Appendix G

Noise Attenuation and Traffic Calculations

APPENDIX G

Noise Attenuation and Traffic Calculations

Attenuation of Construction Noise

Assumed Reference Distance (feet)	Reference Noise Level (dBA)	Distance from nearest equipment (X feet)	Noise Level (dBA) at X Feet -- 7.5 dBA attenuation per doubling of distance	Noise Level (dBA) at X Feet -- 6 dBA attenuation per doubling of distance	
50	89	50	89.0	89.0	residences
		300	69.5	73.4	School
		1278	53.8	60.8	
		1300	53.6	60.7	
		2000	48.9	57.0	

APPENDIX G

Traffic Calculations Alternative A

Traffic Noise Level Estimates rev. 3/16/07

ROAD SEGMENT #1: Elverta from SR 99 to E. Levee Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	560	98	549	1	6	1	6	45 72	45 72	45 72	50	4.5	0.0	65.5
Exiosting + Alt A	1,760	98	1,725	1	18	1	18	45 72	45 72	45 72	50	4.5	0.0	70.4
Cum. No Project	1,900	98	1,862	1	19	1	19	45 72	45 72	45 72	50	4.5	0.0	70.8
Cumulative + Project	2,180	98	2,136	1	22	1	22	45 72	45 72	45 72	50	4.5	0.0	71.4
			0		0		0							

ROAD SEGMENT #2: Elverta from E. Levee Road to Palladay Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	700	98	686	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.4
Exiosting + Alt A	2,060	98	2,019	1	21	1	21	45 72	45 72	45 72	50	4.5	0.0	71.1
Cum. No Project	1,680	98	1,646	1	17	1	17	45 72	45 72	45 72	50	4.5	0.0	70.2
Cumulative + Project	2,030	98	1,989	1	20	1	20	45 72	45 72	45 72	50	4.5	0.0	71
			0		0		0							

ROAD SEGMENT #3: Elverta from Palladay Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	720	98	706	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.5
Exiosting + Alt A	2,350	98	2,303	1	24	1	24	45 72	45 72	45 72	50	4.5	0.0	71.7
Cum. No Project	1,880	98	1,842	1	19	1	19	45 72	45 72	45 72	50	4.5	0.0	70.7
Cumulative + Project	2,800	98	2,744	1	28	1	28	45 72	45 72	45 72	50	4.5	0.0	72.4
			0		0		0							

ROAD SEGMENT #4: Elverta from 16th St. to 28th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,040	98	1,019	1	10	1	10	45 72	45 72	45 72	50	4.5	0.0	68.1
Exiosting + Alt A	3,330	98	3,263	1	33	1	33	45 72	45 72	45 72	50	4.5	0.0	73.2
Cum. No Project	2,620	98	2,568	1	26	1	26	45 72	45 72	45 72	50	4.5	0.0	72.2
Cumulative + Project	3,750	98	3,675	1	38	1	38	45 72	45 72	45 72	50	4.5	0.0	73.7
			0		0		0							

ROAD SEGMENT #5: Elverta from 28th St. to Watt Avenue	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,410	98	1,382	1	14	1	14	45 72	45 72	45 72	50	4.5	0.0	69.5
Exiosting + Alt A	3,320	98	3,254	1	33	1	33	45 72	45 72	45 72	50	4.5	0.0	73.2
Cum. No Project	3,260	98	3,195	1	33	1	33	45 72	45 72	45 72	50	4.5	0.0	73.1
Cumulative + Project	4,200	98	4,116	1	42	1	42	45 72	45 72	45 72	50	4.5	0.0	74.2
			0		0		0							

ROAD SEGMENT #6: U St. from Dry Creek Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	30	98	29	1	0	1	0	35 56	35 56	35 56	50	4.5	0.0	48.6
Exiosting + Alt A	140	98	137	1	1	1	1	35 56	35 56	35 56	50	4.5	0.0	56.1
Cum. No Project	630	98	617	1	6	1	6	35 56	35 56	35 56	50	4.5	0.0	62.8
Cumulative + Project	340	98	333	1	3	1	3	35 56	35 56	35 56	50	4.5	0.0	60.1
			0		0		0							

ROAD SEGMENT #7: 9th St. from Elverta Road to U St.

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	50	98	49	1	1	1	1	45 72	45 72	45 72	50	4.5	0.0	55.6
Exiosting + Alt A	320	98	314	1	3	1	3	45 72	45 72	45 72	50	4.5	0.0	63
Cum. No Project	260	98	255	1	3	1	3	45 72	45 72	45 72	50	4.5	0.0	62.2
Cumulative + Project	430	98	421	1	4	1	4	45 72	45 72	45 72	50	4.5	0.0	64.3
			0		0		0							

ROAD SEGMENT #8: Dry Creek Road from Q St. to U St.

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	150	98	147	1	2	1	2	45 72	45 72	45 72	50	4.5	0.0	59.9
Exiosting + Alt A	1,290	98	1,264	1	13	1	13	45 72	45 72	45 72	50	4.5	0.0	69.1
Cum. No Project	690	98	676	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.4
Cumulative + Project	1,220	98	1,196	1	12	1	12	45 72	45 72	45 72	50	4.5	0.0	68.8
			0		0		0							

ROAD SEGMENT #9: 16th St. from Q St. to Elverta Road

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	150	98	147	1	2	1	2	45 72	45 72	45 72	50	4.5	0.0	59.9
Exiosting + Alt A	690	98	676	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.4
Cum. No Project	710	98	696	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.5
Cumulative + Project	720	98	706	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.5
			0		0		0							

ROAD SEGMENT #10: 16th St. from Elverta to County Line

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Medium Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	50	98	49	1	1	1	1	45 72	45 72	45 72	50	4.5	0.0	55.6
Exiosting + Alt A	1,190	98	1,166	1	12	1	12	45 72	45 72	45 72	50	4.5	0.0	68.7
Cum. No Project	1,220	98	1,196	1	12	1	12	45 72	45 72	45 72	50	4.5	0.0	68.8
Cumulative + Project	1,570	98	1,539	1	16	1	16	45 72	45 72	45 72	50	4.5	0.0	70
			0		0		0							

APPENDIX G

Traffic Calculations Alternative B

Traffic Noise Level Estimates rev. 3/16/07

ROAD SEGMENT #1: Elverta from SR 99 to E. Levee Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Heavy Truck %	Heavy Truck HT	VEHICLE SPEED Auto k/h	Auto k/h	MT k/h	MT k/h	HT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	560	98	549	1	6	1	6	45	72	45	72	45	72	50	4.5	0.0	65.5
Existing + Alt B	1,700	98	1,666	1	17	1	17	45	72	45	72	45	72	50	4.5	0.0	69
Cum. No Project	1,900	98	1,862	1	19	1	19	45	72	45	72	45	72	50	4.5	0.0	70.8
Cumulative + Project	2,150	98	2,107	1	22	1	22	45	72	45	72	45	72	50	4.5	0.0	71.3
			0		0		0										

ROAD SEGMENT #2: Elverta from E. Levee Road to Palladay Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto k/h	MT k/h	MT k/h	HT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	700	98	686	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.4
Existing + Alt B	1,950	98	1,911	1	20	1	20	45	72	45	72	45	72	50	4.5	0.0	70.9
Cum. No Project	1,680	98	1,646	1	17	1	17	45	72	45	72	45	72	50	4.5	0.0	70.2
Cumulative + Project	1,990	98	1,950	1	20	1	20	45	72	45	72	45	72	50	4.5	0.0	71
			0		0		0										

ROAD SEGMENT #3: Elverta from Palladay Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto k/h	MT k/h	MT k/h	HT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	720	98	706	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.5
Existing + Alt B	2,220	98	2,176	1	22	1	22	45	72	45	72	45	72	50	4.5	0.0	71.4
Cum. No Project	1,880	98	1,842	1	19	1	19	45	72	45	72	45	72	50	4.5	0.0	70.7
Cumulative + Project	2,780	98	2,724	1	28	1	28	45	72	45	72	45	72	50	4.5	0.0	72.4
			0		0		0										

ROAD SEGMENT #4: Elverta from 16th St. to 28th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto k/h	MT k/h	MT k/h	HT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,040	98	1,019	1	10	1	10	45	72	45	72	45	72	50	4.5	0.0	68.1
Existing + Alt B	3,220	98	3,156	1	32	1	32	45	72	45	72	45	72	50	4.5	0.0	73.1
Cum. No Project	2,620	98	2,568	1	26	1	26	45	72	45	72	45	72	50	4.5	0.0	72.2
Cumulative + Project	3,750	98	3,675	1	38	1	38	45	72	45	72	45	72	50	4.5	0.0	73.7
			0		0		0										

ROAD SEGMENT #5: Elverta from 28th St. to Watt Avenue	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto k/h	MT k/h	MT k/h	HT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,410	98	1,382	1	14	1	14	45	72	45	72	45	72	50	4.5	0.0	69.5
Existing + Alt B	3,230	98	3,165	1	32	1	32	45	72	45	72	45	72	50	4.5	0.0	73.1
Cum. No Project	3,260	98	3,195	1	33	1	33	45	72	45	72	45	72	50	4.5	0.0	73.1
Cumulative + Project	4,180	98	4,096	1	42	1	42	45	72	45	72	45	72	50	4.5	0.0	74.2
			0		0		0										

ROAD SEGMENT #6: U St. from Dry Creek Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto k/h	MT k/h	MT k/h	HT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	30	98	29	1	0	1	0	35	56	35	56	35	56	50	4.5	0.0	48.6
Existing + Alt B	130	98	127	1	1	1	1	35	56	35	56	35	56	50	4.5	0.0	55.8
Cum. No Project	630	98	617	1	6	1	6	35	56	35	56	35	56	50	4.5	0.0	62.8
Cumulative + Project	350	98	343	1	4	1	4	35	56	35	56	35	56	50	4.5	0.0	60.4
			0		0		0										

ROAD SEGMENT #7: 9th St. from Elverta Road to U St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	VEHICLE TYPE % %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto	MT k/h	MT	HT k/h	HT	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	50	98	49	1	1	1	1	45	72	45	72	45	72	50	4.5	0.0	55.6
Existing + Alt B	310	98	304	1	3	1	3	45	72	45	72	45	72	50	4.5	0.0	62.9
Cum. No Project	260	98	255	1	3	1	3	45	72	45	72	45	72	50	4.5	0.0	62.2
Cumulative + Project	400	98	392	1	4	1	4	45	72	45	72	45	72	50	4.5	0.0	64
			0		0		0										

ROAD SEGMENT #8: Dry Creek Road from Q St. to U St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	VEHICLE TYPE % %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto	MT k/h	MT	HT k/h	HT	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	150	98	147	1	2	1	2	45	72	45	72	45	72	50	4.5	0.0	59.9
Existing + Alt B	1,240	98	1,215	1	12	1	12	45	72	45	72	45	72	50	4.5	0.0	68.9
Cum. No Project	690	98	676	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.4
Cumulative + Project	1,210	98	1,186	1	12	1	12	45	72	45	72	45	72	50	4.5	0.0	68.8
			0		0		0										

ROAD SEGMENT #9: 16th St. from Q St. to Elverta Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	VEHICLE TYPE % %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto	MT k/h	MT	HT k/h	HT	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	150	98	147	1	2	1	2	45	72	45	72	45	72	50	4.5	0.0	59.9
Existing + Alt B	670	98	657	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.3
Cum. No Project	710	98	696	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.5
Cumulative + Project	720	98	706	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.5
			0		0		0										

ROAD SEGMENT #10: 16th St. from Elverta to County Line	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	VEHICLE TYPE % %	Medium Truck HT	VEHICLE SPEED Auto k/h	Auto	MT k/h	MT	HT k/h	HT	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	50	98	49	1	1	1	1	45	72	45	72	45	72	50	4.5	0.0	55.6
Existing + Alt B	1,140	98	1,117	1	11	1	11	45	72	45	72	45	72	50	4.5	0.0	68.5
Cum. No Project	1,220	98	1,196	1	12	1	12	45	72	45	72	45	72	50	4.5	0.0	68.8
Cumulative + Project	1,560	98	1,529	1	16	1	16	45	72	45	72	45	72	50	4.5	0.0	69.9
			0		0		0										

APPENDIX G

Traffic Calculations Alternative C

Traffic Noise Level Estimates rev. 3/16/07

ROAD SEGMENT #1: Elverta from SR 99 to E. Levee Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	560	98	549	1	6	1	6	45 72	45 72	45 72	50	4.5	0.0	65.5
Exiosting + Alt C	1,760	98	1,725	1	18	1	18	45 72	45 72	45 72	50	4.5	0.0	70.4
Cum. No Project	1,900	98	1,862	1	19	1	19	45 72	45 72	45 72	50	4.5	0.0	70.8
Cumulative + Project	2,170	98	2,127	1	22	1	22	45 72	45 72	45 72	50	4.5	0.0	71.4
			0		0		0							

ROAD SEGMENT #2: Elverta from E. Levee Road to Palladay Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	700	98	686	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.4
Exiosting + Alt C	2,010	98	1,970	1	20	1	20	45 72	45 72	45 72	50	4.5	0.0	71
Cum. No Project	1,680	98	1,646	1	17	1	17	45 72	45 72	45 72	50	4.5	0.0	70.2
Cumulative + Project	2,030	98	1,989	1	20	1	20	45 72	45 72	45 72	50	4.5	0.0	71
			0		0		0							

ROAD SEGMENT #3: Elverta from Palladay Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	720	98	706	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.5
Exiosting + Alt C	2,300	98	2,254	1	23	1	23	45 72	45 72	45 72	50	4.5	0.0	71.6
Cum. No Project	1,880	98	1,842	1	19	1	19	45 72	45 72	45 72	50	4.5	0.0	70.7
Cumulative + Project	2,760	98	2,705	1	28	1	28	45 72	45 72	45 72	50	4.5	0.0	72.4
			0		0		0							

ROAD SEGMENT #4: Elverta from 16th St. to 28th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,040	98	1,019	1	10	1	10	45 72	45 72	45 72	50	4.5	0.0	68.1
Exiosting + Alt C	3,330	98	3,263	1	33	1	33	45 72	45 72	45 72	50	4.5	0.0	73.2
Cum. No Project	2,620	98	2,568	1	26	1	26	45 72	45 72	45 72	50	4.5	0.0	72.2
Cumulative + Project	3,740	98	3,665	1	37	1	37	45 72	45 72	45 72	50	4.5	0.0	73.7
			0		0		0							

ROAD SEGMENT #5: Elverta from 28th St. to Watt Avenue	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,410	98	1,382	1	14	1	14	45 72	45 72	45 72	50	4.5	0.0	69.5
Exiosting + Alt C	3,320	98	3,254	1	33	1	33	45 72	45 72	45 72	50	4.5	0.0	73.2
Cum. No Project	3,260	98	3,195	1	33	1	33	45 72	45 72	45 72	50	4.5	0.0	73.1
Cumulative + Project	4,150	98	4,067	1	42	1	42	45 72	45 72	45 72	50	4.5	0.0	74.2
			0		0		0							

ROAD SEGMENT #6: U St. from Dry Creek Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	30	98	29	1	0	1	0	35 56	35 56	35 56	50	4.5	0.0	48.6
Exiosting + Alt C	140	98	137	1	1	1	1	35 56	35 56	35 56	50	4.5	0.0	56.1
Cum. No Project	630	98	617	1	6	1	6	35 56	35 56	35 56	50	4.5	0.0	62.8
Cumulative + Project	350	98	343	1	4	1	4	35 56	35 56	35 56	50	4.5	0.0	60.4
			0		0		0							

ROAD SEGMENT #7: 9th St. from Elverta Road to U St.

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	VEHICLE TYPE % Medium Truck %	HT	VEHICLE SPEED Auto k/h		MT k/h		HT k/h		Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	50	98	49	1	1	1	1	45	72	45	72	45	72	50	4.5	0.0	55.6
Exiosting + Alt C	320	98	314	1	3	1	3	45	72	45	72	45	72	50	4.5	0.0	63
Cum. No Project	260	98	255	1	3	1	3	45	72	45	72	45	72	50	4.5	0.0	62.2
Cumulative + Project	430	98	421	1	4	1	4	45	72	45	72	45	72	50	4.5	0.0	64.3
			0		0		0										

ROAD SEGMENT #8: Dry Creek Road from Q St. to U St.

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	VEHICLE TYPE % Medium Truck %	HT	VEHICLE SPEED Auto k/h		MT k/h		HT k/h		Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	150	98	147	1	2	1	2	45	72	45	72	45	72	50	4.5	0.0	59.9
Exiosting + Alt C	1,300	98	1,274	1	13	1	13	45	72	45	72	45	72	50	4.5	0.0	69.1
Cum. No Project	690	98	676	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.4
Cumulative + Project	1,240	98	1,215	1	12	1	12	45	72	45	72	45	72	50	4.5	0.0	68.9
			0		0		0										

ROAD SEGMENT #9: 16th St. from Q St. to Elverta Road

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	VEHICLE TYPE % Medium Truck %	HT	VEHICLE SPEED Auto k/h		MT k/h		HT k/h		Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	150	98	147	1	2	1	2	45	72	45	72	45	72	50	4.5	0.0	59.9
Exiosting + Alt C	700	98	686	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.4
Cum. No Project	710	98	696	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.5
Cumulative + Project	730	98	715	1	7	1	7	45	72	45	72	45	72	50	4.5	0.0	66.6
			0		0		0										

ROAD SEGMENT #10: 16th St. from Elverta to County Line

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	VEHICLE TYPE % Medium Truck %	HT	VEHICLE SPEED Auto k/h		MT k/h		HT k/h		Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	50	98	49	1	1	1	1	45	72	45	72	45	72	50	4.5	0.0	55.6
Exiosting + Alt C	1,200	98	1,176	1	12	1	12	45	72	45	72	45	72	50	4.5	0.0	68.8
Cum. No Project	1,220	98	1,196	1	12	1	12	45	72	45	72	45	72	50	4.5	0.0	68.8
Cumulative + Project	1,560	98	1,529	1	16	1	16	45	72	45	72	45	72	50	4.5	0.0	69.9
			0		0		0										

APPENDIX G

Traffic Calculations Alternative D

Traffic Noise Level Estimates rev. 3/16/07

ROAD SEGMENT #1: Elverta from SR 99 to E. Levee Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Heavy Truck %	Heavy Truck HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	560	98	549	1	6	1	6	45 72	45 72	45 72	50	4.5	0.0	65.5
Exiosting + Alt D	730	98	715	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.6
Cum. No Project	1,900	98	1,862	1	19	1	19	45 72	45 72	45 72	50	4.5	0.0	70.8
Cumulative + Alternative D	2,170	98	2,127	1	22	1	22	45 72	45 72	45 72	50	4.5	0.0	71.4
			0		0		0							

ROAD SEGMENT #2: Elverta from E. Levee Road to Palladay Road	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	700	98	686	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.4
Exiosting + Alt D	900	98	882	1	9	1	9	45 72	45 72	45 72	50	4.5	0.0	67.5
Cum. No Project	1,680	98	1,646	1	17	1	17	45 72	45 72	45 72	50	4.5	0.0	70.2
Cumulative + Alternative D	1,960	98	1,921	1	20	1	20	45 72	45 72	45 72	50	4.5	0.0	70.9
			0		0		0							

ROAD SEGMENT #3: Elverta from Palladay Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	720	98	706	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.5
Exiosting + Alt D	970	98	951	1	10	1	10	45 72	45 72	45 72	50	4.5	0.0	67.9
Cum. No Project	1,880	98	1,842	1	19	1	19	45 72	45 72	45 72	50	4.5	0.0	70.7
Cumulative + Alternative D	2,200	98	2,156	1	22	1	22	45 72	45 72	45 72	50	4.5	0.0	71.4
			0		0		0							

ROAD SEGMENT #4: Elverta from 16th St. to 28th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,040	98	1,019	1	10	1	10	45 72	45 72	45 72	50	4.5	0.0	68.1
Exiosting + Alt D	1,380	98	1,352	1	14	1	14	45 72	45 72	45 72	50	4.5	0.0	69.4
Cum. No Project	2,620	98	2,568	1	26	1	26	45 72	45 72	45 72	50	4.5	0.0	72.2
Cumulative + Alternative D	2,830	98	2,773	1	28	1	28	45 72	45 72	45 72	50	4.5	0.0	72.5
			0		0		0							

ROAD SEGMENT #5: Elverta from 28th St. to Watt Avenue	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,410	98	1,382	1	14	1	14	45 72	45 72	45 72	50	4.5	0.0	69.5
Exiosting + Alt D	1,700	98	1,666	1	17	1	17	45 72	45 72	45 72	50	4.5	0.0	70.3
Cum. No Project	3,260	98	3,195	1	33	1	33	45 72	45 72	45 72	50	4.5	0.0	73.1
Cumulative + Alternative D	3,430	98	3,361	1	34	1	34	45 72	45 72	45 72	50	4.5	0.0	73.3
			0		0		0							

ROAD SEGMENT #6: U St. from Dry Creek Road to 16th St.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Medium Truck Auto	Medium Truck %	Medium Truck MT	Medium Truck %	Medium Truck HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	30	98	29	1	0	1	0	35 56	35 56	35 56	50	4.5	0.0	48.6
Exiosting + Alt D	50	98	49	1	1	1	1	35 56	35 56	35 56	50	4.5	0.0	52.7
Cum. No Project	630	98	617	1	6	1	6	35 56	35 56	35 56	50	4.5	0.0	62.8
Cumulative + Alternative D	660	98	647	1	7	1	7	35 56	35 56	35 56	50	4.5	0.0	63.1
			0		0		0							

ROAD SEGMENT #7: 9th St. from Elverta Road to U St.

	TOTAL # VEHICLES	VEHICLE TYPE % Auto	Medium Truck	MT	Medium Truck	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
		%	Auto	%		%							
Existing	50	98	49	1	1	1	1	45 72	45 72	45 72	50	4.5	0.0	55.6
Exiosting + Alt D	100	98	98	1	1	1	1	45 72	45 72	45 72	50	4.5	0.0	58
Cum. No Project	260	98	255	1	3	1	3	45 72	45 72	45 72	50	4.5	0.0	62.2
Cumulative + Alternative D	300	98	294	1	3	1	3	45 72	45 72	45 72	50	4.5	0.0	62.7
			0		0		0							

ROAD SEGMENT #8: Dry Creek Road from Q St. to U St.

	TOTAL # VEHICLES	VEHICLE TYPE % Auto	Medium Truck	MT	Medium Truck	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
		%	Auto	%		%							
Existing	150	98	147	1	2	1	2	45 72	45 72	45 72	50	4.5	0.0	59.9
Exiosting + Alt D	280	98	274	1	3	1	3	45 72	45 72	45 72	50	4.5	0.0	62.5
Cum. No Project	690	98	676	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.4
Cumulative + Alternative D	720	98	706	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.5
			0		0		0							

ROAD SEGMENT #9: 16th St. from Q St. to Elverta Road

	TOTAL # VEHICLES	VEHICLE TYPE % Auto	Medium Truck	MT	Medium Truck	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
		%	Auto	%		%							
Existing	150	98	147	1	2	1	2	45 72	45 72	45 72	50	4.5	0.0	59.9
Exiosting + Alt D	360	98	353	1	4	1	4	45 72	45 72	45 72	50	4.5	0.0	63.6
Cum. No Project	710	98	696	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.5
Cumulative + Alternative D	800	98	784	1	8	1	8	45 72	45 72	45 72	50	4.5	0.0	67
			0		0		0						

ROAD SEGMENT #10: 16th St. from Elverta to County Line

	TOTAL # VEHICLES	VEHICLE TYPE % Auto	Medium Truck	MT	Medium Truck	HT	VEHICLE SPEED Auto k/h	MT k/h	HT k/h	Distance (feet)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
		%	Auto	%		%							
Existing	50	98	49	1	1	1	1	45 72	45 72	45 72	50	4.5	0.0	55.6
Exiosting + Alt D	700	98	686	1	7	1	7	45 72	45 72	45 72	50	4.5	0.0	66.4
Cum. No Project	1,220	98	1,196	1	12	1	12	45 72	45 72	45 72	50	4.5	0.0	68.8
Cumulative + Alternative D	1,840	98	1,803	1	18	1	18	45 72	45 72	45 72	50	4.5	0.0	70.6
			0		0		0						

Appendix H

Burrowing Owl Survey Recommendations

State of California

Memorandum

: "Div. Chiefs - IFD, BDD, NED, & WMD
Reg. Mgrs. - Regions 1, 2, 3, 4, & 5

Date : October 17, 1995

From : Department of Fish and Game

Subject :
Staff Report on Burrowing Owl Mitigation

I am hereby transmitting the Staff Report on Burrowing Owl Mitigation for your use in reviewing projects (California Environmental Quality Act [CEQA] and others) which may affect burrowing owl habitat. The Staff Report has been developed during the last several months by the Environmental Services Division (ESD) in cooperation with the Wildlife Management Division (WMD) and regions 1, 2, and 4. It has been sent out for public review and redrafted as appropriate.

Either the mitigation measures in the staff report may be used or project specific measures may be developed. Alterative project specific measures proposed by the Department divisions/regions or by project sponsors will also be considered. However, such mitigation measures must be submitted to ESD for review. The review process will focus on the consistency of the proposed measure with Department, Fish and Game Commission, and legislative policy and with laws regarding raptor species. ESD will coordinate project specific mitigation measure review with WMD.

If you have any questions regarding the report, please contact Mr. Ron Rempel, Supervising Biologist, Environmental Services Division, telephone (916) 654-9980.

COPY Original signed by C.F. Raysbrook

C. F. Raysbrook
Interim Director

Attachment

cc: Mr. Ron Rempel
Department of Fish and Game
Sacramento

STAFF REPORT ON BURROWING OWL MITIGATION

Introduction

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates to protect native species of fish and wildlife. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to burrowing owls *(Speotyto cunicularia;* A.O.U. 1991) staff (WMD, ESD, and Regions) has prepared this report. To ensure compliance with legislative and commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); and (2) other authorizations the Department gives to project proponents for projects impacting burrowing owls.

This report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes preapproved mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature,. the Fish and Game Commission and the Department's public trust responsibilities. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation of burrowing owls and should compliment multi-species habitat conservation planning efforts currently underway. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* developed by The California Burrowing Owl Consortium (CBOC 1993) were taken into consideration in the preparation of this staff report as were comments from other interested parties.

A range-wide conservation strategy for this species is needed. Any range-wide conservation strategy should establish criteria for avoiding the need to list the species pursuant to either the California or federal Endangered Species Acts through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific efforts.

California's burrowing owl population is clearly declining and, if declines continue, the species may qualify for listing. Because of the intense pressure for urban development within suitable burrowing owl nesting and foraging habitat (open, flat and gently rolling grasslands and grass/shrub lands) in California, conflicts between owls and development projects often occur. Owl survival can be adversely affected by disturbance and foraging habitat loss even when impacts to individual birds and nests/burrows are avoided. Adequate information about the presence of owls is often unavailable prior to project approval. Following project approval there is no legal mechanism through which to seek mitigation other than avoidance of occupied burrows or nests. The absence of standardized survey methods often impedes consistent impact assessment.

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by detecting a burrowing owl, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

CEQA Project Review

The measures included in this report are intended to provide a decision-making process that should be implemented whenever-there is potential for-an action or project to adversely affect burrowing owls. For projects subject to the California Environmental Quality Act (CEQA), the process begins by conducting surveys to determine if burrowing owls are foraging or nesting on or adjacent to the project site. If surveys confirm that the site is occupied habitat, mitigation measures to minimize impacts to burrowing owls, their burrows and foraging habitat should be incorporated into the CEQA document as enforceable conditions. The measures in this document are intended to conserve the species by protecting and maintaining viable' populations of the species throughout their range in California. This may often result in protecting and managing habitat for the species at sites away from rapidly urbanizing/developing areas. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances.

Projects not subject to CEQA review may have to be handled separately since the legal authority the Department has with respect to burrowing owls in this type of situation is often limited. The burrowing owl is protected from "take" (Section 3503.5 of the Fish and Game Code) but unoccupied habitat is likely to be lost for activities not subject to CEQA.

Legal Status

The burrowing owl is a migratory species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. To avoid violation of the take provisions of these laws generally requires that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle (February 1 to August 31). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered "take"' and is potentially punishable by fines and/or imprisonment.

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or "rare" regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 2103; Guidelines 15380, 15064, 15065). To be legally adequate, mitigation measures must be capable of "avoiding the impact altogether by not taking a certain action or parts of an action"; "minimizing impacts by limiting the degree or magnitude of the action and its implementation"; "rectifying the impact by repairing, rehabilitating or restoring the impacted environment"; "or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action" (Guidelines, Section 15370). Avoidance or mitigation to reduce impacts to less than significant levels must be included in a project or the CEQA lead agency must make and justify findings of overriding considerations.

Impact Assessment

Habitat Assessment

The project site and a 150 meter (approximately 500 ft.) buffer (where possible and appropriate based on habitat) should be surveyed to assess the presence of burrowing owls and their habitat (Thomsen 1971, Martin 1973). If occupied habitat is detected on or adjacent to the site, measures to avoid, minimize, or mitigate the project's impacts to the species should be incorporated into the project, including burrow preconstruction surveys to ensure avoidance of direct take. It is also recommended that preconstruction surveys be conducted if the species was not detected but is likely to occur on the project site.

Burrowing Owl and Burrow Surveys

Burrowing owl and burrow surveys should be conducted during both the wintering and nesting seasons, unless the species is detected on the first survey. If possible, the winter survey should be conducted between December 1 and January 31 (when wintering owls are most likely to be present) and the nesting season survey should be conducted between April 15 and July 15 (the peak of the breeding season). Surveys conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise, are also preferable.

Surveys should be conducted by walking suitable habitat on the entire project site and (where possible) in areas within 150 meters (approx. 500 ft.) of the project impact zone. The 150-meter buffer zone is surveyed to identify burrows and owls outside of the project area which may be impacted by factors -such as noise and vibration (heavy equipment, etc.) during project construction. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To effectively survey large projects (100 acres or larger), two or more surveyors should be used to walk adjacent transects. To avoid impacts to owls from surveyors, owls and/or occupied burrows should be avoided by a minimum of 50 meters (approx. 160 ft.) wherever practical. Disturbance to occupied burrows should be avoided during all seasons.

Definition of Impacts

The following should be considered impacts to the species:

- Disturbance within 50 meters (approx. 160 ft.) Which may result in harassment of owls at occupied burrows;
- Destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and
- Destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s).

Written Report

A report for the project should be prepared for the Department and copies should be submitted to the Regional contact and to the Wildlife Management Division Bird and Mammal Conservation Program. The report should include the following information:

- Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;

- Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);

- Assessment of habitat suitability for burrowing owls;

- Map and photographs of the site;

- Results of transect surveys including a map showing the location of all burrow(s) (natural or artificial) and owl(s), including the numbers at each burrow if present and tracks, feathers, pellets, or other items (prey remains, animal scat);

- Behavior of owls during the surveys;

- Summary of both winter and nesting season surveys including any productivity information and a map showing territorial boundaries and home ranges; and

- Any historical information (Natural Diversity Database, Department regional files? Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site.

Mitigation

The objective of these measures is to avoid and minimize impacts to burrowing owls at a project site and preserve habitat that will support viable owls populations. If burrowing owls are detected using the project area, mitigation measures to minimize and offset the potential impacts should be included as enforceable measures during the CEQA process.

Mitigation actions should be carried out from September 1 to January 31 which is prior to the nesting season (Thomsen 1971, Zam 1974). Since the timing of nesting activity may vary with latitude and climatic conditions, this time frame should be adjusted accordingly. Preconstruction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional, burrowing owls have established territories since the initial surveys. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.

Although the mitigation measures may be included as enforceable project conditions in the CEQA process, it may also be desirable to formalize them in a Memorandum of Understanding (MOU) between the Department and the project sponsor. An MOU is needed when lands (fee title or conservation easement) are being transferred to the Department.

Specific Mitigation Measures

1. Occupied burrows should not be disturbed during the nesting season (February 1 through August 3 1) unless a qualified biologist approved by the Department verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

2. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat (calculated on a 100 m {approx. 300 ft.} foraging radius around the burrow) per pair or unpaired resident bird, should be acquired and permanently protected. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to the Department. *Protection of additional habitat acreage per pair or unpaired resident bird may be applicable in some instances.* The CBOC has also developed mitigation guidelines (CBOC 1993) that can be incorporated by CEQA lead agencies and which are consistent with this staff report.

3. When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. One example of an artificial burrow design is provided in Attachment A.

4. If owls must be moved away from the disturbance area, passive relocation techniques (as described below) should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to alternate burrows.

5. The project sponsor should provide funding for long-term management and monitoring of the protected lands. The monitoring plan should include success criteria, remedial measures, and an annual report to the Department.

Impact Avoidance

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approx. 160 ft.) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approx. 250 ft.) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be *permanently* preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department.

Passive Relocation - With One-Way Doors

Owls should be excluded from burrows in the immediate impact zone and within a 50 meter (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to insure owls have left the burrow before excavation. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily for one* week to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

Passive Relocation - Without One-Way Doors

Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily until the owls have relocated to the new burrows.* The formerly occupied burrows may then. be excavated. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

Projects Not Subject to CEQA

The Department is often contacted regarding the presence of burrowing owls on construction sites, parking lots and other areas for which there is no CEQA action or for which the CEQA process has been completed. In these situations, the Department should seek to reach agreement with the project sponsor to implement the specific mitigation measures described above. If they are unwilling to do so, passive relocation without the aid of one-way doors is their only option based upon Fish and Game Code 3503.5.

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Reproductive Success of Burrowing Owls Using Artificial Nest Burrows in Southeastern Idaho

by Bruce Olenick

Artificial nest burrows were implanted in southeastern Idaho f'or burrowing owls in the spring of 1986. These artificial burrows consisted of a 12" x 12" x 8" wood nesting chamber with removable top and a 6 foot corrugated and perforated plastic drainage pipe 6 inches in diameter (Fig. 1). Earlier investigators claimed that artificial burrows must provide a natural dirt floor to allow burrowing owls to modify the nesting tunnel and chamber. Contrary to this, the artificial burrow introduced here does not allow owls to modify the entrance or tunnel. The inability to change the physical dimensions of the burrow tunnel does not seem to reflect the owls' breeding success or deter them from using this burrow design.

In 1936, 22 artificial burrows were inhabited. Thirteen nesting attempts yielded an average clutch size of 8.3 eggs per breeding pair. Eight nests successfully hatched at least 1 nestling. In these nests, *67 of 75* eggs hatched (59.3%) and an estimated 61 nestlings (91.0%) fledged. An analysis of the egg laying and incubation periods showed that incubation commenced well after egg laying bega. Average clutch size at the start of incubation was 5.6 eggs. Most eggs tended to hatch synchronously in all successful nests.

Although the initial cost of constructing this burrow design may be slightly higher than a burrow consisting entirely of wood, the plastic pipe burrow offers the following advantages: (1) it lasts several field seasons without rotting or collapsing; (2) it may prevent or retard predation; (3) construction time is minimal; (4) it is easy to transport, especially over long distances; and (5) the flexible tunnel simplifies installation. The use of this artificial nest burrow design was highly successful and may prove to be a great resource technique for future management of this species.

For additional information on constructing this artificial nest burrow, contact Bruce Olenick, Department of Biology, Idaho State University, Pocatello, ID 83209.

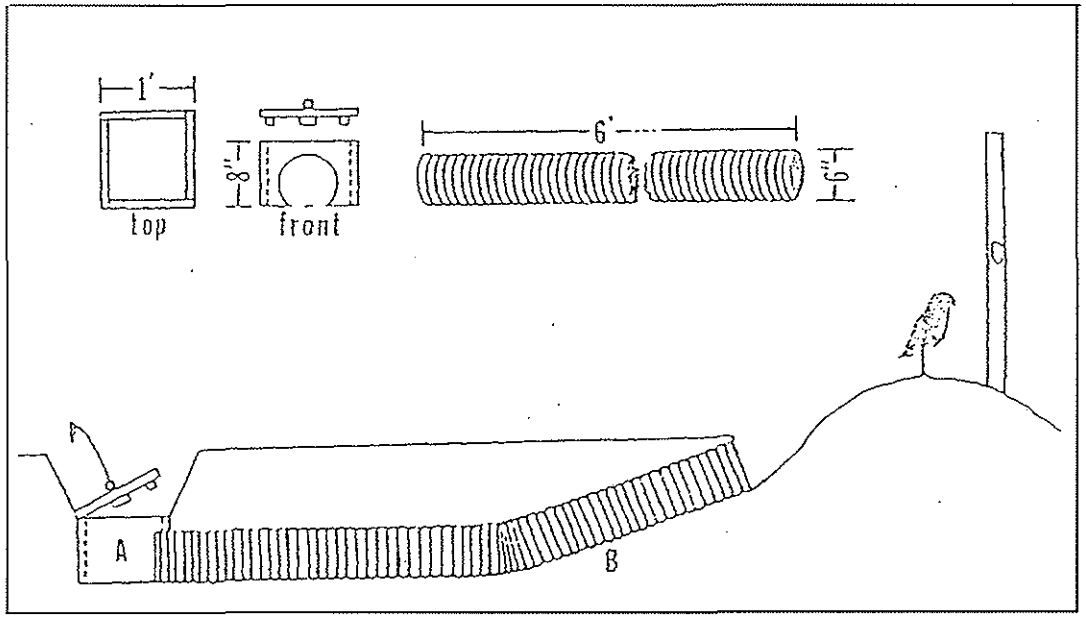

fig. 1 Artificial nest burrow design for burrowing owls Entire unit (including nest chamber) is buried 12" -- 18" below ground for maintaining thermal stability of the nest chamber. A= nest chamber, B = plastic pipe. C = perch.

ATTACHMENT A

Appendix I

Swainson's Hawk Survey Recommendations

State of California

Memorandum

To : Div. Chiefs - IFD, BDD, NHD, WMD
Reg. Mgrs. - Regions 1, 2, 3, 4

Date : November 8, 1994

From : Department of Fish and Game

Subject: Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California

I am hereby transmitting the Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California for your use in reviewing projects (California Environmental Quality Act [CEQA] and others) and in developing 2081 Management Authorizations and 2090 Biological Opinions which may affect Swainson's hawk habitat in the Central Valley. The staff report has been developed during the last 18 months by the Environmental Services Division (ESD) in cooperation with the Wildlife Management Division (WMD) and Regions 1, 2, and 4. It has been sent out for public review on several occasions and redrafted as appropriate.

Either the mitigation measures in the staff report may be used or project specific measures may be developed. Alternative project specific mitigation measures proposed by the Department Divisions/Regions or by project sponsors will also be considered. However, such mitigation measures must be submitted to ESD for review. The review process will focus on the consistency of the proposed measure with Department, Fish and Game Commission, and legislative policy and with laws regarding raptors and listed species. ESD will coordinate project specific mitigation measure review with WMD.

If you have any questions regarding the report, please contact Mr. Ron Rempel, Program Supervisor, Habitat Conservation Planning and Endangered Species Permitting, Environmental Services Division at (916) 654-9980.

COPY Original signed by
A. Petrovich, Jr.
For
Boyd Gibbons
Direction

Enclosure

cc: Mr. Ron Rempel
Department of Fish and Game
Sacramento

file; d, exfile, esd, chron
Vouchilas/seh/pdl SRPBUTEO.DS1

Staff Report regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California

INTRODUCTION

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates which, if implemented, are intended to help stabilize and reverse dramatic population declines of threatened and endangered species. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to Swainson's hawks in the Central Valley, Staff (WMD, ESD and Regions) has prepared this report. To ensure compliance with legislative and Commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); (2) Fish and Game Code Section 2081 Management Authorizations (Management Authorizations); and (3) Fish and Game Code Section 2090 Consultations with State CEQA Lead Agencies.

The report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes "model" mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature and Fish and Game Commission. Alternative mitigation measures, tailored to specific projects, may be developed if consistent with this report. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation goals for the Swainson's hawk and should complement multi-species habitat conservation planning efforts currently underway.

The Department is preparing a recovery plan for the species and it is anticipated that this report will be revised to incorporate recovery plan goals. It is anticipated that the recovery plan will be completed by the end of 1995. The Swainson's hawk recovery plan will establish criteria for species recovery through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific recovery efforts.

During project review the Department should consider whether a proposed project will adversely affect suitable foraging habitat within a ten (10) mile radius of an active (used during one or more of the last 5 years) Swainson's hawk nest(s). Suitable Swainson's hawk foraging habitat will be those habitats and crops identified in Bechard (1983), Bloom (1980), and Estep (1989). The following vegetation types/agricultural crops are considered small mammal and insect foraging habitat

for Swainson's hawks:

- alfalfa
- fallow fields
- beet, tomato, and other low-growing row or field crops
- dry-land and irrigated pasture
- rice land (when not flooded)
- cereal grain crops (including corn after harvest)

The ten mile radius standard is the flight distance between active (and successful) nest sites and suitable foraging habitats, as documented in telemetry studies (Estep 1989, Babcock 1993). Based on the ten mile radius, new development projects which adversely modify nesting and/or foraging habitat should mitigate the project's impacts to the species. The ten mile foraging radius recognizes a need to strike a balance between the biological needs of reproducing pairs (including eggs and nestlings) and the economic benefit of development(s) consistent with Fish and Game Code Section 2053.

Since over 95% of Swainson's hawk nests occur on private land, the Department's mitigation program should include incentives that preserve agricultural lands used for the production of crops, which are compatible with Swainson's hawk foraging needs, while providing an opportunity for urban development and other changes in land use adjacent to existing urban areas.

LEGAL STATUS

Federal

The Swainson's hawk is a migratory bird species protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in Section 50 of the Code of Federal Regulations (C.F.R.) Part 10, including feathers or other parts, nests, eggs or products, except as allowed by implementing regulations (50 C.F.R. 21).

State

The Swainson's hawk has been listed as a threatened species by the California Fish and Game Commission pursuant to the California Endangered Species Act (CESA), see Title 14, California Code of Regulations, Section 670.5(b)(5)(A).

LEGISLATIVE AND COMMISSION POLICIES, LEGAL MANDATES AND STANDARDS

The FGC policy for threatened species is, in part, to: "Protect and preserve all native species...and their habitats...." This policy also directs the Department to work with all interested persons to protect and preserve sensitive resources and their habitats. Consistent with this policy and direction, the Department is enjoined to implement measures that assure protection for the Swainson's hawk.

The California State Legislature, when enacting the provisions of CESA, made the following findings and declarations in Fish and Game Code Section 2051:

> a) "Certain species of fish, wildlife, and plants have been rendered extinct as a consequence of man's activities, untempered by adequate concern and conservation";
>
> b) "Other species of fish, wildlife, and plants are in danger of, or threatened with, extinction because their habitats are threatened with destruction, adverse modification, or severe curtailment because of overexploitation, disease, predation, or other factors (emphasis added)";and
>
> c) "These species of fish, wildlife, and plants are of ecological, educational, historical, recreational, esthetic, economic, and scientific value to the people of this state, and the conservation, protection, and enhancement of these species and their habitat is of statewide concern" (emphasis added).

The Legislature also proclaimed that it "is the policy of the state to conserve, protect, restore, and enhance any endangered or threatened species and its habitat and that it is the intent of the Legislature, consistent with conserving the species, to acquire lands for habitat for these species" (emphasis added).

Section 2053 of the Fish and Game Code states, in part, "it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species and or its habitat which would prevent jeopardy" (emphasis added).

Section 2054 states "The Legislature further finds and declares that, in the event specific economic, social, and or other conditions make infeasible such alternatives, individual projects may be approved if appropriate mitigation and enhancement measures are provided" (emphasis added).

Loss or alteration of foraging habitat or nest site disturbance which results in:

(1) nest abandonment; (2) loss of young; (3) reduced health and vigor of eggs and/or nestlings (resulting in reduced survival rates), may ultimately result in the take (killing) of nestling or fledgling Swainson's hawks incidental to otherwise lawful activities. The taking of Swainson's hawks in this manner can be a violation of Section 2080 of the Fish and Game Code. This interpretation of take has been judicially affirmed by the landmark appellate court decision pertaining to CESA (DFG v. ACID, 8 CA App.4, 41554). The essence of the decision emphasized that the intent and purpose of CESA applies to all activities that take or kill endangered or threatened species, even when the taking is incidental to otherwise legal activities. To avoid potential violations of Fish and Game Code Section 2080, the Department recommends and encourages project sponsors to obtain 2081 Management Authorizations for their projects.

Although this report has been prepared to assist the Department in working with the development community, the prohibition against take (Fish and Game Code Section 2080) applies to all persons, including those engaged in agricultural activities and routine maintenance of facilities. In addition, sections 3503, 3503.5, and 3800 of the Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs.

To avoid potential violation of Fish and Game Code Section 2080 (i.e. killing of a listed species), project-related disturbance at active Swainson's hawk nesting sites should be reduced or eliminated during critical phases of the nesting cycle (March 1 - September 15 annually). Delineation of specific activities which could cause nest abandonment (take) of Swainson's hawk during the nesting period should be done on a case-by-case basis.

CEQA requires a mandatory findings of significance if a project's impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 21083, Guidelines Sections 15380, 15064, 15065). Impacts must be avoided or mitigated to less than significant levels unless the CEQA Lead Agency makes and supports findings of Overriding Consideration. The CEQA Lead Agency's Findings of Overriding Consideration does not eliminate the project sponsor's obligation to comply with Fish and Game Code Section 2080.

NATURAL HISTORY

The Swainson's hawk (*Buteo swainsoni*) is a large, broad winged buteo which frequents open country. They are about the same size as a red-tailed hawk (*Buteo jamaicensis*), but trimmer, weighing approximately 800-1100 grams (1.75 - 2 lbs). They have about a 125 cm. (4+foot) wingspan. The basic body plumage may be highly variable and is characterized by several color morphs - light, dark, and rufous. In dark phase birds, the entire body of the bird may be sooty black. Adult birds generally have dark backs. The ventral or underneath sections may be light with a characteristic dark, wide "bib" from the lower throat down to the upper

breast, light colored wing linings and pointed wing tips. The tail is gray ventrally with a subterminal dusky band, and narrow, less conspicuous barring proximally. The sexes are similar in appearance; females however, are slightly larger and heavier than males, as is the case in most sexually dimorphic raptors. There are no recognized subspecies (Palmer 1988).

The Swainson's hawk is a long distance migrator. The nesting grounds occur in northwestern Canada, the western U.S., and Mexico and most populations migrate to wintering grounds in the open pampas and agricultural areas of South America (Argentina, Uruguay, southern Brazil). The species is included among the group of birds known as "neotropical migrants". Some individuals or small groups (20-30 birds) may winter in the U.S., including California (Delta Islands). This round trip journey may exceed 14,000 miles. The birds return to the nesting grounds and establish nesting territories in early March.

Swainson's hawks are monogamous and remain so until the loss of a mate (Palmer 1988). Nest construction and courtship continues through April. The clutch (commonly 3-4 eggs) is generally laid in early April to early May, but may occur later. Incubation lasts 34-35 days, with both parents participating in the brooding of eggs and young. The young fledge (leave the nest) approximately 42-44 days after hatching and remain with their parents until they depart in the fall. Large groups (up to 100+ birds) may congregate in holding areas in the fall and may exhibit a delayed migration depending upon forage availability. The specific purpose of these congregation areas is as yet unknown, but is likely related to: increasing energy reserves for migration; the timing of migration; aggregation into larger migratory groups (including assisting the young in learning migration routes); and providing a pairing and courtship opportunity for unattached adults.

Foraging Requirements

Swainson's hawk nests in the Central Valley of California are generally found in scattered trees or along riparian systems adjacent to agricultural fields or pastures. These open fields and pastures are the primary foraging areas. Major prey items for Central Valley birds include: California voles (*Microtus californicus*), valley pocket gophers (*Thomomys bottae*), deer mice (*Peromyscus maniculatus*), California ground squirrels (*Spermophilus beecheyi*), mourning doves (*Zenaida macroura*), ring-necked pheasants (*Phasianus colchicus*), meadowlarks (*Sturnella neglecta*), other passerines, grasshoppers (*Conocephalinae* sp.), crickets (*Gryllidae* sp.), and beetles (Estep 1989). Swainson's hawks generally search for prey by soaring in open country and agricultural fields similar to northern hariers (*Circus cyaneus*) and ferruginous hawks (*Buteo regalis*). Often several hawks may be seen foraging together following tractors or other farm equipment capturing prey escaping from farming operations. During the breeding season, Swainson's hawks eat mainly vertebrates (small rodents and reptiles), whereas during migration vast numbers of insects are consumed (Palmer 1988).

Department funded research has documented the importance of suitable foraging habitats (e.g., annual grasslands, pasture lands, alfalfa and other hay crops, and combinations of hay, grain and row crops) within an energetically efficient flight distance from active Swainson's hawk nests (Estep pers. comm.). Recent telemetry studies to determine foraging requirements have shown that birds may use in excess of 15,000 acres of habitat or range up to 18.0 miles from the nest in search of prey (Estep 1989, Babcock 1993). The prey base (availability and abundance) for the species is highly variable from year to year, with major prey population (small mammals and insects) fluctuations occurring based on rainfall patterns, natural cycles and agricultural cropping and harvesting patterns. Based on these variables, significant acreages of potential foraging habitat (primarily agricultural lands) should be preserved per nesting pair (or aggregation of nesting pairs) to avoid jeopardizing existing populations. Preserved foraging areas should be adequate to allow additional Swainson's hawk nesting pairs to successfully breed and use the foraging habitat during good prey production years.

Suitable foraging habitat is necessary to provide an adequate energy source for breeding adults, including support of nestlings and fledglings. Adults must achieve an energy balance between the needs of themselves and the demands of nestlings and fledglings, or the health and survival of both may be jeopardized. If prey resources are not sufficient, or if adults must hunt long distances from the nest site, the energetics of the foraging effort may result in reduced nestling vigor with an increased likelihood of disease and/or starvation. In more extreme cases, the breeding pair, in an effort to assure their own existence, may even abandon the nest and young (Woodbridge 1985).

Prey abundance and availability is determined by land and farming patterns including crop types, agricultural practices and harvesting regimes. Estep (1989) found that 73.4% of observed prey captures were in fields being harvested, disced, mowed, or irrigated. Preferred foraging habitats for Swainson's hawks include:

- alfalfa;
- fallow fields;
- beet, tomato, and other low-growing row or field crops;
- dry-land and irrigated pasture;
- rice land (during the non-flooded period); and
- cereal grain crops (including corn after harvest).

Unsuitable foraging habitat types include crops where prey species (even if present) are not available due to vegetation characteristics (e.g. vineyards, mature orchards, and cotton fields, dense vegetation).

Nesting Requirements

Although the Swainson's hawk's current nesting habitat is fragmented and unevenly distributed, Swainson's hawks nest throughout most of the Central Valley floor. More than 85% of the known nests in the Central Valley are within riparian systems in Sacramento, Sutter, Yolo, and San Joaquin counties. Much of the potential nesting habitat remaining in this area is in riparian forests, although isolated and roadside trees are also used. Nest sites are generally adjacent to or within easy flying distance to alfalfa or hay fields or other habitats or agricultural crops which provide an abundant and available prey source. Department research has shown that valley oaks (*Quercus lobata*), Fremont's cottonwood (*Populus fremontii*), willows (*Salix* spp.), sycamores (*Platanus* spp.), and walnuts (*Juglans* spp.) are the preferred nest trees for Swainson's hawks (Bloom 1980, Schlorff and Bloom 1983, Estep 1989).

Fall and Winter Migration Habitats

During their annual fall and winter migration periods, Swainson's hawks may congregate in large groups (up to 100+ birds). Some of these sites may be used during delayed migration periods lasting up to three months. Such sites have been identified in Yolo, Tulare, Kern and San Joaquin counties and protection is needed for these critical foraging areas which support birds during their long migration.

Historical and Current Population Status

The Swainson's hawk was historically regarded as one of the most common and numerous raptor species in the state, so much so that they were often not given special mention in field notes. The breeding population has declined by an estimated 91% in California since the turn of the century (Bloom 1980). The historical Swainson's hawk population estimates are based on current densities and extrapolated based on the historical amount of available habitat. The historical population estimate is 4,284-17,136 pairs (Bloom 1980). In 1979, approximately 375 ($\pm$ 50) breeding pairs of Swainson's hawks were estimated in California, and 280 (75%) of those pairs were estimated to be in the Central Valley (Bloom 1980). In 1988, 241 active breeding pairs were found in the Central Valley, with an additional 78 active pairs known in northeastern California. The 1989 population estimate was 430 pairs for the Central Valley and 550 pairs statewide (Estep, 1989). This difference in population estimates is probably a result of increased survey effort rather than an actual population increase.

Reasons for decline

The dramatic Swainson's hawk population decline has been attributed to loss of

native nesting and foraging habitat, and more recently to the loss of suitable nesting trees and the conversion of agricultural lands. Agricultural lands have been converted to urban land uses and incompatible crops. In addition, pesticides, shooting, disturbance at the nest site, and impacts on wintering areas may have contributed to their decline. Although losses on the wintering areas in South America may occur, they are not considered significant since breeding populations outside of California are stable. The loss of nesting habitat within riparian areas has been accelerated by flood control practices and bank stabilization programs. Smith (1977) estimated that in 1850 over 770,000 acres of riparian habitat were present in the Sacramento Valley. By the mid-1980s, Warner and Hendrix (1984) estimated that there was only 120,000 acres of riparian habitat remaining in the Central Valley (Sacramento and San Joaquin Valleys combined). Based on Warner and Hendrix's estimates approximately 93% of the San Joaquin Valley and 73% of the Sacramento Valley riparian habitat has been eliminated since 1850.

MANAGEMENT STRATEGIES

Management and mitigation strategies for the Central Valley population of the Swainson's hawk should ensure that:

- suitable nesting habitat continues to be available (this can be accomplished by protecting existing nesting habitat from destruction or disturbance and by increasing the number of suitable nest trees); and

- foraging habitat is available during the period of the year when Swainson's hawks are present in the Central Valley (this should be accomplished by maintaining or creating adequate and suitable foraging habitat in areas of existing and potential nest sites and along migratory routes within the state).

A key to the ultimate success in meeting the Legislature's goal of maintaining habitat sufficient to preserve this species is the implementation of these management strategies in cooperation with project sponsors and local, state and federal agencies.

DEPARTMENT'S ROLES AND RESPONSIBILITIES IN PROJECT CONSULTATION AND ADMINISTRATION OF CEQA AND THE FISH AND GAME CODE

The Department, through its administration of the Fish and Game Code and its trust responsibilities, should continue its efforts to minimize further habitat destruction and should seek mitigation to offset unavoidable losses by (1) including the mitigation measures in this document in CEQA comment letters and/or as

management conditions in Department issued Management Authorizations or (2) by developing project specific mitigation measures (consistent with the Commission's and the Legislature's mandates) and including them in CEQA comment letters and/or as management conditions in Fish and Game Code Section 2081 Management Authorizations issued by the Department and/or in Fish and Game Code Section 2090 Biological Opinions.

The Department should submit comments to CEQA Lead Agencies on all projects which adversely affect Swainson's hawks. CEQA requires a mandatory findings of significance if a project's impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 21083. Guidelines 15380, 15064, 15065). Impacts must be: (1) avoided; or (2) appropriate mitigation must be provided to reduce impacts to less than significant levels; or (3) the lead agency must make and support findings of overriding consideration. If the CEQA Lead Agency makes a Finding of Overriding Consideration, it does not eliminate the project sponsor's obligation to comply with the take prohibitions of Fish and Game Code Section 2080. Activities which result in (1) nest abandonment; (2) starvation of young; and/or (3) reduced health and vigor of eggs and nestlings may result in the take (killing) of Swainson's hawks incidental to otherwise lawful activities (urban development, recreational activities, agricultural practices, levee maintenance and similar activities. The taking of Swainson's hawk in this manner may be a violation of Section 2080 of the Fish and Game Code. To avoid potential violations of Fish and Game Code Section 2080, the Department should recommend and encourage project sponsors to obtain 2081 Management Authorizations.

In aggregate, the mitigation measures incorporated into CEQA comment letters and/or 2081 Management Authorizations for a project should be consistent with Section 2053 and 2054 of the Fish and Game Code. Section 2053 states, in part, "it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species and or its habitat which would prevent jeopardy" . Section 2054 states: "The Legislature further finds and declares that, in the event specific economic, social, and or other conditions make infeasible such alternatives, individual projects may be approved if appropriate mitigation and enhancement measures are provided."

State lead agencies are required to consult with the Department pursuant to Fish and Game Code Section 2090 to ensure that any action authorized, funded, or carried out by that state agency will not jeopardize the continued existence of any threatened or endangered species. Comment letters to State Lead Agencies should also include a reminder that the State Lead Agency has the responsibility to consult with the Department pursuant to Fish and Game Code Section 2090 and obtain a written findings (Biological Opinion). Mitigation measures included in Biological Opinions issued to State Lead Agencies must be consistent with Fish and Game

Code Sections 2051-2054 and 2091-2092.

NEST SITE AND HABITAT LOCATION INFORMATION SOURCES

The Department's Natural Diversity Data Base (NDDB) is a continually updated, computerized inventory of location information on the State's rarest plants, animals, and natural communities. Department personnel should encourage project proponents and CEQA Lead Agencies, either directly or through CEQA comment letters, to purchase NDDB products for information on the locations of Swainson's hawk nesting areas as well as other sensitive species. The Department's Nongame Bird and Mammal Program also maintains information on Swainson's hawk nesting areas and may be contacted for additional information on the species.

Project applicants and CEQA Lead Agencies may also need to conduct site specific surveys (conducted by qualified biologists at the appropriate time of the year using approved protocols) to determine the status (location of nest sites, foraging areas, etc.) of listed species as part of the CEQA and 2081 Management Authorization process. Since these studies may require multiple years to complete, the Department shall identify any needed studies at the earliest possible time in the project review process. To facilitate project review and reduce the potential for costly project delays, the Department should make it a standard practice to advise developers or others planning projects that may impact one or more Swainson's hawk nesting or foraging areas to initiate communication with the Department as early as possible .

MANAGEMENT CONDITIONS

Staff believes the following mitigation measures (nos. 1-4) are adequate to meet the Commission's and Legislature's policy regarding listed species and are considered as preapproved for incorporation into any Management Authorizations for the Swainson's hawk issued by the Department. The incorporation of measures 1-4 into a CEQA document should reduce a project's impact to a Swainson's hawk(s) to less than significant levels. Since these measures are Staff recommendations, a project sponsor or CEQA Lead agency may choose to negotiate project specific mitigation measures which differ. In such cases, the negotiated Management Conditions must be consistent with Commission and Legislative policy and be submitted to the ESD for review and approval prior to reaching agreement with the project sponsor or CEQA Lead Agency.

Staff recommended Management Conditions are:

1. No intensive new disturbances (e.g. heavy equipment operation associated with construction, use of cranes or draglines, new rock crushing

activities) or other project related activities which may cause nest abandonment or forced fledging, should be initiated within 1/4 mile (buffer zone) of an active nest between March 1 - September 15 or until August 15 if a Management Authorization or Biological Opinion is obtained for the project. The buffer zone should be increased to 1/2 mile in nesting areas away from urban development (i.e. in areas where disturbance [e.g. heavy equipment operation associated with construction, use of cranes or draglines, new rock crushing activities] is not a normal occurrence during the nesting season). Nest trees should not be removed unless there is no feasible way of avoiding it. If a nest tree must be removed, a Management Authorization (including conditions to off-set the loss of the nest tree) must be obtained with the tree removal period specified in the Management Authorization, generally between October 1- February 1. If construction or other project related activities which may cause nest abandonment or forced fledging are necessary within the buffer zone, monitoring of the nest site (funded by the project sponsor) by a qualified biologist (to determine if the nest is abandoned) should be required . If it is abandoned and if the nestlings are still alive, the project sponsor shall fund the recovery and hacking (controlled release of captive reared young) of the nestling(s). Routine disturbances such as agricultural activities, commuter traffic, and routine facility maintenance activities within 1/4 mile of an active nest should not be prohibited.

2. Hacking as a substitute for avoidance of impacts during the nesting period may be used in unusual circumstances after review and approval of a hacking plan by ESD and WMD. Proponents who propose using hacking will be required to fund the full costs of the effort, including any telemetry work specified by the Department.

3. To mitigate for the loss of foraging habitat (as specified in this document), the Management Authorization holder/project sponsor shall provide Habitat Management (HM) lands to the Department based on the following ratios:

(a) Projects within 1 mile of an active nest tree shall provide:

• one acre of HM land (at least 10% of the HM land requirements shall be met by fee title acquisition or a conservation easement allowing for the active management of the habitat, with the remaining 90% of the HM lands protected by a conservation easement [acceptable to the Department] on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk) for each acre of development authorized (1:1 ratio); or

• one-half acre of HM land (all of the HM land requirements shall be met by fee title acquisition or a conservation easement

[acceptable to the Department] which allows for the active management of the habitat for prey production on the HM lands) for each acre of development authorized (0.5:1 ratio).

(b) Projects within 5 miles of an active nest tree but greater than 1 mile from the nest tree shall provide 0.75 acres of HM land for each acre of urban development authorized (0.75:1 ratio). All HM lands protected under this requirement may be protected through fee title acquisition or conservation easement (acceptable to the Department) on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk.

(c) Projects within 10 miles of an active nest tree but greater than 5 miles from an active nest tree shall provide 0.5 acres of HM land for each acre of urban development authorized (0.5:1 ratio). All HM lands protected under this requirement may be protected through fee title acquisition or a conservation easement (acceptable to the Department) on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk.

4. Management Authorization holders/project sponsors shall provide for the long-term management of the HM lands by funding a management endowment (the interest on which shall be used for managing the HM lands) at the rate of $400 per HM land acre (adjusted annually for inflation and varying interest rates).

Some project sponsors may desire to provide funds to the Department for HM land protection. This option is acceptable to the extent the proposal is consistent with Department policy regarding acceptance of funds for land acquisition. All HM lands should be located in areas which are consistent with a multi-species habitat conservation focus. Management Authorization holders/project sponsors who are willing to establish a significant mitigation bank (> 900 acres) should be given special consideration such as 1.1 acres of mitigation credit for each acre preserved.

PROJECT SPECIFIC MITIGATION MEASURES

Although this report includes recommended Management Measures, the Department should encourage project proponents to propose alternative mitigation strategies that provide equal or greater protection of the species and which also expedite project environmental review or issuance of a CESA Management Authorization. The Department and sponsor may choose to conduct cooperative, multi-year field studies to assess the site's habitat value and determine its use by nesting and foraging Swainson's hawk. Study plans should include clearly defined criteria for judging the project's impacts on Swainson's hawks and the methodologies (days of monitoring, foraging effort/efficiency, etc.) that will be used.

The study plans should be submitted to the Wildlife Management Division and ESD for review. Mitigation measures developed as a result of the study must be reviewed by ESD (for consistency with the policies of the Legislature and Fish and Game Commission) and approved by the Director.

EXCEPTIONS

Cities, counties and project sponsors should be encouraged to focus development on open lands within already urbanized areas. Since small disjunct parcels of habitat seldom provide foraging habitat needed to sustain the reproductive effort of a Swainson's hawk pair, Staff does not recommend requiring mitigation pursuant to CEQA nor a Management Authorization by the Department for infill (within an already urbanized area) projects in areas which have less than 5 acres of foraging habitat and are surrounded by existing urban development, unless the project area is within 1/4 mile of an active nest tree.

REVIEW

Staff should revise this report at least annually to determine if the proposed mitigation strategies should be retained, modified or if additional mitigation strategies should be included as a result of new scientific information.

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Appendix J
Green Building and Development Measures

APPENDIX J
Green Building and Development Measures

To comply with **Measure 3.8**, each increment of new development within the project site requiring a discretionary approval from the County (e.g., proposed tentative subdivision map, conditional use permit), would demonstrate that GHG emissions from construction and operation would be reduced by 30 percent from business-as-usual 2006 emissions levels.

For each increment of new development, each applicant would submit to the County a proposed mitigation plan that lists the measures selected to be implemented as part of the development and/or consideration of previously implemented measures, including analysis demonstrating the associated reduction in GHG emissions. The list would reflect the then-current state of the regulation of GHG emissions and climate change, which is expected to continue to evolve under the mandate of AB 32. The County would review, in consultation with the SMAQMD, the mitigation report for the applicable increment of development and approve the report (with modifications, if considered necessary and feasible) prior to granting any requested discretionary approval for that increment of development. In determining what sort of measures should appropriately be imposed to attain the overall, project-wide 30 percent emissions requirement, the County would consider the following factors:

- The extent to which rates of GHG emissions generated by motor vehicles traveling to, from, and within the project site are projected to decrease over time as a result of regulations, policies, and/or plans that have already been adopted or may be adopted in the future by ARB or other public agency pursuant to AB 32, or by the EPA;
- The extent to which mobile-source GHG emissions, which at the time of writing this EIS comprise a substantial portion of the state's GHG inventory, can also be reduced through design measures that result in trip reductions and reductions in trip length;
- The extent to which GHG emissions emitted by the mix of power generation operated by SMUD, that would serve the project site, are projected to decrease pursuant to the Renewable Portfolio Standard required by SB 1078 and SB 107, as well as any future regulations, policies, and/or plans adopted by the federal and state governments that reduce GHG emissions from power generation;
- The extent to which replacement of CCR Title 24 with the California Green Building Standards Code or other similar requirements would result in new buildings being more energy efficient and consequently more GHG efficient;
- The extent to which any stationary sources of GHG emissions that would be operated on a proposed land use are already subject to regulations, policies, and/or plans that reduce GHG emissions, particularly any future regulations that would be developed as part of ARB's implementation of AB 32, or other pertinent regulations on stationary sources that have the indirect effect of reducing GHG emissions;

- The extent to which the feasibility of existing GHG reduction technologies may change in the future, and to which innovation in GHG reduction technologies would continue, affecting cost-benefit analyses that determine economic feasibility; and
- Whether the total costs of proposed mitigation for GHG emissions, together with other mitigation measures, required for the proposed development, are so great that a reasonably prudent property owner would not proceed with the development in the face of such costs.

In considering how much and what kind of mitigation is necessary in light of these factors, the applicant(s) would consider a list of options, though the list is not intended to be exhaustive, as GHG reduction strategies and their respective feasibility are likely to evolve over time. These measures are derived from multiple sources including the Mitigation Measure Summary in Appendix B of the California Air Pollution Control Officer's Association (CAPCOA) white paper, CEQA & Climate Change (CAPCOA, 2008), the California Attorney General's Office (2008) and the Sacramento Metropolitan Air District *Guide to Air Quality Assessment* (2009).

Energy Efficiency

- Include clean alternative energy features to promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems).
- Site buildings to take advantage of shade and prevailing winds and design landscaping and sun screens to reduce energy use.
- Install efficient lighting in all buildings (including residential). Also install lighting control systems, where practical. Use daylight as an integral part of lighting systems in all buildings.
- Install Energy Star compliant highly reflective roofing materials.
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes.

Each applicant would be encouraged to incorporate "green building" points into the construction and design of all projects for which "green building" points are available. Such points may be achieved through conformity with the checklists identified by New Home Construction Green Building Guidelines available at www.builditgreen.org (which were developed to apply to residential construction, but include measures that are also pertinent to commercial construction), or through any similar list that distinguishes specific measures targeting efficiencies in energy, resource use, or other measures that would also directly or indirectly result in GHG emission reductions. Specific efficiencies that would reduce GHG emissions would be implemented where feasible, for all project areas including site design, landscaping, foundation, structural frame and building envelope, exterior finishing, plumbing, appliance use, insulation, heating, venting and air conditioning, building performance, use of renewable energy, finishes, and flooring.

Each applicant would be encouraged to incorporate any combination of the following strategies to reduce heat gain of the non-roof impervious site landscape (including roads, sidewalks, courtyards, parking lots, and driveways) into the construction and design of all new projects:

- Shaded (Within 5 years of occupancy)

- Paving materials with a Solar Reflective Index (SRI) of at least 29
- Open grid pavement system (pavement that is less than 50% impervious and contains vegetation in the open cells)
- Parking spaces under cover (defined as underground, under deck, under roof, or under building). Any roof used to shade or cover parking should have an SRI of at least 29.
- Optional level of Leadership in Energy and Environmental Design (LEED) certification, such as silver or gold which can allow for further reductions in energy consumption and GHG emissions.

Water Conservation and Efficiency

The following should be considered:

- With the exception of ornamental shade trees, use water-efficient landscapes with native, drought-resistant species in all public area and commercial landscaping.
- Install the infrastructure to use recycled water for landscape irrigation.
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
- Design buildings and lots to be water-efficient. Install water-efficient fixtures and appliances. (e.g., Ultra low-flow toilets, no flow urinals etc.)
- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces). Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces unless required to mitigate health and safety concerns.

Solid Waste Measures

Each applicant would be encouraged to incorporate any combination of the following strategies:

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).
- Provide interior and exterior storage areas for recyclables and green waste at all buildings.
- Provide adequate recycling containers in public areas, including parks, school grounds, paseos, and pedestrian zones in areas of mixed-use development.
- Provide education and publicity about reducing waste and available recycling services.

Transportation and Motor Vehicles

Each applicant would be encouraged to incorporate any combination of the following strategies:

- Promote ride sharing programs at employment centers (e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading zones and waiting areas for ride share vehicles, and providing a web site or message board for coordinating ride sharing).

- Provide the necessary facilities and infrastructure in all land use types to encourage the use of low or zero emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
- At commercial land uses, all forklifts, "yard trucks," or vehicles that are predominately used on-site at non-residential land uses should be electric-powered or powered by biofuels (such as biodiesel [B100]) that are produced from waste products, or would use other technologies that do not rely on direct fossil fuel consumption.
- Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
- Prioritized parking within new commercial and retail areas would be given to electric vehicles, hybrid vehicles, and alternative fuel vehicles.
- Incorporate bicycle lanes, routes, and intersection improvements into street systems within the Specific Plan.
- For commercial land uses, provide adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience.
- For commercial land uses, provide "end-of-trip" facilities including showers, lockers, and changing space.
- Create Class II bicycle lanes and walking paths directed to the location of schools, parks, and other destination points.
- Construction of transit facility/amenity (bus shelters, bicycle lockers/racks, etc.) for existing public and private transit.
- Provide secure bicycle storage at public parking facilities.
- Design site and building placement to facilitate the expansion and use of alternative modes of transportation, and integrate the project site with the surrounding development and circulation pattern by creating street and pedestrian/bicycle access throughout the project site to enable trips without depending exclusively on major roads, secondary roads, or the automobile.
- Design roadways to reduce motor vehicle speeds and encourage pedestrian and bicycle trips by featuring traffic calming features.