

DD43 Palo Alto County - Preliminary Tile Design Analysis

<u>Lateral</u>	<u>Starting Station</u>	<u>Dia. (in)</u>	<u>Grade (%)</u>	<u>Ex Capac. (cfs)</u>	<u>Approx. Length</u>	<u>Acres Drained</u>	<u>Drainage Coefficient (in/day)</u>	<u>Rec Dia at Ex Grade for 1/2" DC (in)</u>
Main	0+00	18	0.86%	11.51	1,600	1035	0.26	24
	16+00	20	0.86%	15.25	1,300	974	0.37	24
	29+00	24	0.10%	8.45	1,160	913	0.22	36
	40+60	20	0.10%	5.20	140	555	0.22	30
	42+00	16	0.10%	2.87	2,200	399	0.17	24
	64+00	24	0.14%	10.00	1,800	330	0.72	24
Branch 1	0+00	16	0.40%	5.74	1,350	358	0.38	18
	13+50	12	1.20%	4.61	520	339	0.32	15
	18+70	10	1.20%	2.84	433	145	0.47	10
	23+03	10	0.80%	2.32	500	141	0.39	12
	28+03	10	1.53%	3.20	897	135	0.57	10
	37+00	12	0.10%	1.33	400	116	0.27	15
Branch 1A	0+00	8	0.85%	1.32	700	68	0.46	8
Branch 2	0+00	12	0.70%	3.52	600	156	0.54	12

Notes and Comments:

1. Between 1985 and 1995 the upper end of the DD6 Open Ditch was filled in, approximately 420 feet. It is likely that the Main Tile was extended at a lower grade, with an unknown size. This would need to be investigated further.
2. Drainage coefficient is the standard for design of tile. It is the equivalent depth of water that can be drained over an area per day. We recommend between 1/2 and 1 inch per day for this drainage district. Existing drainage coefficients are calculated assuming the tile is in good condition, operating as originally designed and installed. This may not be the case.
3. Recommended tile size based on target drainage coefficient of 1/2 inch per day and existing grades. A higher drainage coefficient design could also be considered. We anticipate that with a fully engineered design we would find opportunities to lower the tile size by varying the existing grades and depths, and save money. We have much more flexibility today on installation depths than when the original tile was installed in approx. 1910. Much of the Main Tile should have at least double its current capacity, with one reach needing at least triple.
4. The Main Tile has the greatest need for improvement. Branches 1, 1A and 2, if in good condition may not be worth improving at this time, unless a drainage coefficient higher than 1/2 inch per day is desired. We did not evaluate Branch 3, which is 85' of 10" tile.
5. See attached original plat map for DD43.