

**APPENDIX I**  
**SUPPLEMENTAL SEWER CAPACITY INFORMATION**



# Dixon Ranch El Dorado Hills, CA

## Existing Sewer Capacity Analysis to Highland Hills Lift Station April 2015

(An Addendum to "Offsite Water Improvements & Offsite Sewer Alternatives dated march 2013, revised August 2013")

### GENERAL

This analysis summarizes existing gravity sewer line capacities from the Dixon Ranch project's westerly boundary to the Highland Hills Lift Station (HHLS) and the ability of these existing pipes to convey project flows. As stated in the Offsite Sewer Alternatives Summary dated August 14, 2013, "Project sewer flows will connect to the existing gravity sewer line in Lima Way and make the necessary improvements to split the project sewer flows near the intersection of Lima Way and Aberdeen Lane. Project flows will then make their way through the existing system in Highland View, down to the existing Highland Hills Lift Station (HHLS)."

### DEMANDS

An average dry weather flow (ADWF) of 240 gallons per single family dwelling per day represents one equivalent dwelling unit (EDU) of sewer demand. This equates to an ADWF of 0.166 (1/6) gallons per minute (gpm) per EDU. A peaking factor of 4.0 applied to the average dry weather flow results in peak wet weather flow (PWWF) of 0.66 (2/3) gpm per EDU.

### CAPACITY CRITERIA

- Sewage flows for 33 EDU's and fewer served by 6-inch sewers are to have a minimum slope of 1.5% (0.015 ft/ft).
- Sewer lines serving 34 or more EDU's are sized according to velocity and capacity criteria, as follows.
- Minimum and maximum design velocities are 2 feet per second (fps) and 10 feet per second (fps), respectively.
- Six-inch sewers may flow no more than 50% full. All other sizes may flow no more than 67% full.
- The maximum slope of any sewer line is 19%.
- Manning's "n" used in hydraulic computations is 0.013 for all sewer pipes.

### CONCLUSIONS

Based on the attached supporting calculations, the existing gravity sewer lines would adequately convey the proposed project flows, with the exception of pipe segments previously identified for upsizing in the Offsite Sewer Alternatives Summary dated August 14, 2013. Three segments would exceed current capacity limitations and would be replaced with increased capacity designs such as larger pipes or steeper pipe slopes. The first segment at the upper connection point exceeds the maximum allowed velocity standard by a very small margin. Further review and coordination with the El Dorado Irrigation District (EID) at the time of final design will determine if the final design velocity is acceptable or if this short segment of pipe would be replaced as a part of the connection to existing facilities and flow splitting improvements proposed at the intersection of Lima Way and Aberdeen Lane. Flow splitting improvements at Lima Way and Aberdeen Lane would include a new pipe segment and modification of existing sewer facilities, as previously described in the Offsite Sewer Alternatives Summary dated August 14, 2013.

Figure A depicts the sewer system and the analyzed routes. Table A summarizes sewer flows and calculations. The analysis assumes service to 612 total EDUs, including 604 residences, a park restroom, and the clubhouse.

FROM	TO	EX. & FUTURE EDU'S	EX. EDU'S + PP	PWWF @ 2/3 GPM/EDU	EX. PIPE DIA. (IN)	EX. PIPE SLOPE (FT/FT)	VELOCITY (FPS)	PERCENT FULL
C	1	0	612	408.00	8"	0.1500	10.38	29.9
1	2	0	612	408.00	8"	0.0607	7.49	37.9
2	3	2	308	205.33	8"	0.0503	5.78	27.8
3	4	5	311	207.33	8"	0.1076	7.61	23.0
4	5	13	319	212.67	8"	0.1006	7.48	23.7
5	6	19	325	216.67	8"	0.0745	6.75	25.9
6	7	26	332	221.33	8"	0.1112	7.83	23.6
7	8	29	335	223.33	8"	0.0350	5.19	31.9
8	9	29	335	223.33	8"	0.0701	6.66	26.7
9	10	56	362	241.33	8"	0.0875	7.37	26.2
10	11	58	364	242.67	8"	0.0050	2.59	57.7
11	12	60	366	244.00	8"	0.0050	2.59	57.9
12	13	62	368	245.33	8"	0.0325	5.19	34.2
13	14	79	385	256.67	8"	0.0570	6.43	30.2
14	15	81	387	258.00	8"	0.1057	8.04	25.8
15	16	91	397	264.67	8"	0.0216	4.57	39.7
16	17	96	402	268.00	8"	0.0900	7.66	27.5
17	18	96	402	268.00	8"	0.0100	3.45	49.6
18	19	97	403	268.67	8"	0.0847	7.52	27.9
19	20	97	403	268.67	8"	0.0540	6.39	31.4
20	21	111	417	278.00	8"	0.1050	8.19	26.9
21	36	111	417	278.00	8"	0.1000	8.04	27.2
2	22±	0	306	204.00	6"	0.0262	4.63	50.0
22	23	4	310	206.67	6"	0.1000	7.58	34.8
23	24	8	314	209.33	6"	0.1640	9.09	30.8
24	25	10	316	210.67	6"	0.0750	6.88	37.9
25	26	16	322	214.67	6"	0.1522	8.94	31.7
26	27	19	325	216.67	6"	0.1106	7.96	34.7
27	28	28	334	222.67	6"	0.1186	8.22	34.6
28	29	32	338	225.33	6"	0.1029	7.87	36.1
29	30	41	347	231.33	6"	0.1000	7.84	36.9
30	31	46	352	234.67	6"	0.0735	7.04	40.4
31	32	55	361	240.67	6"	0.1000	7.92	37.7
32	33	55	361	240.67	6"	0.0824	7.39	39.7
33	34	128	434	289.33	8"	0.0050	2.69	64.9
34	35	131	437	291.33	8"	0.0650	6.99	31.2
35	36	131	437	291.33	8"	0.0205	4.60	42.4
36	37	334	946	630.67	8"	0.0650	8.62	47.4
37	38	335	947	631.33	8"	0.0900	9.73	43.2
38	39	339	951	634.00	8"	0.0050	N/A	FULL
39	40	346	958	638.67	8"	0.0334	6.72	58.4
40	41	347	959	639.33	8"	0.0118	4.19	92.3
41	42	348	960	640.00	8"	0.0093	N/A	FULL
42	43	478	1090	726.67	10"	0.02	5.74	51.3
43	HHLS	500	1112	741.33	10"	0.02	5.77	51.9
DESIGN CRITERIA								
MINIMUM VELOCITY = 2 FPS @ 33+ EDUs; MAXIMUM VELOCITY = 10 FPS								
MAXIMUM VOLUME: 6" @ 50%; 8"+ @ 67%								
MAXIMUM SLOPE = 19%								
ASSUMES 50/50 SPLIT   EXISTING PIPE SLOPES BASED ON RECORD DRAWINGS								
VELOCITY CRITERIA EXCEEDED								
CAPACITY CRITERIA EXCEEDED								

## Circular Pipe (040615 Highland View Sewer Capacities.fm8) Report

Label	Discharge (gpm)	Roughness Coefficient	Diameter (in)	Channel Slope (ft/ft)	Velocity (ft/s)	Percent Full (%)
C-1	408.00	0.013	8	0.1500	10.38	29.9
1-2	408.00	0.013	8	0.0607	7.49	37.9
2-3	205.33	0.013	8	0.0503	5.78	27.8
3-4	207.33	0.013	8	0.1076	7.61	23.0
4-5	212.67	0.013	8	0.1006	7.48	23.7
5-6	216.67	0.013	8	0.0745	6.75	25.9
6-7	221.33	0.013	8	0.1112	7.83	23.6
7-8	223.33	0.013	8	0.0350	5.19	31.9
8-9	223.33	0.013	8	0.0701	6.66	26.7
9-10	241.33	0.013	8	0.0875	7.37	26.2
10-11	242.67	0.013	8	0.0050	2.59	57.7
11-12	244.00	0.013	8	0.0050	2.59	57.9
12-13	245.33	0.013	8	0.0325	5.19	34.2
13-14	256.67	0.013	8	0.0570	6.43	30.2
14-15	258.00	0.013	8	0.1057	8.04	25.8
15-16	264.67	0.013	8	0.0216	4.57	39.7
16-17	268.00	0.013	8	0.0900	7.66	27.5
17-18	268.00	0.013	8	0.0100	3.45	49.6
18-19	268.67	0.013	8	0.0847	7.52	27.9
19-20	268.67	0.013	8	0.0540	6.39	31.4
20-21	278.00	0.013	8	0.1050	8.19	26.9
21-36	278.00	0.013	8	0.1000	8.04	27.2
S-22	204.00	0.013	6	0.0262	4.63	50.0
22-23	206.67	0.013	6	0.1000	7.58	34.8

## Circular Pipe (040615 Highland View Sewer Capacities.fm8) Report

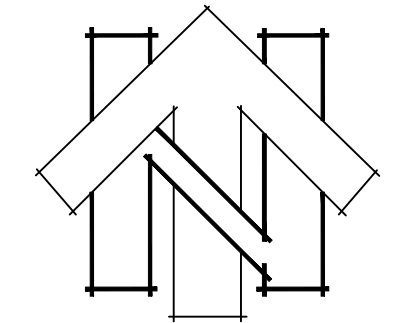
Label	Discharge (gpm)	Roughness Coefficient	Diameter (in)	Channel Slope (ft/ft)	Velocity (ft/s)	Percent Full (%)
23-24	209.33	0.013	6	0.1640	9.09	30.8
24-25	210.67	0.013	6	0.0750	6.88	37.9
25-26	214.67	0.013	6	0.1522	8.94	31.7
26-27	216.67	0.013	6	0.1106	7.96	34.7
27-28	222.67	0.013	6	0.1186	8.22	34.6
28-29	225.33	0.013	6	0.1029	7.87	36.1
29-30	231.33	0.013	6	0.1000	7.84	36.9
30-31	234.67	0.013	6	0.0735	7.04	40.4
31-32	240.67	0.013	6	0.1000	7.92	37.7
32-33	240.67	0.013	6	0.0824	7.39	39.7
33-34	289.33	0.013	8	0.0050	2.69	64.9
34-35	291.33	0.013	8	0.0650	6.99	31.2
35-36	291.33	0.013	8	0.0205	4.60	42.4
36-37	630.67	0.013	8	0.0650	8.62	47.4
37-38	631.33	0.013	8	0.0900	9.73	43.2
38-39	634.00	0.013	* 10	* 0.0067	3.64	66.9
39-40	638.67	0.013	8	0.0334	6.72	58.4
40-41	639.33	0.013	* 10	* 0.0068	3.67	67.0
41-42	640.00	0.013	* 10	* 0.0068	3.67	67.0
42-43	726.67	0.013	10	0.0200	5.74	51.3
43-HHLS	741.33	0.013	10	0.0200	5.77	51.9

**\* MINIMUM PIPE DIAMETER & SLOPE TO ACCOMMODATE PROJECT FLOWS**



# FIGURE A DIXON RANCH

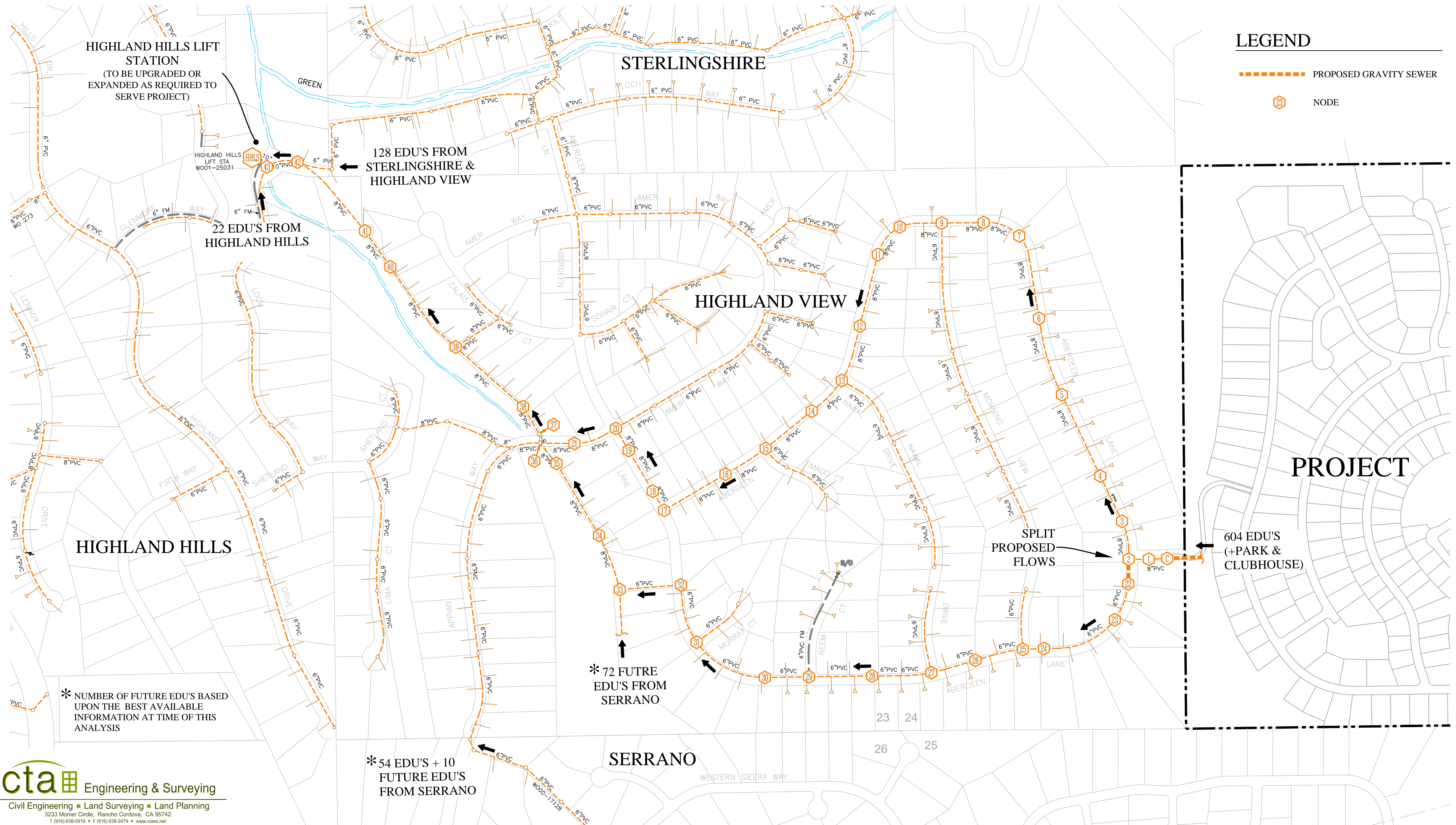
EXISTING SEWER CAPACITY ANALYSIS TO HIGHLAND HILLS LIFT STATION  
 COUNTY OF EL DORADO APRIL, 2015 STATE OF CALIFORNIA



SCALE: 1" = 200'

## LEGEND

- PROPOSED GRAVITY SEWER
- 23 NODE



\* NUMBER OF FUTURE EDU'S BASED UPON THE BEST AVAILABLE INFORMATION AT TIME OF THIS ANALYSIS