PRELIMINARY DRAINAGE REPORT
for
PIEDMONT OAK ESTATES
EL DORADO, CA

PREPARED BY:

GENE E. THORNE & ASSOCIATES, INC.
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REVIEWED BY:

GENE E. THORNE, RCE 20462

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BT Consulting
incorporated

October 3, 2012

Lillian MacLeod, Senior Planner
El Dorado County Development Services Dept.
Planning Services
2850 Fairlane Court
Placerville, CA 95667

RE: Piedmont Oak Estates Preliminary Drainage Report by Gene E. Thorne & Assoc, Inc.

Lillian,

This letter serves to verify the applicability of the Preliminary Drainage Report for Piedmont Oak Estates dated May 11, 2009 by Gene E. Thorne. I have reviewed the Report, and find that it adequately demonstrates that drainage facilities, including those areas designated for detention and post construction runoff control are adequate to serve the reduced project study area currently in for review by the Development Services Department. Unfortunately, due the passing of Gene Thorne, and the resulting closure of Gene E. Thorne & Associates, revisions to the Report are impossible.

During the final design phase of the project for improvement plans, and likely required by the Conditions of Approval, a Final Drainage Report will be prepared to meet the requirements of El Dorado County Department of Transportation. The Final Drainage Report will be significantly more detailed, and will consider the current project and design standards.

With kindest regards,

Peter K. Thorne
Vice-President, BTConsulting Inc.
PE 58279

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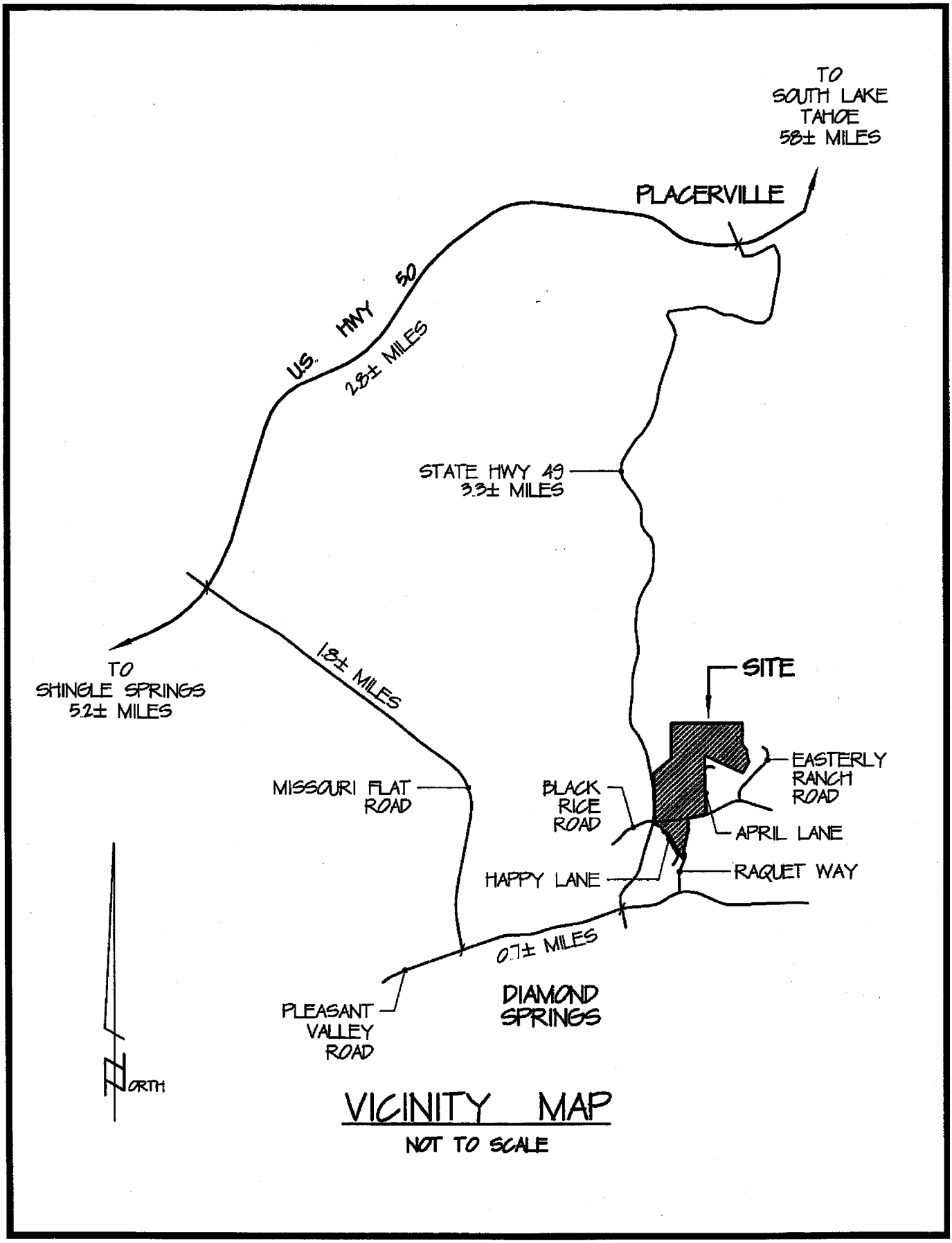


VICINITY MAP

NOT TO SCALE

Table of Contents

Introduction and Background

Piedmont Oaks Drainage Report analyzes the possibility of flooding because of development during any storm event at the project site.

The drainage report examines and recommends drainage improvements to handle computed discharges, based upon the 100-year hydraulic grade line (HGL), as stated in Section 3.2.6 of the County of El Dorado Drainage Manual, March 14, 1995.

The drainage for Piedmont Oaks was analyzed using the **Unit Hydrograph** method as discussed in Section 2.4 of the El Dorado County Drainage Manual, adopted March 14, 1995.

The hydraulic analysis of the existing and proposed drainage improvements related to the project area was based on Civil Storm modeling software by Haestad Methods.

Location:

Piedmont Oaks is located north of Pleasant Valley Road and east of State Highway 49 along Black Rice Road near Diamond Springs, California. The property is owned by Jim Davies, and encompasses approximately 48.97 acres.

Existing Conditions:

The property area is covered mostly with grass, trees and surrounded by residential development. All runoff from the project site flows north, through two existing trapezoidal channels into Weber Creek. See Quad Map in Appendix E.

Summary and Conclusions

Pre-Development Hydraulic Analysis:

See Appendix B for Pre Development Drainage Sheds, and analysis of three (3) Points of Release. Note that Point of Release "A" is analyzed for flow contributed only by the subject property in order to compare pre and post development increases or decreases in flow and does not consider the entire drainage shed for flow at that location.

Proposed Improvements:

- Drainage improvements along onsite roads with outlet pipe to daylight.
- Detention Ponds. See proposed detention basins in Appendix A.

Storm Drain Flow Calculations:

Civil Storm software computes the flow rate and analyzes the existing and future storm drain system. For quantity of flow and hydraulic grade line (HGL) in each pipe see Future and Existing Storm Drain Pipes in Appendix A and B respectively.

Post-Development Hydraulic Analysis:

With the addition of two (2) detention facilities (see Post-Development Drainage Shed Map), the project maintains pre development runoff when built. Table 1 provides a summary of results for three (3) release points.

Table 1: Existing and Proposed Peak Flow Comparison

	Pre-Development		Post-Development	
Release Point	10-yr Peak Flow (cfs)	100-yr Peak Flow (cfs)	10-yr Peak Flow (cfs)	100-yr Peak Flow (cfs)
A	15.95	28.44	19.17	31.53
B	21.01	38.98	22.32	32.05
C	2.60	4.90	3.61	4.95
Total	**39.56**	**72.32**	**45.10**	**68.51**

Procedure

A. *Watershed Areas*:

For location of delineated pre and post development watershed areas, see the attached drainage shed maps located in Appendix A and B respectively.

B. *Mean Annual Precipitation, Pptn:* The site was located on the Mean Annual Rainfall Map for El Dorado County. Then, the annual rainfall for the project was determined from the map.

Use Pptn = 38 inches (see Appendix C)

C. *Soil Survey*:

The soil survey map (Appendix E) was used in order to determine the soil types present within the watershed areas that contribute runoff to the project site. Next, data from the El Dorado Area Soil Survey (USDA, April 1974) describing each soil type was reviewed in order to determine the hydrological soil group of the soil. Soils are rated as Type A, having high infiltration rates, through Type D, having the lowest infiltration rate. This project site contains 2 soil types. Diamond Springs (DfC and DgE) , a very fine sandy loam over clay loam with bedrock found between 20 to 50 inches deep, and Placer Diggins (PrD), no interpretations made because of variable properties. DfC and DgE soils lie within soil hydrological group C. Utilizing Table 2-2a in Appendix D, pre and post-development curve numbers are determined.

D. *Time of Concentration, Tc:* Per Section 2.4 of the EDC Drainage Manual.

See Watershed Properties Table in Appendix A and B for Post and Pre Development Tc of each shed area. A minimum time of concentrations of 5 minutes was used.

E. *Unit Hydrograph:*

Using the Mean Annual Precipitation, and the El Dorado Design Rainfall Tables (See Appendix C), both 10 and 100 year event Rainfall Depths are determined. This information is then entered into Bentley Civil Storm Type 1 SCS Storm Event to produce a Temporal Distribution Model (Cumulative Rainfall) for the 10 and 100-year events. The rainfall excess and the incremental excess values are estimated per Section 2.4 of the EDC Drainage Manual. Then, the runoff hydrograph is computed using the incremental rainfall excess per Section 2.4.2 of the EDC Drainage Manual.

F. *Pipes Size Requirements:*

Pipes sizes vary to convey the 10-year event within the pipe and within storm structures as stated in Section 4.3.2 of El Dorado County Drainage Manual, adopted March 14, 1995.

G. *Detention Facilities:*

Utilizing Bentley Civil Storm, two detention ponds have been located to reduce offsite flows to be near or below existing pre development levels. Outlet control structures are designed to accomplish this.

APPENDIX A – Post Development Hydraulic Analysis

Watershed Properties Table

Watershed areas tributary to existing downstream pipes and ponds analyzed. Data imported from Bentley CivilStorm v8. See delineated watershed areas in Post-Development Drainage Shed Map.

Shed Name	SCS Curve Number	Area (Acres)	2-yr 24 hr depth	Tc (min)	100-Year Peak Flow (cfs)	10-Year Peak Flow (cfs)
CS1	98	0.32	3.34	5	0.53	0.37
CS2	98	0.34	3.34	5	0.57	0.40
CS3	98	0.25	3.34	5	0.41	0.29
CS4	98	0.26	3.34	5	0.44	0.31
CS5	90.8	2.34	3.34	10	3.56	2.35
CS6	92	1.12	3.34	10	1.73	1.16
CS7	83	1.99	3.34	15	2.49	1.50
CS8	83	4.75	3.34	15	5.97	3.59
CS9	83	5.92	3.34	15	7.44	4.48
CS10	83	0.26	3.34	10	0.33	0.20
CS11	90.4	4.15	3.34	15	6.14	4.04
CS12	74	1.17	3.34	10	1.14	0.61
CS13	74	0.52	3.34	10	0.51	0.27
CS14	79.7	9.80	3.34	20	10.80	6.21
CS15	79	14.03	3.34	20	15.20	8.64
CS16	83	1.79	3.34	10	2.30	1.38
CS17	79	1.60	3.34	10	1.84	1.05
CS18	92.4	1.24	3.34	10	1.93	1.30
CS19	90.8	1.05	3.34	10	1.59	1.05
CS20	98	0.59	3.34	5	0.99	0.70
CS21	98	0.32	3.34	5	0.53	0.37
CS22	98	0.26	3.34	5	0.43	0.30
CS23	74	0.81	3.34	5	0.80	0.43
CS24	98	0.13	3.34	5	0.22	0.16
CS25	98	0.14	3.34	5	0.24	0.17
CS26	98	0.12	3.34	5	0.20	0.14
CS27	90.8	2.85	3.34	10	4.32	2.86
CS28	98	0.31	3.34	5	0.51	0.36
CS29	90	0.92	3.34	10	1.38	0.90
CS30	90	0.13	3.34	5	0.20	0.13
CS31	98	0.14	3.34	5	0.23	0.16
CS32	98	0.10	3.34	5	0.16	0.12
CS33	98	0.12	3.34	5	0.21	0.15
CS34	90	0.85	3.34	8	1.28	0.84
CS35	84.5	1.61	3.34	10	2.15	1.32
CS36	98	0.12	3.34	5	0.20	0.14
CS37	90	0.50	3.34	7	0.77	0.51

CS38	98	0.12	3.34	5	0.20	0.14
CS39	91.2	0.21	3.34	5	0.33	0.22
CS40	84.5	1.47	3.34	10	1.95	1.20

Future Storm Drain Pipes - Hydraulic Analysis

Hydraulic analysis of 100-yr non-uniform flow in proposed storm drain pipes. (Source: Civil Storm v8).

FlexTable: Conduit Table (Piedmont Post with Det NORTH.csd)

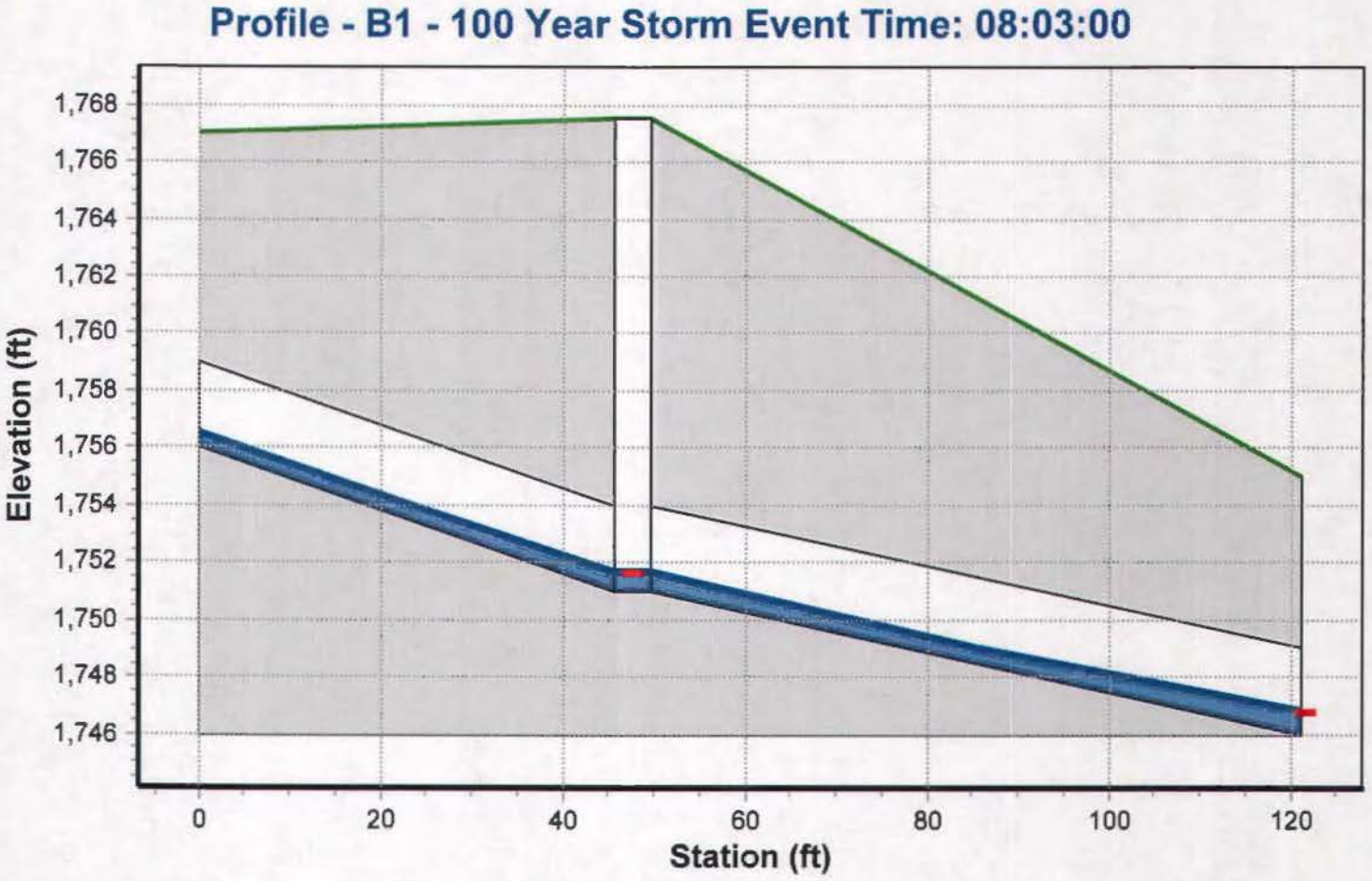
Current Time: 483.000 min

Label	Elevation (Start Invert) (ft)	Elevation (Stop Invert) (ft)	Slope (%)	Diameter (in)	Material	Manning's n	Flow (Maximum) (ft^3/s)
SD E 07	1794.00	1793.00	7.246	18.0	HDPE	0.013	4.91
SD E 06	1795.54	1794.00	8.613	12.0	HDPE	0.013	0.41
SD E 05	1810.00	1794.00	2.495	18.0	HDPE	0.013	4.51
SD E 01	1814.51	1814.01	1.518	12.0	HDPE	0.013	3.56
SD E 02	1814.01	1810.00	4.093	18.0	HDPE	0.013	3.56
SD F 01	1822.00	1821.00	4.492	12.0	HDPE	0.013	1.73
SD G 03	1819.00	1818.00	3.391	18.0	HDPE	0.013	1.25
SD E 03	1810.77	1810.00	4.784	12.0	HDPE	0.013	0.53
SD E 04	1810.77	1810.00	4.471	12.0	HDPE	0.013	0.44
SD A 01	1786.00	1785.00	3.766	12.0	HDPE	0.013	4.32
SD A 02	1785.00	1784.00	2.572	12.0	HDPE	0.013	4.82
SD B 07	1751.00	1746.00	6.978	36.0	HDPE	0.013	19.72
SD B 01	1798.33	1797.50	5.140	12.0	HDPE	0.013	1.59
SD B 02	1798.50	1797.50	4.073	12.0	HDPE	0.013	0.20
SD E 08	1793.00	1790.00	3.984	18.0	HDPE	0.013	5.47
SD A 03	1780.00	1779.00	2.051	18.0	HDPE	0.013	6.13
SD B 06	1756.00	1751.00	10.963	36.0	HDPE	0.013	16.27
SD G 01	1821.00	1820.00	2.929	18.0	None	0.013	0.80
SD B 05	1763.00	1762.00	2.794	12.0	HDPE	0.013	1.93
SD B 04	1763.00	1762.00	2.978	18.0	HDPE	0.013	0.99
SD D 01	1806.36	1805.36	3.006	12.0	HDPE	0.013	0.53
SD D 02	1805.36	1804.00	1.212	12.0	HDPE	0.013	0.96
SD G 02	1820.00	1819.00	2.555	18.0	HDPE	0.013	1.02
SD B 03	1797.00	1751.00	9.115	18.0	HDPE	0.013	1.79

FlexTable: Conduit Table (Piedmont Post with Det.csd)

Current Time: 480.000 min

Label	Elevation (Start Invert) (ft)	Elevation (Stop Invert) (ft)	Slope (%)	Diameter (in)	Material	Manning's n	Flow (Maximum) (ft^3/s)
SD C 1	1825.00	1824.00	6.457	12.0	HDPE	0.013	0.16
SD C 2	1825.00	1824.00	4.431	12.0	HDPE	0.013	0.21
SD C 3	1824.00	1820.00	1.433	18.0	HDPE	0.013	0.37
SD C 4	1824.50	1823.50	2.443	12.0	HDPE	0.013	0.23
SD C 5	1820.00	1818.00	1.865	18.0	HDPE	0.013	0.60
SD C 6	1821.00	1818.00	9.676	18.0	HDPE	0.013	1.28
SD C 7	1818.00	1809.50	6.772	18.0	HDPE	0.013	1.88
SD C 8	1810.50	1809.50	3.529	18.0	HDPE	0.013	2.15
SD C 9	1809.50	1804.50	9.333	18.0	HDPE	0.013	4.01
SD C 10	1804.86	1804.50	1.786	12.0	HDPE	0.013	0.20
SD C 11	1804.50	1804.00	2.834	18.0	HDPE	0.013	4.20
SD C 15 (E)	1802.16	1799.93	2.071	18.0	HDPE	0.013	1.95
SD C 14 (E)	1799.93	1798.80	2.234	18.0	HDPE	0.013	4.95
SD C 16 (E)	1798.80	1796.00	16.393	18.0	HDPE	0.013	4.95
SD C 12	1804.00	1803.00	2.363	18.0	HDPE	0.013	4.40
SD C 13	1803.00	1799.93	6.150	18.0	None	0.013	2.91


Profile - B1 - 100 Year Storm Event Time: 08:03:00
Elevation (ft)
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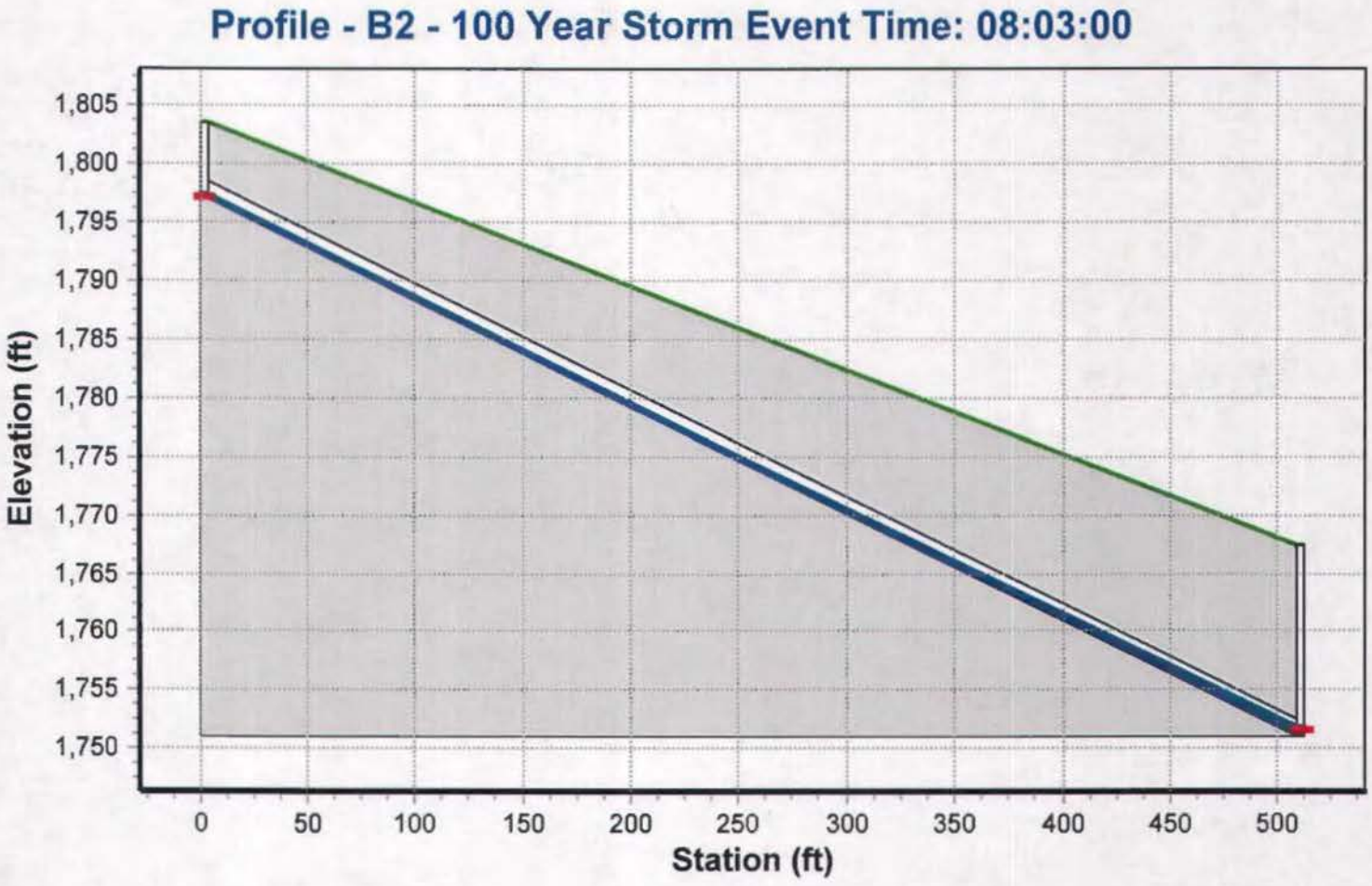
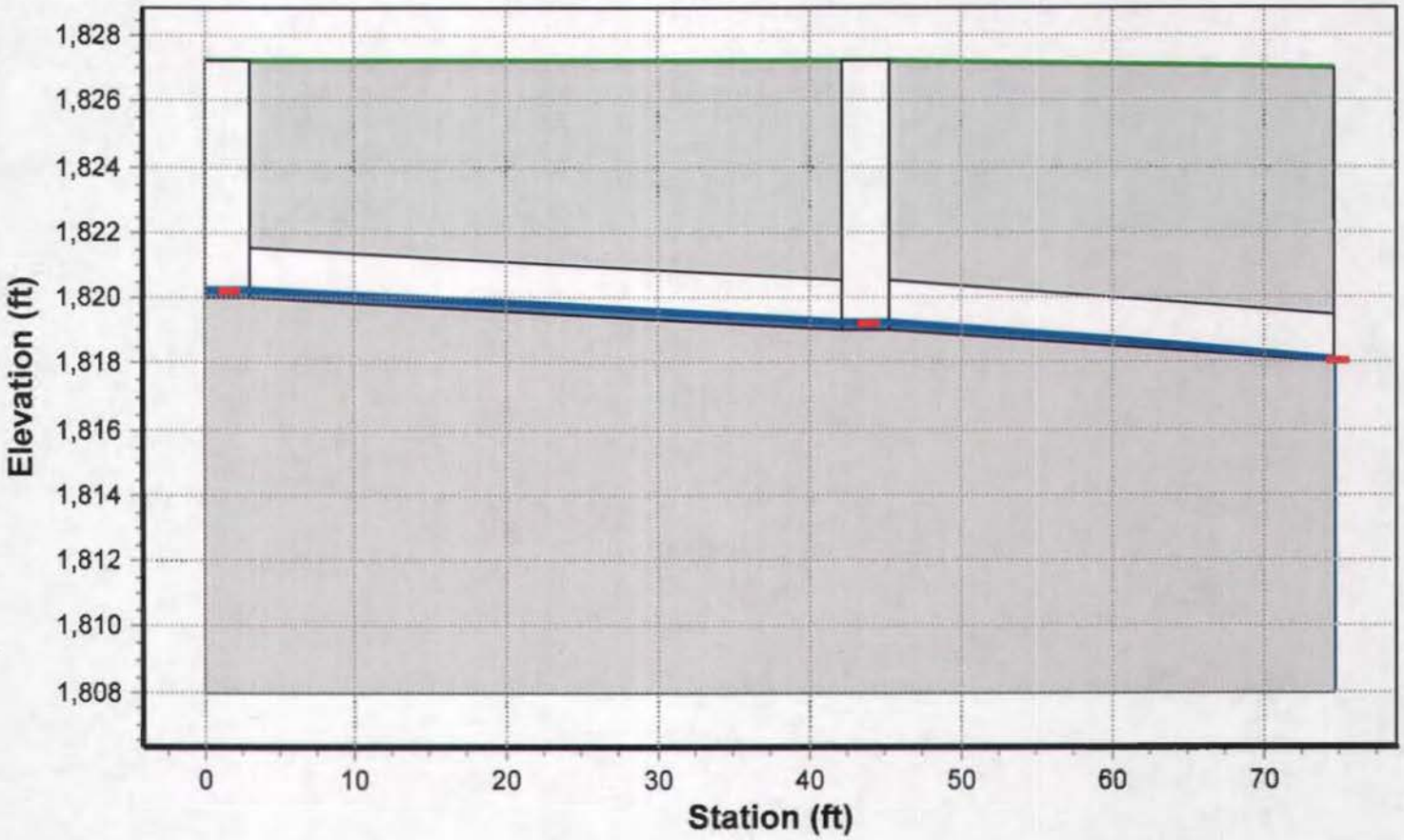
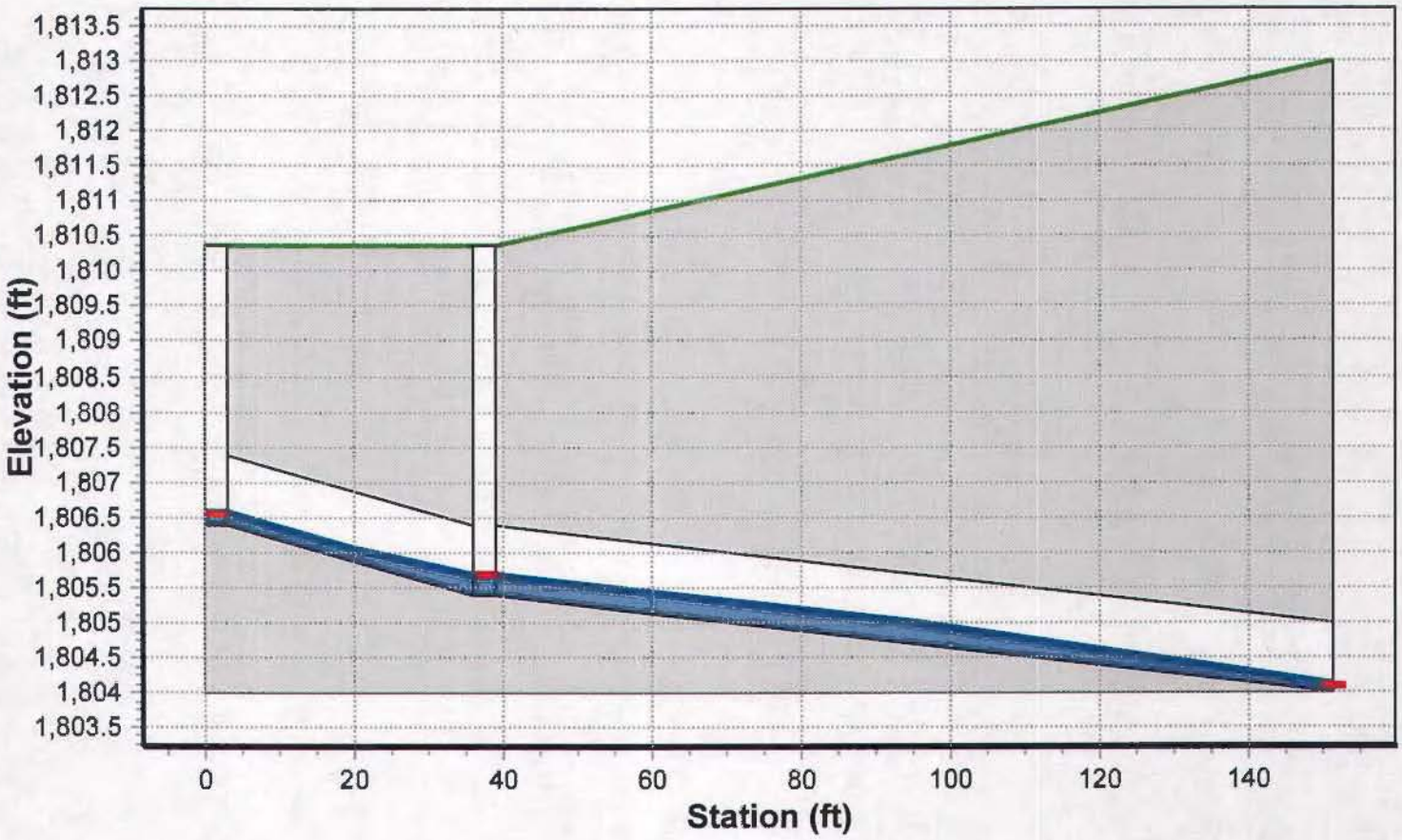
1,766
1,764
1,762
1,760
1,758
1,756
1,754
1,752
1,750
1,748
1,746
0
20
40
60
80
100
120
Station (ft)

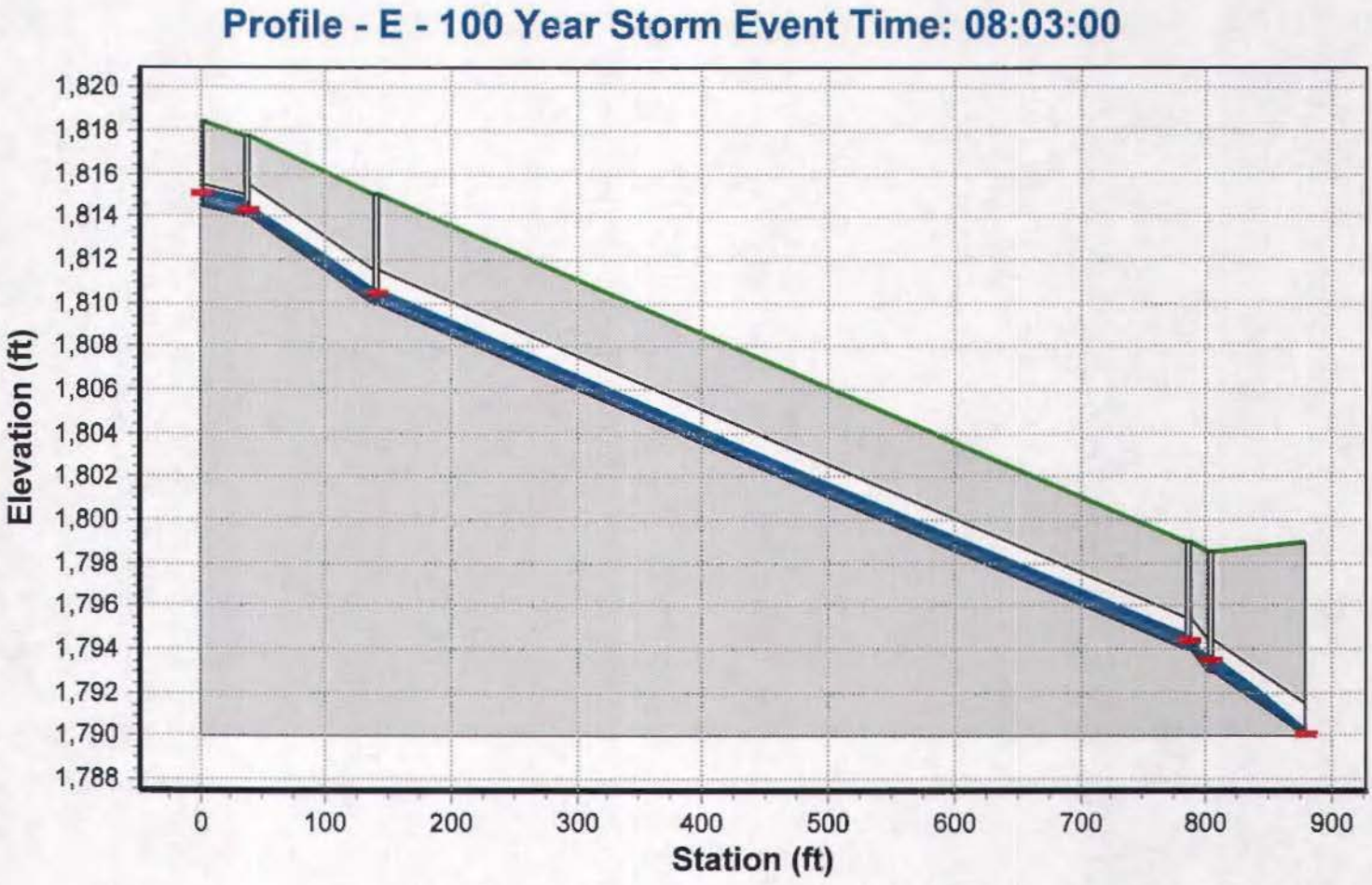

Profile - B2 - 100 Year Storm Event Time: 08:03:00
Elevation (ft)
1,805
1,800
1,795
1,790
1,785
1,780
1,775
1,770
1,765
1,760
1,755
1,750
0
50
100
150
200
250
300
350
400
450
500
Station (ft)

Profile - G - 100 Year Storm Event Time: 08:03:00



Profile - D - 100 Year Storm Event Time: 08:03:00

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Elevation (ft)
1,820
1,818
1,816
1,814
1,812
1,810
1,808
1,806
1,804
1,802
1,800
1,798
1,796
1,794
1,792
1,790
1,788
0
100
200
300
400
500
600
700
800
900
Station (ft)

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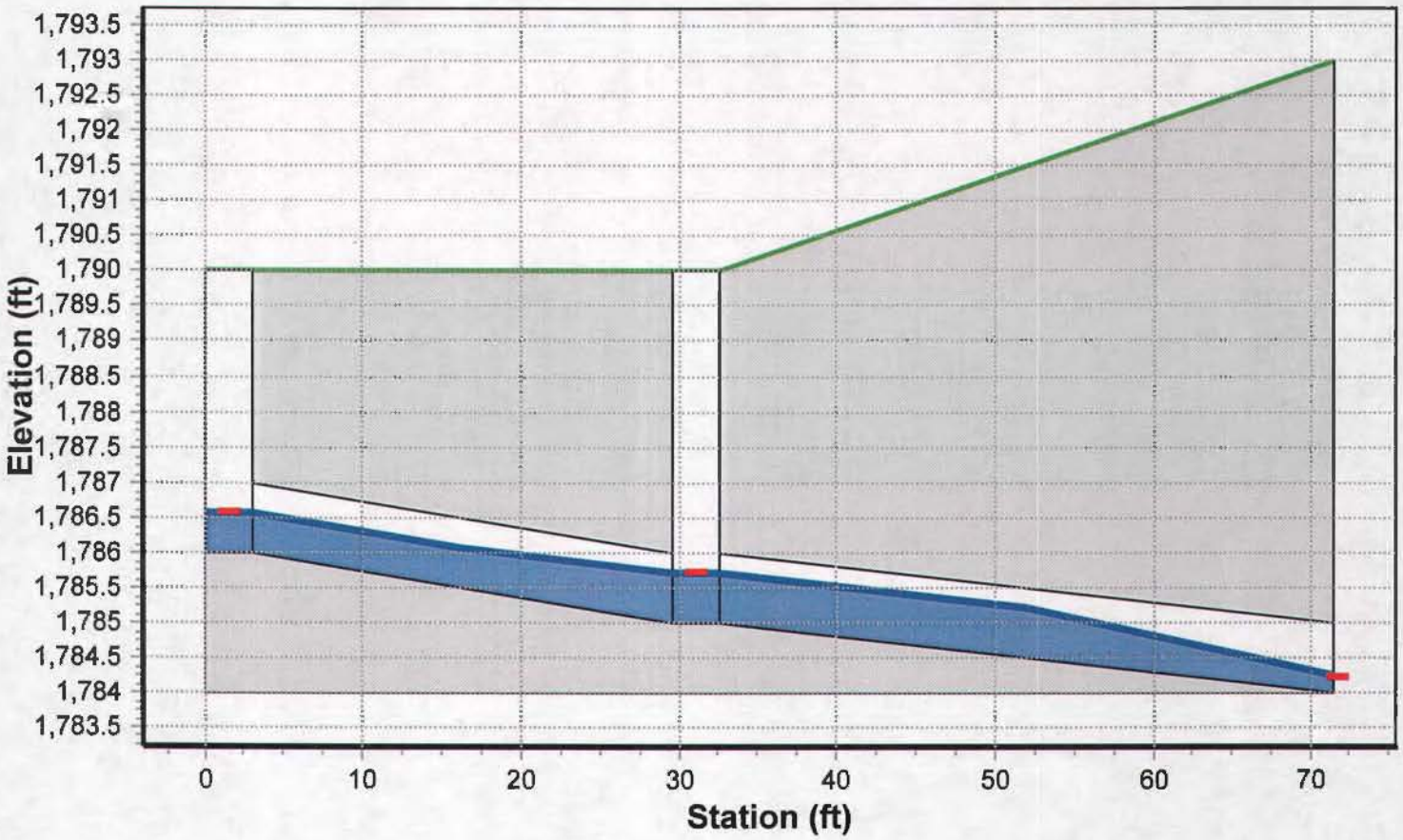

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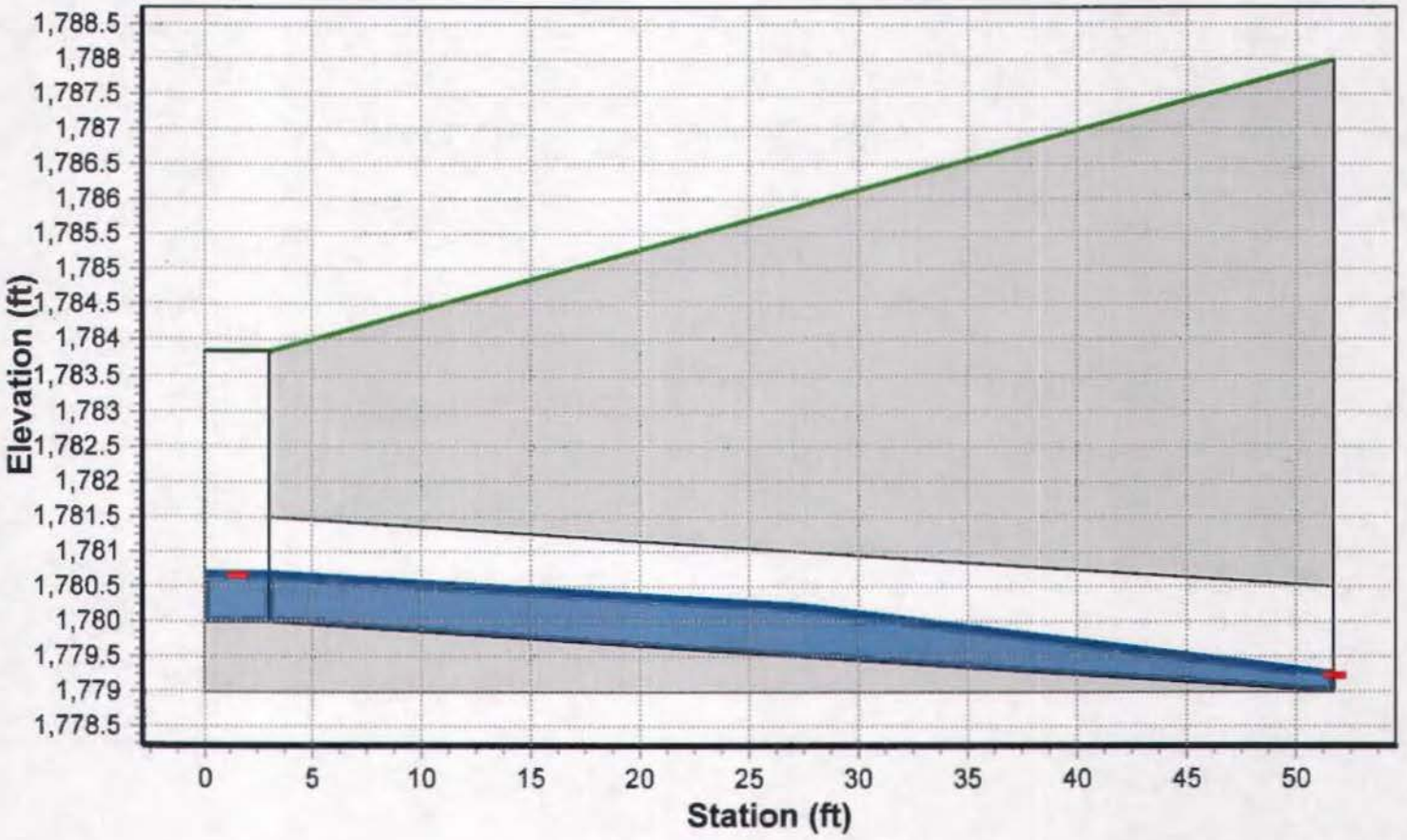

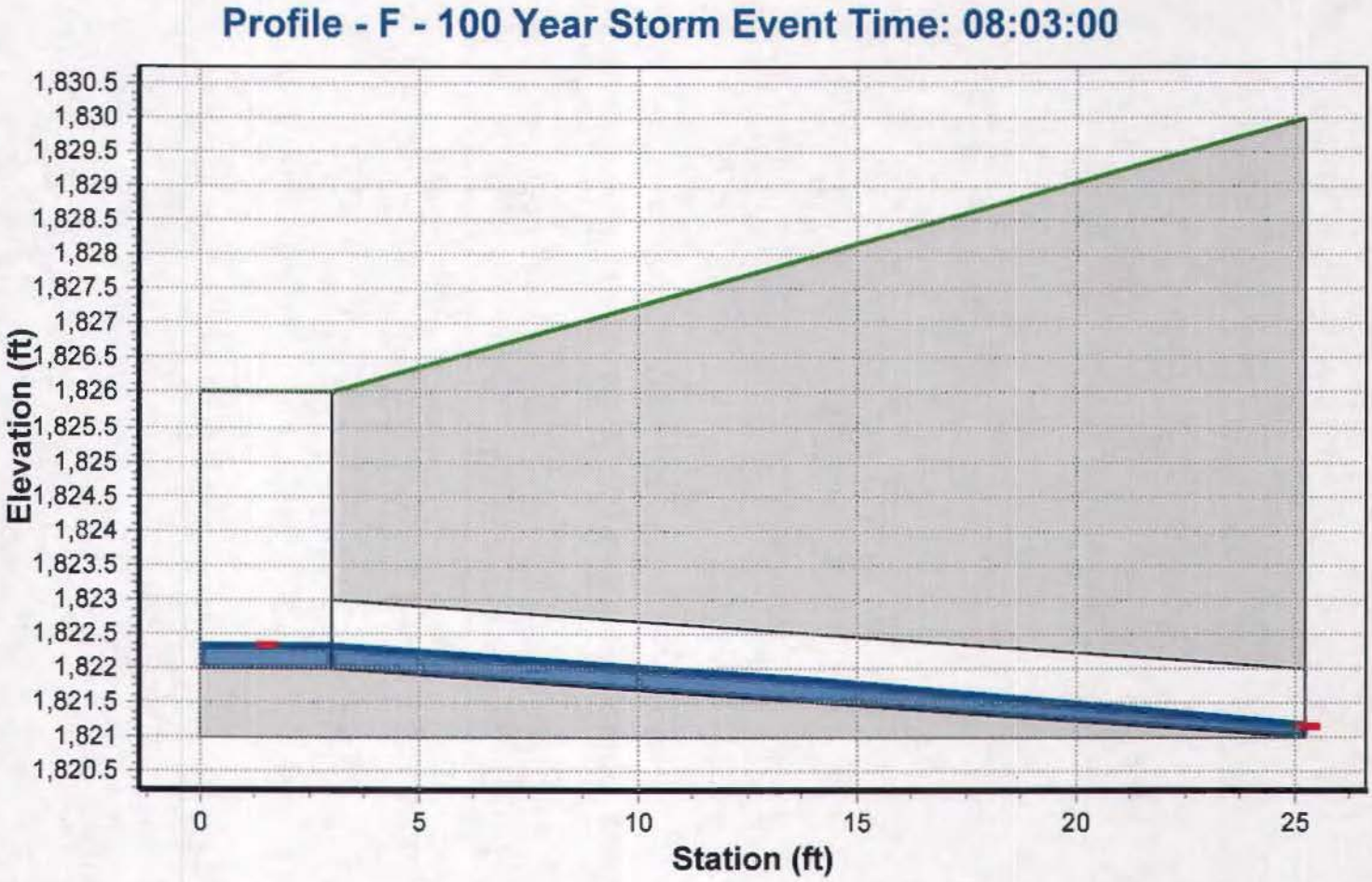
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1,823
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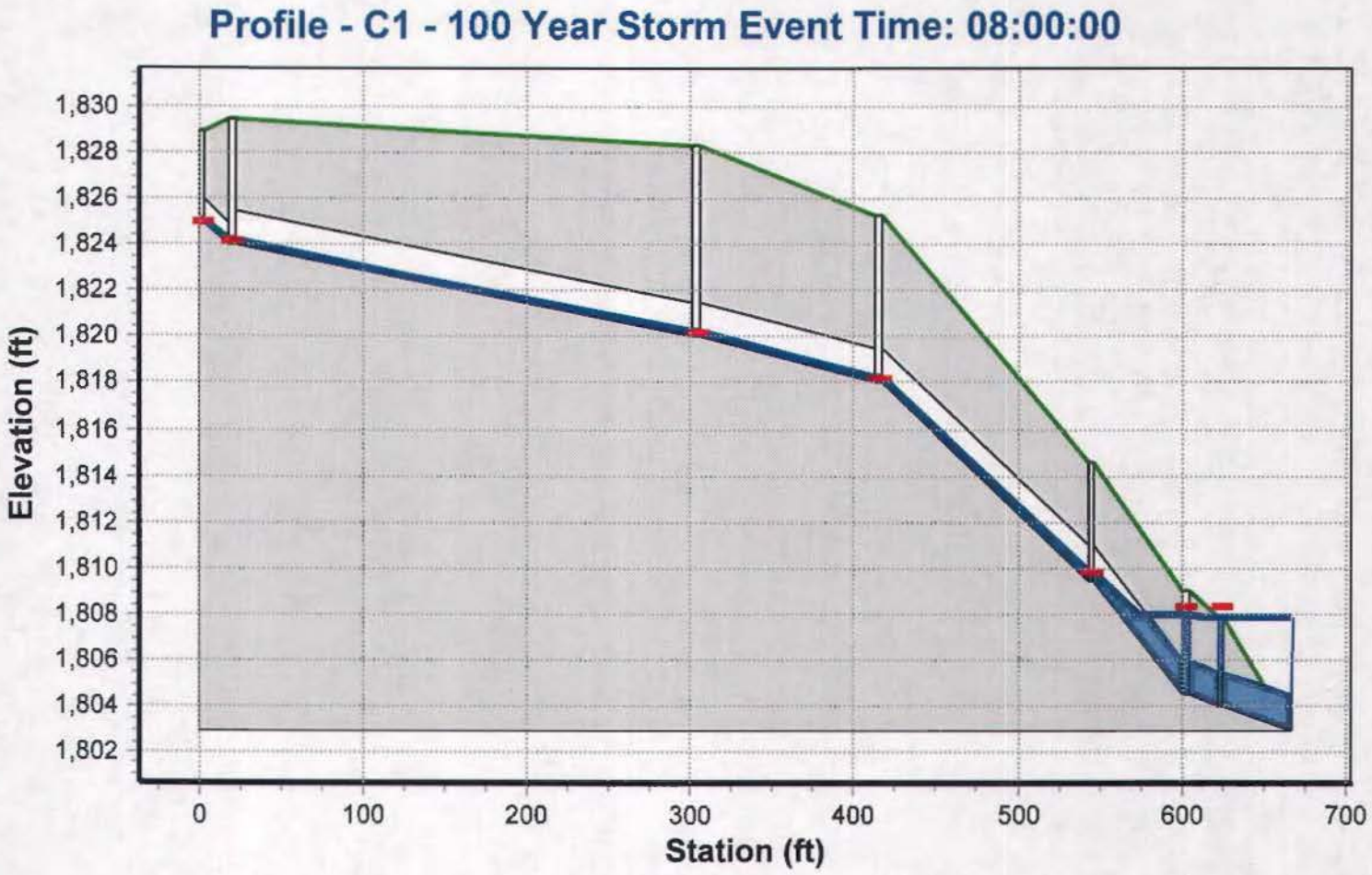
0
5
10
15
20
25
Station (ft)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Elevation (ft)
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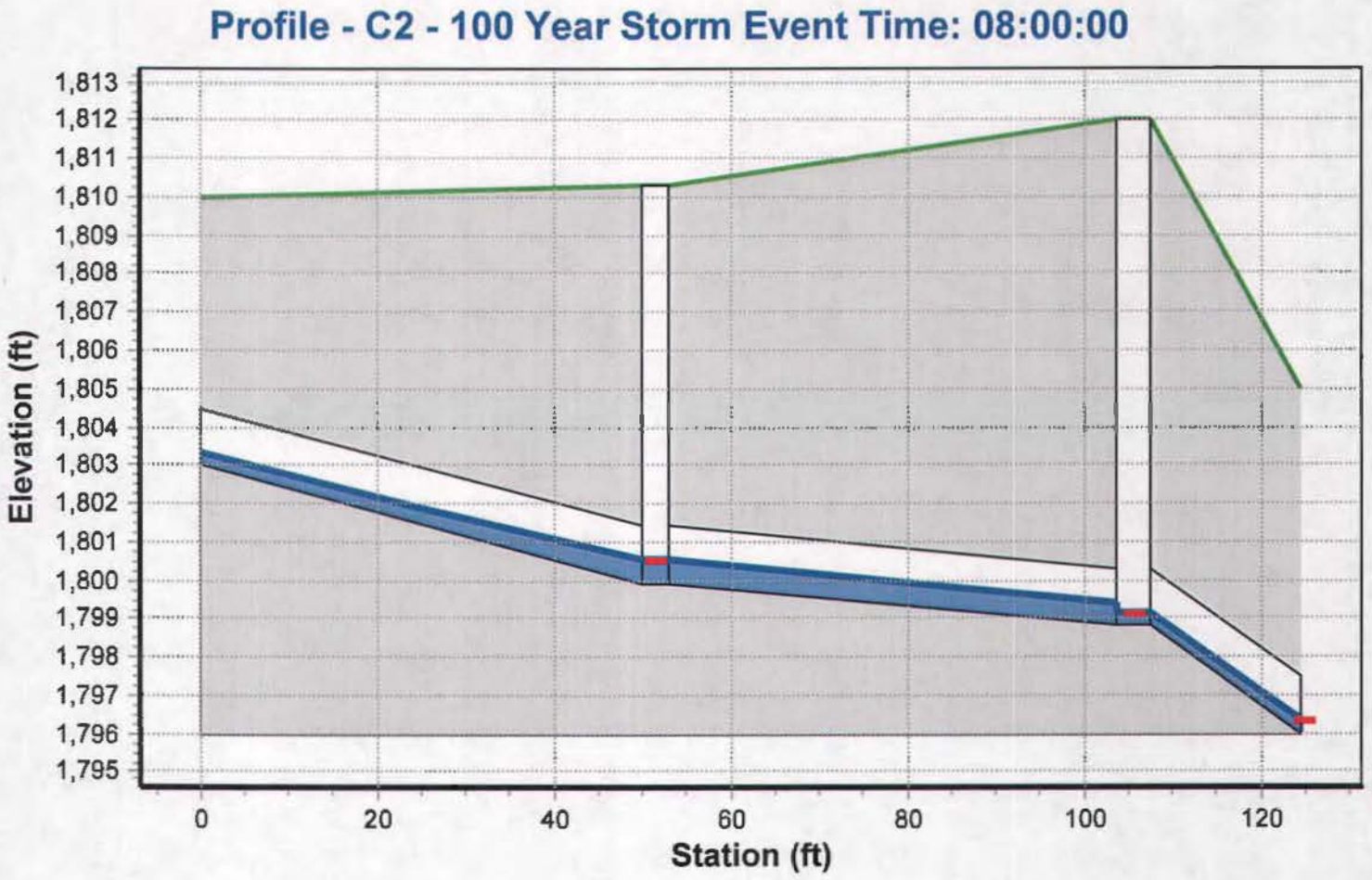
1,826
1,824
1,822
1,820
1,818
1,816
1,814
1,812
1,810
1,808
1,806
1,804
1,802
0
100
200
300
400
500
600
700
Station (ft)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Elevation (ft)
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1,811
1,810
1,809
1,808
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1,806
1,805
1,804
1,803
1,802
1,801
1,800
1,799
1,798
1,797
1,796
1,795
0
20
40
60
80
100
120
Station (ft)

APPENDIX B – Pre Development Hydraulic Analysis

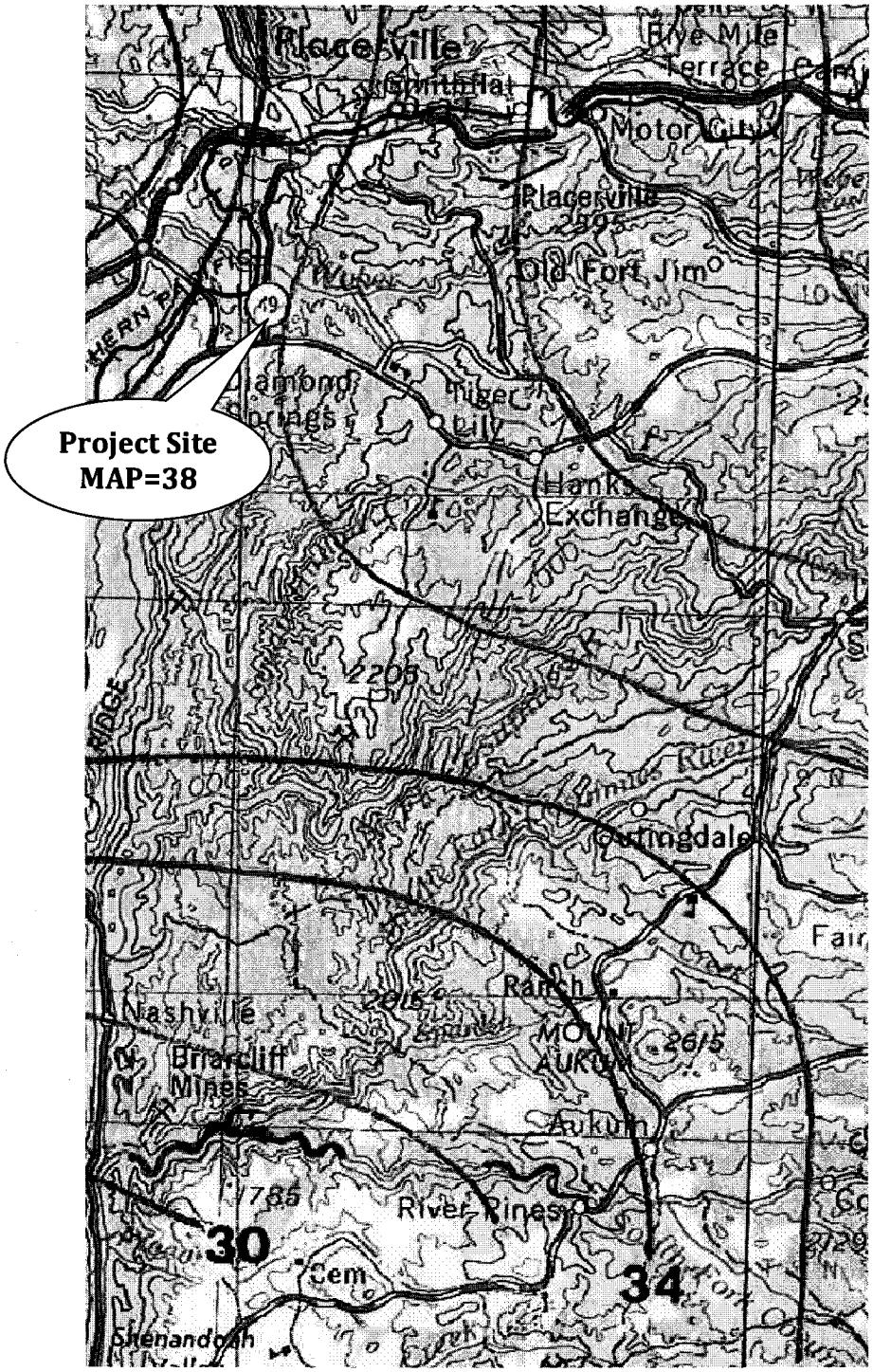
Watershed Properties Table

Watershed areas tributary to existing downstream pipes and channels. Data imported from Bentley CivilStorm v8. See delineated watershed areas in Pre-Development Drainage Shed Map, Appendix B.

Shed Name	SCS Curve Number	Area (Acres)	2-yr 24 hr depth	Tc (min)	100-Year Peak Flow (cfs)	10-Year Peak Flow (cfs)
CS101	74.0	8.39	3.34	14	8.05	4.25
CS102	94.0	5.05	3.34	14	7.94	5.42
CS103	74.0	4.26	3.34	20	3.90	2.05
CS104	74.0	3.25	3.34	8	3.20	1.70
CS105	74.0	22.65	3.34	28	19.37	10.13
CS106	74.0	2.35	3.34	12	2.28	1.21
CS107	74.0	3.84	3.34	11	3.76	1.99
CS108	74.0	0.98	3.34	8	0.97	0.51
CS109	79.0	20.80	3.34	20	22.53	12.83
CS110	98.0	0.07	3.34	5	0.11	0.08

APPENDIX C

Mean Annual Rainfall Map



APPENDIX D - El Dorado Design Rainfall Tables

APPENDIX D – El Dorado Design Rainfall

Table 2-2a Runoff Curve Numbers for Urban Areas

Table 2.4.3 Overland-Flow Roughness Coefficients

El Dorado Design Rainfall Depth

Rainfall Intensity – 10 year

Rainfall Intensity – 100 year

TABLE 2-2a

RUNOFF CURVE NUMBERS FOR URBAN AREAS[1]

Cover Description		Curve Numbers for Hydrologic Soil Group			
Cover Type and Hydrologic Condition	Average Percent Impervious Area[2]	A	B	C	D
Fully developed and hydrologic condition					
Open Space (lawn, parks, golf courses, cemeteries, etc.)[3]					
Poor condition (grass cover <50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover >75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including (right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in Table 2-2c					

[1]Average runoff condition, and $I_a = 0.2S$

[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic conditions. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas

Table 2.4.3

OVERLAND-FLOW ROUGHNESS COEFFICIENTS

(Source: SCS, 1986)

Surface Description (1)	Overland Flow n (2)
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue Cover <20%	0.06
Residue Cover >20%	0.17
Grass:	
Short Grass Prairie	0.15
Dense Grasses	0.24
Bermuda	0.41
Range (natural)	0.13
Woods:	
Light Underbrush	0.40
Dense Underbrush	0.80

EL DORADO DESIGN RAINFALL

Rainfall Depth in Inches for Return Period = 2.33 years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hrs	3 Hrs	6 Hrs	12 Hrs	24 Hrs
20	0.113	0.162	0.200	0.286	0.410	0.587	0.723	1.035	1.481	2.120
22	0.120	0.172	0.212	0.304	0.435	0.623	0.768	1.099	1.572	2.249
24	0.128	0.183	0.225	0.322	0.461	0.660	0.814	1.165	1.667	2.385
26	0.135	0.193	0.238	0.341	0.488	0.698	0.860	1.231	1.762	2.251
28	0.142	0.203	0.251	0.359	0.514	0.735	0.907	1.298	1.857	2.657
30	0.149	0.214	0.264	0.377	0.540	0.773	0.953	1.364	1.952	2.793
32	0.157	0.224	0.277	0.396	0.566	0.810	1.000	1.430	2.047	2.929
34	0.164	0.235	0.289	0.414	0.593	0.848	1.046	1.497	2.142	3.065
36	0.171	0.245	0.302	0.433	0.619	0.886	1.092	1.563	2.237	3.200
38	0.179	0.256	0.315	0.451	0.645	0.923	1.139	1.629	2.332	3.336
40	0.186	0.266	0.328	0.469	0.671	0.961	1.185	1.696	2.246	3.472
42	0.193	0.276	0.341	0.488	0.698	0.998	1.231	1.762	2.521	3.608
44	0.200	0.287	0.354	0.506	0.724	1.036	1.278	1.282	2.616	3.744
46	0.208	0.297	0.366	0.524	0.750	1.074	1.324	1.895	2.77	3.880
48	0.512	0.308	0.379	0.543	0.777	1.111	1.370	1.961	2.806	4.016
50	0.222	0.318	0.392	0.561	0.803	1.149	1.417	2.027	2.91	4.152
52	0.229	0.328	0.405	0.579	0.829	1.186	1.463	2.094	2.996	4.287
54	0.237	0.339	0.418	0.598	0.855	1.224	1.510	2.160	3.091	4.423
56	0.244	0.349	0.431	0.616	0.882	1.262	1.556	2.226	3.186	4.559
58	0.251	0.360	0.443	0.643	0.908	1.299	1.602	2.293	3.281	4.695
60	0.259	0.370	0.456	0.653	0.934	1.337	1.649	2.359	3.376	4.831
62	0.266	0.380	0.469	0.671	0.960	1.374	1.695	2.425	3.471	4.967
64	0.273	0.391	0.482	0.690	0.987	1.412	1.741	2.492	3.566	5.103
66	0.280	0.401	0.495	0.708	1.013	1.450	1.788	2.558	3.661	5.238
68	0.288	0.412	0.508	0.726	1.039	1.487	1.834	2.625	.3.756	5.374
70	0.295	0.422	0.520	0.745	1.066	1.525	1.880	2.691	3.851	5.510
72	0.302	0.432	0.533	0.762	1.092	1.562	1.927	2.757	3.946	5.646
74	0.309	0.443	0.546	0.781	1.118	1.600	1.973	2.824	4.040	5.782
76	0.317	0.453	0.559	0.800	1.144	1.638	2.020	2.890	4.135	5.918
78	0.324	0.464	0.572	0.818	1.171	1.675	2.066	2.956	4.230	6.054
80	.0331	0.474	0.585	0.836	1.197	1.713	2.112	3.023	4.325	6.189
82	0.339	0.484	0.597	0.855	1.223	1.750	2.159	3.089	4.420	6.325
84	0.346	0.495	0.610	0.873	1.250	1.788	2.205	3.155	4.515	6.461
86	0.353	0.505	0.623	0.892	1.276	1.826	2.251	3.222	4.610	6.597
88	0.360	0.516	0.636	0.910	1.302	1.863	2.298	3.288	4.705	6.733
90	0.368	0.526	0.649	0.928	1.328	1.901	2.344	3.354	4.800	6.869

Source: Design Rainfall Tables for El Dorado County, prepared by Jim Goodridge, July 29, 1989

Rainfall Intensity in Inches per Hour for Return Period = 10 years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hrs	3 Hrs	6 Hrs	12 Hrs	24 Hrs
20	2.004	1.434	1.179	0.843	0.603	0.432	0.355	0.254	0.182	0.130
22	2.127	1.522	1.251	0.895	0.640	0.458	0.377	0.270	0.193	0.138
24	2.255	1.613	1.326	0.949	0.679	0.486	0.399	0.286	0.204	0.146
26	2.383	1.705	1.402	1.003	0.718	0.514	0.422	0.302	0.216	0.155
28	2.512	1.797	1.478	1.057	0.756	0.541	0.422	0.318	0.228	0.163
30	2.640	1.889	1.553	1.111	0.795	0.569	0.468	0.335	0.239	0.171
32	2.769	1.981	1.629	1.165	0.834	0.597	0.490	0.351	0.251	0.180
34	2.897	2.073	1.704	1.219	0.872	0.624	0.513	0.367	0.263	0.188
36	3.026	2.165	1.780	1.273	0.911	0.652	0.536	0.383	0.274	0.196
38	3.154	2.257	1.855	1.327	0.950	0.680	0.559	0.400	0.286	0.205
40	3.282	2.349	1.931	1.381	0.988	0.707	0.581	0.416	0.298	0.213
42	3.411	2.440	2.006	1.436	1.027	0.735	0.604	0.432	0.309	0.221
44	3.539	2.532	2.082	1.490	1.066	0.763	0.627	0.449	0.321	0.230
46	3.668	2.624	2.157	1.544	1.104	0.790	0.650	0.465	0.333	0.238
48	3.796	2.716	2.233	1.598	1.143	0.818	0.672	0.481	0.344	0.246
50	3.925	2.808	2.309	1.652	1.182	0.846	0.695	0.497	0.356	0.255
52	4.053	2.900	2.384	1.706	1.221	0.873	0.718	0.514	0.368	0.263
54	4.181	2.922	2.460	1.760	1.259	0.901	0.741	0.530	0.379	0.271
56	4.310	3.084	2.535	1.814	1.298	0.929	0.763	0.546	0.391	0.280
58	4.438	3.176	2.611	1.868	1.337	0.956	0.786	0.563	0.402	0.288
60	4.567	3.267	2.686	1.922	1.375	0.984	0.809	0.579	0.414	0.296
62	4.695	3.359	2.762	1.976	1.414	1.012	0.832	0.595	0.426	0.305
64	4.824	3.451	2.837	2.030	1.453	1.039	0.854	0.611	0.437	0.313
66	4.952	3.543	2.913	2.084	1.491	1.067	0.877	0.628	0.449	0.321
68	5.081	3.635	2.989	2.138	1.530	1.095	0.900	0.644	0.461	0.330
70	5.209	3.727	3.064	2.192	1.569	1.122	0.923	0.660	0.472	0.338
72	5.337	3.819	3.140	2.246	1.607	1.150	0.945	0.676	0.484	0.346
74	5.466	3.911	3.215	2.300	1.646	1.178	0.968	0.693	0.496	0.355
76	5.594	4.003	3.291	2.354	1.685	1.205	0.991	0.709	0.507	0.363
78	5.723	4.095	3.366	2.409	1.723	1.233	1.014	0.725	0.519	0.371
80	5.851	4.186	3.442	2.463	1.762	1.261	1.036	0.742	0.531	0.380
82	5.980	4.278	3.517	2.517	1.801	1.288	1.059	0.758	0.542	0.388
84	6.108	4.370	3.593	2.571	1.839	1.316	1.082	0.774	0.554	0.396
86	6.236	4.462	3.668	2.625	1.878	1.344	1.105	0.790	0.566	0.405
88	6.365	4.554	3.744	2.679	1.917	1.371	1.127	0.807	0.577	0.413
90	6.493	4.646	3.820	2.733	1.955	1.399	1.150	0.823	0.589	0.421

7/24/89 Note older versions are superseded
12:08 PM Prepared by Jim Goodridge 916.345.3106

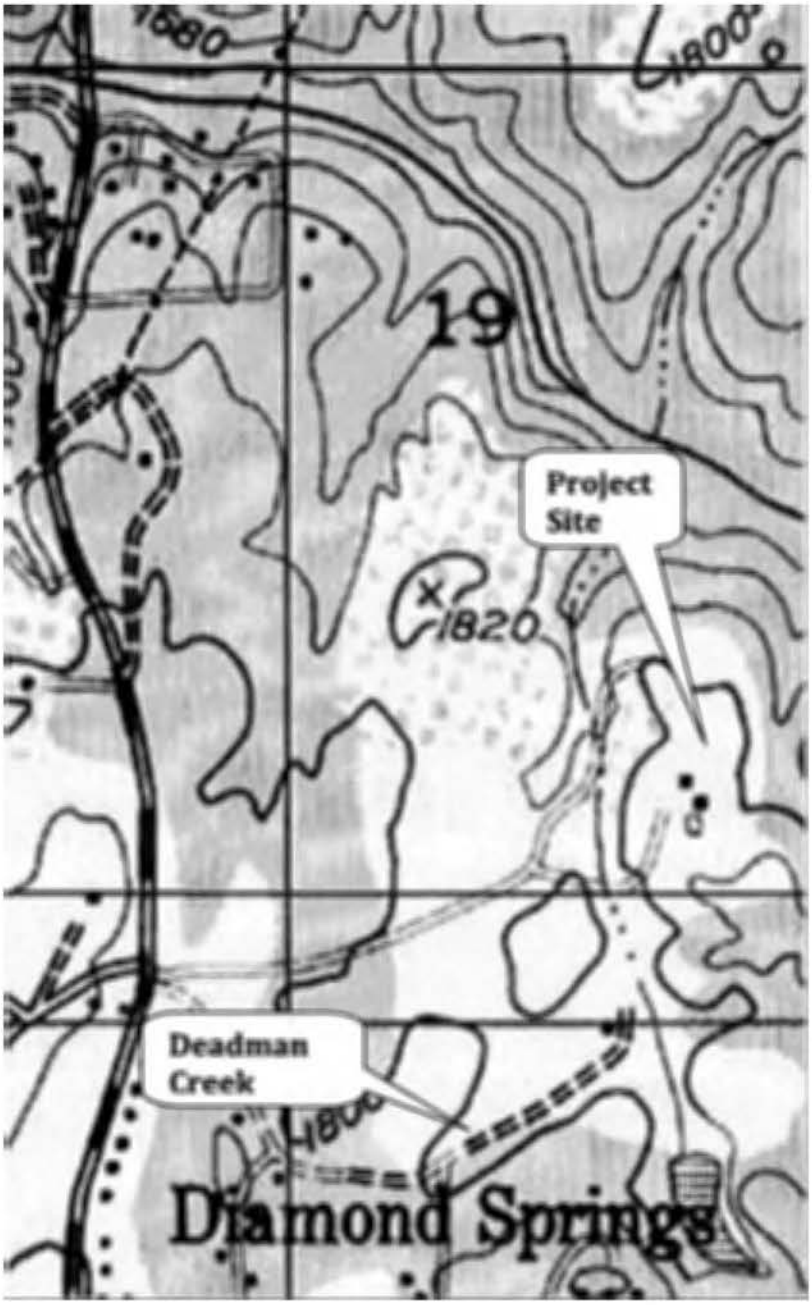
Rainfall Intensity in Inches per Hour for Return Period = 100 years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hrs	3 Hrs	6 Hrs	12 Hrs	24 Hrs
20	2.840	2.032	1.671	1.195	0.855	0.612	0.503	0.360	0.258	0.184
22	3.014	2.157	1.773	1.269	0.908	0.649	0.534	0.382	0.273	0.196
24	3.196	2.287	1.880	1.345	0.963	0.689	0.566	0.405	0.290	0.207
26	3.378	2.417	1.987	1.422	1.017	0.728	0.598	0.428	0.306	0.219
28	3.561	2.548	2.094	1.499	1.072	0.767	0.631	0.451	0.323	0.231
30	3.743	2.678	2.202	1.575	1.127	0.806	0.663	0.474	0.339	0.243
32	3.925	2.808	2.309	1.652	1.182	0.846	0.695	0.497	0.356	0.255
34	4.107	2.938	2.416	1.728	1.237	0.885	0.727	0.520.	0.372	0.266
36	4.289	3.069	2.523	1.805	1.291	0.924	0.760	0.544	0.389	0.278
38	4.471	3.199	2.630	1.882	1.346	0.963	0.792	0.567	0.405	0.290
40	4.653	3.329	2.737	1.958	1.401	1.002	0.824	0.590	0.422	0.302
42	4.835	3.459	2.844	2.035	1.456	1.042	0.856	0.613	0.438	0.314
44	5.017	3.590	2.951	2.112	1.511	1.081	0.889	0.636	0.455	0.326
46	5.199	3.720	3.058	2.188	1.566	1.120	0.921	0.659	0.471	0.337
48	5.381	3.850	3.164	2.265	1.620	1.159	0.953	0.682	0.488	0.349
50	5.563	3.980	3.272	2.341	1.675	1.199	0.985	0.705	0.504	0.361
52	5.745	4.111	3.380	2.418	1.730	1.238	1.018	0.728	0.521	0.373
51	5.927	4.241	3.487	2.495	1.785	1.277	1.050	0.751	0.537	0.385
56	6.109	4.371	3.594	2.571	1.840	1.316	1.082	0.774	0.554	0.396
58	6.291	4.501	3.701	2.648	1.895	1.356	1.114	0.797	0.571	0.408
60	6.473	4.632	3.808	2.725	1.949	1.395	1.147	0.820	0.587	0.420
62	6.656	4.762	3.915	2.801	2.004	1.434	1.179	0.844	0.604	0.432
64	6.838	4.892	4.022	2.878	2.059	1.473	1.211	0.867	0.620	0.444
66	7.020	5.022	4.129	2.954	2.114	1.512	1.243	0.890	0.637	0.455
68	7.202	5.153	4.236	3.031	2.169	1.552	1.276	0.913	0.653	0.467
70	7.384	5.283	4.343	3.108	2.223	1.591	1.308	0.936	0.670	0.479
72	7.566	5.413	4.450	3.184	2.278	1.630	1.340	0.959	0.686	0.491
74	7.748	5.544	4.558	3.261	2.333	1.669	1.372	0.982	0.703	0.503
76	7.930	5.674	4.665	3.338	2.388	1.709	1.405	1.005	0.719	0.514
78	8.112	5.804	4.772	3.414	2.443	1.748	1.437	1.028	0.736	0.526
80	8.294	5.934	4.879	3.491	2.498	1.787	1.469	1.051	0.752	0.538
82	8.476	6.065	4.986	3.567	2.552	1.826	1.501	1.074	0.769	0.550
84	8.658	6.195	5.093	3.644	2.607	1.865	1.534	1.097	0.785	0.562
86	8.840	6.325	5.200	3.721	2.662	1.905	1.566	1.120	0.802	0.574
88	9.022	6.455	5.307	3.797	2.717	1.944	1.598	1.143	0.818	0.585
90	9.204	6.586	5.414	3.874	2.772	1.983	1.630	1.167	0.835	0.597

7/27/89 Note older versions are superseded
12:08 PM Prepared by Jim Goodridge 916.345.3106

APPENDIX E

Quad Map


1880
1800
19
Project Site
1820
Deadman Creek
1800
Diamond Springs

Soil Survey Map

Map Unit Legend

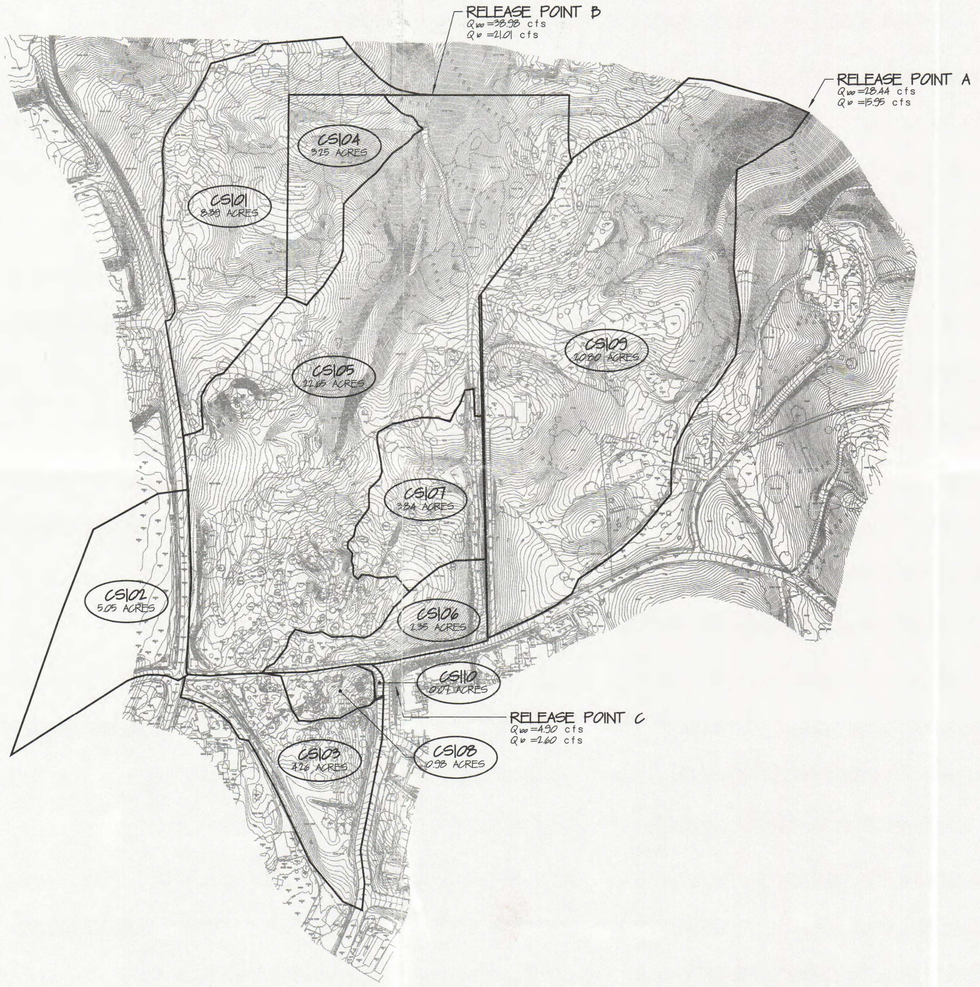
El Dorado Area, California (CA624)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DfC	Diamond Springs very fine sandy loam, 9 to 15 percent slopes	22.0	45.9%
DgE	Diamond Springs very rocky, very fine sandy 3 to 50 percent slopes	5.1	10.6%
PrD	Placer Diggins	20.9	43.5%
Totals for Area of Interest (AOI)		48.1	100.0%

PRE DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



NORTH

0 200 400 600

SCALE IN FEET

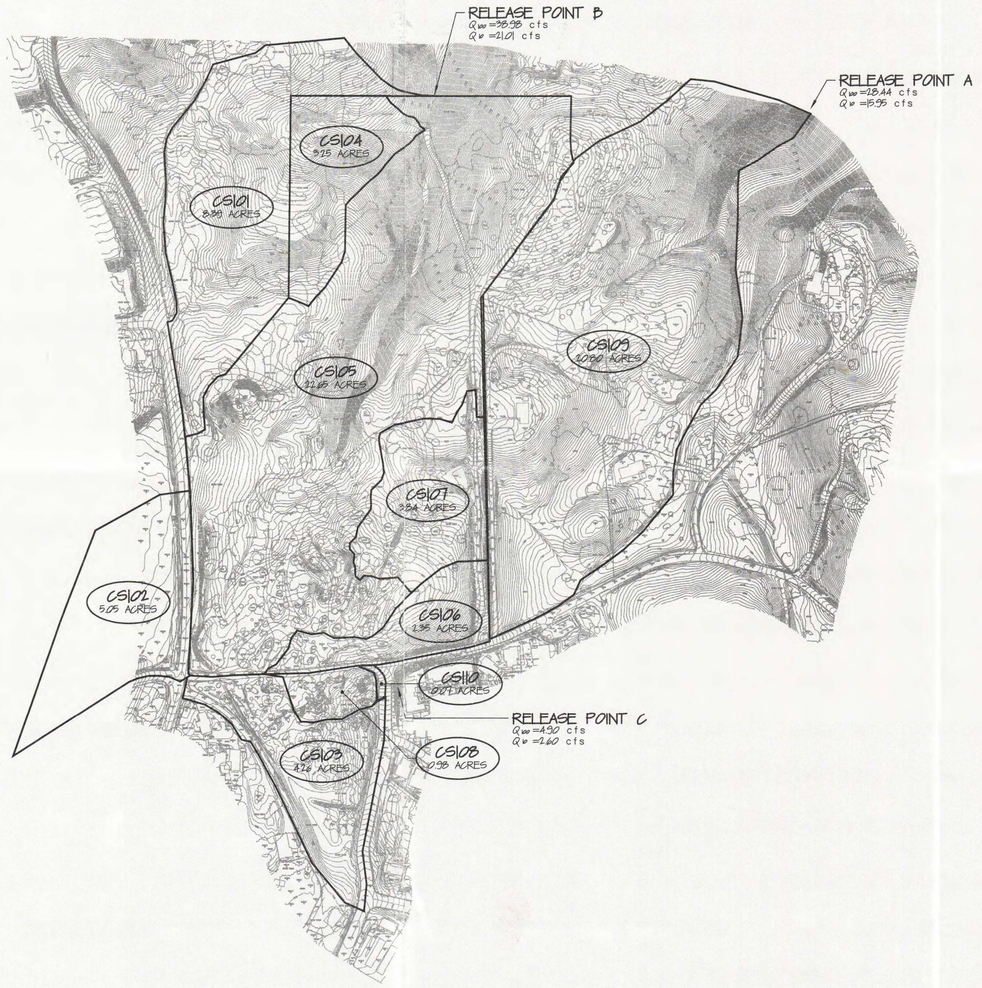
PRE DEVELOPMENT DRAINAGE SHED MAP

APRIL 24, 2009

PRE DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



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SCALE IN FEET

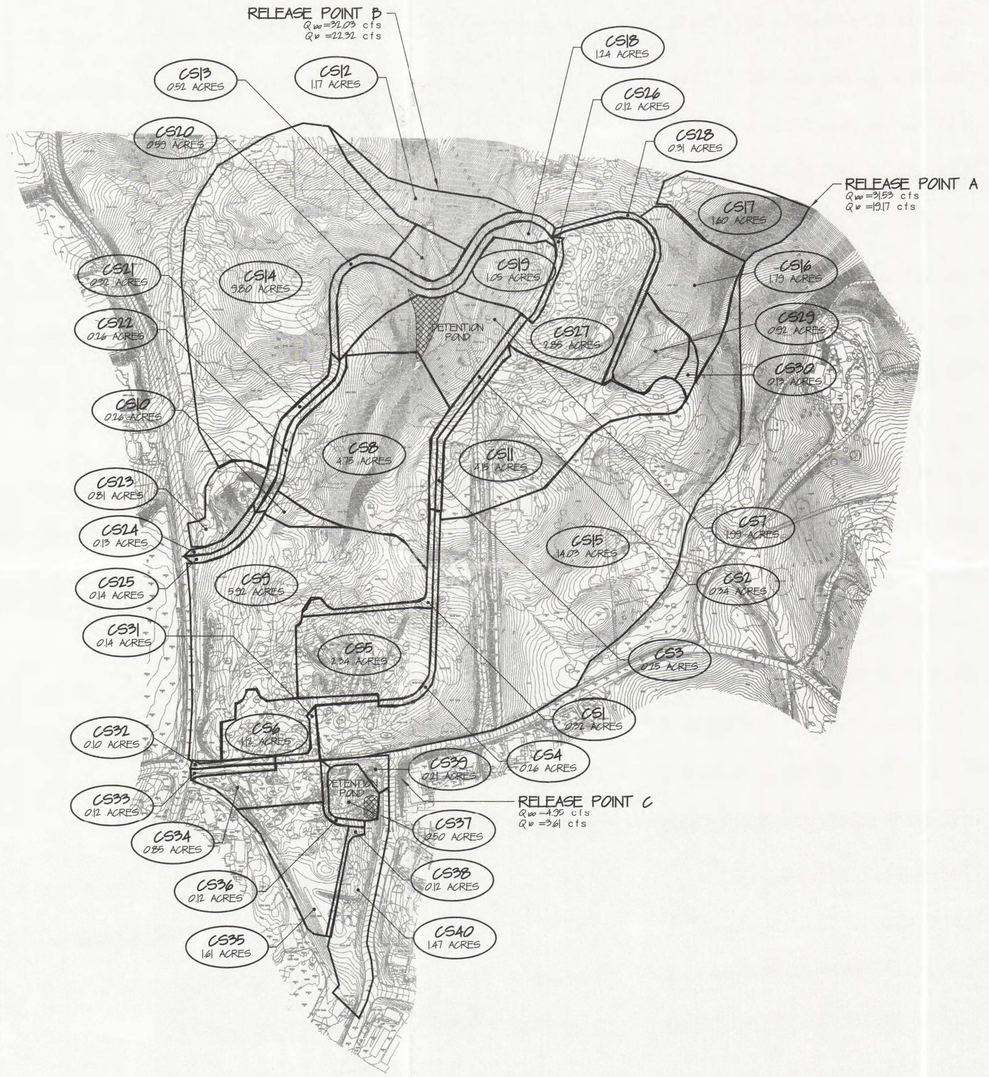
PRE DEVELOPMENT DRAINAGE SHED MAP

APRIL 24, 2009

POST DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



NORTH

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SCALE IN FEET

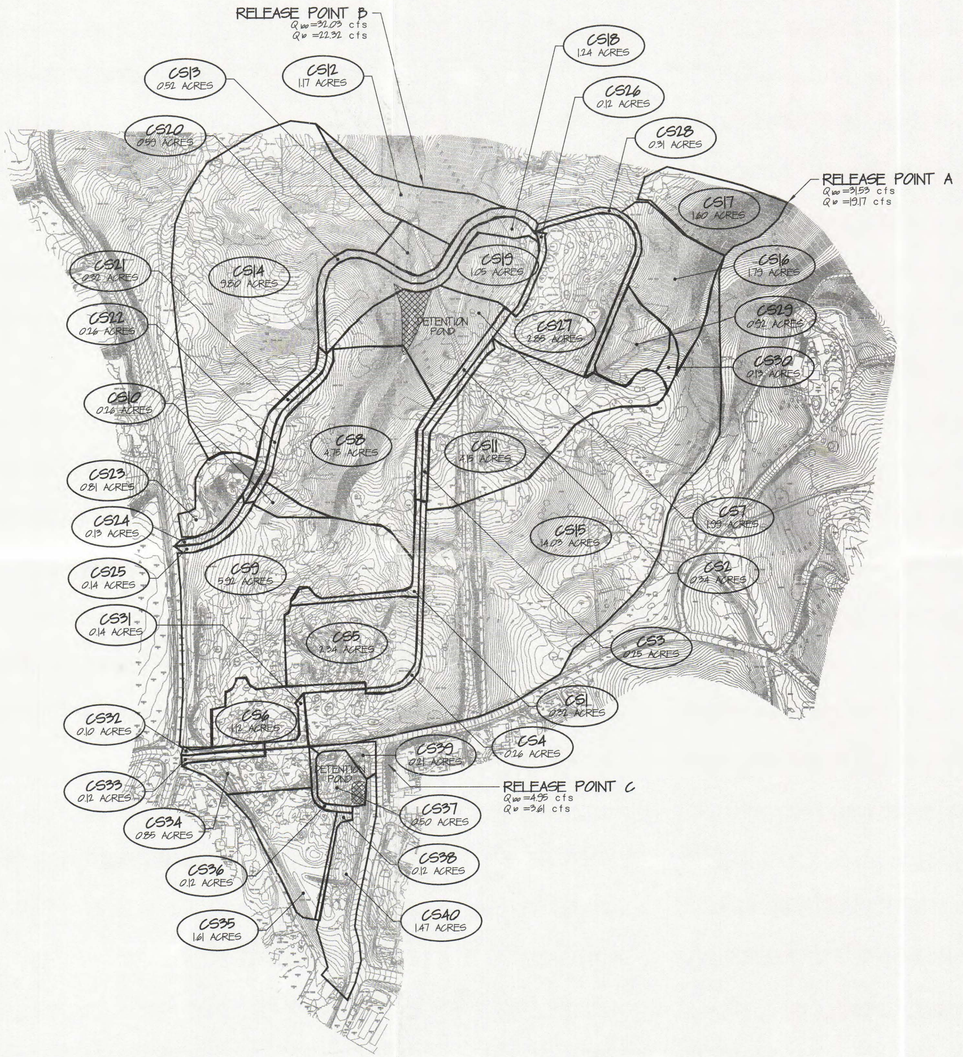
POST DEVELOPMENT DRAINAGE SHED MAP

APRIL 24, 2009

POST DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



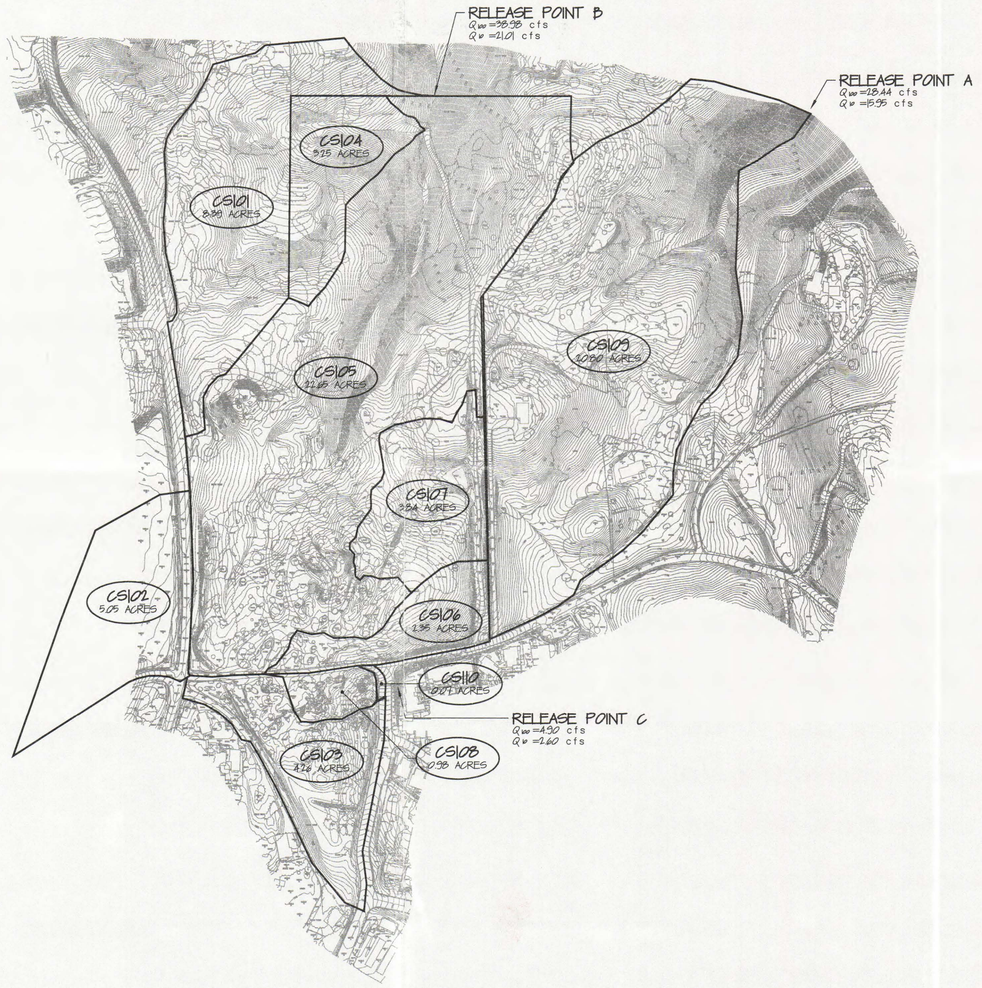
POST DEVELOPMENT DRAINAGE SHED MAP

APRIL 24, 2009

PRE DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



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SCALE IN FEET

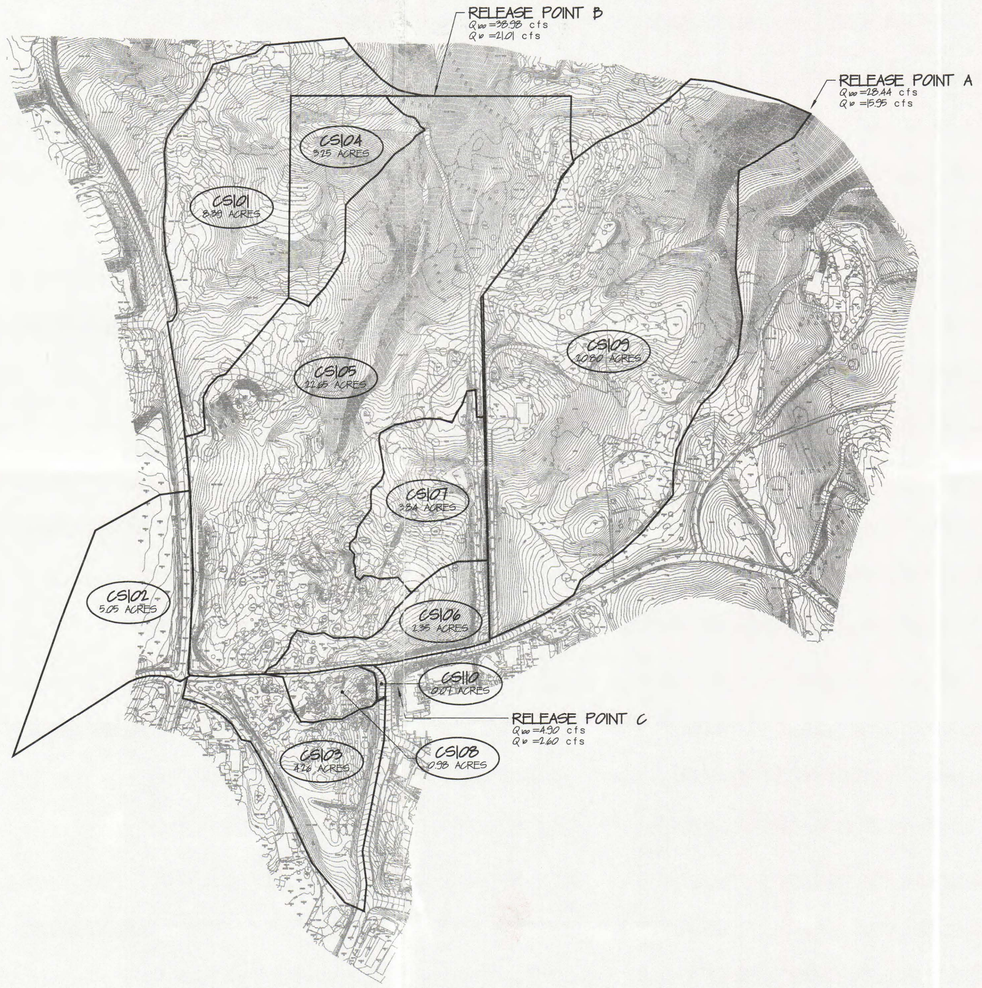
PRE DEVELOPMENT DRAINAGE SHED MAP

APRIL 24, 2009

PRE DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



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SCALE IN FEET

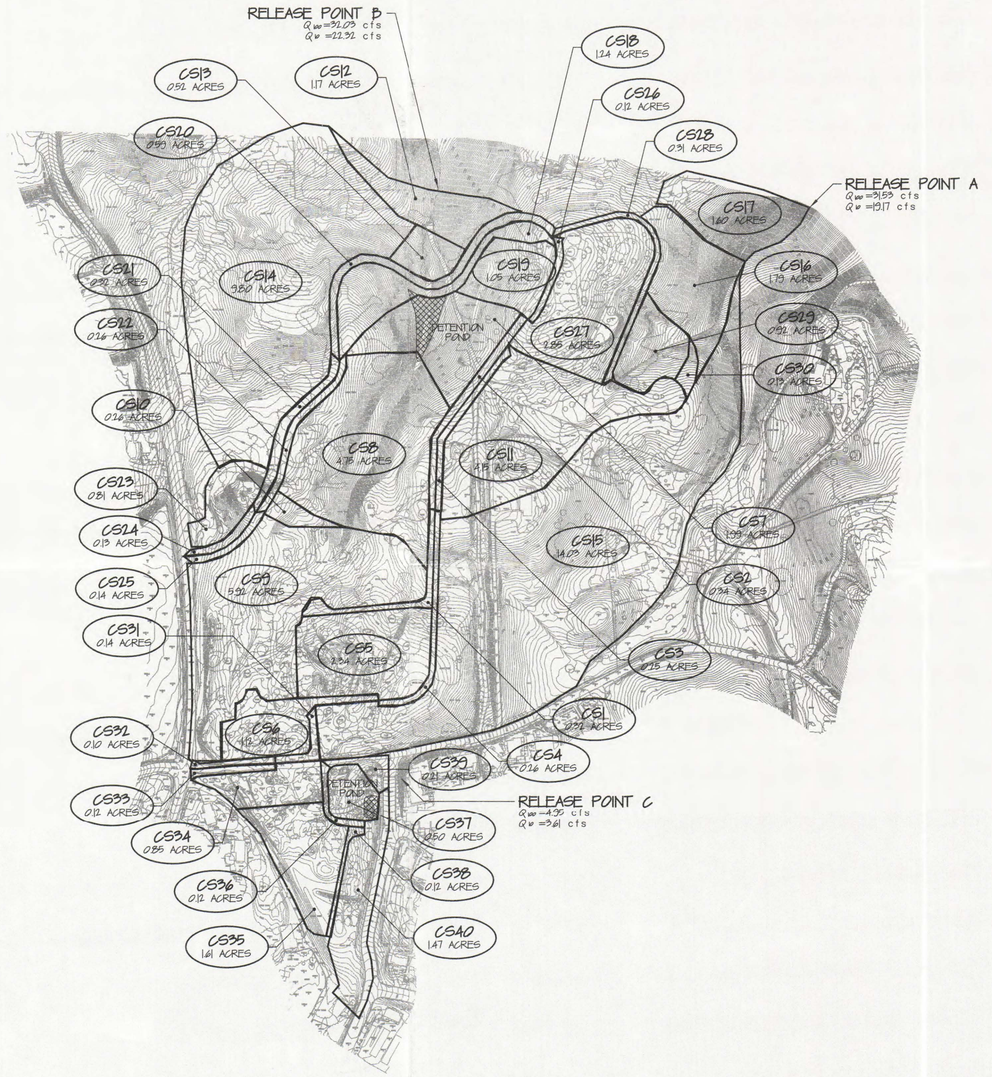
PRE DEVELOPMENT DRAINAGE SHED MAP

APRIL 24, 2009

POST DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



NORTH

0 200 400 600

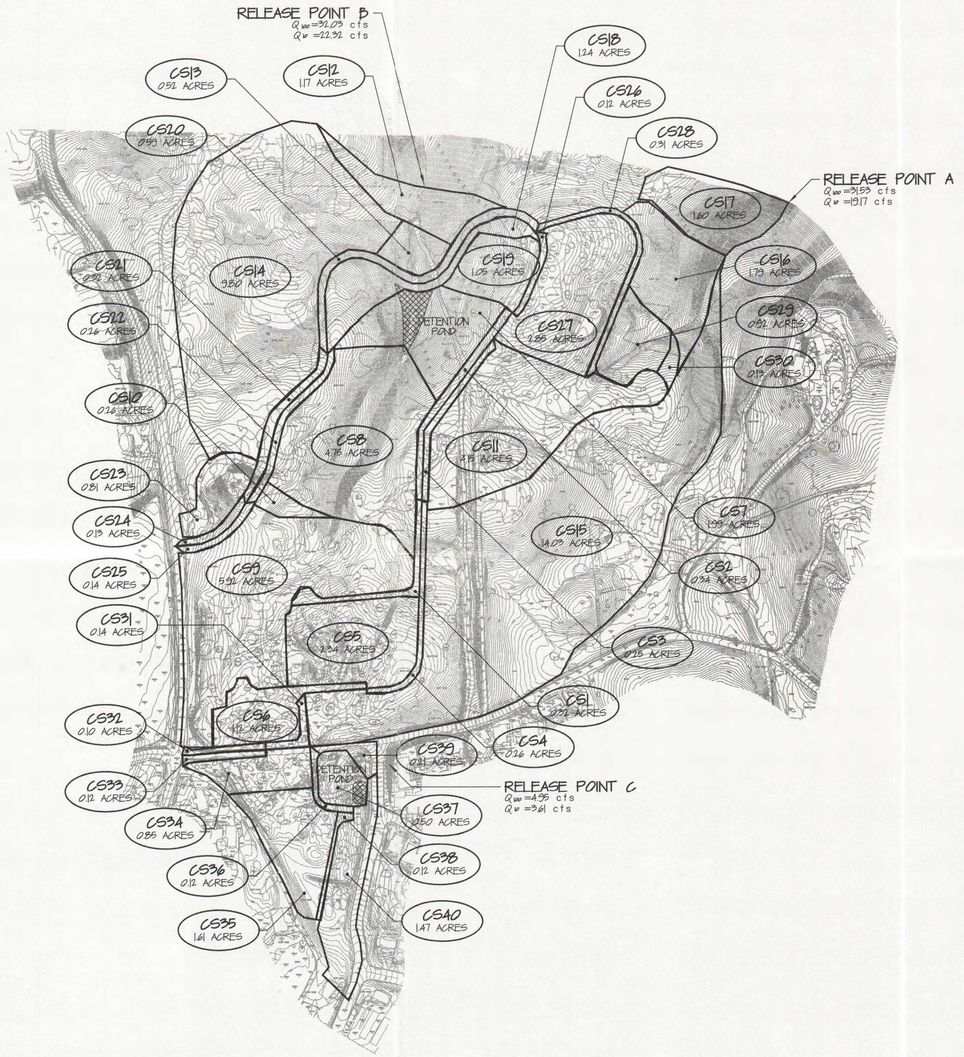
SCALE IN FEET

POST DEVELOPMENT DRAINAGE SHED MAP
APRIL 24, 2009

POST DEVELOPMENT DRAINAGE SHED MAP

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



NORTH

0 200 400 600

SCALE IN FEET

POST DEVELOPMENT DRAINAGE SHED MAP

APRIL 24, 2009

j.c. brennan & associates
consultants in acoustics
P.O. Box 6748 • Auburn, California 95604
1287 High Street • Auburn, California 95603
p.530.823.0960 • f.530.823.0961 • www.jcbrennanassoc.com

June 21, 2016

Mr. Jim Davies
854 Diablo Road
Danville, CA 94526

Subject: Review of the Piedmont Oak Estates Revised Site Plan - Per 2012 Noise Analysis

Dear Mr. Davies:

j.c. brennan & associates, Inc. conducted a Revised Environmental Noise Analysis for the Piedmont Oak Estates Project on March 6, 2013 (*Revised Environmental Noise Assessment , Piedmont Oaks, El Dorado County California, Prepared for: Mr. Jim Davies, Prepared by: j.c. brennan & associates, Inc., March 6, 2013*). The conclusions and recommendations for the March 2013 analysis are as follows:

A summary of the conclusions are as follows:

1) *The project will not be exposed to roadway traffic noise levels which exceeds the exterior and interior noise level criteria of 60 dBA Ldn and 45 dBA Ldn, respectively;*

2) *The project will not be exposed to noise levels from nearby light industrial and commercial uses which will exceed the noise level standards;*

3) *The project will not result in a significant increase in roadway traffic noise levels;*

4) *The proposed commercial uses on the project site may result in noise levels which exceed the El Dorado County stationary noise level criteria.*

The following mitigation measures are recommended:

1) *When site plans and specific uses are proposed on Lots A and B, the applicants shall provide a noise analysis to ensure compliance with the El Dorado County noise level criteria. The noise analyses shall evaluate any potential loading dock operations, truck circulation, parking lot activity and HVAC noise levels. If additional noise sources are identified, they must also be reviewed.*

ATTACHMENT 13

On June 16, 2016, you forwarded a revised site plan for the Piedmont Oak Estates dated March 2016 (See attached site plan). The revised site plan reflects the following, as compared to the site plan analyzed in March 2013:

- At the recommendation of the Planning Commissioners, you have moved the cluster lot configuration away from the northern boundary;
- Removal of 7 residential cluster lots;
- Replaced with 1 residential lot of 1/4 acre;
- Removed 1 commercial lot and replaced with 6 residential cluster lots;
- Addition of 3 residential cluster lots to the main group of cluster lots;
- Total of 107 residential lots and 1 commercial lot of 10,000 square feet;
- A net reduction of 10,000 square feet of commercial.

Based upon the 2013 noise analysis, the revised site plan does not reflect any additional noise impacts. Consistent with the previous report, when site plans and specific uses are proposed any commercial uses will require additional analyses of noise impacts to ensure compliance with the El Dorado County noise level criteria. The noise analyses shall evaluate any potential loading dock operations, truck circulation, parking lot activity and HVAC noise levels. If additional noise sources are identified, they must also be reviewed.

If you or the El Dorado County planning staff have questions, please contact me at 530-823-0960, or jbrennan@jcbrennanassoc.com.

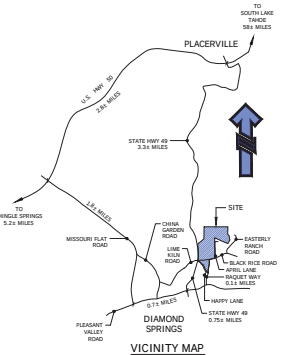
Respectfully submitted,
j.c. brennan & associates, Inc.

Jim Brennan
President
Member: Institute of Noise Control Engineering
File: 2012-164 Revised Site Plan Review

TENTATIVE MAP & DEVELOPMENT PLAN

PIEDMONT OAK ESTATES

COUNTY OF EL DORADO, STATE OF CALIFORNIA



VICINITY MAP

NOT TO SCALE

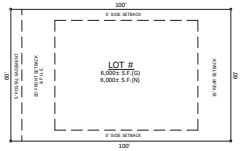
DEVIATIONS FROM R1 STANDARDS:

1. LOT SIZE LESS THAN 6,000 SF - SEE TABLE.
2. LOT WIDTH LESS THAN 60 FT. - SEE DETAIL.
3. REDUCED SETBACKS AS SHOWN - SEE DETAIL.
4. BUILDING COVERAGE IN EXCESS OF 35% - SEE TABLE.

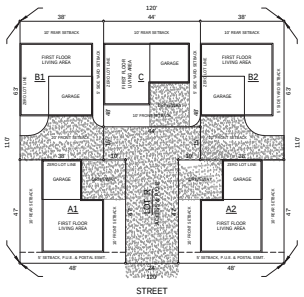
TYPICAL LOT DATA

LOT	LOT SIZE	STORIES	LIVING SPACE	BUILDING COVERAGE	IMPERVIOUS SURFACE
A1	2,256 SF	2	1,668 SF	998 SF/44%	1,356 SF/60%
A2	2,256 SF	2	1,668 SF	996 SF/44%	1,356 SF/60%
B1	2,394 SF	2	1,618 SF	1,089 SF/45%	1,730 SF/72%
B2	2,394 SF	2	1,618 SF	1,089 SF/45%	1,704 SF/71%
C	2,112 SF	2	1,500 SF	912 SF/81%	1,272 SF/60%
R	1,788 SF	-	-	-	1,788 SF/100%
TOTAL	13,200 SF	-	-	5,082 SF/39%	9,206 SF/70%

DETAIL
TYPICAL CUSTOM LOTS
SCALE: 1"=20'



DETAIL
TYPICAL CLUSTERED RESIDENCES
SCALE: 1"=20'
THE RESIDENTIAL STRUCTURE SHOWN IS CONCEPTUAL ONLY.



DESIGN WAIVER REQUEST:

DESIGN WAIVERS HAVE BEEN REQUESTED PURSUANT TO SECTION 16.08.020 OF THE MAJOR LAND DIVISION ORDINANCE TO ALLOW FOUR (4) FOOT WIDE SIDEWALK IN LIEU OF THE SIX (6) FOOT WIDE STANDARD.

REQUEST FOR ROAD WIDTH RELIEF WITH ON-STREET PARKING:

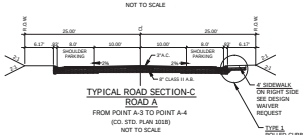
A REQUEST IS HEREBY MADE FOR RELIEF FROM APPROVING AGENCIES REGARDING REQUIRED ROAD WIDTH FOR ROADWAYS THAT INCLUDE ON-STREET PARKING AS FOLLOWS: ROAD SECTION C & D - 2 LANES OF ON-STREET PARKING ARE REQUESTED TO BE ALLOWED ON A 36- FOOT WIDE ROADWAY. ROAD SECTION E - 1 LANE OF ON-STREET PARKING IS REQUESTED TO BE ALLOWED ON A 28 FOOT WIDE ROADWAY.

NOTES:

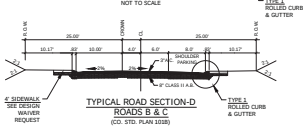
1. EASEMENTS WILL BE PROVIDED AS FOLLOWS:
   A. THE FRONT 20' OF ALL CUSTOM RESIDENTIAL LOTS AS PUBLIC UTILITIES EASEMENTS.
   B. THE 5' ADJACENT TO ALL STREET RIGHT-OF-WAYS AS POSTAL EASEMENTS.
   C. DRAINAGE EASEMENTS AS SHOWN AND/OR NEEDED.
   D. OTHER AS SHOWN OR NOTED.
2. THE SUBDIVIDER WILL MAKE ALL REQUIRED IMPROVEMENTS BASED ON PLANS AND SPECIFICATIONS APPROVED BY THE COUNTY OF EL DORADO DEPARTMENT OF TRANSPORTATION, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   A. CONSTRUCT ALL ROADS AS SHOWN IN CONFORMANCE WITH THE TYPICAL ROAD SECTIONS, WITH CUTS AND FILLS BEING NO STEEPER THAN 2:1, EXCEPT IN ROCK MATERIAL.
   B. DISTURBED AREAS WILL BE SEEDED IN CONFORMANCE WITH THE EL DORADO COUNTY RESOURCE CONSERVATION DISTRICT SPECIFICATIONS.
   C. DRAINAGE CHANNELS SUBJECT TO EROSION WILL BE RIPRAPPED OR ASPHALT LINED.
   D. EXTEND E.I.D. WATER AND SEWER SERVICE TO ALL RESIDENTIAL LOTS.

TYPICAL ROAD SECTION-A
ROAD A
FROM POINT A-1 TO POINT A-2
(CO. STD. PLAN 101A)
NOT TO SCALE

TYPICAL ROAD SECTION-B
ROAD A
FROM POINT A-2 TO POINT A-3
AND FROM POINT A-4 TO END
(CO. STD. PLAN 101B)
NOT TO SCALE



TYPICAL ROAD SECTION-C
ROAD A
FROM POINT A-3 TO POINT A-4
(CO. STD. PLAN 101B)
NOT TO SCALE



TYPICAL ROAD SECTION-D
ROADS B & C
(CO. STD. PLAN 101B)
NOT TO SCALE

OWNERS OF RECORD:
JIM DAVIES AND TERRI CHANG
CONTACT: JIM DAVIES
854 DIABLO ROAD
DANVILLE, CA 94526
TEL: 925-820-9444 FAX: 925-820-7917

NAME OF APPLICANT:
JIM DAVIES AND TERRI CHANG
CONTACT: JIM DAVIES
854 DIABLO ROAD
DANVILLE, CA 94526
TEL: 925-820-9444 FAX: 925-820-7917

MAP ORIGINALLY PREPARED BY:
BTCONSULTING, INC.
CONTACT: PETER THORNE
PO BOX 304
SHINGLE SPRINGS, CA 95682
TEL: 530-672-2316 FAX: 530-405-4722
E-MAIL: pthorne@gobtc.net

MAP REVISED MARCH 2016 BY:
LEBECK YOUNG ENGINEERING, INC.
CONTACT: BARBARA "BOBBIE" LEBECK
3430 ROBIN LANE #2
CAMERON PARK, CA 95682
TEL: 530-677-4080
E-MAIL: bobbie@lebeckyoung.com

NOTE: MARCH 2016 REVISIONS ADDRESS LOTTING ONLY, NO CHANGES TO UTILITIES OR GRADING & DRAINAGE.

SCALE:
1"=60'

CONTOUR INTERVAL:
FIVE FEET (5')

SOURCE OF TOPOGRAPHY:
AERIAL SURVEY

SECTION, TOWNSHIP & RANGE:
SECTIONS 19 & 30, T.10 N., R.11 E., M.D.M. (BEING PORTIONS OF PM 25-46, PM 32-6, PM 36-119 AND RS 20-113)

ASSESSOR'S PARCEL NUMBERS:
051-550-40, 47, 48 & 51

PRESENT/PROPOSED ZONING:
051-550-40: R1/R1-PD
051-550-47: R1-PE-CPD/R1-PD, C-PD
051-550-48: R1/R1-PD
051-550-51: R1/R1-PD

TOTAL AREA:
25.89± ACRES

TOTAL NUMBER OF PARCELS:
43 CUSTOM RESIDENTIAL LOTS
64 CLUSTERED RESIDENTIAL LOTS
1 COMMERCIAL LOTS
5 OPEN SPACE LOTS
12 ACCESS LOTS
1 ROAD LOT
1 LIFT STATION LOT
127 TOTAL

MINIMUM PARCEL AREA:
2,000 S.F.

WATER SUPPLY:
EL DORADO IRRIGATION DISTRICT

SEWAGE DISPOSAL:
EL DORADO IRRIGATION DISTRICT

PROPOSED STRUCTURAL FIRE PROTECTION:
DIAMOND SPRINGS/EL DORADO F.P.D.

DATE:
APRIL 24, 2009
REVISED: SEPTEMBER 7, 2012
REVISED: FEBRUARY 2013
REVISED: MARCH 2016

PLANNING COMMISSION:

APPROVAL/DENIAL DATE:

BOARD OF SUPERVISORS:

APPROVAL/DENIAL DATE:

LEGEND:

P.U.E. PUBLIC UTILITIES EASEMENT
CH# CHANNEL NUMBER (SEE REPORT BY SYCAMORE ENVIRONMENTAL CONSULTANTS)
DETENTION POND
OPEN SPACE
PAVED AREAS

LEBECK ▪ YOUNG ENGINEERING, INC.
3430 ROBIN LANE, BLDG. #2
CAMERON PARK, CA 95682
Ph. (530) 677-4080 Fax. (530) 677-4080

TENTATIVE MAP & DEVELOPMENT PLAN
MARCH 2016

Revised Environmental Noise Assessment

Piedmont Oaks

El Dorado County, California

Job# 2012-164

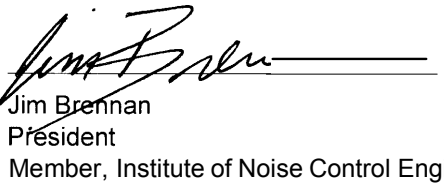
Prepared For:

Mr. Jim Davies

854 Diablo Road
Danville, CA 94526

Prepared By:

j.c. brennan & associates, Inc.



Jim Brennan
President
Member, Institute of Noise Control Engineering

March 6, 2013

llj.c. brennan & associates
IV\./VCn nmltan ts in tlCnusticJ

P.O. Box 6748- 263 Nevada Street- Auburn, California 95603 -p: (530) 823-0960 -f: (530) 823-0961

INTRODUCTION

The proposed Piedmont Oak Estates project is generally located east of Highway 49 and north Black Rice Lane in the unincorporated area of El Dorado County, known as Diamond Springs, California. The proposed project is a mixed use development with single family large and "patio" lot residential use, and two large commercial lots. Figure 1 shows the project site and an aerial of the project location. Figure 2 shows the project site plan.

Potential noise impacts upon the site include commercial and light industrial uses to the west, and across Highway 49 from the project site, and traffic on Highway 49. The project could result in increased traffic noise along the local roadway system, and some noise from potential commercial uses on the project site.

ACOUSTIC TERMINOLOGY

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

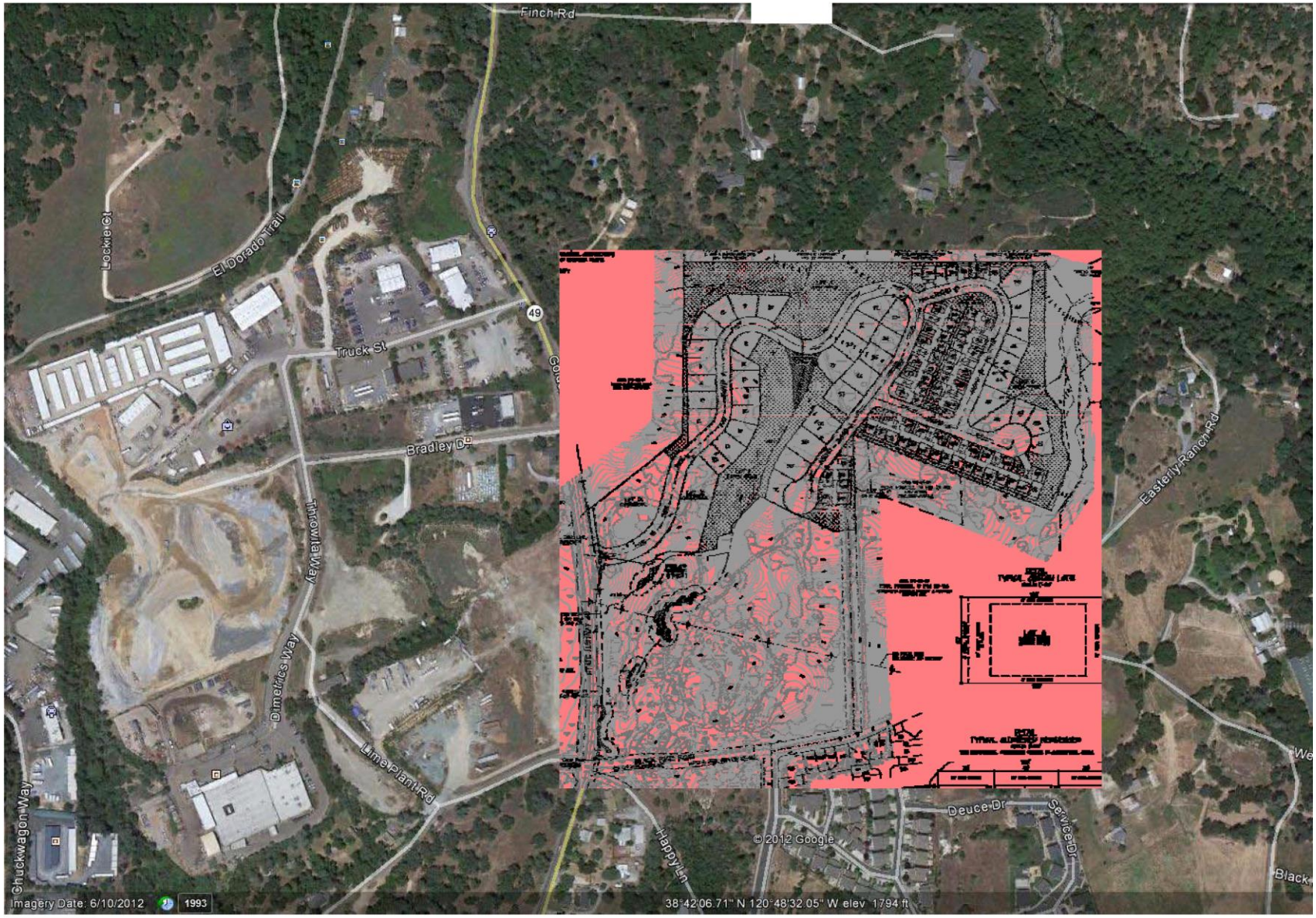
Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise can be highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

Figure 1

Project Site Location and Layout



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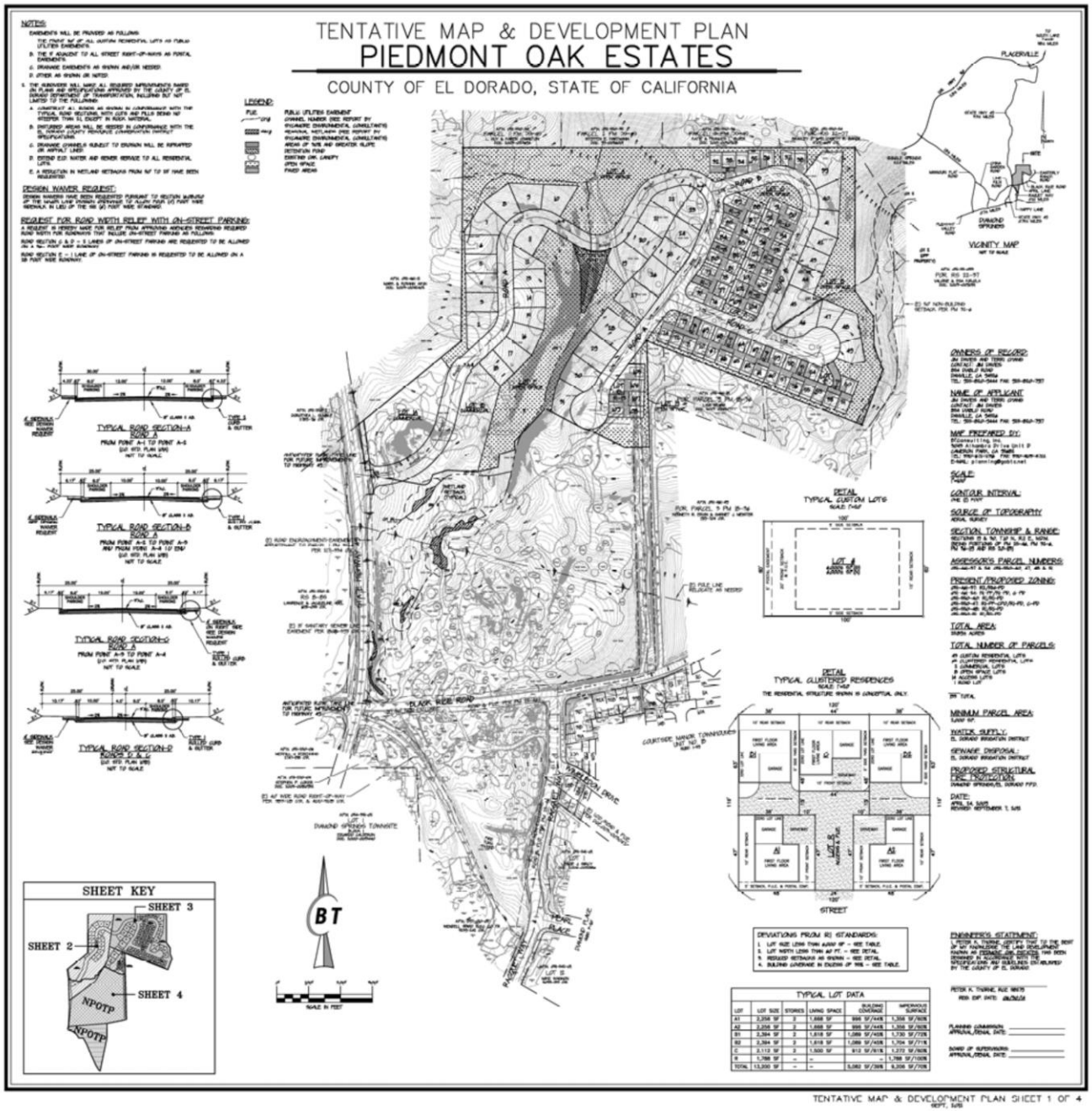
llj.c. brennan & associates
/VV"\./consultants in acoustics

Figure 2

Piedmont Oak Estates

Site Plan



j.c. brennan & associates
consultants in acoustics

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. Appendix A provides a summary of acoustical terms used in this report.

Table 1 Typical Noise Levels		
Common Outdoor Activities	**Noise Level (dBA)**	**Common Indoor Activities**
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing
Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. October 1998.		

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and

dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.
With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

CRITERIA FOR ACCEPTABLE NOISE EXPOSURE

Transportation Noise - (Highway 49)

The El Dorado County General Plan Noise Element establishes exterior and interior noise level standards for a variety of land uses affected by transportation noise sources. The El Dorado County Noise Element noise standards which would be applicable to this project are provided in Table 2. The criteria in Table 2 are applied at the outdoor activity area and interior spaces of residential land uses.

Table 2
El Dorado County General Plan Noise Element Standards Applicable at Residential Land Uses for Transportation Noise Sources

Land Use	Outdoor Activity Areas	Interior Spaces
Residential	60 dB Ldn[1]	45 dB Ldn

[1]For residential uses with front yards facing the identified noise source, an exterior noise level criterion of 65 dB Ldn shall be applied at the building façade, in addition to a 60 dB Ldn criterion at the outdoor activity area.

Source: Table 6-1 of the El Dorado County General Plan.

Table 6-1 of the El Dorado County Noise Element establishes an exterior noise level criterion of 60 dB Ldn at the outdoor activity area of residential land uses impacted by transportation noise sources. Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn may be allowed provided that available exterior noise level reduction measures have been implemented. In addition, an interior noise level criterion of 45 dB Ldn is applied to all residential land uses.

Non-Transportation Noise - *(Project Generated Noise)*

The El Dorado County General Plan Noise Element also contains goals and standards for non-transportation noise affecting existing noise-sensitive receptors.

Goal 6.5: ACCEPTABLE NOISE LEVELS

Ensure that County residents are not subjected to noise beyond acceptable levels.

Objective 6.5.1 PROTECTION OF NOISE-SENSITIVE DEVELOPMENT

Protect existing noise-sensitive developments (e.g. hospitals, schools, churches and residential) from new uses that would generate noise levels incompatible with those uses and, conversely, discourage noise-sensitive uses from locating near sources of high noise levels.

Policy 6.5.1.7

Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table 6-2 for noise-sensitive uses.

Policy 6.5.1.13

When determining the significance of impacts and appropriate mitigation to reduce those impacts for new development projects, including ministerial development, the following criteria shall be taken into consideration:

A. In areas in which ambient noise levels are in accordance with the standards in Table 6-2, increases in ambient noise levels caused by new nontransportation noise sources that exceed 5 dBA shall be considered significant; and

B. In areas in which ambient noise levels are not in accordance with the standards in Table 6-2, increases in ambient noise levels caused by new nontransportation noise sources that exceed 3 dBA shall be considered significant.

Table 3
Noise Level Performance Protection Standards For Noise Sensitive Land Uses Affected by Non-Transportation Noise Sources

Noise Level Descriptor	Daytime 7 a.m. - 7 p.m.		Evening 7 p.m. - 10 p.m.		Night 10 p.m. - 7 a.m.	
	Community	Rural	Community	Rural	Community	Rural
Hourly L_{eq}, dB	55	50	50	45	45	40
Lmax, dB	70	60	60	55	55	50

Each of the noise levels specified above shall be lowered by five dB for simple noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

County can impose noise level standards which are up to 5 dB less than those specified above based upon determination of existing low ambient noise levels in the vicinity of the project site.

In Community areas the exterior noise level standard shall be applied to the property line of the receiving property. In Rural areas the exterior noise level shall be applied at a point 100 feet away from the residence.

Source: Table 6-2 of the El Dorado County General Plan.

The noise standards in Table 3 are divided into daytime hours (7 am to 7 pm), evening hours (7 pm to 10 pm), and nighttime hours (10 pm to 7 am).

EXISTING NOISE ENVIRONMENT

Existing Traffic Noise:

j.c. brennan & associates, Inc., utilizes the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) for the prediction of traffic noise levels. The model is based upon the CALVENO noise emission factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

On October 12, 2012, j.c. brennan & associates, Inc. conducted short-term noise level measurements and concurrent counts of traffic on Highway 49 on the project site. The purpose of the short-term traffic noise level measurements is to determine the accuracy of the FHWA model in describing the existing traffic noise environment on the project site, while accounting for shielding from existing intervening topography, actual travel speeds, and roadway grade. Noise measurement results were compared to the FHWA model results by entering the observed traffic volume, speed, and distance as inputs to the FHWA model.

Instrumentation used for the measurements was a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter which was calibrated in the field before use with an LDL CA200 acoustical calibrator. The sound level meter was programmed to collect all noise level

data using the A-weighting filter and slow response. The equipment meets ANSI standards for Type 1 noise measurement equipment. The results of the traffic noise calibration process, which was conducted on the project site, is shown in Table 4. Based upon Table 4, the FHWA Model considerably over-predicted the traffic noise levels at the project site by 4 dBA. The reason was that the roadway grade is considerably below the project site, and the roadway embankment shields roadway traffic. A -3 dBA adjustment will be made to the predicted future traffic noise levels.

Table 4
Comparison of FHWA Model to Measured Traffic Noise Levels
Piedmont Oaks - El Dorado County

Vehicles/Hour.				Speed (mph)	Dist. (Feet)	Measured L_{eq}, dBA	Modeled L_{eq}, dBA*
Site	Autos	Med. Trk.	Hvy.Trk.				
Highway 49							
1	237	12	4	45	100	59.5	63.7
* Acoustically "soft" site assumed							

A complete listing of FHWA Model inputs and results are shown in Appendix B.

j.c. brennan & associates, Inc. utilized the calibrated FHWA traffic noise prediction model and existing traffic volumes contained in the project applicant's traffic study to predict existing traffic noise levels at various locations on the project site, and along the primary roadways. Truck percentages on Highway 49 were obtained from Caltrans. The predicted traffic noise levels and distances to traffic noise contours are shown in Table 5. A complete listing of the FHWA Model inputs and results are provided in Appendix B.

Table 5
Predicted Existing Traffic Noise Levels
Piedmont Oaks – El Dorado County, California

Location	Distance	Predicted Noise Level, Ldn	Distance to Noise Contours[1]		
			70 dB Ldn	65 dB Ldn	60 dB Ldn
Highway 49					
N. of Pleasant Valley @ Project Residential	400'	54 dBA	37 feet	79 feet	272 feet
N. of Pleasant Valley Project Commercial	100'	63 dBA	37 feet	79 feet	272 feet
West of Pleasant Valley	100'	61 dBA	26 feet	56 feet	121 feet
Pleasant Valley					
East of Highway 49	100'	58 dBA	16 feet	35 feet	75 feet
Missouri Flat Road					
W. of Future Diamond Springs Parkway	100'	62 dBA	29 feet	63 feet	135 feet
Diamond Springs Parkway					
Not Applicable	---	NA	NA	NA	NA

[1]Distances are measured from the roadway centerline. Contour distances are generalized and do not account for shielding from intervening buildings.
Source: j.c. brennan & associates, Inc., Caltrans, AECom Traffic Study.

Existing Industrial and Commercial Noise:

Existing commercial and light industrial uses to the west, and across Highway 49 include a materials recovery facility (MRF) and transfer station, auto body repair facility, mini storage facility, and a small sand and gravel operation. Each of these operations occur during the daytime hours. During the site visit, traffic noise at the residential portion of the project site was the dominant noise source, and noise from the commercial and light industrial uses were not contributing the exiting noise environment.

FUTURE NOISE ENVIRONMENT

Once again the FHWA traffic noise prediction model was used to predict Future (2025) traffic on the project site and on adjacent roadways. The project applicant's traffic study was used as direct inputs to the traffic noise prediction model. Appendix B provides the complete listing of the FHWA Model inputs. Table 6 provides the results of the analysis.

Table 6
Predicted Future (2025) Traffic Noise Levels
Piedmont Oaks – El Dorado County, California

Location	Predicted Ldn		Distance to Noise Contours[1]		
	No Project	W/Project	70 dB Ldn	65 dB Ldn	60 dB Ldn
Highway 49					
N. of Pleasant Valley @ Project Residential	55 dBA	55 dBA	41 feet	87 feet	188 feet
N. of Pleasant Valley Project Commercial	64 dBA*	64 dBA*	41 feet	87 feet	188 feet
West of Pleasant Valley	60 dBA*	60 dBA*	22 feet	47 feet	101 feet
Pleasant Valley					
East of Highway 49	60 dBA*	60 dBA*	22 feet	48 feet	103 feet
Missouri Flat Road					
W. of Future Diamond Springs Parkway	64 dBA*	65 dBA*	45 feet	96 feet	207 feet
Diamond Springs Parkway					
Not Applicable	63 dBA*	64 dBA*	38 feet	81 feet	175 feet

[1]Distances are measured from the roadway centerline. Contour distances are based upon 2025 With Project Scenario.
* Indicates the predicted noise level at 100 feet from the roadway centerline.
Source: j.c. brennan & associates, Inc., Caltrans, AECom Traffic Study.

Based upon the Table 6 data, the residential portion of the project site will comply with the exterior noise level standard of 60 dBA Ldn. The project will not contribute to a significant increase in traffic noise levels along Highway 49, Pleasant Valley Road, Missouri Flat Road and Diamond Springs Parkway.

Based upon a typical exterior to interior noise level reduction of 25 dBA, the interior noise levels at the residential portion of the project site will comply with the 45 dBA interior noise level criterion.

PROJECT NOISE GENERATION AND POTENTIAL NOISE IMPACTS

Noise impacts due to the proposed project were evaluated relative to the applicable El Dorado County noise standards. Noise generated by project-related activities was quantified through the application of accepted noise modeling techniques. Since no specific uses are proposed for the Commercially designated areas of the site, specific mitigation measures cannot be prescribed at this point.

Loading Dock Operations

Loading dock operations typically generate noise levels of approximately 63 dB Leq and 76 dB Lmax at a distance of 50 feet from the loading dock. The primary noise source associated with loading dock areas is typically heavy trucks stopping (air brakes), backing into the loading areas as necessary, and pulling out of the loading docks (revving engines) and fork lifts. The nearest proposed residential uses on the project site are Lots 2 and 18, which are directly adjacent to the commercial Lots A and B. Assuming a typical setback, the predicted noise levels would exceed the daytime noise level criteria of 55 dBA Leq and 70 dBA Lmax. Therefore, noise reduction measures could be warranted. A typical 8-foot tall wall will reduce overall noise levels by approximately 5 to 6 dBA. Therefore, a combination of a 100 foot setback from a loading dock, and an 8-foot tall property line barrier would reduce noise levels to within the daytime noise level criteria.

Parking Lot Circulation Noise Generation

Parking lots can be a source of noise. A typical SEL due to automobile arrivals and departures, including car doors slamming and people conversing is approximately 71 dB, with a maximum level of 63 dB Lmax, at a distance of 50 feet. Assuming a parking lot which has 100 spaces, and they are all utilized in one hour, the parking lot Leq noise level can be determined using the following formula:

$$\text{Peak Hour Leq} = 71 + 10 * \log(100) - 35.6, \text{dB}$$

71 is the mean sound exposure levels (SEL) for an automobile arrival or departure, and 10 * log(100) is 10 times the logarithm of the number of automobile and departures per hour, and 35.6 is 10 times the logarithm of the number seconds in an hour.

Based upon the calculation above, the predicted noise level due to parking lot activities is 55 dB Leq at a reference distance of 50 feet. the maximum noise level would be 63 dBA Lmax. Therefore, a typical parking lot of 100 spaces could comply with the daytime noise level standards.

Mechanical Equipment Noise

Generally, commercial uses include packaged roof-top HVAC units. A roof-top HVAC unit will provide approximately one ton of cooling per 250 sf. of space. Therefore, the cooling load for

2,000 square feet would be eight tons of cooling. Noise levels for the roof-top HVAC units were calculated based upon typical manufacturer data for packaged HVAC units.

Manufacturer data states that the Air-Conditioning and Refrigeration Institute (ARI) sound power rating for two four ton units would likely be 88 dBA for a modern HVAC unit. The hourly average noise level for the HVAC these units is predicted to be 48 dBA Leq at a distance of 100 feet.

Assuming a 3 foot tall building parapet, noise levels would be predicted to be reduced by 5.0 dBA.

CONCLUSION

A summary of the conclusions are as follows:

1) The project will not be exposed to roadway traffic noise levels which exceeds the exterior and interior noise level criteria of 60 dBA Ldn and 45 dBA Ldn, respectively;

2) The project will not be exposed to noise levels from nearby light industrial and commercial uses which will exceed the noise level standards;

3) The project will not result in a significant increase in roadway traffic noise levels;

4) The proposed commercial uses on the project site may result in noise levels which exceed the El Dorado County stationary noise level criteria.

The following mitigation measures are recommended:

1) When site plans and specific uses are proposed on Lots A and B, the applicants shall provide a noise analysis to ensure compliance with the El Dorado County noise level criteria. The noise analyses shall evaluate any potential loading dock operations, truck circulation, parking lot activity and HVAC noise levels. If additional noise sources are identified, they must also be reviewed.

Appendix A

Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the AMaximum@ level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

Appendix B

FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Calibration Worksheet

Project Information:	Job Number:	2012-164
	Project Name:	Piedmont Oaks
	Roadway Tested:	Hwy 49
	Test Location:	_____
	Test Date:	October 12, 2012
Weather Conditions:	Temperature (Fahrenheit):	60
	Relative Humidity:	Dry
	Wind Speed and Direction:	5-10 from West
	Cloud Cover:	ptly cloudy
Sound Level Meter:	Sound Level Meter:	LDL Model 820
	Calibrator:	LDL Model CA200
	Meter Calibrated:	Immediately before and after test
	Meter Settings:	A-weighted, slow response
Microphone:	Microphone Location:	On Project Site
	Distance to Centerline (feet):	100
	Microphone Height:	5 feet above ground
	Intervening Ground (Hard or Soft):	**Soft**
	Elevation Relative to Road (feet):	10
Roadway Condition:	Pavement Type	Asphalt
	Pavement Condition:	Good
	Number of Lanes:	2
	Posted Maximum Speed (mph):	45
Test Parameters:	Test Time:	12:00 PM
	Test Duration (minutes):	15
	Observed Number Automobiles:	237
	Observed Number Medium Trucks:	12
	Observed Number Heavy Trucks:	4
	Observed Average Speed (mph):	45
Model Calibration:	Measured Average Level (L_{eq}):	59.5
	Level Predicted by FHWA Model:	63.7
	Difference:	***4.2 dB***

Conclusions:

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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2012-164
Description: Existing Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Highway 49	Project Site Residential	15,860	85		15	7	3	45	400	-3
2	Highway 49	Project Site Commercial	15,860	85		15	7	3	45	100	-3
3	Highway 49	West of Pleasant Valley	11,210	85		15	7	3	25	100	
4	Pleasant Valley	East of Highway 49	10,870	85		15	3	1	25	100	
5	Missouri Flat	W. of Future Diamons Springs Pky	14,500	85		15	3	1	35	100	
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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-164
Description: Existing Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Highway 49	Project Site Residential	51.1	48.3	49.1	54
2	Highway 49	Project Site Commercial	60.2	57.3	58.1	63
3	Highway 49	West of Pleasant Valley	54.3	54.8	58.8	61
4	Pleasant Valley	East of Highway 49	54.4	51.0	53.9	58
5	Missouri Flat	W. of Future Diamons Springs Pky	59.9	54.5	55.0	62

Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-164
Description: Existing Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Highway 49	Project Site Residential	17	37	79	171	367
2	Highway 49	Project Site Commercial	17	37	79	171	367
3	Highway 49	West of Pleasant Valley	12	26	56	121	260
4	Pleasant Valley	East of Highway 49	7	16	35	75	161
5	Missouri Flat	W. of Future Diamons Springs Pky	14	29	63	135	292

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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2012-164
Description: Future No Project Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Highway 49	Project Site Residential	17,741	85		15	7	3	45	400	-3
2	Highway 49	Project Site Commercial	17,741	85		15	7	3	45	100	-3
3	Highway 49	West of Pleasant Valley	8,366	85		15	7	3	25	100	
4	Pleasant Valley	East of Highway 49	16,958	85		15	3	1	25	100	
5	Missouri Flat	W. of Future Diamons Springs Pky	25,122	85		15	3	1	35	100	
6	Pleasant Valley Pkwy	W. of Highway 49	19,072	85		15	3	1	35	100	
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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-164
Description: Future No Project Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Highway 49	Project Site Residential	51.6	48.8	49.6	55
2	Highway 49	Project Site Commercial	60.6	57.8	58.6	64
3	Highway 49	West of Pleasant Valley	53.0	53.6	57.5	60
4	Pleasant Valley	East of Highway 49	56.4	52.9	55.8	60
5	Missouri Flat	W. of Future Diamons Springs Pky	62.3	56.9	57.4	64
6	Pleasant Valley Pkwy	W. of Highway 49	61.1	55.7	56.2	63

Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-164
Description: Future No Project Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Highway 49	Project Site Residential	18	40	85	184	396
2	Highway 49	Project Site Commercial	18	40	85	184	396
3	Highway 49	West of Pleasant Valley	10	21	46	99	214
4	Pleasant Valley	East of Highway 49	10	22	47	101	217
5	Missouri Flat	W. of Future Diamons Springs Pky	20	42	91	195	421
6	Pleasant Valley Pkwy	W. of Highway 49	16	35	75	163	350

Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2012-164
Description: Future with Project Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Highway 49	Project Site Residential	18,390	85		15	7	3	45	400	-3
2	Highway 49	Project Site Commercial	18,390	85		15	7	3	45	100	-3
3	Highway 49	West of Pleasant Valley	8,540	85		15	7	3	25	100	
4	Pleasant Valley	East of Highway 49	17,570	85		15	3	1	25	100	
5	Missouri Flat	W. of Future Diamons Springs Pky	27,350	85		15	3	1	35	100	
6	Pleasant Valley Pkwy	W. of Highway 49	21,300	85		15	3	1	35	100	
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FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-164
Description: Future with Project Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Highway 49	Project Site Residential	51.8	48.9	49.7	55
2	Highway 49	Project Site Commercial	60.8	58.0	58.8	64
3	Highway 49	West of Pleasant Valley	53.1	53.6	57.6	60
4	Pleasant Valley	East of Highway 49	56.5	53.1	56.0	60
5	Missouri Flat	W. of Future Diamons Springs Pky	62.7	57.3	57.7	65
6	Pleasant Valley Pkwy	W. of Highway 49	61.6	56.2	56.6	64

Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-164
Description: Future with Project Piedmont Oaks
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Highway 49	Project Site Residential	19	41	87	188	405
2	Highway 49	Project Site Commercial	19	41	87	188	405
3	Highway 49	West of Pleasant Valley	10	22	47	101	217
4	Pleasant Valley	East of Highway 49	10	22	48	103	222
5	Missouri Flat	W. of Future Diamons Springs Pky	21	45	96	207	446
6	Pleasant Valley Pkwy	W. of Highway 49	18	38	81	175	377

Piedmont Oak Estates
Subdivision
APN:
051-550-40, 47- 48 & 51

Wildland Fire Safe Plan

Prepared for:

Jim Davies

Prepared by:

CDS Fire Prevention Planning
William F. Draper
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4645 Meadowlark Way
Placerville, CA 95667

December 6, 2012

ATTACHMENT 14

Z12-0010 / PD12-0002
TM12-1510

Piedmont Oak Estates

Approved by:

Rob Coombs, Fire Chief
Fire Marshal
Diamond Springs/El Dorado
Fire Protection District

1-22-13
Date

Darin McFarlin, Fire Captain
Fire Prevention
California Department of
Forestry and Fire Protection

1-22-13
Date

Prepared by:

William F. Draper
RPF #898

1-22-13
Date

CONTENTS

I. PURPOSE AND SCOPE

Communities are increasingly concerned about wildfire safety. Drought years coupled with flammable vegetation and annual periods of severe fire weather insure the potential for periodic wildfires.

The purpose of this plan is to assess the wildfire hazards and risks of the Piedmont Oak Estates, to identify measures to reduce these hazards and risks and protect the native vegetation. There are light to moderate fuel hazards and gentle topography associated with this proposed project both on and adjacent to the project.

The possibility of large fires occurring when the subdivision is complete will be greatly reduced. However, small wildfires in the open space areas and on the larger lots may occur due to the increase in public uses.

Incorporation of the fire hazard reduction measures into the design and maintenance of the future parcels will reduce the size and intensity of wildfires and help prevent catastrophic fire losses. State and County regulations provide the basic guidelines and requirements for fire safe mitigation measures and defensible space around dwellings. This plan builds on these basic rules and provides additional fire hazard reduction measures customized to the topography and vegetation of the development with special emphases on the interface of homes and wildland fuels.

The scope of the Piedmont Oak Estates Wildland Fire Safe Plan recognizes the extraordinary natural features of the area and designs wildfire safety measures which are meant to compliment and become part of the community design. The Plan contains measures for providing and maintaining defensible space around future homes and open space. Plan implementation measures must be maintained in order to assure adequate wildfire protection.

Homeowners who live in and adjacent to the wildfire environment must take primary responsibility along with the fire services for ensuring their homes have sufficient low ignitability and surrounding fuel reduction treatment. The fire services should become a community partner providing homeowners with technical assistance as well as fire response. For this to succeed it must be shared and implemented equally by homeowners and the fire services.

II. FIRE PLAN LIMITATIONS

The Wildland Fire Safe Plan for Piedmont Oak Estates does not guarantee that wildfire will not threaten, damage or destroy natural resources, homes or endanger residents. However, the full implementation of the mitigation measures will greatly reduce the exposure of homes to potential loss from wildfire and provide defensible space for firefighters and residents as well as protect the native vegetation. Specific items are listed for homeowner's attention to aid in home wildfire safety.

III. PIEDMONT OAK ESTATES WILDLAND FIRE SAFE PLAN

1. PROJECT DESCRIPTION

Piedmont Oak Estates is located east of Highway 49 and north of Black Rice Road. April Lane borders a portion of the subdivision along the east side.. A new road, Road "A", providing access to the new lots is to be constructed approximately .1 mile north of Black Rice Road and intersect Hwy 49 just south of Bradley Drive. Private property borders the project on the north, east and south. Black Rice Road, the existing road, is 18' wide of travel surface with shoulders and the necessary drainage ditches. A secondary road, Road "D", providing access from Road "A" to Black Rice Road will be built providing two way access. This road will be approximately .2 miles long. Road "D" is being proposed as a DOT 101C road (20'plus shoulders). It shall be posted with "No Parking". All roads shall have rolled curbs on one or both sides to allow for better vehicle passage. With open space to the north and south of Black Rice Road, Racquet Way should be connected to provide additional emergency access. This access is needed since the distance from Black Rice Road and Road "A" is less than ¼ mile and therefore not consistent with The Land Design Manual (LSDM). Racquet Way is currently barricaded at Black Rice Road. Interior roads "B" and "C" will connect to "A". No new road will be a dead end road over 800' without second access. Posting of the Emergency Access road is being proposed instead of a locked gate at the end of road "A". Locked gates on access roads are not acceptable to the fire agencies since this would constitute a long dead end road which would violate the County Fire Safe Regulations. The roads will be constructed to El Dorado County Department of Transportation (DOT), Fire Safe and LDMS standards. A design waiver is being proposed by the developer to allow on street parking on one side of 28' roads and parking on both sides of 36' wide roads.

- Road "A" 36' Parking on both sides, rolled curbs and fire hydrant turnouts.
- Road "B" 28' Parking on one side, rolled curb on the opposite side and posted "No Parking" with fire hydrant turnouts.
- Road "C" 28' Parking on one side, rolled curb on the opposite side and posted "No Parking" with fire hydrants turnouts.
- Road "D" 20' Posted "No Parking" rolled curb on both sides and fire hydrant turnouts.
- All driveways/alleys for the clustered units shall be posted "No Parking".

Turnouts at each fire hydrant and clustered parking at the high density housing area should be required. The turnout will conform to fire department and DOT standards. The project shall be served by El Dorado Irrigation District (EID). All fire hydrant locations and spacing shall be determined by Diamond Springs Fire and the Residential Fire Code. There is not any road work anticipated to Black Rice Road beyond the normal encroachment and clearing of a fuel hazard reduction zone. Any private gate shall meet the requirements for Diamond Springs Fire. A fuel hazard reduction zone along the entire length of the roads in and adjacent to the project and around the perimeter of the project will be needed. The project is proposing to split parcels APN: 051-550-40, 47, 48 and 51 totaling 25.89 acres into 43 custom lots, 65 clustered lots, 2 commercial lots, and 8 open space lots. All the lots shall have water provided by EID.

The clustered units will have a common alley between rows of units extending the entire block with driveways serving a 5 unit cluster (normally). Each unit has designated parking. No parking will be allowed in the alleys or driveways serving the clusters.

A tank farm of central propane tanks will serve the cluster units in this development as well as the small custom lots. Due to the setback requirements for propane tanks, the tank farm concept is the only practical way to distribute propane to all the lots with houses. Propane tanks require 10' setback from the property line and 10' from any structure. They also must have a 10' setback from any ignition source such as the electric meter. The commercial lots will have individual tanks. The

preferred system would have underground tanks inside an enclosed area for the tank farm. This area would be landscaped and maintained. Each residence would have its own gas meter.

A Lighting and Landscape District (LLD) shall be formed for the purpose of maintaining the fuel hazard reduction zones along the new roads and open spaces, interior road maintenance, landscaped areas, and signage. Annual maintenance is essential for keeping fire safe conditions viable.

The Diamond Springs/El Dorado Fire Protection District provides all fire and emergency medical services to this project. The California Department of Forestry and Fire Protection (CAL FIRE) has wildland fire responsibility in this state responsibility area (SRA).

2. PROJECT VEGETATION (FUELS)

For wildfire planning purposes the vegetation is classified as follows:

(a) ground fuels- annual grasses, manzanita, toyon, blackberries and buckeye with downed limbs (Brush)

(b) overstory- ponderosa pine, gray pine, liveoak with scattered black oaks.

In general, the property gently slopes to the east and west with most slopes less than 10%. Lots 11 to 17 have steeper east facing slopes up to approximately 25%. There is a seasonal drainage running through Open Space Lot F with steep slopes. Fire hazard reduction of the fuels will be extremely important around the house sites and surrounding areas. Ladder fuels in all open spaces need to be eliminated. Sprouting will bring back the problem of ladder fuels. Sprout treatment and pruning of the overstory trees will be needed to reduce the fire hazard. Limbing of trees is important to reduce their susceptibility from a ground fire. Tree spacing on the slopes is a critical component to attaining the required fire safe clearances. A separation of the brush fuels and trees are essential for creating the defensible space around the residence and along the perimeter. CDF guidelines for the 100 foot clearance requirements are attached.

3. PROBLEM STATEMENTS

A. The brush fuels on the slopes will ignite and have a rapid rate of spread.

Fire in the grass and brush fuels on the slopes is the most serious wildfire problem for this project.

B. Risk of fire starts will increase with development.

The greatest risk from fire ignition will be along roads and on large lots as human activity increases in these areas.

C. Provisions must be made to maintain all fuel treatments.

The wildfire protection values of fuel reduction are rapidly lost if not maintained. Continued review of potential ladder fuels to maintain a fire safe environment is very important. Annual maintenance by June 1 of each year is necessary.

D. Typical home design and siting often does not recognize adequate wildfire mitigation measures.

A review of many wildfires has conclusively shown that most home losses occur when: (1) there is inadequate clearing of flammable vegetation around a house, (2) roofs are not fire

resistant, (3) homes are sited in hazardous locations, (4) firebrand ignition points and heat traps are not adequately protected and (5) there is a lack of water for suppression.

4. GOALS

A. Modify the continuity of high hazard vegetation fuels.
B. Reduce the size and intensity of wildfires.
C. Ensure defensible space is provided around all structures.
D. Design fuel treatments to minimize tree removal.
E. Ensure fuel treatment measures are maintained.
F. Identify fire safe structural features.
G. Help homeowners protect their homes from wildfire.

5. WILDFIRE MITIGATION MEASURES

Wildfire mitigation measures are designed to accomplish the Goals by providing and maintaining defensible space and treating high hazard fuel areas. Fire hazard severity is reduced through these mitigation measures. The Wildland Fire Safe Plan places emphasis on defensible space around structures and project perimeter.

Fuel hazard reduction zones (FHRZ) of at least 20 feet in width shall be installed around the perimeter of the project and a 10 foot fuel hazard reduction zone along both sides of the roads. All open space perimeters shall have a 20' FHRZ adjacent to backyards. Sidewalks and planted landscaping may be a part of the FHRZ. The propane tank farm shall have a 20' FHRZ around its perimeter and the interior shall be kept free of high weeds and brush. Low fuel ground cover would be a good alternative to bare ground. Any tree canopy over the roads and driveways will have 15' of vertical clearance over the roadways.

All residences shall be required to have NFPA 13D fire sprinkler systems. The project is located in a Moderate Fire Hazard Severity Zone. Implementation of Wildland-Urban Interface Fire Areas Building Standards will be required for the construction of new residences. These standards address roofing, venting, eave enclosure, windows, exterior doors, siding, and decking.

Clearance along the road and around structures is very important and necessary. Fire Safe specifications state that all trees in the fuel treatment zones shall be thinned so the crowns are not touching. Branches on remaining trees shall be pruned up 10 feet as measured on the uphill side of the tree. Brush shall be removed. Grasses shall be kept mowed to a 2 inch stubble annually by June 1. Any tree crown canopy over the driveways shall be pruned at least 15 feet up from the driveway surface.

This zone is in addition to the clearances required by state law. The State required Fire Safe clearances (PRC 4291) shall be implemented around all structures (See CDF Guideline). Clearances may be required at the time of construction by the County.

More restrictive standards may be applied by approving El Dorado County Authorities. Approval of this plan does not by itself guarantee approval of this project.

Mitigation Measures:

- Driveways shall be 12 feet wide. Driveways shall comply with the DOT weight standards.
    a. Responsibility- homeowner

- All private driveway gates on custom lots shall be inset on the driveway at least 30 feet from the road. Gate opening shall be 2 feet wider than the driveway. Knox lock assess shall be provided to the fire department.
    a. Responsibility- homeowner

- All homes shall have Class A listed roof covering.
    a. Responsibility- homeowner

- Decks that are cantilevered over the natural slope shall be enclosed.
    a. Responsibility- homeowner (See Appendix C for guidelines)

- The houses shall be constructed with exterior wall sheathing that shall be rated noncombustible.
    a. Responsibility-developer

- Windows and glass doors on the sides of the structure shall have tempered glass and fire resistant frames.
    a. Responsibility-builder

- Rafter tails shall be enclosed with noncombustible material on the sides of the structure.
    a. Responsibility-builder

- Gutters and downspouts shall be noncombustible.
    a. Responsibility-builder

- Attic and floor vents shall be covered with ¼ inch, or less, noncombustible mesh and horizontal to the ground.
    a. Responsibility-builder

6. OTHER FIRE SAFE REQUIREMENTS

A. New roadways, turnouts, alleys, and driveway shall be constructed only after consulting with Diamond Springs Fire, DOT and consulting El Dorado County Design Standard for specifications (See Attachment). A design waiver may be requested.

B. Each new property owner prior to construction shall be required to contact El Dorado County Planning Services/Building Department to have the residential fire sprinklers plans approved. All fire sprinkler systems shall be designed and installed by a licensed contractor.

C. Any new road and turnout shall be built to DOT standards. Driveways can only serve one parcel except in the clustered units.

D. 20' fuel hazard reduction zone along the perimeter of the project, both sides of the open spaces, around the tank farm and 10' on both sides of the roads shall be installed and annually maintained by June 1 to the Fire Safe specifications. Tree canopy over the road and driveways shall be cleared up 15'.

E. The developer shall file with DOT to get the roads named and have the names posted at the intersections.

F. A Lighting and Landscape District (LLD) shall be formed for the specific purpose of maintaining the fuel hazard reduction zones along the roads, perimeter, open space and tank farm annually by June 1 in addition to other specific needs of the Fire District.

G. Roads shall be posted "No Parking" on both sides of the road unless a design waiver is approved. Posting on one side as determined in the design waiver.

H. If the parking design waiver is granted, turnouts at each fire hydrant location on roads "A", "B", "C", and "D" shall be installed and meet fire department specifications.

I. Rolled curbs shall be used on all roads as specified to allow for safe vehicle passage on roads narrower than fire code requirements.

J. A Notice of Restriction shall be filed with the final parcel map which stipulates that a Wildland Fire Safe Plan has been prepared and wildfire mitigation measures must be implemented.

K. The project shall meet all the Public Resource Codes 4290 as amended (the 1991 SRA Fire Safe Regulations- Article 2 Access, Article 3 Signing, Article 4 Water, Article 5 Fuels), County and Fire Department ordinances.

L. The home/property owners are responsible for any future fire safe or building code changes adopted by the State or local authority.

M. Only fire rated composite deck material, wood or non-combustibles shall be allowed for decks.

V. Appendix

APPENDIX A

PIEDMONT OAK ESTEATES

FUEL TREATMENT SPECIFICATIONS
For
OAK WOODLAND
Within The Designated Fuel Treatment Areas

1. Leave all live trees where possible.

2. Remove all dead trees.

3. Remove all brush.

4. Prune all live trees of dead branches and green branches 10 feet from the ground as measured on the uphill side of the tree, except no more than 1/3 of the live crown is removed. All slash created by pruning must be disposed of by chipping or hauling off site.

5. Annually by June 1, reduce the grass or weeds to a 2 inch stubble by mowing, chemical treatment, disking or a combination of treatments.

6. Conifers within 30 feet of a house shall be removed. Those pines in the open space shall be isolated with no brush understory within the dripline of the tree.

APPENDIX B

PIEDMONT OAK ESTATES

ENCLOSED DECK GUIDELINES

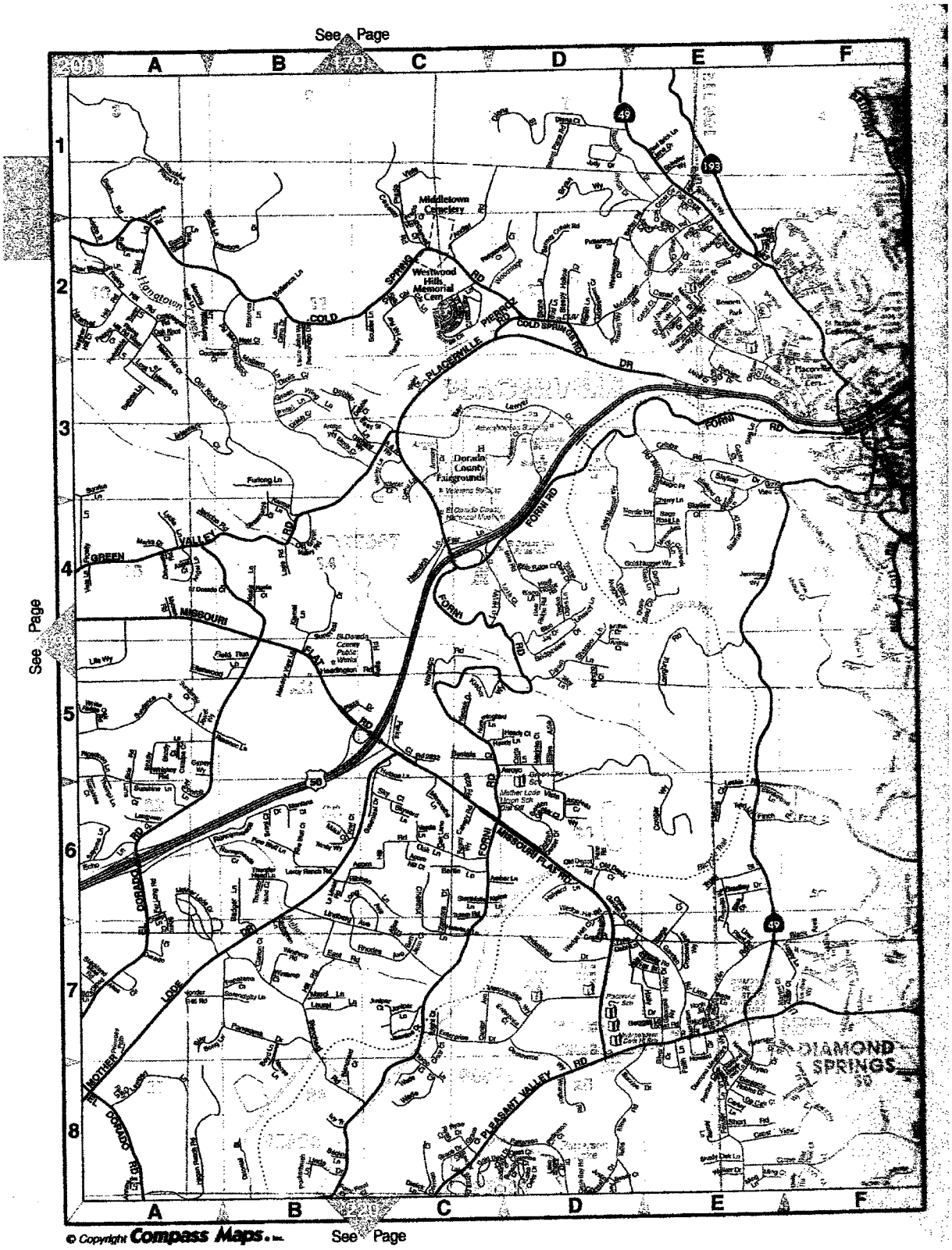
The purpose of enclosing the underside of decks that are cantilevered out over the natural slope is to help prevent heat traps and fire brands from a wildfire igniting the deck or fuels under the deck.

1. Does not apply to decks that are constructed using fire resistant materials such as concrete, steel, stucco etc.

2. Any deck shall not include non fire rated composite deck material.

3. This applies to decks one story or less above natural slopes.

4. Combustible material must not be stored under the deck.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A
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Middletown Cemetery
Westwood Hills Memorial Cem
Longstown Creek
COLD SPRING RD
PLACERVILLE
FORNI RD
El Dorado County Fairgrounds
VALLEY
GREEN
MISSOURI FLAT RD
DIAMOND SPRINGS
PLEASANT VALLEY RD
MOTHER LODE DR
EL DORADO RD
49
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See Page
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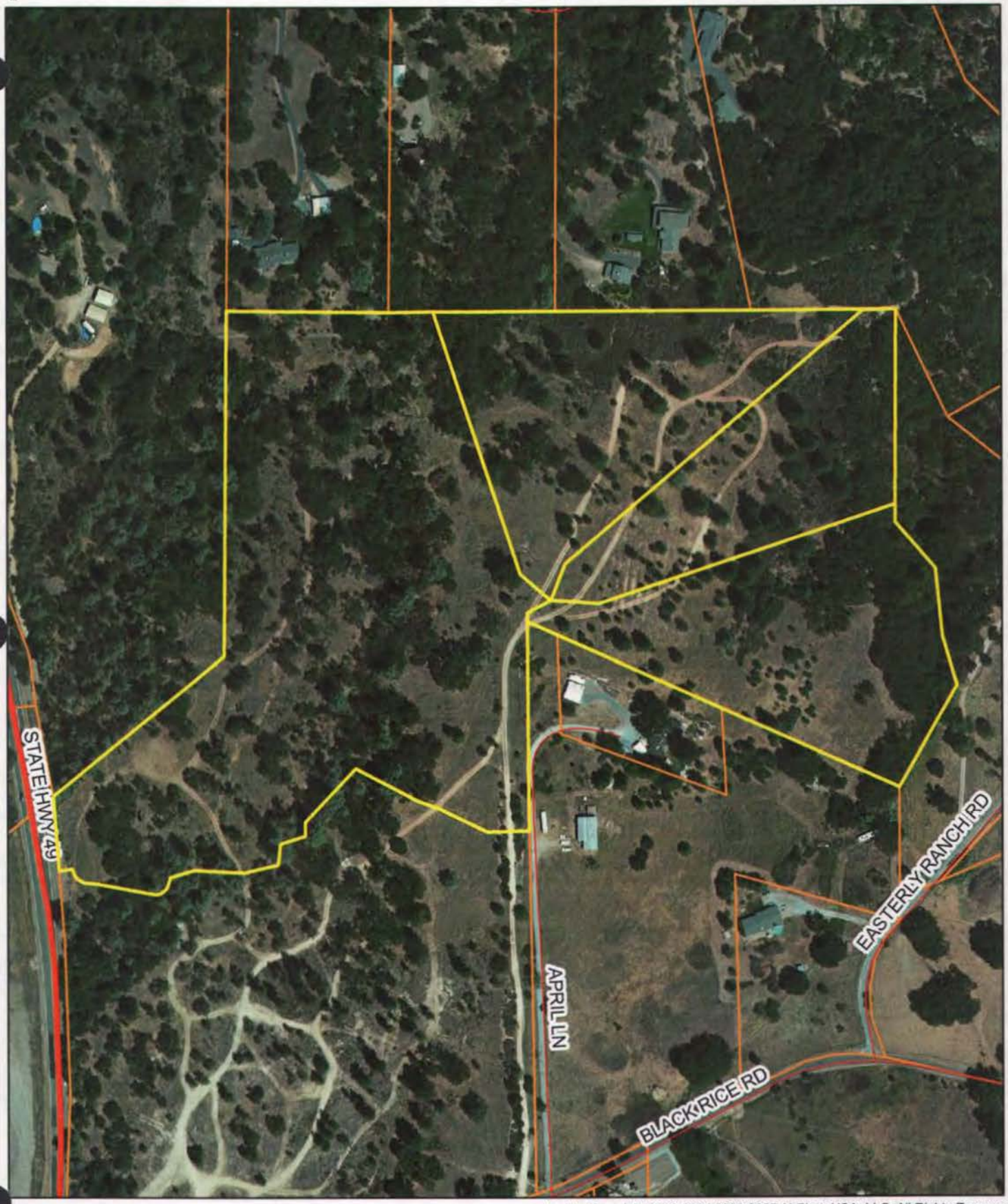


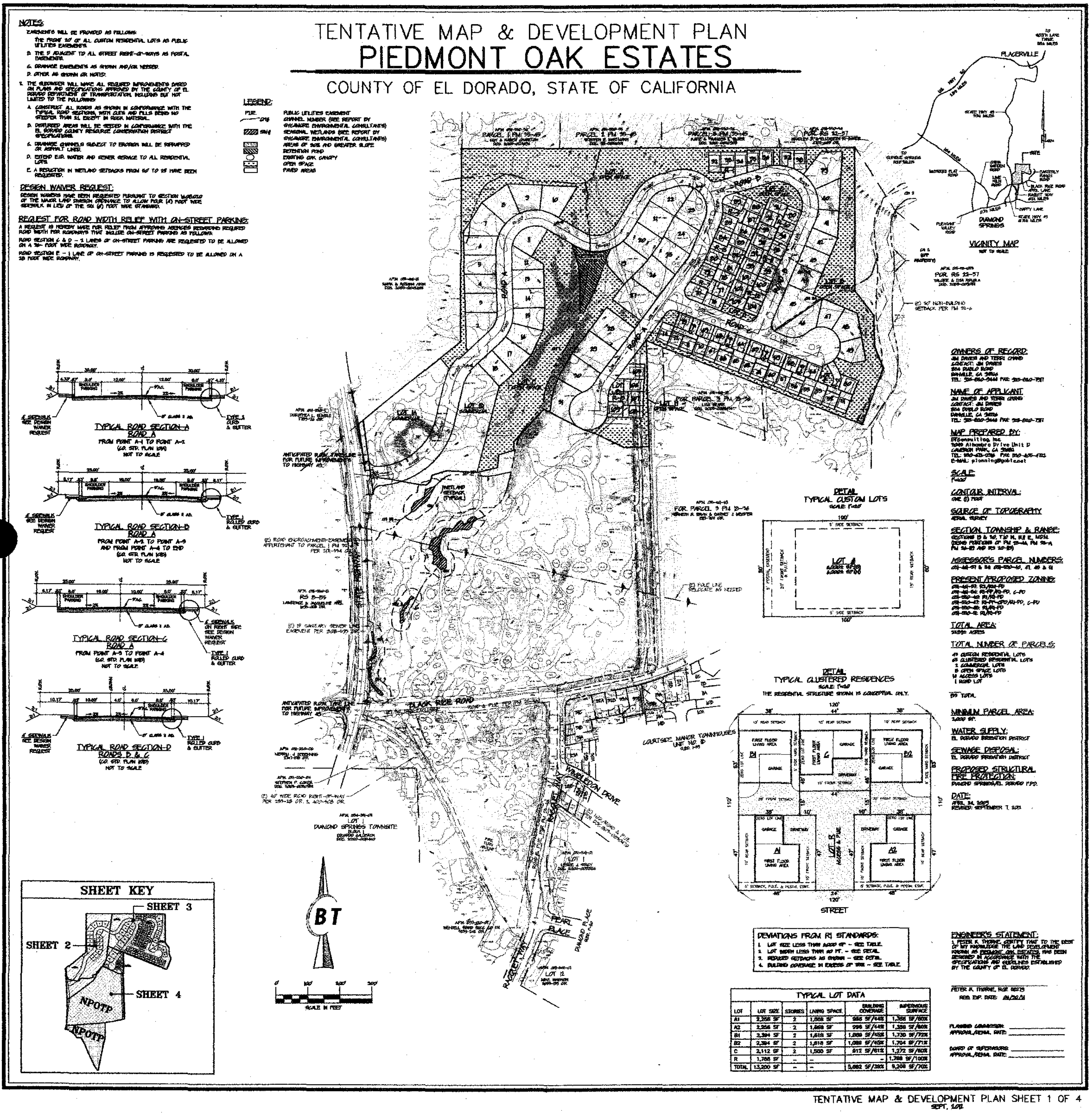
Disclaimer: This depiction was compiled from unverified public and private sources and is illustrative only. No representation is made as to accuracy of this information. Parcel boundaries are particularly unreliable. Users make use of this depiction at their own risk.

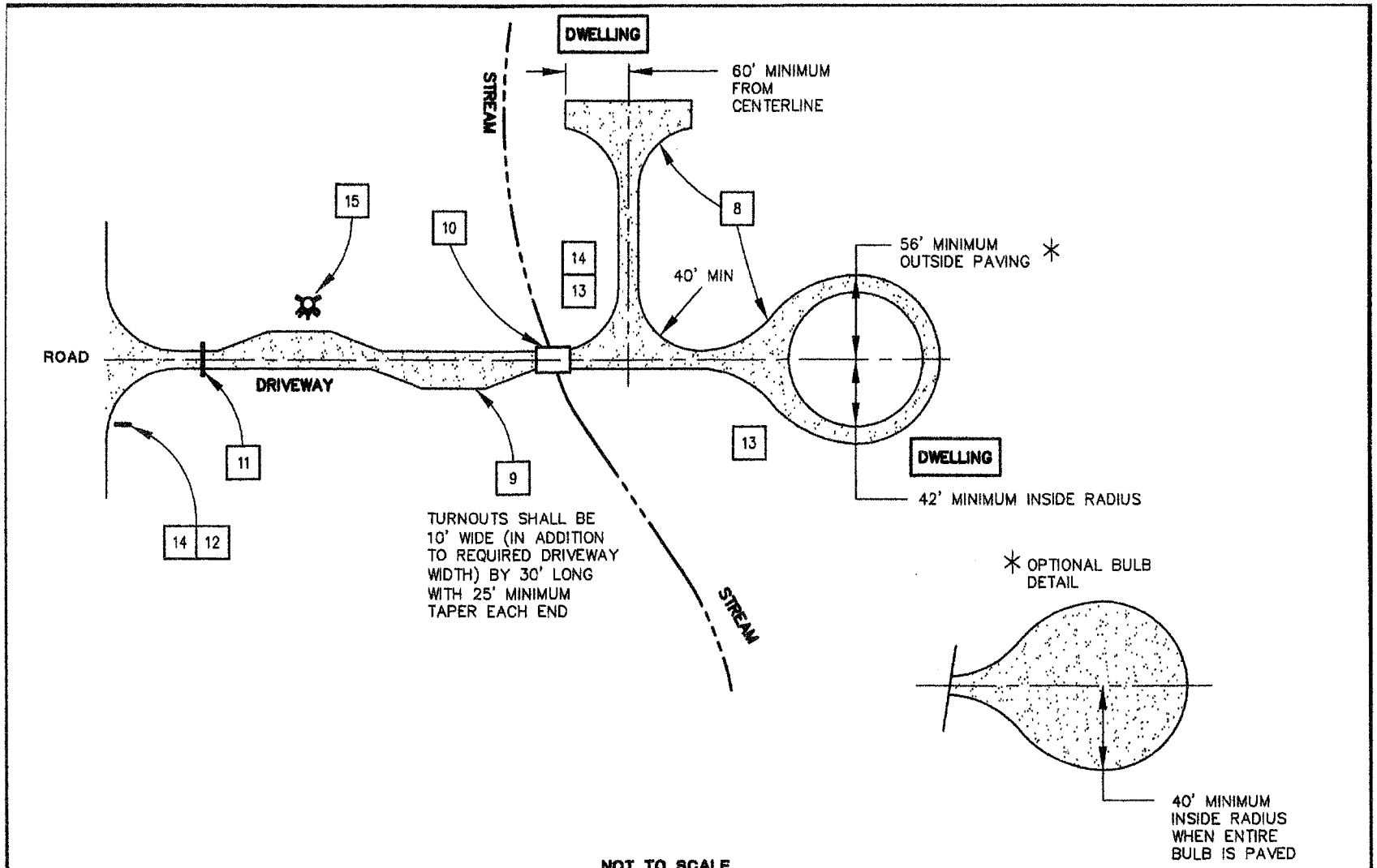
Printed on 1/4/2013 from El Dorado County Surveyor's Office

N
W E
S

0 175 350 525
Feet

Map displayed in State Plane Coordinate System
(NAD 83, California Zone 2, feet)


TENTATIVE MAP & DEVELOPMENT PLAN
PIEDMONT OAK ESTATES
COUNTY OF EL DORADO, STATE OF CALIFORNIA
NOTES:
LEGEND:
DESIGN WAIVER REQUEST:
REQUEST FOR ROAD WIDTH RELIEF WITH ON-STREET PARKING:
TYPICAL ROAD SECTION-A
TYPICAL ROAD SECTION-B
TYPICAL ROAD SECTION-C
TYPICAL ROAD SECTION-D
SHEET KEY
SHEET 2
SHEET 3
SHEET 4
NPOTP
VICINITY MAP
PLACERVILLE
OWNERS OF RECORD:
NAME OF APPLICANT
MAP PREPARED BY:
SCALE:
CONTOUR INTERVAL:
SOURCE OF TOPOGRAPHY
SECTION, TOWNSHIP & RANGE:
ASSESSOR'S PARCEL NUMBERS:
PRESENT/PROPOSED ZONING:
TOTAL AREA:
TOTAL NUMBER OF PARCELS:
MINIMUM PARCEL AREA:
WATER SUPPLY:
SEWAGE DISPOSAL:
PROPOSED STRUCTURAL FIRE PROTECTION:
DATE:
DETAIL TYPICAL CUSTOM LOTS
DETAIL TYPICAL CLUSTERED RESIDENCES
STREET
DEVIATIONS FROM R1 STANDARDS:
TYPICAL LOT DATA
ENGINEER'S STATEMENT:
BLACK RICE ROAD
WIMBLEDON DRIVE
PEARL PLACE
DIAMOND SPRINGS TOWNSITE
SCALE IN FEET
BT
TENTATIVE MAP & DEVELOPMENT PLAN SHEET 1 OF 4



APPROVED BY:

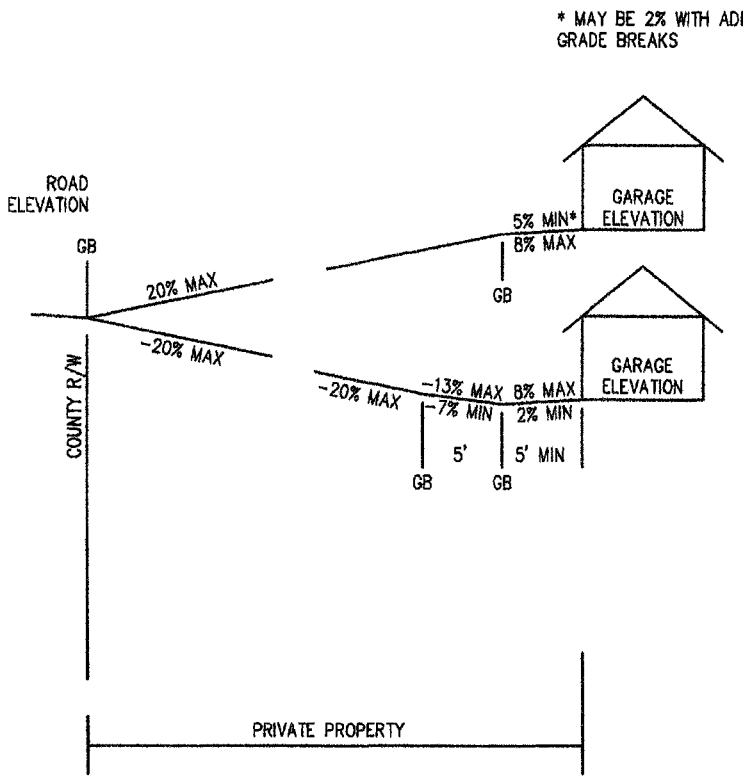
JAMES W. WARE, P.E. NO. C61036 DATE:
INTERIM DIRECTOR, EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

BOARD OF SUPERVISOR'S RESOLUTION NO. _____

EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS

RURAL RESIDENTIAL DRIVEWAY

STD. PLAN
RS-68
SHT 1 OF 2



DRIVEWAY GRADES STANDARDS

NOT TO SCALE

NOTES:

1. MAXIMUM 15% GRADE BREAK BETWEEN DRIVEWAY SECTIONS (I.E. AREAS IN DRIVEWAY WHERE GRADE CHANGES). ADDITIONAL GRADE BREAKS ARE ALLOWED.
2. DRIVEWAY CONNECTING TO A COUNTY MAINTAINED ROAD REQUIRES A COUNTY ISSUED ENCROACHMENT PERMIT. SEE APPLICABLE ENCROACHMENT STANDARD PLAN
3. EACH DRIVEWAY SHALL SERVE NO MORE THAN TWO BUILDINGS WITH NO MORE THAN THREE DWELLING UNITS ON A SINGLE PARCEL, AND ANY NUMBER OF ACCESSORY BUILDINGS.
4. GRADE NOT TO EXCEED 16%. (DRIVEWAY GRADE MAY BE UP TO 20%, WHEN PAVED), 12' WIDE MINIMUM. CENTERLINE RADIUS ON CURVES IS 50' MINIMUM. VERTICAL CLEARANCE OF 15' MINIMUM.
5. DRIVEWAY SURFACE MUST BE ALL-WEATHER AND SUPPORT 75,000 POUNDS. MINIMUM SURFACING ON 90% COMPACTED SOIL IS 6" AGGREGATE BASE. ALTERNATE SURFACING DESIGNS MAY BE PERMITTED FROM A CIVIL ENGINEER CERTIFYING THE DRIVEWAY WILL SUPPORT A 75,000 POUND LOAD AND BE ALL-WEATHER.
6. DRIVEWAYS AT OR ABOVE 3,000 FT ELEVATION: SHALL INCLUDE PARKING AREAS AS SET FORTH IN THE COUNTY'S ZONING CODE.
7. IF IN THE TAHOE BASIN, DRIVEWAY MUST MEET TRPA REQUIREMENTS, AND THE REQUIREMENTS OF THIS STANDARD PLAN WHERE THEY DO NOT CONFLICT.
8. TURN AROUNDS SHALL BE HAMMERHEAD, "T" OR PEAR SHAPED BULB. TURNAROUND WILL BE NO MORE THAN 50' FROM BUILDINGS WHEN DRIVEWAY EXCEEDS 300' IN LENGTH.
9. DRIVEWAYS EXCEEDING 150' IN LENGTH, BUT LESS THAN 800' IN LENGTH, SHALL PROVIDE A TURNOUT NEAR THE MIDPOINT OF THE DRIVEWAY. WHERE THE DRIVEWAY EXCEEDS 800', TURNOUTS SHALL BE PROVIDED NO MORE THAN 400' APART. TURNOUTS SHALL BE SURFACED SAME AS THE DRIVEWAY.
10. BRIDGES AND CULVERTS SHALL BE DESIGNED BY A CIVIL ENGINEER AND SHALL SUPPORT A MINIMUM LOAD OF 75,000 POUNDS. SIGNS SHALL BE POSTED ON BRIDGE WHICH INDICATE THE WEIGHT LIMIT, WIDTH AND HEIGHT RESTRICTIONS. SINGLE LANE BRIDGES REQUIRE TURNOUTS ON EACH SIDE OF THE BRIDGE.
11. GATES SHALL OPEN TO PROVIDE A CLEAR OPENING, AT LEAST 2 FEET WIDER THAN THE DRIVEWAY AND NOT LESS THAN 14 FEET WIDE. GATE TO BE LOCATED 30' MINIMUM FROM THE ROAD, AND OPEN AWAY FROM THE ROAD.
12. ADDRESSES TO BE 4" HIGH WITH 3/8" STROKE WIDTH LETTERS OR NUMBERS, REFLECTORIZED WITH CONTRASTING BACKGROUND AND VISIBLE FROM BOTH DIRECTIONS. MULTIPLE ADDRESSES SHALL BE ON A SINGLE POST.
13. ALL INTERSECTIONS SERVING DWELLING UNITS SHALL HAVE ADDRESS SIGNS THAT CLEARLY IDENTIFY THE LOCATION OF EACH DWELLING UNIT.
14. ADDRESS SIGNS MUST BE CLEARLY VISIBLE ABOVE SNOW HEIGHT. CONTACT THE APPLICABLE FIRE PROTECTION DISTRICT FOR SPECIFIC HEIGHT REQUIREMENTS.
15. FIRE APPARATUS SPACE SHALL BE LOCATED NEXT TO FIRE HYDRANTS, STANDPIPES OR WATER SUPPLY APERTURES.
16. VARIATIONS TO THIS STANDARD MAY ONLY BE APPROVED BY THE FIRE PROTECTION DISTRICT HAVING JURISDICTION.

APPROVED BY:

JAMES W. WARE, P.E. NO. C61036 DATE:
INTERIM DIRECTOR, EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION

BOARD OF SUPERVISOR'S RESOLUTION NO. _____

EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS

RURAL RESIDENTIAL DRIVEWAY

STD. PLAN
RS-68
SHT 2 OF 2

CAL FIRE GUIDELINE

100' DEFENSIBLE SPACE

Make Your Home FIRE SAFE

Why 100 Feet?

Following these simple steps can dramatically increase the chance of your home surviving a wildfire!

A Defensible Space of 100 feet around your home is required by law.[1] The goal is to protect your home while providing a safe area for firefighters.

1 Lean, Clean and Green Zone

– Clearing an area of 30 feet immediately surrounding your home is critical. This area requires the greatest reduction in flammable vegetation.

2 Reduced Fuel Zone

– The fuel reduction zone in the remaining 70 feet (or to property line) will depend on the steepness of your property and the vegetation.

Spacing between plants improves the chance of stopping a wildfire before it destroys your home. You have two options in this area:

a. Create horizontal and vertical spacing between plants. The amount of space will depend on how steep the slope is and the size of the plants.

b. Large trees do not have to be cut and removed as long as all of the plants beneath them are removed. This eliminates a vertical "fire ladder."

When clearing vegetation, use care when operating equipment such as lawnmowers. One small spark may start a fire; a string trimmer is much safer.

Remove all build – up of needles and leaves from your roof and gutters. Keep tree limbs trimmed at least 10 feet from any chimneys and remove dead limbs that hang over your home or garage. The law also requires a screen over your chimney outlet of not more than ½ inch mesh.

1. These regulations affect most of the grass, brush, and timber-covered private lands in the State. Some fire department jurisdictions may have additional requirements. Some activities may require permits for tree removal. Also, some activities may require special procedures for, 1) threatened or endangered species, 2) avoiding erosion, and 3) protection of water quality. Check with local officials if in doubt. Current regulations allow an insurance company to require additional clearance. The area to be treated does not extend beyond your property. The State Board of Forestry and Fire Protection has approved Guidelines to assist you in complying with the new law. Contact your local CDF office for more details.

Fuel Break

State of California
Department of Forestry and Fire Protection

NOTICE OF
FIRE HAZARD INSPECTION

A representative from CAL FIRE has inspected your property for fire hazards. You are hereby notified to correct the violation(s) indicated below.
Failure to correct these violations may result in a citation and fine.

Occupant:	Physical Address:	Phone #:

Occupant Not Home: 1st Attempt: ___/___/___	Occupant Not Home: 2nd Attempt: ___/___/___	Refused Inspection: ___/___/___	For Questions, Contact Inspector at: (___) ___-____	Battalion #:

Roof Construction Combustible/Non-Combustible	Exterior Siding Combustible/Non-Combustible	Window Panes Single Pane/Double Pane	Eaves Enclosed/Unenclosed	Decks or Porches Masonry/Composite/Wood	Location of Structure Flat Ground/Slope/Ridge Top

Checked boxes indicate violations.

Corrected		
☐	2	3	**Defensible Space Zone (within 30 feet of all structures or to property line):**
☐	2	3	A. Remove leaves, needles or other vegetation on roofs, gutters, decks, porches and stairways etc. PRC §4291(a)(6)
☐	2	3	B. Remove all dead trees, shrubs or other plants adjacent to or overhanging buildings. PRC §4291(a)(5)
☐	2	3	C. Remove all dead or dying branches and stems from trees, shrubs or other plants adjacent to or overhanging buildings. PRC §4291(a)(5)
☐	2	3	D. Remove all branches within 10 feet of any stovepipe or chimney outlet. PRC §4291(a)(4)
☐	2	3	E. Remove all dead or dying grass, leaves, needles or other vegetation. PRC §4291(a)(1)
☐	2	3	F. Remove or isolate live flammable ground cover and shrubs (i.e. Bear Clover, Mountain Misery, Juniper etc.). PRC §4291(a)(1)
			Reduced Fuel Zone (within 30 - 100 feet of all structures or to property line):
☐	2	3	G. Mow dead or dying grass to a maximum of 4 inches in height. Trimmings may remain on the ground. PRC §4291(a)(1)
☐	2	3	H. Live flammable ground cover less than 18 inches in height (i.e. Mountain Misery, Bear Clover etc.) may remain, but overhanging and adjacent trees must be pruned up to 15 feet. PRC §4291(a)(1)
☐	2	3	I. Reduce fuels in accordance with the Continuous Tree Canopy Standard (see back). PRC §4291(a)(1)
☐	2	3	J. Reduce fuels in accordance with the Horizontal Spacing Standard (see back). PRC §4291(a)(1)
			Defensible and Reduced Fuel Zone (within 100 feet of all structures or to property line):
☐	2	3	K. Logs or stumps embedded in the soil must be removed or isolated from structures and other vegetation. PRC §4291(a)(1)
☐	2	3	L. Remove all dead or dying brush, trees and branches within 15 feet of the ground. PRC §4291(a)(1)
			Other Requirements:
☐	2	3	M. Clear dead, dying or flammable vegetation within 10 feet around and above propane tanks. CFC §3807.3
☐	2	3	N. Address numbers shall be displayed in contrasting colors (4" Min. Size) and readable from the street or access road. CFC §505.1

Recommendations.

Other Recommendations:

☐ Cover all chimney or stovepipe openings with a metal screen having openings no larger than 1/2 inch.
☐ Clear 10 feet around and 15 feet above fuels (i.e. Woodpiles, lumber, scrap etc.). Move woodpiles as far as possible from structures.
☐ Remove flammable materials stored under decks and similar overhangs of structures.
☐ Clear vegetation 10 feet from sides and 15 feet above all driveways and turnaround areas.

Comments:

Additional Information on Back

Complete only if occupant contacted

1. Inspector:_____ Date:___/___/___ A re-inspection will occur on/after: ___/___/___
2. Inspector:_____ Date:___/___/___ A re-inspection will occur on/after: ___/___/___
3. Inspector:_____ Date:___/___/___

AFU 02/09 (White-Inspector Copy; 1st to Occupant, Pink-2nd to Occupant, Gold-2nd to Occupant)

Continuous Tree Canopy Standard

To achieve defensible space while keeping a larger stand of trees with a continuous tree canopy, adhere to the guidelines below:

- Prune lower branches of trees to a height of 6 to 15 feet from the top of the vegetation below or 1/3 to 1/2 the tree height for trees under 30 feet, whichever is less.
- Remove all ground fuels greater than four inches in height. Single specimens of trees or other vegetation may be kept if they are well spaced, well pruned and create an overall condition that avoids the spread of fire to other vegetation or to structures.

Horizontal Spacing Standard

- Ideally, grass should not exceed four inches in height. In situations where these fuels are isolated from other fuels or where necessary to stabilize soil, grasses may reach a height of 18 inches.
- Clearance between shrubs should be 4 to 40 feet depending on the slope of the land and size and type of vegetation. Check the chart below for an estimation of clearance distance. Any questions regarding requirements for a specific property should be addressed to your local fire official.

Minimum Horizontal Spacing Guidelines		
Slope	Shrubs, Ground Covers & Other Ornamental Plants Space required between clumps of ground cover, plants, bushes, shrubs, seedlings or sapling trees, etc.	Trees Space required between tree canopies
Flat or gentle slope (0% to 20%)	2 times the height of the plant	10 feet
Moderate slope (20% to 40%)	4 times the height of the plant	20 feet
Steep slope (greater than 40%)	6 times the height of the plant	30 feet

PRC §4291(a) A person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material, shall at all times do all of the following:

(1) Maintain defensible space no greater than 100 feet from each side of the structure, but not beyond the property line unless allowed by state law, local ordinance, or regulation and as provided in paragraph (2). The amount of fuel modification necessary shall take into account the flammability of the structure as affected by building material, building standards, location, and type of vegetation. Fuels shall be maintained in a condition so that a wildfire burning under average weather conditions would be unlikely to ignite the structure. This paragraph does not apply to single specimens of trees or other vegetation that are well-pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation. The intensity of fuels management may vary within the 100-foot perimeter of the structure, the most intense being within the first 30 feet around the structure. Consistent with fuels management objectives, steps should be taken to minimize erosion.

(2) A greater distance than that required under paragraph (1) may be required by state law, local ordinance, rule, or regulation. Clearance beyond the property line may only be required if the state law, local ordinance, rule, or regulation includes findings that such a clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure, and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. Clearance on adjacent property shall only be conducted following written consent by the adjacent landowner.

(3) An insurance company that insures an occupied dwelling or occupied structure may require a greater distance than that required under paragraph (1) if a fire expert, designated by the director, provides findings that such a clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure, and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. The greater distance may not be beyond the property line unless allowed by state law, local ordinance, rule, or regulation.

(4) Remove that portion of any tree that extends within 10 feet of the outlet of a chimney or stovepipe.

(5) Maintain any tree, shrub, or other plant adjacent to or overhanging a building free of dead or dying wood.

(6) Maintain the roof of a structure free of leaves, needles, or other vegetative materials.

For additional information on how to comply with defensible space clearance requirements, please visit:
WWW.FIRE.CA.GOV