Appendix 4.14-1:

Collection System Impacts of Proposed Green Tree Redevelopment (Revised)

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TECHNICAL MEMORANDUM

DATE: November 4, 2021

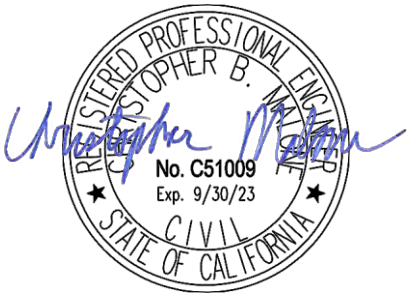
Project No.: 001-60-20-93
SENT VIA: EMAIL

TO: Bonnie Robison, City of Vacaville

CC: Justen Cole, City of Vacaville

FROM: Chris Malone, PE, RCE #51009

REVIEWED BY: Jeff Pelz, PE, RCE #46088



SUBJECT: Collection System Impacts of Proposed Green Tree Redevelopment (revised)

The purpose of this technical memorandum (TM) is to present an assessment of the impacts on the City of Vacaville (City) wastewater collection system of the proposed redevelopment of the existing Green Tree Golf Course site. The major elements of this TM include:

- Background Information
- Proposed Development
- Collection System Modeling
- Required Collection System Improvements and Costs
- Conclusions and Recommendations

BACKGROUND INFORMATION

The Green Tree site is located along the west side of Leisure Town Road between Gilley Way in the north and the old Ulatis Creek channel in the south. The site was previously a golf course that closed in February 2016, and redevelopment of the site has been under consideration since that time. The site occupies approximately 161 acres of now-vacant land with a land use designation of Private Recreation for both existing and buildout development conditions, as per the City's current General Plan adopted in 2015 (2015 General Plan).

The most recent proposed Green Tree site development plan is presented in the report titled "Project Description Summary, Greentree Development Project" dated June 30, 2021 (2021 Green Tree Development Plan) and prepared by EMC Planning Group. In addition to the golf course site, the 2021 Green Tree Development Plan also includes the 10.5-acre vacant parcel located just north of Gilley Way, which is designated as Retail Service land use for both existing and buildout development conditions in the 2015 General Plan. The addition of this parcel brings the total development area to approximately 159 acres. This total area is collectively referred to in this TM as the Green Tree redevelopment area.

PROPOSED DEVELOPMENT

The proposed development of the Green Tree redevelopment area, as presented in the 2021 Green Tree Development Plan, is shown graphically on Figure 1. Flow producing land uses taken from the 2021 Green Tree Development Plan are summarized in Table 1. The Northern Area is defined as all proposed development north of Sequoia Drive, and the Southern Area is defined as all proposed development south of Sequoia Drive.

Table 1. Summary of Proposed Green Tree Flow-Producing Land Uses[a]

Area/ Sub-Area	Gross Area, acres	Residential Units[b]	Assumed Land Use Designation
Northern Area			
Residential-1	9.9	139	Residential Medium Density
Residential-2	5.9	83	Residential Medium Density
Residential-3	8.5	170	Residential Medium High Density
Residential-4	7.1	170	Residential High Density
Residential-5	8.6	172	Residential Medium High Density
Residential-6	5.0	100	Residential Medium High Density
Residential-7	10.8	259	Residential High Density
Commercial-1	4.7	0	Commercial Service/Retail Service
Commercial-2	9.2	0	Commercial Service/Retail Service
Commercial-3	6.0	0	Commercial Service/Retail Service
Subtotal	**93.2**	**1,093**	--
Southern Area			
Tributary to Sequoia Drive	28.7	127	Residential Low Density
Tributary to Rushmore Drive	19.9	72	Residential Low Density
Subtotal	**65.7**	**199**	--
TOTAL	**158.9**	**1,292**	--

(a) Excludes areas designated as Parks, Open Space, Detention Basins, Water Quality, Well Sites, and City Sewer Pump Station.

(b) For residential development in the Northern Area, the following densities are assumed, per the 2021 Green Tree Redevelopment Plan:
- Residential High Density: 24 units per acre
- Residential Medium High Density: 20 units per acre
- Residential Medium Density: 14 units per acre

As indicated in Table 1, the proposed development includes areas designated as Residential of varying densities, plus three areas identified as Commercial. A total of 1,292 residential units is proposed based on a unit count in the Southern Area coupled with the following residential density assumptions in the Northern Area, per the 2021 Green Tree Development Plan:

- Residential High Density: 24 units per acre
- Residential Medium High Density: 20 units per acre
- Residential Medium Density: 14 units per acre

The Commercial designation indicated in the 2021 Green Tree Development Plan is not a 2015 General Plan-defined land use. Accordingly, for purposes of this analysis, all areas with the Commercial designation are assumed to equate to the Commercial Service and/or Retail Service land use categories, both of which have the same flow generation factor, as discussed below.

COLLECTION SYSTEM MODELING

Key topics discussed in the section include:

- Modeled Facilities and Methods
- Points of Connection
- Downstream Flow Routing
- Model Results – Existing Conditions
- Model Results – Buildout Conditions
- Interim Discharge to the Gilley Way Sewer

Modeled Facilities and Methods

All collection system analyses presented in this TM make use of the City-wide wastewater collection system model that was most recently documented in the April 2018 Draft Wastewater Facilities Master Plan (2018 Wastewater Master Plan), produced by West Yost. In general, the modeled lines are limited to gravity sewers of 12-inch diameter or larger as well as lift stations and associated force mains.

The relevant modeled collection system facilities in the vicinity and downstream of the Green Tree redevelopment area are shown on Figure 3. The Green Tree redevelopment area is located within the Leisure Town Road trunk system that flows into Leisure Town Road Lift Station (Leisure Town Road LS) and then south into the existing parallel trunk sewers between Ulatis Drive and Elmira Road. The older of those two parallel lines is planned for replacement and upsizing under a project previously identified as DIF 38A, which is currently in the design stage. It is thus assumed that the DIF 38A replacement sewer would be constructed in advance of any significant future upstream development.

For modeling purposes, the two time frames under consideration include existing development conditions and buildout development conditions, as defined in the 2015 General Plan. For both time frames, modeled peak flow conditions are considered both with and without the proposed Green Tree development. The average dry weather flow factors used in this analysis are for future, unapproved development per the 2018 Wastewater Master Plan and include the following:

- Residential (all densities): 240 gallons per day (gpd) per dwelling unit
- Commercial: 1,900 gpd per acre
- Public Park: 0 gpd per acre
- Miscellaneous: 0 gpd per acre

Points of Connection

The planned layout of the onsite sewer facilities for the Green Tree redevelopment area is shown on Figure 3, as taken from the 2021 Green Tree Development Plan. These lines are not included in the City-wide model, but instead are used to determine the local tributary areas and points of connection into the City's existing collection system facilities. Key flow paths and points of connection include:

1. Commercial Areas 1, 2, and 3 and Residential Areas 4, 5, 6, and 7 in the Northern Area are assumed to flow into model node 105040 at the intersection of Leisure Town Road and Poplar Road.
2. Residential Areas 1, 2, and 3 in the Northern Area are assumed to flow into model node 105247 at the intersection of Sequoia Drive and Yellowstone Drive.
3. Proposed residential lots 41 through 167 in the Southern Area are assumed to flow into model node 105246 on Sequoia Drive approximately 350 feet west of the Leisure Town Road LS.
4. Proposed residential lots 1 through 40 and 168 through 199 in the Southern Area are assumed to flow into model node 101302 at the intersection of Yellowstone Drive and Rushmore Drive.

Downstream Flow Routing

The 30-inch diameter Leisure Town Road trunk sewer that runs from the outlet of the Leisure Town Road LS twin force mains to Ulatis Drive has been modeled as being undersized for buildout development conditions. Accordingly, two different flow routing schemes are considered in this analysis for buildout flow conditions. The first assumption is that all flow from the Leisure Town Road LS twin force mains would be directed into the 30-inch diameter trunk line in question, as is currently the case.

The second downstream flow routing assumption is that flow from the Leisure Town Road LS twin force mains would be split between the 30-inch diameter trunk sewer and a currently inactive parallel 18-inch line that connects to the existing 18-inch diameter sewer in Stonegate Drive and Fallen Leaf Drive. CCTV inspections conducted by City staff in the mid-2010s show that the inactive 18-inch diameter line in Leisure Town Road is in good condition, and it extends up Leisure Town Road from Stonegate Drive to within about 10 feet of the outlet manhole from the Leisure Town Road LS twin force mains. Accordingly, a short connection line would need to be constructed for this alternative to be viable.

Model Results – Existing Conditions

The model gravity sewer results for existing conditions both with and without the assumed Green Tree flows are summarized in Table 2. The table shows the results for the entire flow path from the proposed Green Tree redevelopment area to the Easterly Wastewater Treatment Plant (WWTP). The results include pipe lengths, diameters, slopes, and full-pipe capacities, as well as peak wet weather flows, peak surcharging, and minimum sewer manhole headspace. As per previously developed criteria, any peak surcharging above the pipe crown to less than 8 feet from the ground surface is considered excessive.

As indicated in Table 2, the only gravity sewer exceedances under existing conditions are associated with the parallel sewers in Leisure Town Road between Ulatis Drive and Elmira Road. Specifically, a marginal exceedance in those lines causes excessive upstream surcharging under modeled peak wet weather flow conditions and in the 30-inch diameter Leisure Town Road trunk sewer. The addition of the Green Tree flow slightly exacerbates the existing modeled exceedance.

Table 2. Existing Conditions Peak Wet Weather Flow Results for Downstream Facilities With and Without the Green Tree Redevelopment Project

MH ID #s			System Configuration			Full-Pipe	Peak Wet Weather Flow, mgd		System Surcharging, ft		System Headspace, ft	
Upstream	Downstream	Pipe ID	Length, ft	Diameter, in	Slope	Capacity, mgd	w/out Green Tree	w/Green Tree	w/out Green Tree	w/Green Tree	w/out Green Tree	w/Green Tree
Leisure Town Road – Gilley Way to LS												
105038	105039	105038-105039	325	27	0.0017	8.26	3.40	3.40	0	0	11.9	11.9
105039	105040	105039-105040	266	27	0.0017	8.24	3.41	3.41	0	0	12.7	12.7
105040	105041	105040-105041	289	27	0.0017	8.18	3.41	3.82	0	0	13.2	13.2
105041	105042	105041-105042	288	27	0.0017	8.28	3.41	3.83	0	0	13.0	13.0
105042	105043	105042-105043	403	27	0.0015	7.67	3.41	3.83	0	0	13.0	12.9
105043	105044	105043-105044	395	27	0.0015	7.69	3.41	3.83	0	0	14.6	14.6
105044	105045	105044-105045	375	27	0.0015	7.68	3.42	3.83	0	0	15.1	15.0
105045	105046	105045-105046	425	27	0.0015	7.66	3.42	3.84	0	0	17.0	16.9
105046	105053	105046-105053	19	27	0.0253	31.97	3.51	3.93	0	0	18.0	17.9
105053	1402	105053-1402	73	27	0.0256	31.99	3.52	3.94	0	0	18.4	18.4
Yellowstone/Sequoia sewer												
101179	101206	101179-101206	192	12	0.0025	1.15	0.84	0.86	0	0	9.8	9.8
101206	101207	101206-101207	301	12	0.0025	1.14	0.84	0.86	0	0	9.3	9.2
101207	101294	101207-101294	302	12	0.0032	1.29	0.84	0.87	0	0	9.3	9.3
101294	101299	101294-101299	301	12	0.0031	1.29	0.99	1.02	0	0	9.0	9.0
101299	101306	101299-101306	302	15	0.0024	2.06	1.03	1.06	0	0	9.4	9.4
101306	101302	101306-101302	152	15	0.0024	2.06	1.54	1.56	0	0	10.8	10.8
101302	101307	101302-101307	152	15	0.0024	2.07	1.68	1.81	0	0	11.6	11.5
101307	100804	101307-100804	171	15	0.0025	2.10	1.69	1.81	0	0	12.5	12.5
100804	100805	100804-100805	111	15	0.0024	2.07	1.69	1.81	0	0	12.3	12.2
100805	100808	100805-100808	171	15	0.0025	2.08	1.69	1.81	0	0	12.2	12.1
100808	100065	100808-100065	91	15	0.0030	2.28	1.87	1.99	0	0	12.0	11.9
100065	100806	100065-100806	140	15	0.0029	2.27	1.87	1.99	0	0	12.0	12.0
100806	105247	100806-105247	419	15	0.0029	2.27	1.87	2.00	0	0	11.9	11.9
105247	105246	105247-105246	357	15	0.0029	2.27	1.87	2.23	0	0	12.5	12.3
105246	100811	105246-100811	364	15	0.0035	2.47	1.88	2.33	0	0	12.1	12.0
100811	100812	100811-100812	53	15	0.0036	2.51	1.88	2.33	0	0	12.4	12.2
100812	1402	100812-1402	21	15	0.2146	19.44	1.88	2.33	0	0	14.2	14.1
Leisure Town Road – LS to Ulatis Drive												
LTRLS	0.88	LTRLS	--	--	--	6.48	5.39	6.27	--	--	--	--
1402	105084	1402-105084	3,323	18/12	FM	16.50	5.39	6.27	--	--	--	--
105084	100783	105084-100783	363	30	0.0013	9.46	5.39	6.27	0	0	4.4	4.4
100783	105064	100783-105064	404	30	0.0013	9.44	5.40	6.27	0	0	5.1	5.0
105064	105065	105064-105065	395	30	0.0012	9.36	5.40	6.27	0	0	6.8	6.7
105065	105066	105065-105066	402	30	0.0012	9.19	5.40	6.28	0	0	8.6	8.2
105066	100767	105066-100767	399	30	0.0012	9.22	5.40	6.28	0	0	8.9	8.3
100767	100755	100767-100755	394	30	0.0012	9.27	5.40	6.28	0	0.1	9.3	8.8
100755	105070	100755-105070	331	30	0.0012	9.24	5.41	6.28	0	0.3	8.0	7.6
Ulatis Drive to Elmira Road-24 inch												
105070	100749	105070-100749	110	24	0.0014	5.40	5.77	6.12	0.4	0.8	7.9	7.5
100749	100747	100749-100747	722	24	0.0013	5.38	5.77	6.12	0.6	1.0	8.3	7.9
100747	100733	100747-100733	356	24	0.0012	5.15	5.77	6.12	0.5	0.7	10.9	10.7
100733	100750	100733-100750	465	24	0.0012	5.18	5.87	6.22	0.3	0.5	12.6	12.4
100750	100751	100750-100751	187	24	0.0012	5.14	5.87	6.22	0.2	0.3	14.9	14.8
100751	100702	100751-100702	277	24	0.0012	5.14	5.87	6.22	0.1	0.2	15.8	15.7
100702	105207	100702-105207	303	24	0.0096	14.34	5.87	6.22	0	0	18.6	18.5
Ulatis Drive to Elmira Road-27 inch												
105070	105071	105070-105071	408	48	0.0015	7.70	8.21	8.71	0.4	0.8	7.9	7.5
105071	105072	105071-105072	401	48	0.0015	7.70	8.21	8.71	0.2	0.3	8.9	8.7
105072	105073	105072-105073	400	48	0.0015	7.71	8.21	8.72	0.1	0.2	10.7	10.7
105073	105074	105073-105074	327	48	0.0014	10.08	8.22	8.72	0	0	12.3	12.2
105074	105075	105074-105075	294	48	0.0014	10.04	8.22	8.72	0	0	15.1	15.1
105075	105076	105075-105076	280	48	0.0014	9.93	8.26	8.76	0	0	16.1	16.0
105076	105077	105076-105077	299	48	0.0014	10.09	8.26	8.77	0	0	17.7	17.6
105077	105207	105077-105207	25	54	0.0229	193.34	22.49	23.01	0	0	21.1	21.0
Elmira Road sewer – Leisure Town Road to Brighton Landing												
105077	105207	105077-105207	25	54	0.0229	193.34	22.49	23.01	0	0	21.1	21.0
105207	105205	105207-105205	557	54	0.0014	48.26	28.21	29.10	0	0	20.9	20.9
105205	105206	105205-105206	600	54	0.0014	48.50	28.21	29.10	0	0	16.9	16.9
105206	105208	105206-105208	599	54	0.0014	48.26	28.22	29.10	0	0	14.1	14.1
105208	105209	105208-105209	600	54	0.0017	52.06	28.22	29.10	0	0	13.5	13.5
105209	105210	105209-105210	600	54	0.0017	51.97	28.22	29.11	0	0	13.3	13.2
105210	105211	105210-105211	599	54	0.0017	51.79	28.22	29.11	0	0	13.2	13.2
105211	105212	105211-105212	600	54	0.0018	54.30	28.22	29.11	0	0	13.5	13.4
Elmira Road sewer – Brighton Landing to Elmira												
105212	105213	105212-105213	600	54	0.0018	54.31	28.22	29.11	0	0	13.3	13.3
105213	104591	105213-104591	599	54	0.0018	54.41	28.22	29.11	0	0	12.8	12.8
104591	105214	104591-105214	484	54	0.0017	52.74	33.40	34.28	0	0	13.1	13.0
105214	105215	105214-105215	39	54	0.0018	54.08	33.40	34.29	0	0	12.6	12.6
105215	105216	105215-105216	200	54	0.0017	52.51	33.40	34.29	0	0	13.5	13.5
105216	105217	105216-105217	722	54	0.0017	52.83	33.40	34.29	0	0	13.9	13.9
105217	105218	105217-105218	162	54	0.0015	49.05	33.40	34.29	0	0	15.3	15.2
105218	105219	105218-105219	350	54	0.0015	49.62	33.40	34.29	0	0	12.2	12.1
105219	105220	105219-105220	397	54	0.0015	49.13	33.40	34.29	0	0	10.4	10.4
Elmira Road sewer – Elmira to WWTP												
105220	100488	105220-100488	524	54	0.0010	40.16	33.49	34.38	0	0	11.4	11.3
100488	105222	100488-105222	37	54	0.0011	41.77	33.49	34.38	0	0	13.9	13.9
105222	105223	105222-105223	80	54	0.0010	40.21	33.50	34.38	0	0	12.1	12.0
105223	105078	105223-105078	44	54	0.0011	42.93	33.50	34.38	0	0	11.4	11.3
105078	105079	105078-105079	236	54	0.0010	39.80	33.50	34.38	0	0	12.1	12.0
105079	105080	105079-105080	237	54	0.0010	40.55	33.50	34.39	0	0	10.8	10.7
105080	1022	105080-1022	263	54	0.0010	40.79	33.58	34.47	0	0	8.7	8.6

Indicates an exceedance of full-pipe capacity for peak wet weather flow conditions.

Indicates non-excessive surcharging at peak wet weather flow conditions due to an exceedance of full-pipe capacity.

Indicates excessive surcharging at peak wet weather flow conditions due to an exceedance of full-pipe capacity.

Indicates excessive surcharging at peak wet weather flow conditions due to backwater conditions arising from downstream capacity restrictions.

In addition, for existing conditions, adding the Green Tree flows is estimated to increase peak wet weather flows at the Leisure Town Road LS from 5.39 million gallons per day (mgd) to 6.27 mgd. Based upon a recent pump curve analysis performed by West Yost, the firm capacity of the station is estimated to be 4,500 gallons per minute (gpm) or 6.48 mgd. As a result, in the absence of any other new upstream flow inputs, the addition of the Green Tree flows does not trigger any upsizing of pumps at the lift station.

Model Results – Buildout Conditions

The model gravity sewer results for buildout conditions assuming no downstream flow split are summarized in Table 3. The model gravity sewer results for buildout conditions assuming splitting of a portion of the flows into the Fallen Leaf Drive sewer downstream are summarized in Table 4. It should be noted that the modeled buildout flow results are based on the assumption that the Northeast Sector area would be fully built out and that all flow sources would discharge at maximum capacity, as per the assumptions of the December 2009 Northeast Sector Sewer Master Plan (NESSMP). It is also assumed that no other upstream flow inputs would occur beyond those expressly identified in the City's General Plan and the NESSMP.

As indicated in Table 3, the addition of the flows from the Northern Area slightly exacerbates non-excessive surcharge conditions (i.e., surcharging that does not come within 8 feet of the ground surface) in the 27-inch diameter Leisure Town Road trunk sewer north of the lift station under modeled buildout flow conditions. Moreover, the addition of the Green Tree flows slightly exacerbates excessive surcharging in the 30-inch diameter Leisure Town Road trunk sewer between Ulatis Creek and Ulatis Drive under modeled buildout flow conditions. The excessive surcharging would be eliminated by upsizing that line to 36-inch diameter. Finally, the model also shows non-excessive surcharging in the furthest downstream segments of the 54-inch diameter Elmira Road trunk sewer (not shown on Figure 3). This condition is marginally exacerbated by the addition of the Green Tree flows. In general, the existence of non-excessive surcharging would not typically trigger any system improvements but instead would place the facilities in question on a watch list where those facilities would be monitored to confirm that the modeled results accurately reflect actual conditions.

As indicated in Table 4, if the flow split downstream of Ulatis Creek is assumed, surcharging would be significantly reduced in the 30-inch diameter Leisure Town Road trunk sewer versus the no-split alternative, but excessive surcharging would still occur in that line. Moreover, the flow split would trigger excessive surcharging in the Fallen Leaf Drive sewer. Therefore, according to City standards, if buildout flows occur as modeled, an upsizing improvement on the 30-inch diameter Leisure Town Road trunk sewer would be necessary either with or without the addition of the Green Tree flows.

As shown in Table 3, the addition of the Green Tree flows is estimated to increase peak wet weather flows from 11.3 mgd to 12.1 mgd at the Leisure Town Road LS under buildout flow conditions, whereas the firm capacity of the station is estimated to be 6.48 mgd, as noted above. As per the June 2021 Vaca Valley Parkway and Leisure Town Road Sewer Lift Station Improvements Project Preliminary Design Report (Lift Station Predesign Report), significant improvements would be needed to accommodate a future flow condition of 11.89 mgd. It should be noted, however, that that analysis also assumed an additional major industrial flow input not otherwise specified in either the City's General Plan or the NESSMP. As a result, the target flow rate of 11.89 mgd in that report compares closely with the 12.13 mgd buildout flow value shown in Table 3. A review of the pump curve information presented in the Lift Station Predesign Report indicates that the assumed buildout configuration could accommodate up to approximately 9,400 gpm, or about 13.5 mgd. It is thus concluded that addition of the Green Tree flows would not require further improvements beyond those specified in the Lift Station Predesign Report, provided that no significant flows beyond those identified in the City's General Plan and in the NESSMP are added.

Table 3. Buildout Peak Wet Weather Flow Results for Downstream Facilities With and Without the Green Tree Redevelopment Project, No Downstream Flow Split

MH ID #s			System Configuration			Full-Pipe	Peak Wet Weather Flow, mgd		System Surcharging, ft		System Headspace, ft	
Upstream	Downstream	Pipe ID	Length, ft	Diameter, in	Slope	Capacity, mgd	w/out Green Tree	w/Green Tree	w/out Green Tree	w/Green Tree	w/out Green Tree	w/Green Tree
Leisure Town Road – Gilley Way to LS												
105038	105039	105038-105039	325	27	0.0017	8.26	8.94	8.94	1.2	1.7	9.5	9.0
105039	105040	105039-105040	266	27	0.0017	8.25	8.95	8.95	1.2	1.6	10.3	9.8
105040	105041	105040-105041	289	27	0.0017	8.18	8.95	9.38	1.1	1.5	10.9	10.5
105041	105042	105041-105042	288	27	0.0017	8.28	8.95	9.39	1.0	1.4	10.8	10.4
105042	105043	105042-105043	403	27	0.0015	7.68	8.95	9.39	0.9	1.2	10.9	10.5
105043	105044	105043-105044	395	27	0.0015	7.68	9.00	9.44	0.7	0.9	12.8	12.5
105044	105045	105044-105045	375	27	0.0015	7.69	9.00	9.44	0.5	0.6	13.5	13.3
105045	105046	105045-105046	425	27	0.0015	7.66	9.01	9.44	0.2	0.3	15.6	15.5
105046	105053	105046-105053	19	27	0.0253	31.96	9.18	9.62	0	0	17.6	17.6
105053	1402	105053-1402	73	27	0.0256	32.07	9.19	9.62	0	0	18.1	18.0
Yellowstone/Sequoia sewer												
101179	101206	101179-101206	192	12	0.0025	1.15	0.84	0.87	0	0	9.8	9.8
101206	101207	101206-101207	301	12	0.0025	1.14	0.84	0.87	0	0	9.3	9.2
101207	101294	101207-101294	302	12	0.0032	1.30	0.85	0.87	0	0	9.3	9.3
101294	101299	101294-101299	301	12	0.0031	1.29	1.00	1.02	0	0	9.0	9.0
101299	101306	101299-101306	302	15	0.0024	2.06	1.22	1.25	0	0	9.4	9.4
101306	101302	101306-101302	152	15	0.0024	2.06	1.63	1.66	0	0	10.8	10.8
101302	101307	101302-101307	152	15	0.0024	2.07	1.78	1.91	0	0	11.5	11.5
101307	100804	101307-100804	171	15	0.0025	2.10	1.78	1.91	0	0	12.5	12.4
100804	100805	100804-100805	111	15	0.0024	2.07	1.79	1.91	0	0	12.3	12.2
100805	100808	100805-100808	171	15	0.0025	2.08	1.79	1.91	0	0	12.1	12.1
100808	100065	100808-100065	91	15	0.0030	2.28	2.00	2.12	0	0	11.9	11.9
100065	100806	100065-100806	140	15	0.0029	2.27	2.00	2.12	0	0	11.9	11.9
100806	105247	100806-105247	419	15	0.0029	2.27	2.00	2.13	0	0	11.9	11.8
105247	105246	105247-105246	357	15	0.0029	2.27	2.00	2.33	0	0	12.4	12.0
105246	100811	105246-100811	364	15	0.0035	2.47	2.01	2.46	0	0	12.1	11.9
100811	100812	100811-100812	53	15	0.0036	2.51	2.01	2.46	0	0	12.3	12.2
100812	1402	100812-1402	21	15	0.2146	19.37	2.01	2.46	0	0	14.2	14.1
Leisure Town Road – LS to Ulatis Drive												
LTRLS		LTRLS	--	--	--	6.48	11.19	12.08	--	--	--	--
1402	105084	1402-105084	3,323	18/12	FM	16.50	11.19	12.08	--	--	--	--
105084	100783	105084-100783	363	30	0.0013	11.33	11.25	12.13	0.8	1.7	2.8	2.0
100783	105064	100783-105064	404	30	0.0013	9.45	11.25	12.14	1.0	1.7	3.0	2.3
105064	105065	105064-105065	395	30	0.0012	9.37	11.25	12.14	0.8	1.5	4.8	4.2
105065	105066	105065-105066	402	30	0.0012	9.18	11.25	12.14	0.6	1.1	6.9	6.4
105066	100767	105066-100767	399	30	0.0012	9.22	11.26	12.14	0.7	1.1	7.5	7.1
100767	100755	100767-100755	394	30	0.0012	9.28	11.26	12.14	0.4	0.7	8.4	8.1
100755	105070	100755-105070	331	30	0.0012	9.25	11.26	12.15	0.2	0.4	7.7	7.5
Fallen Leaf Drive sewer												
105084	FL02	105084-FL02	10	18	0.0010	2.15			0.8	1.7	2.8	2.0
FL02	FL01	FL02-FL01	427	18	0.0008	1.94	0	0	0	0	6.2	6.2
FL01	100788	FL01-100788	202	18	0.0011	2.26	0	0	0	0	6.5	6.5
100788	100785	100788-100785	293	18	0.0011	2.26	0	0	0	0	7.8	7.8
100785	100777	100785-100777	273	18	0.0011	2.26	0	0	0	0	7.1	7.1
100777	100774	100777-100774	367	18	0.0011	2.26	0	0	0	0	7.4	7.4
100774	100768	100774-100768	318	18	0.0011	2.26	0	0	0	0	7.4	7.4
100768	100061	100768-100061	267	18	0.0011	2.26	0	0	0	0	8.4	8.4
100061	100766	100061-100766	303	18	0.0012	2.38	0.34	0.34	0	0	6.8	6.7
100766	100124	100766-100124	305	18	0.0012	2.34	0.34	0.34	0	0	6.8	6.7
100124	100756	100124-100756	305	18	0.0012	2.37	0.34	0.34	0.2	0.3	6.8	6.8
100756	105069	100756-105069	249	18	0.0012	2.36	0.35	0.35	0.6	0.6	6.8	6.8
DIF 38A – Ulatis Drive to Elmira Road												
105070	105071A	105070-105071A	408	48	0.0015	35.68	25.96	26.83	0	0	8.0	8.0
105071A	105072A	105071A-105072A	401	48	0.0015	35.68	25.96	26.83	0	0	8.8	8.7
105072A	100733A	105072A-100733A	400	48	0.0015	35.78	25.96	26.83	0	0	10.5	10.5
100733A	105074A	100733A-105074A	327	48	0.0014	35.30	26.03	26.90	0	0	11.4	11.4
105074A	105075A	105074A-105075A	294	48	0.0014	35.17	26.03	26.90	0	0	14.3	14.2
105075A	105076A	105075A-105076A	280	48	0.0014	34.76	26.07	26.94	0	0	15.3	15.2
105076A	105077	105076A-105077	299	48	0.0014	35.31	26.07	26.94	0	0	16.9	16.8
Elmira Road sewer – Leisure Town Road to Brighton Landing												
105077	105207	105077-105207	25	54	0.0229	192.81	43.27	44.15	0	0	20.2	20.1
105207	105205	105207-105205	557	54	0.0014	48.30	43.36	44.24	0	0	20.1	20.0
105205	105206	105205-105206	600	54	0.0014	48.51	43.36	44.24	0	0	16.1	16.0
105206	105208	105206-105208	599	54	0.0014	48.30	43.36	44.25	0	0	13.3	13.2
105208	105209	105208-105209	600	54	0.0017	52.05	43.36	44.25	0	0	12.7	12.7
105209	105210	105209-105210	600	54	0.0017	51.99	43.37	44.25	0	0	12.5	12.4
105210	105211	105210-105211	599	54	0.0017	51.81	43.37	44.25	0	0	12.4	12.4
105211	105212	105211-105212	600	54	0.0018	54.29	43.37	44.25	0	0	12.7	12.7
Elmira Road sewer – Brighton Landing to Elmira												
105212	105213	105212-105213	600	54	0.0018	54.29	43.37	44.25	0	0	12.6	12.5
105213	104591	105213-104591	599	54	0.0018	54.36	43.37	44.25	0	0	12.1	12.0
104591	105214	104591-105214	484	54	0.0017	52.74	43.37	44.25	0	0	12.5	11.9
105214	105215	105214-105215	39	54	0.0018	54.03	43.37	44.25	0	0	11.4	11.2
105215	105216	105215-105216	200	54	0.0017	52.50	43.37	44.26	0	0	12.3	12.1
105216	105217	105216-105217	722	54	0.0017	52.81	43.37	44.26	0	0	12.6	12.4
105217	105218	105217-105218	162	54	0.0015	49.07	43.38	44.26	0	0	13.7	13.6
105218	105219	105218-105219	350	54	0.0015	49.62	43.38	44.26	0	0	10.5	10.4
105219	105220	105219-105220	397	54	0.0015	49.12	43.38	44.26	0	0.1	8.6	8.5
Elmira Road sewer – Elmira to WWTP												
105220	100488	105220-100488	524	54	0.0010	40.16	43.49	44.37	0.1	0.2	9.9	9.8
100488	105222	100488-105222	37	54	0.0011	41.79	43.49	44.38	0	0	12.5	12.4
105222	105223	105222-105223	80	54	0.0010	40.20	43.49	44.38	0	0	10.7	10.7
105223	105078	105223-105078	44	54	0.0011	42.92	43.50	44.38	0.1	0.2	9.9	9.9
105078	105079	105078-105079	236	54	0.0010	39.80	43.50	44.38	0.1	0.2	10.6	10.6
105079	105080	105079-105080	237	54	0.0010	40.53	43.50	44.38	0	0.1	9.4	9.3
105080	1022	105080-1022	263	54	0.0010	40.79	43.58	44.47	0	0	7.3	7.2

Indicates an exceedance of full-pipe capacity for peak wet weather flow conditions.

Indicates non-excessive surcharging at peak wet weather flow conditions due to an exceedance of full-pipe capacity.

Indicates excessive surcharging at peak wet weather flow conditions due to an exceedance of full-pipe capacity.

Indicates excessive surcharging at peak wet weather flow conditions due to backwater conditions arising from downstream capacity restrictions.

Table 4. Buildout Peak Wet Weather Flow Results for Downstream Facilities With and Without the Green Tree Redevelopment Project, Downstream Flow Split

MH ID #s			System Configuration			Full-Pipe	Peak Wet Weather Flow, mgd		System Surcharging, ft		System Headspace, ft	
Upstream	Downstream	Pipe ID	Length, ft	Diameter, in	Slope	Capacity, mgd	w/out Green Tree	w/Green Tree	w/out Green Tree	w/Green Tree	w/out Green Tree	w/Green Tree
Leisure Town Road – Gilley Way to LS												
105038	105039	105038-105039	325	27	0.0017	8.26	8.94	8.94	1.2	1.7	9.5	9.0
105039	105040	105039-105040	266	27	0.0017	8.25	8.95	8.95	1.2	1.6	10.3	9.8
105040	105041	105040-105041	289	27	0.0017	8.18	8.95	9.38	1.1	1.5	10.9	10.5
105041	105042	105041-105042	288	27	0.0017	8.28	8.95	9.39	1.0	1.4	10.8	10.4
105042	105043	105042-105043	403	27	0.0015	7.68	8.95	9.39	0.9	1.2	10.9	10.5
105043	105044	105043-105044	395	27	0.0015	7.68	9.00	9.44	0.7	0.9	12.8	12.5
105044	105045	105044-105045	375	27	0.0015	7.69	9.00	9.44	0.5	0.6	13.5	13.3
105045	105046	105045-105046	425	27	0.0015	7.66	9.01	9.44	0.2	0.3	15.6	15.5
105046	105053	105046-105053	19	27	0.0253	31.96	9.18	9.62	0	0	17.6	17.6
105053	1402	105053-1402	73	27	0.0256	32.07	9.19	9.62	0	0	18.1	18.0
Yellowstone/Sequoia sewer												
101179	101206	101179-101206	192	12	0.0025	1.15	0.84	0.87	0	0	9.8	9.8
101206	101207	101206-101207	301	12	0.0025	1.14	0.84	0.87	0	0	9.3	9.2
101207	101294	101207-101294	302	12	0.0032	1.30	0.85	0.87	0	0	9.3	9.3
101294	101299	101294-101299	301	12	0.0031	1.29	1.00	1.02	0	0	9.0	9.0
101299	101306	101299-101306	302	15	0.0024	2.06	1.22	1.25	0	0	9.4	9.4
101306	101302	101306-101302	152	15	0.0024	2.06	1.63	1.66	0	0	10.8	10.8
101302	101307	101302-101307	152	15	0.0024	2.07	1.78	1.91	0	0	11.5	11.5
101307	100804	101307-100804	171	15	0.0025	2.10	1.78	1.91	0	0	12.5	12.4
100804	100805	100804-100805	111	15	0.0024	2.07	1.79	1.91	0	0	12.3	12.2
100805	100808	100805-100808	171	15	0.0025	2.08	1.79	1.91	0	0	12.1	12.1
100808	100065	100808-100065	91	15	0.0030	2.28	2.00	2.12	0	0	11.9	11.9
100065	100806	100065-100806	140	15	0.0029	2.27	2.00	2.12	0	0	11.9	11.9
100806	105247	100806-105247	419	15	0.0029	2.27	2.00	2.13	0	0	11.9	11.8
105247	105246	105247-105246	357	15	0.0029	2.27	2.00	2.33	0	0	12.4	12.0
105246	100811	105246-100811	364	15	0.0035	2.47	2.01	2.46	0	0	12.1	11.9
100811	100812	100811-100812	53	15	0.0036	2.51	2.01	2.46	0	0	12.3	12.2
100812	1402	100812-1402	21	15	0.2146	19.37	2.01	2.46	0	0	14.2	14.1
Leisure Town Road – LS to Ulatis Drive												
LTRLS		LTRLS	--	--	--	6.48	11.19	12.08	--	--	--	--
1402	105084	1402-105084	3,323	18/12	FM	16.50	11.19	12.08	--	--	--	--
105084	100783	105084-100783	363	30	0.0013	11.33	9.10	9.98	0	0	3.6	3.6
100783	105064	100783-105064	404	30	0.0013	9.45	9.10	9.98	0	0.1	4.5	3.9
105064	105065	105064-105065	395	30	0.0012	9.37	9.10	9.99	0	0.2	6.2	5.5
105065	105066	105065-105066	402	30	0.0012	9.18	9.10	9.99	0	0	8.0	7.4
105066	100767	105066-100767	399	30	0.0012	9.22	9.10	9.99	0	0.3	8.2	7.8
100767	100755	100767-100755	394	30	0.0012	9.28	9.11	9.99	0	0.2	8.8	8.6
100755	105070	100755-105070	331	30	0.0012	9.25	9.11	9.99	0	0.2	7.9	7.7
Fallen Leaf Drive sewer												
105084	FL02	105084-FL02	10	18	0.0010	2.15	2.32	2.32	0	0	3.6	3.6
FL02	FL01	FL02-FL01	427	18	0.0008	1.94	2.32	2.32	1.1	1.1	3.6	3.6
FL01	100788	FL01-100788	202	18	0.0011	2.26	2.32	2.32	1.0	1.0	4.1	4.1
100788	100785	100788-100785	293	18	0.0011	2.26	2.32	2.32	1.0	1.0	5.3	5.3
100785	100777	100785-100777	273	18	0.0011	2.26	2.32	2.32	1.0	1.0	4.6	4.6
100777	100774	100777-100774	367	18	0.0011	2.26	2.32	2.32	1.0	1.0	4.9	4.9
100774	100768	100774-100768	318	18	0.0011	2.26	2.32	2.32	1.0	1.0	5.3	5.3
100768	100061	100768-100061	267	18	0.0011	2.26	2.32	2.32	1.0	1.0	6.7	6.6
100061	100766	100061-100766	303	18	0.0012	2.38	2.61	2.64	1.0	1.0	5.3	5.3
100766	100124	100766-100124	305	18	0.0012	2.34	2.61	2.65	1.0	1.0	5.7	5.6
100124	100756	100124-100756	305	18	0.0012	2.37	2.61	2.65	1.0	1.0	6.0	6.0
100756	105069	100756-105069	249	18	0.0012	2.36	2.62	2.65	1.0	1.0	6.4	6.4
DIF 38A – Ulatis Drive to Elmira Road												
105070	105071A	105070-105071A	408	48	0.0015	35.68	25.96	26.83	0	0	8.0	8.0
105071A	105072A	105071A-105072A	401	48	0.0015	35.68	25.96	26.83	0	0	8.8	8.7
105072A	100733A	105072A-100733A	400	48	0.0015	35.78	25.96	26.83	0	0	10.5	10.5
100733A	105074A	100733A-105074A	327	48	0.0014	35.30	26.03	26.90	0	0	11.4	11.4
105074A	105075A	105074A-105075A	294	48	0.0014	35.17	26.03	26.90	0	0	14.3	14.2
105075A	105076A	105075A-105076A	280	48	0.0014	34.76	26.07	26.94	0	0	15.3	15.2
105076A	105077	105076A-105077	299	48	0.0014	35.31	26.07	26.94	0	0	16.9	16.8
Elmira Road sewer – Leisure Town Road to Brighton Landing												
105077	105207	105077-105207	25	54	0.0229	192.81	43.27	44.15	0	0	20.2	20.1
105207	105205	105207-105205	557	54	0.0014	48.30	43.36	44.24	0	0	20.1	20.0
105205	105206	105205-105206	600	54	0.0014	48.51	43.36	44.24	0	0	16.1	16.0
105206	105208	105206-105208	599	54	0.0014	48.30	43.36	44.25	0	0	13.3	13.2
105208	105209	105208-105209	600	54	0.0017	52.05	43.36	44.25	0	0	12.7	12.7
105209	105210	105209-105210	600	54	0.0017	51.99	43.37	44.25	0	0	12.5	12.4
105210	105211	105210-105211	599	54	0.0017	51.81	43.37	44.25	0	0	12.4	12.4
105211	105212	105211-105212	600	54	0.0018	54.29	43.37	44.25	0	0	12.7	12.7
Elmira Road sewer – Brighton Landing to Elmira												
105212	105213	105212-105213	600	54	0.0018	54.29	43.37	44.25	0	0	12.6	12.5
105213	104591	105213-104591	599	54	0.0018	54.36	43.37	44.25	0	0	12.1	12.0
104591	105214	104591-105214	484	54	0.0017	52.74	43.37	44.25	0	0	12.5	11.9
105214	105215	105214-105215	39	54	0.0018	54.03	43.37	44.25	0	0	11.4	11.2
105215	105216	105215-105216	200	54	0.0017	52.50	43.37	44.26	0	0	12.3	12.1
105216	105217	105216-105217	722	54	0.0017	52.81	43.37	44.26	0	0	12.6	12.4
105217	105218	105217-105218	162	54	0.0015	49.07	43.38	44.26	0	0	13.7	13.6
105218	105219	105218-105219	350	54	0.0015	49.62	43.38	44.26	0	0	10.5	10.4
105219	105220	105219-105220	397	54	0.0015	49.12	43.38	44.26	0	0.1	8.6	8.5
Elmira Road sewer – Elmira to WWTP												
105220	100488	105220-100488	524	54	0.0010	40.16	43.49	44.37	0.1	0.2	9.9	9.8
100488	105222	100488-105222	37	54	0.0011	41.79	43.49	44.38	0	0	12.5	12.4
105222	105223	105222-105223	80	54	0.0010	40.20	43.49	44.38	0	0	10.7	10.7
105223	105078	105223-105078	44	54	0.0011	42.92	43.50	44.38	0.1	0.2	9.9	9.9
105078	105079	105078-105079	236	54	0.0010	39.80	43.50	44.38	0.1	0.2	10.6	10.6
105079	105080	105079-105080	237	54	0.0010	40.53	43.50	44.38	0	0.1	9.4	9.3
105080	1022	105080-1022	263	54	0.0010	40.79	43.58	44.47	0	0	7.3	7.2

Indicates an exceedance of full-pipe capacity for peak wet weather flow conditions.
Indicates non-excessive surcharging at peak wet weather flow conditions due to an exceedance of full-pipe capacity.
Indicates excessive surcharging at peak wet weather flow conditions due to an exceedance of full-pipe capacity.
Indicates excessive surcharging at peak wet weather flow conditions due to backwater conditions arising from downstream capacity restrictions.

Interim Discharge to the Gilley Way Sewer

As shown in Figure 3, in the 2021 Green Tree Development Plan, it is proposed that the existing 8-inch and 10-inch diameter sewers in Orange Drive and Gilley Way be rerouted through the redevelopment site along the proposed Village Way and would reconnect to the City's existing collection system at the 27-inch diameter Leisure Town Road trunk sewer at the intersection of Leisure Town Road and Poplar Road (as noted above). As an interim measure, the developer has inquired about the possibility of a temporary connection to the Gilley Way sewer prior to construction of the sewer realignment just noted. The purpose of this interim measure would be to enable the construction of the Residential-7 subarea shown in Figure 1 prior to completion of other development subareas within the Northern Area.

Based on the results of the City-wide model, significant unused capacity currently exists on the Gilley Way sewer. For existing development conditions, the City-wide model shows a peak wet weather flow of 0.127 mgd in a line with 0.778 mgd of full-pipe capacity, thus indicating approximately 0.65 mgd of available peak flow capacity under current conditions.

For this analysis, peak wet weather flows from the Residential-7 subarea are estimated as follows:

1. Apply a residential flow factor of 240 gpd per dwelling unit to the estimated dwelling unit total of 259 dwelling units (per Table 1 above) to obtain an average dry weather flow (ADWF) value. The resulting estimated ADWF is 62,160 gpd, or approximately 0.062 mgd.
2. Apply the following peaking factor equation taken from the 2018 Wastewater Master Plan to obtain a peak dry weather flow (PDWF) value, where the flows are expressed in units of mgd:

   $$PDWF = 2.1*ADWF^{0.943}$$

   The resultant PDWF value is estimated to be 0.153 mgd.
3. Apply a peak infiltration and inflow (I&I) rate of 2,000 gpd per acre over the 10.8-acre parcel. The resultant peak I&I is estimated to be 21,600 gpd, or approximately 0.022 mgd.
4. Sum the PDWF and peak I&I value to obtain a peak wet weather flow value of 0.175 mgd.

Adding this peak wet weather flow estimate to the current modeled value in the Gilley Way sewer results in a combined peak wet weather flow of 0.202 mgd, which represents only 26 percent of the full-pipe capacity of that line. In addition, the effect of these flows on the 27-inch diameter Leisure Town Road trunk sewer between Gilley Way and Poplar Road is expected to be minor. It is therefore concluded that the Gilley Way sewer can easily accommodate the Residential-7 subarea flows in an interim configuration.

REQUIRED COLLECTION SYSTEM IMPROVEMENTS AND COSTS

For this analysis, it is assumed that all collection system improvements that are internal to the Green Tree redevelopment site would be the responsibility of the developer and are therefore not addressed here.

Based on this analysis, it is concluded that for existing conditions, the only improvement that would be needed to support the proposed Green Tree redevelopment would be the DIF 38A improvements on Leisure Town Road between Ulatis Drive and Elmira Road. As noted above, the existing facilities show marginally excessive surcharging under existing flow conditions, and planned improvements are currently in the design phase.

For buildout flow conditions, possible improvements that may be needed include the following:

- Upsizing of the Leisure Town Road LS pumps and motor controls, with associated electrical improvements and modification to the discharge piping and valves, as well as wet well improvements, a new concrete masonry unit (CMU) building to accommodate the larger equipment, and acquisition of additional land to accommodate the building.
- Upsizing of approximately 2,700 lineal feet of the Leisure Town Road trunk sewer between Ulatis Creek and Ulatis Drive from a 30-inch diameter pipe to a 36-inch diameter pipe

As noted above, for this analysis, modeled non-excessive surcharging conditions in the 27-inch diameter Leisure Town Road trunk sewer upstream of the lift station and in the 54-inch diameter Elmira Road sewer are not assumed to trigger the need for future improvements.

Planning and predesign-level costs for the indicated improvements are summarized in Table 5. Predesign-level costs for DIF 38A were established as part of the June 2018 Draft DIF 38A Predesign Report. Planning-level costs for the lift station improvements were determined as part of the 2018 Wastewater Master Plan. Planning level costs for the Gilley Way sewer and Leisure Town Road trunk sewers are calculated using the cost estimating methodology and unit cost assumptions from the 2018 Wastewater Master Plan. All costs have been adjusted to 2021 dollars, based on a January 2021 Engineering News Record 20-Cities Average Construction Cost Index of 11628.

Table 5. Planning-Level Costs for Improvements to Support Green Tree Redevelopment

Improvement	Cost, million dollars	Source	Notes
Ulatis Drive to Elmira Road (DIF 38A)	6.63	June 2018 DIF 38A Predesign Report	Assumes Alternative 2: Parallel 42-inch diameter replacement sewer on existing 24-inch diameter sewer alignment
Leisure Town Road LS	Phase 1: 1.77 Phase 2: 3.52	Vaca Valley Parkway and Leisure Town Road Sewer Lift Station Improvements Project Preliminary Design Report	Two-phase improvements include upsized pumps and motor controls, with associated electrical improvements and modification to the discharge piping and valves; wet well improvements; land acquisition; new CMU building
Leisure Town Road Trunk Sewer — Ulatis Creek to Ulatis Drive	11.29	Cost estimating methodology from the 2018 Wastewater Master Plan	Assumes upsizing to 36-inch diameter over 2,690 lineal-feet

The cost estimating methodology from the 2018 Wastewater Master Plan uses assumptions of 30 dollars per inch-diameter/lineal-foot, 10,000 dollars per manhole replacement, a 30 percent construction/ estimating contingency, and an additional 65 percent for administration, engineering, and permitting. It is recognized that these numbers are conservatively high and are used to reflect uncertainty in terms of project timing, markets, and potential project complications.

ADWF may serve as the basis for cost sharing of improvements. The proportion of Green Tree flows relative to those in the 30-inch diameter trunk sewer downstream are summarized in Table 6.

Table 6. Modeled ADWF, Leisure Town Road LS and 30-inch Diameter Trunk Sewer

Quantity	ADWF, mgd		% Green Tree
	Without Green Tree	With Green Tree[(a)]	
Existing Conditions	1.184	1.532	22.7%
General Plan Buildout Total	3.050	3.398	10.2%
General Plan Growth Portion	1.866	2.214	15.7%

(a) ADWF from Green Tree estimated to be 0.348 mgd.

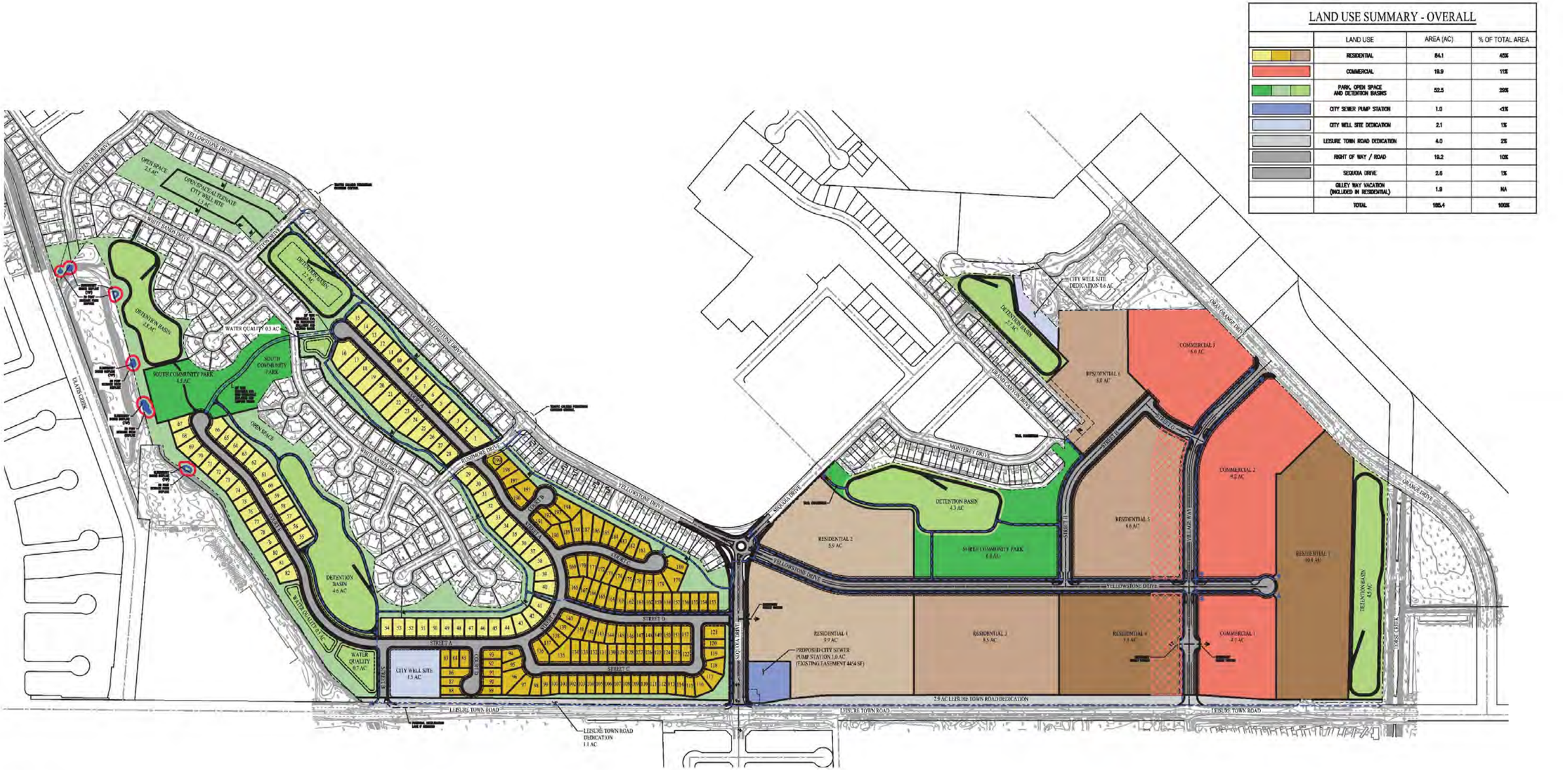
CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this analysis, the following conclusions and recommendations apply:

1. It is recommended that construction of the planned DIF 38A replacement sewer be completed prior to completion of the Green Tree redevelopment project. The Green Tree redevelopment would not change the required size of the replacement sewer. The DIF 38A replacement is funded by development impact fees, so the share of cost attributable to the Green Tree redevelopment would be covered by payment of applicable fees.
2. The Leisure Town Road LS pumps and motor controls will need to be upsized, and electrical improvements and modifications to the discharge piping and valves will be needed in the future to support future development, including the Green Tree redevelopment project. The timing and the Green Tree share of the costs are unclear until decisions have been made about other future upstream flows. Preliminary design of upgrades has been completed based on the previous flow projection, as detailed in the June 2021 report titled “Vaca Valley Parkway and Leisure Town Road Sewer Lift Station Improvements Project Preliminary Design Report”. The updated flow project is not expected to significantly change the findings, but the equipment sizing and costs presented in the PDR will need to be reviewed and revised based on the adopted redevelopment plan.
3. Current flow modeling indicates that the 27-inch diameter Leisure Town Road trunk sewer upstream of the Leisure Town Road LS may need to be upsized to support buildout flows, either with or without the addition of the Green Tree flows. The need, timing, and the Green Tree cost share of the improvement are unclear until decisions have been made about other future upstream flows. According to current modeling assumptions, the Green Tree flows would account for 12.9 percent of the total modeled buildout average dry weather flows in that line and 16.4 percent of the growth-only portion of the modeled buildout average dry weather flows in that line.
4. Current flow modeling indicates that the 30-inch diameter Leisure Town Road trunk sewer between Ulatis Creek and Ulatis Drive would need to be upsized to support buildout flows in that line, either with or without the addition of the Green Tree flows. According to current modeling assumptions, the Green Tree flows would account for 10.2 percent of the total modeled buildout average dry weather flows in that line and 15.7 percent of the growth-only portion of the modeled buildout average dry weather flows in that line.

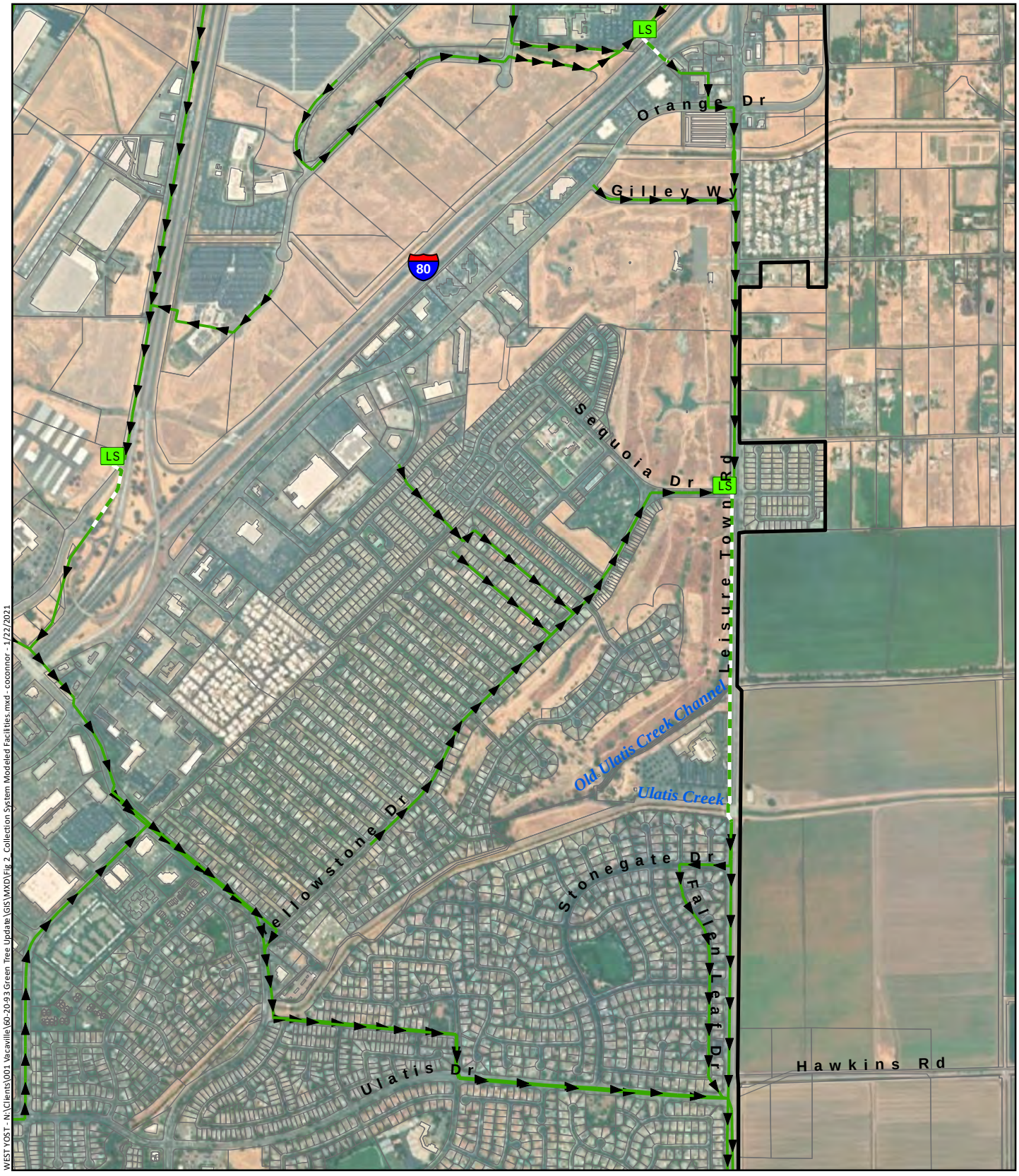
It should be noted that any other proposed flow changes outside of those identified in the 2015 General Plan, in the NESSMP, or in this TM may further impact the results and conclusions presented herein.

Figure 1. Proposed Land Use Plan, Green Tree Redevelopment



Source: CBG 2021, EMC Planning Group 2021, Google Earth 2019

Source: Project Description Summary, Greentree Development Project, EMC Planning Group, June 30, 2021.



LS Lift Station

Existing Force Main

Existing Gravity Main

City Limits

Parcels

N

0 0.125 0.25

Miles

VACAVILLE

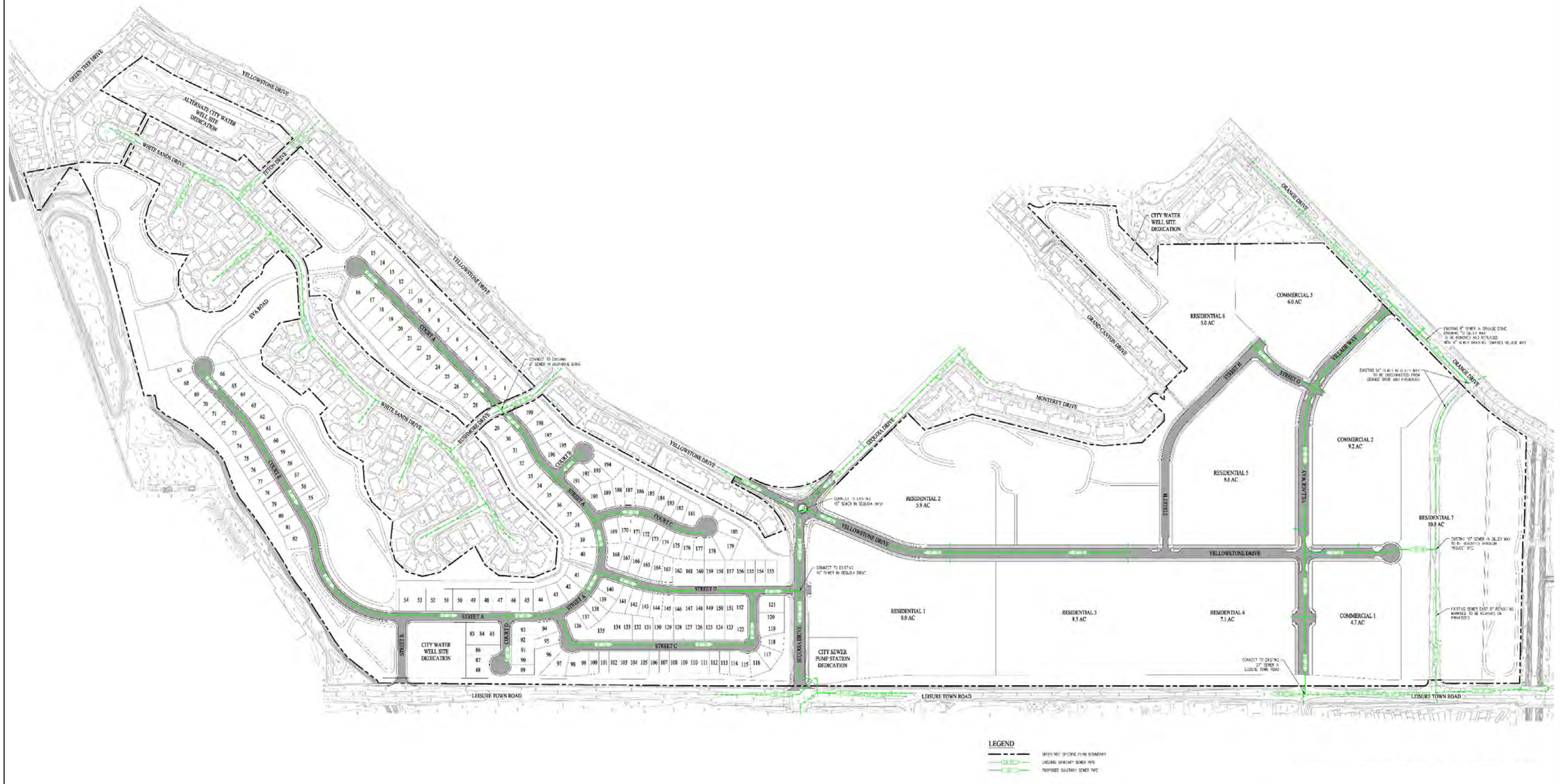
WEST YOST

Figure 2

Modeled Collection System Facilities

City of Vacaville
Green Tree
Redevelopment Project

Figure 3. Proposed Sewer System Layout, Green Tree Redevelopment



Source: Project Description Summary, Greentree Development Project, EMC Planning Group, June 30, 2021.