydraulic model: Barcelona Infill; Berg Road Properties; Harvest Apartments; 321 E. Grant Line Apartments; Home 2 Suites; IPT Pescadero Buildings 2 and 3; IPT Pescadero Building 4; Byron Apartments; Assisted Living and Memory Care; La Quinta Inn & Suites; Seefried Industrial Campus; and California Highway Patrol.