Appendix A
Air Quality

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TABLE A-1
CLIMATE DATA FOR LAS VEGAS, NEVADA

	Average Temperature(^{O}F)	Average High Temperature(^{O}F)	Average Low Temperature(^{O}F)	Precipitation (inches)	Average Wind Speed (mph)
Jan.	45.4	56.8	33.9	0.51	7.2
Feb.	50.6	62.6	38.5	0.53	8
Mar.	56.5	69.3	43.7	0.48	9.1
Apr.	64.8	78.3	51.3	0.21	10.9
May	74.3	88.2	60.4	0.16	11
Jun.	83.9	98.5	69.3	0.08	11.2
Jul.	90.1	104.4	75.9	0.45	10
Aug.	88.3	102.2	74.3	0.45	9.4
Sep.	80.3	94.6	66	0.33	8.6
Oct.	67.6	81.4	53.8	0.24	7.6
Nov.	53.9	66.4	41.5	0.36	7.2
Dec.	45.9	57.4	34.3	0.37	7.2

From Western Regional Climate Center, Data for Las Vegas Airport (WSO), Period of Record: 2/ 1/1937 to 7/31/2003, Desert Research Institute, Reno, Nevada. (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nvlasv).

TABLE A-2
OBSERVED PM_{10} CONCENTRATIONS, LAS VEGAS, NEVADA, 2002

Site	Number of Observations	Annual Mean	1st High	Month	Date	2nd High	Month	Date	3rd High	Month	Date	4th High	Month	Date
Apex	349	26	465	APR	15	176	AUG	19	151	APR	17	125	JUN	8
Boulder City	340	21	371	APR	15	168	AUG	19	104	FEB	23	103	MAR	13
Craig Road	346	50	535	APR	15	335	MAR	13	188	AUG	19	145	MAR	7
City Center	338	44	255	APR	15	197	MAR	1	164	AUG	19	154	MAR	13
Green Valley	343	36	371	APR	15	190	JUL	10	185	AUG	19	146	JUL	15
JD Smith	349	48	339	APR	15	211	MAR	1	177	MAR	13	168	AUG	19
E. Sahara	346	39	308	APR	15	180	MAR	13	163	AUG	19	123	JUL	10
Microscale	353	52	411	APR	15	179	MAR	1	171	APR	14	163	AUG	19
S.E. Valley	343	34	255	APR	15	143	AUG	19	137	MAR	13	130	JUL	15
Paul Meyer Park	343	29	103	JUL	15	89	JUL	10	79	SEP	27	72	JUL	31
Walter Johnson	344	26	158	APR	15	114	JUL	10	104	JUL	15	103	AUG	19
Jean	337	16	208	APR	15	78	JUL	10	74	AUG	19	69	MAR	13
Lone Mountain	346	27	125	AUG	19	101	APR	15	93	JUL	15	83	JUL	10
Pelo Verde	333	25	150	APR	15	102	AUG	19	92	JUL	10	91	JUL	15
Joe Neal	346	43	296	APR	15	268	MAR	1	258	MAR	13	204	JAN	10
Mesquite	328	33	413	APR	15	380	JUL	14	192	JUL	13	184	FEB	28
E. Flamingo	251	36	358	APR	15	127	MAR	1	123	JUL	15	111	AUG	19
Orr	85	35	62	DEC	13	58	NOV	25	54	NOV	8	52	DEC	10

Source: Clark County Air Monitoring 2002 NAMS/SLAMS Network Review, June 30, 2003, Clark County Department of Air Quality and Environmental Management.

TABLE A.3 Future-Year (2006, 2012, 2018) BLM Land Sale Emissions by Development Type

Final Land Use Source Group	Year[a]	Construction PM_{10} Emissions (tons)	Operation Emissions (tons)						
			SO_2	NOx	CO	VOC	PM_{10}	PM_{25}	CO_2
1. Single-family housing	2000	151.63	191.3	812.2	1,979.9	179.8	593.5	82.5	373,925.6
	2006	799.35	627.5	2,588.8	5,836.1	462.9	1,938.9	272.7	1,244,660.1
	2018	555.39	1,409.1	5,211.1	7,725.6	507.5	4,521.1	621.9	2,863,040.4
2. Multifamily housing	2000	27.78	11.8	53.9	177.3	16.0	46.0	3.8	21,792.8
	2006	61.25	139.4	605.3	1,827.3	136.1	542.7	45.3	264,599.9
	2018	77.98	438.3	1,609.9	3,136.4	178.8	1,814.6	144.0	863,338.5
3. Office buildings	2000	1.29	6.4	24.6	44.9	4.1	15.5	2.8	11,688.8
	2006	109.53	121.8	455.7	734.3	54.8	292.6	54.5	226,246.7
	2018	149.95	347.3	1,190.3	1,128.5	64.9	861.3	157.2	654,650.1
4. Retail	2000	0.75	5.2	40.3	285.8	25.7	67.2	1.7	7,006.2
	2006	58.25	255.7	1,829.7	13,146.6	952.0	3,570.9	87.9	389,137.5
	2018	82.04	902.0	3,948.4	23,633.6	1,265.9	12,977.0	321.8	1,606,591.1
5. Moderate-sized casinos/hotels	2000	0.12	0.0	0.1	0.5	0.0	0.1	0.0	17.5
	2006	11.7	25.9	163.0	1,017.1	73.4	281.1	9.3	43,685.0
	2018	16.48	79.8	341.5	1,793.5	95.7	998.6	29.7	150,677.3
6. Industrial	2000	0.76	0.5	2.7	12.8	1.2	8.5	2.3	850.8
	2006	146.3	3.1	15.3	68.6	5.2	52.6	15.5	5,305.1
	2018	206.1	16.9	59.4	187.5	10.2	286.1	77.9	28,803.50
7. Recreational	2000	4.34	0.2	1.4	11.0	1.0	6.2	1.5	212.6
	2006	78.19	0.9	7.9	61.8	4.7	39.9	9.8	1,393.2
	2018	110.12	2.6	17.8	140.9	7.8	177.4	43.2	6,132.1

TABLE A.3 (Cont.)

Final Land Use Source Group	Year[a]	Construction PM_{10} Emissions (tons)	Operation Emissions (tons)						
			SO_2	NOx	CO	VOC	PM_{10}	PM_{25}	CO_2
8. Religious	2000	12.14	4.2	18.0	53.4	4.8	17.3	2.6	7,393.5
	2006	3.85	6.7	28.5	81.4	6.9	28.0	4.2	12,077.0
	2018	5.43	14.9	55.5	107.0	7.9	59.6	9.5	27,698.5
9. Public facilities	2000	0.11	0.6	2.5	6.6	0.6	2.6	0.5	1,078.7
	2006	29.58	7.6	30.6	71.4	5.3	33.3	6.8	14,012.3
	2018	41.66	45.9	159.1	194.0	11.2	189.2	41.2	86,023.9
BLM total	2000	198.93	220.2	955.7	2,572.1	233.3	756.9	97.7	423,966.5
	2006	1298.01	1,188.6	5,724.7	22,844.6	1,701.2	6,780.0	504.9	2,201,116.8
	2018	1245.12	3,256.7[c]	12,593.1	38,047.0	2,149.9	21,884.9	1,446.2	6,286,957.4
Clark County total	2000	NA[b]	47,693.2	78,737.3	307,587.4	28,792.2	87,870.0	3,242.3	NA
	2006	NA	47,833.3	79,525.7	349,923.5	25,829.5	103,353.9	3,095.8	NA
	2018	NA	4,472.7[c]	48,998.5	306,131.9	19,986.1	132,900.3	2,597.6	NA
% of BLM to Clark County total	2000	NA	0.5	1.2	0.8	0.8	0.9	NA	NA
	2006	NA	2.5	7.2	6.5	6.6	6.6	NA	NA
	2018	NA	72.8[c]	25.7	12.4	10.8	16.5	NA	NA

[a] Construction emissions denote those occurring in the year of interest and operation emissions denote those occurring from BLM lands patented up to the year of interest since 1998.

[b] NA = not available.

[c] Anticipate 50-65% reduction in emissions based on energy usage factor.

NOTE: Figures A-1 through A-6 are from the Cumulative Las Vegas Valley Air Quality Monitoring Assessment of Ongoing Bureau of Land Management (BLM) Federal Land Disposition Actions within the BLM Disposal Boundary, Work Conducted in Support of Current and Proposed Land Disposition Actions, October 1998 through 2018, by Argonne National Laboratory, a U.S. Department of Energy Office of Science Laboratory, April 2004. The green line on figures A-2 through A-6 represents the cumulative impact assessment area in the air quality model.

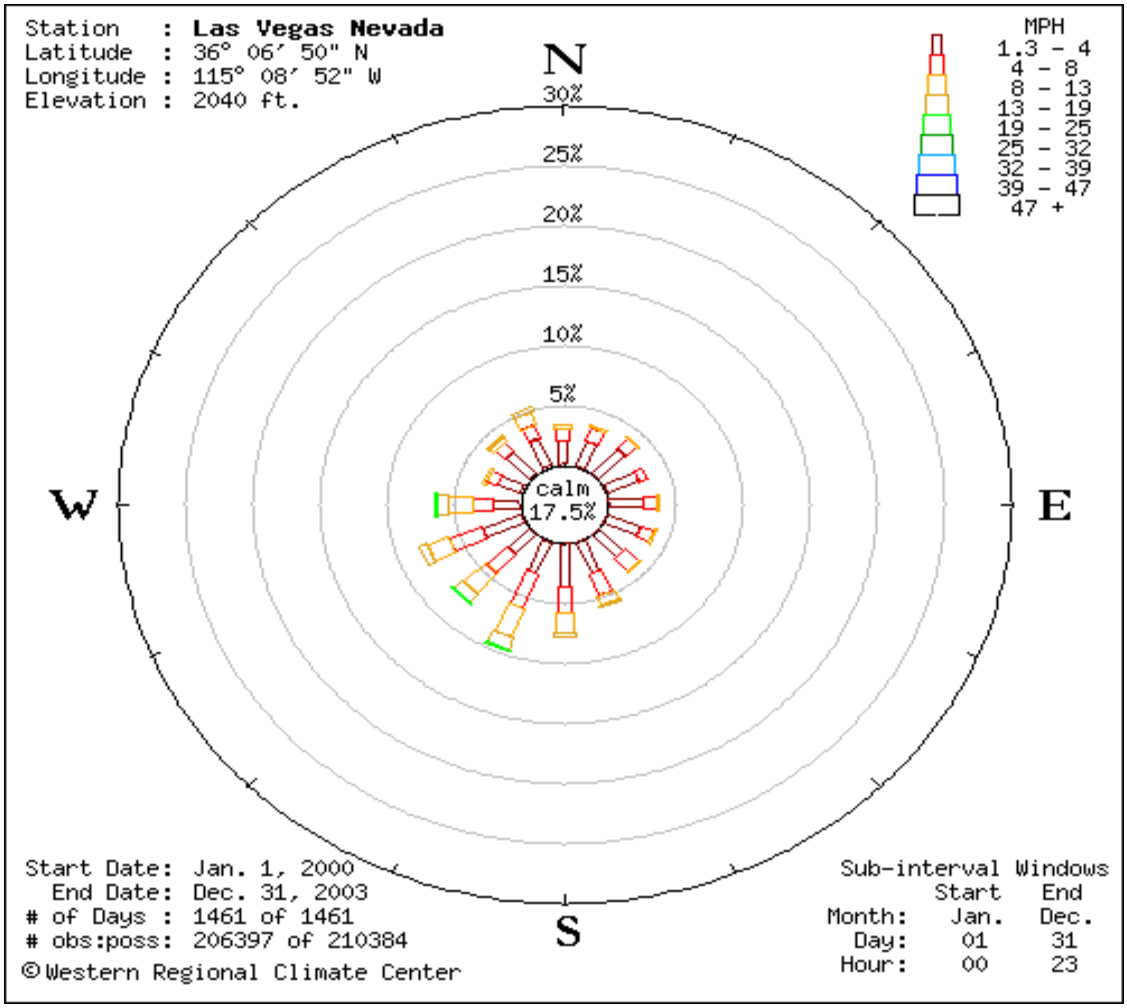


FIGURE A-1
Wind Direction Distribution for Las Vegas, Nevada

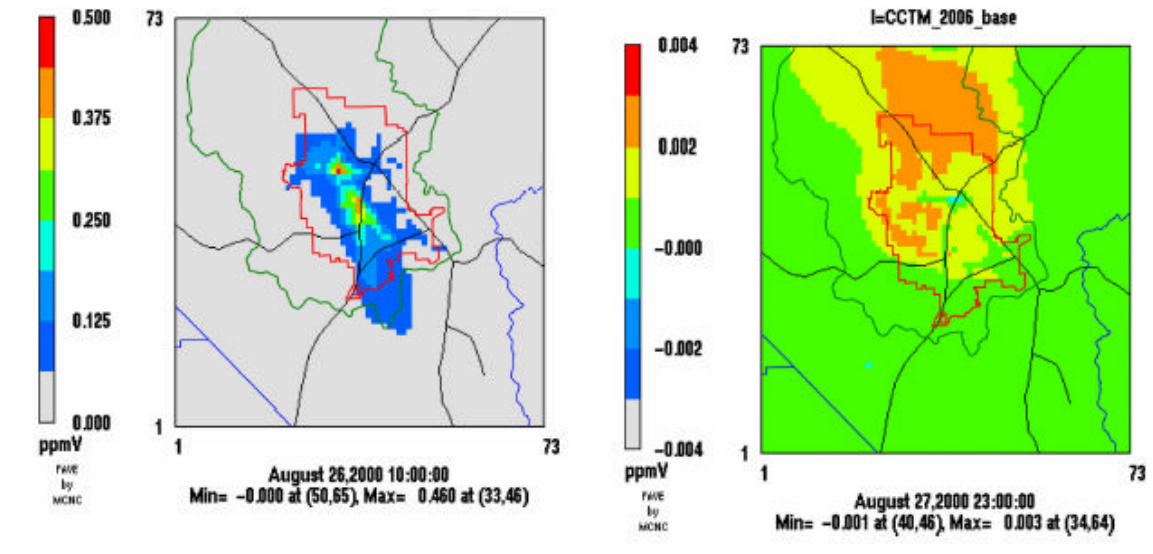


FIGURE A-2
Projected Changes in CO and O_3 Concentrations from 2000 to 2006 (The figures shown are for Greenwich meantime with the maximum differences in CO and O_3 for the days shown.) From Main Report Figure 5.18.

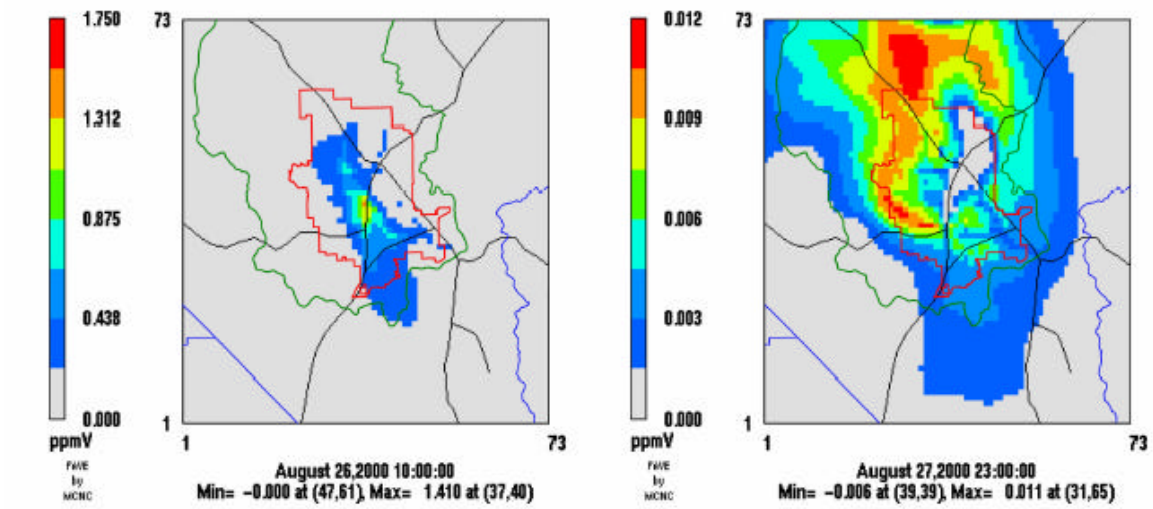


FIGURE A-3
Projected Changes in CO and O_3 Concentrations from 2000 to 2018 (The figures shown are for Greenwich meantime with the maximum differences in CO and O_3 for the days shown.) From Main Report Figure 5.19.

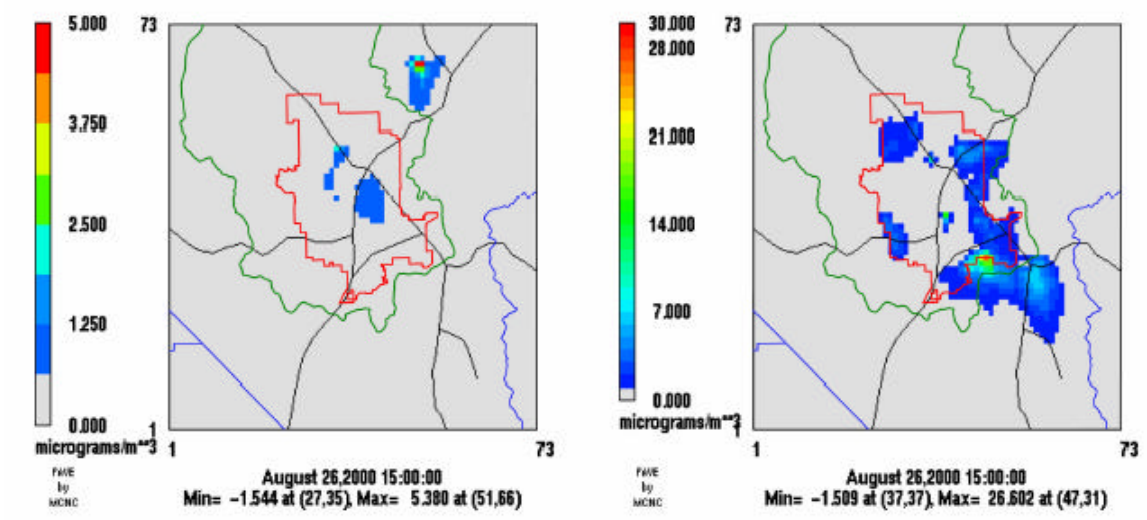


FIGURE A-4
Projected Changes in PM_{10} Concentrations from 2000 to 2006 and 2000 to 2018 (The 1-hour average values correspond to the highest levels calculated for the day.) From Main Report Figure 5.20.

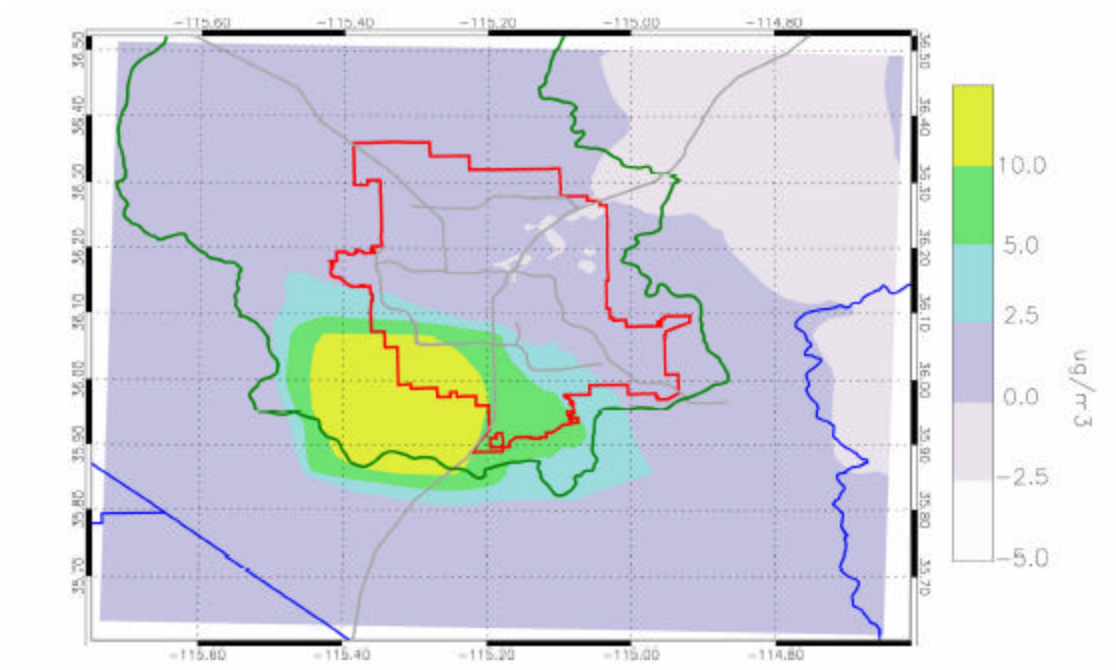


FIGURE A-5
Differences in PM_{10} between the Base Year 2000 and Future Year 2006 (The regions with positive values signify regions where the PM_{10} concentration will be lower in 2006 than in 2000.) From Main Report Figure 5.21.

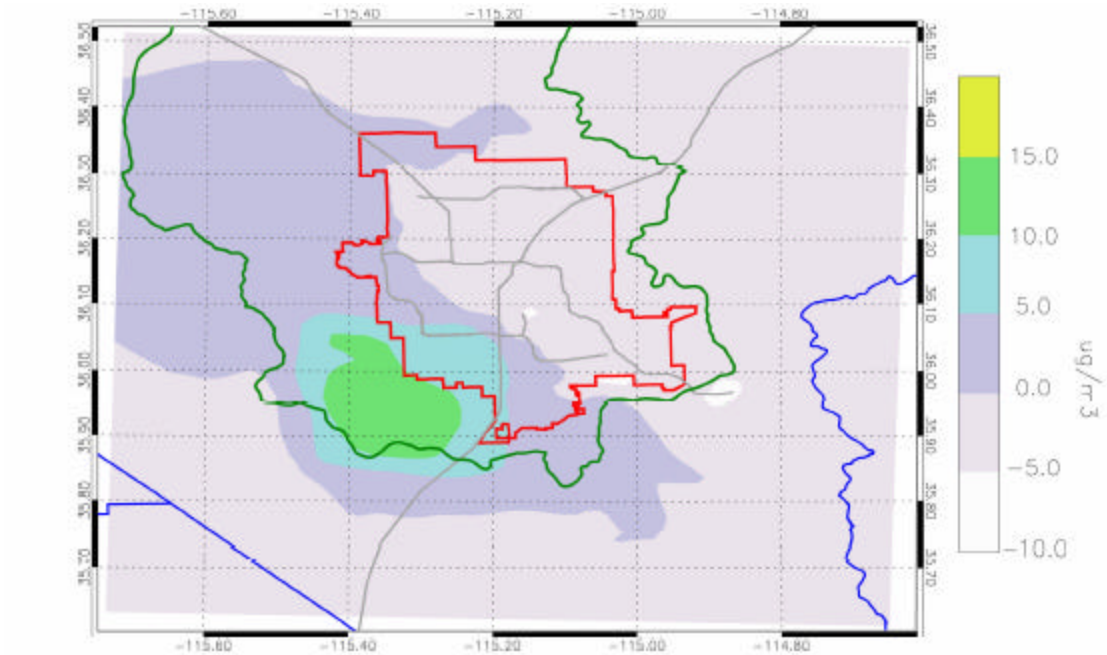


FIGURE A-6
Differences in PM_{10} between the Base Year 2000 and Future Year 2018 (The regions with positive values signify regions where the PM_{10} concentration will be lower in 2018 than in 2000.) From Main Report Figure 5.22.

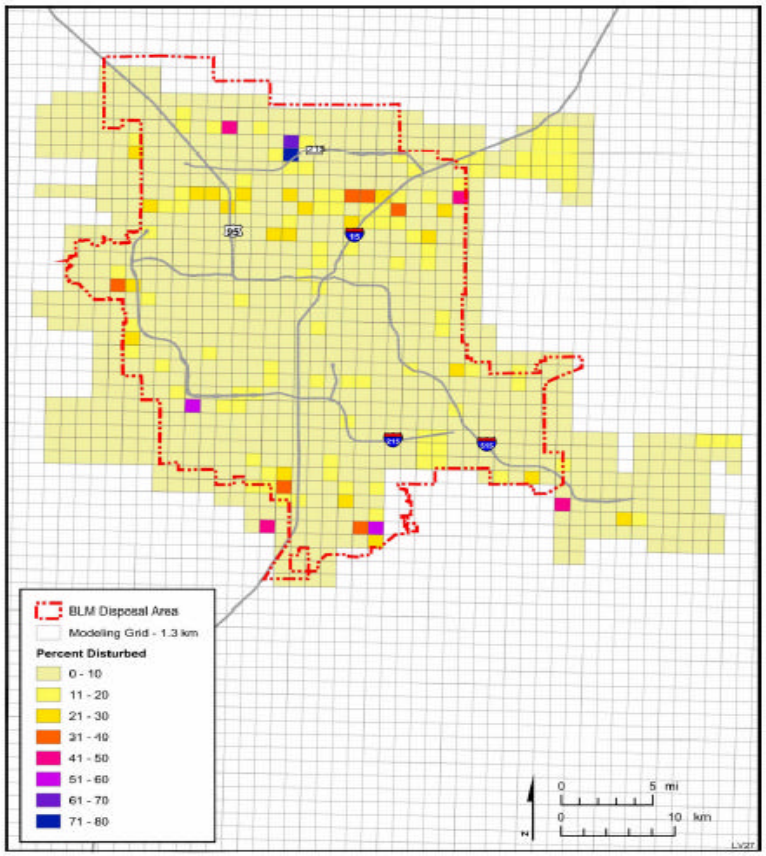
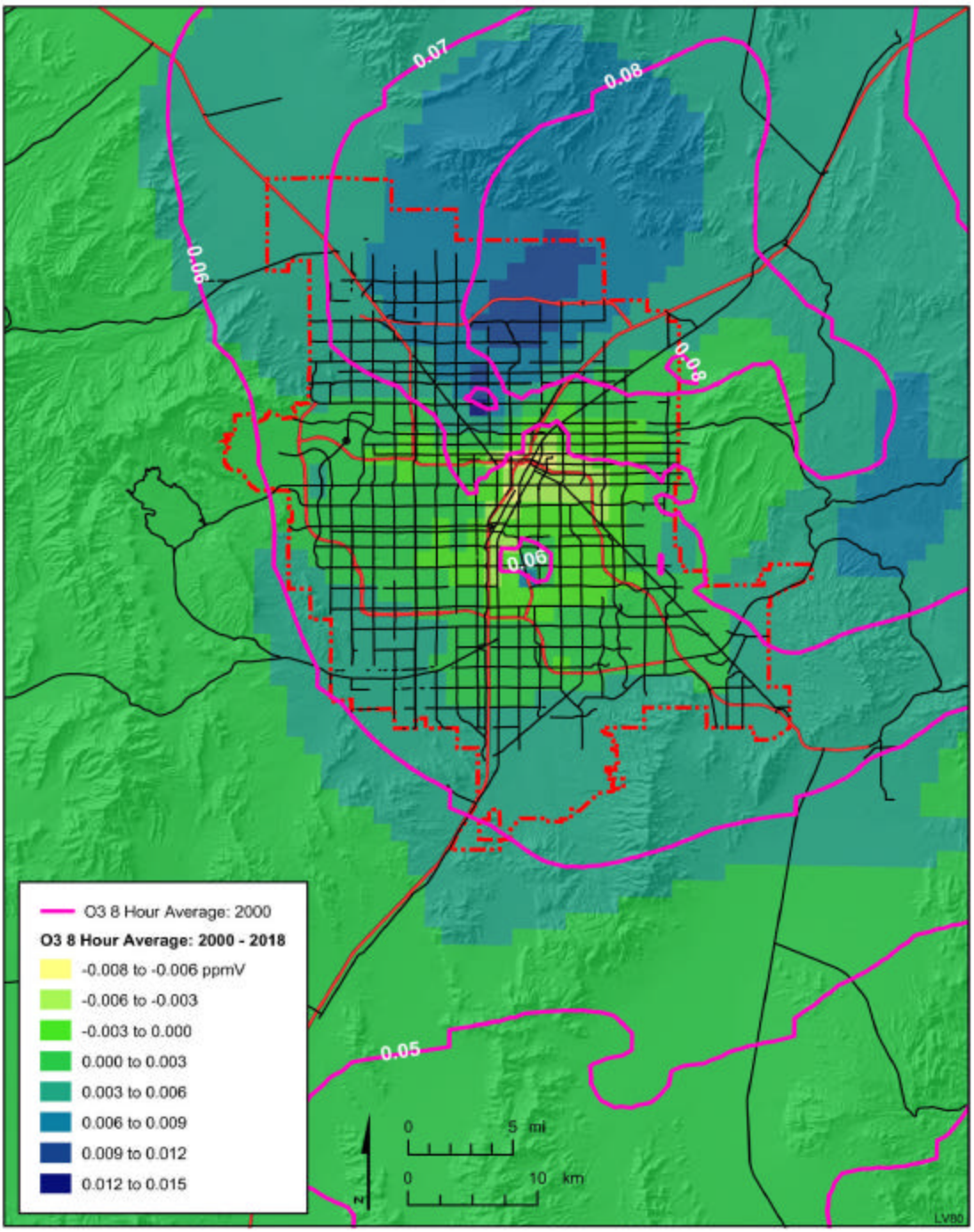


FIGURE A-7 Baseline Soil Disturbance Dust Model Input Layer for the 1.3-km Resolution Grid.



O_3 Change, 2000–2018, Calculated by the Model for July 31 at 10:00 a.m. Local Time (8-hour average).

FIGURE A-8 Ozone Change 2000-2081 (DAQEM 2004)

TABLE A-4
OZONE (PPM) 8-HOUR AVERAGE 2001

Monitoring Station Name	Highest 8-Hour Conc.	2nd Highest 8-Hour Conc.	3rd Highest 8-Hour Conc.	4th Highest 8-Hour Conc.	Mean	Number of Exceedances of Primary Standard
Apex	0.076	0.075	0.074	0.074	0.036	0
Boulder City	0.074	0.073	0.072	0.071	0.040	0
Craig Road	0.078	0.071	0.071	0.070	0.024	0
City Center	0.083	0.070	0.067	0.063	0.019	0
J.D. Smith	0.080	0.072	0.072	0.071	0.023	0
Jean	0.082	0.080	0.080	0.079	0.041	0
Joe Neal	0.094	0.085	0.084	0.083	0.036	2
Lone Mountain	0.090	0.088	0.082	0.080	0.030	2
Southeast Valley	0.076	0.076	0.075	0.072	0.030	0
Paul Meyer Park	0.085	0.081	0.080	0.076	0.030	1
Palo Verde	0.091	0.090	0.078	0.078	0.039	2
Searchlight	0.084	0.079	0.074	0.073	0.042	0
Walter Johnson	0.092	0.088	0.082	0.082	0.032	2
Winterwood	0.085	0.074	0.072	0.071	0.026	1
Mesquite	0.056	0.051	0.050	0.049	0.016	0
Health District	0.087	0.073	0.070	0.068	0.025	1

8-hour ozone readings (in ppm) for monitoring stations in the NAMS/SLAMS Network for Las Vegas, Nevada. The four highest 8-hour readings are used to determine violations of the new standard of 0.08 ppm for ozone on an 8-hour basis.

TABLE A-5
2001 ANNUAL BLM DISPOSAL AREA CONTROLLED PM_{1O} EMISSIONS AND ATTAINMENT CONCENTRATION CONTRIBUTIONS

SOURCES	PM_{10} (TPY)	Controlled PM_{10} (TPY)	Percent Reduction	Impact on Attainment Concentration ($\mu g/m^3$)
Stationary Point Sources				
Sand & Gravel Operations	627	627	0.00	0.13
Utilities - Natural Gas	199	199	0.00	0.04
Asphalt Concrete Manufacture	171	171	0.00	0.04
Industrial Processes	80	80	0.00	0.02
Other Sources	124	124	0.00	0.03
Total	1,201	1,201	0.00	0.26
Stationary Area Sources				
Small Point Sources	184	184	0.00	0.04
Residential Firewood	89	89	0.00	0.02
Residential Natural Gas	79	79	0.00	0.02
Commercial Natural Gas	33.2	33.2	0.00	0.01
Industrial Natural Gas	14	14	0.00	0.00
NG - Purchased at the Source - Carried by SWG	210	210	0.00	0.04
Structural / Vehicle Fires / Wild Fires	20	20	0.00	0.00
Charbroiling! Meat Cooking	889	889	0.00	0.19
Disturbed Vacant Lands / Unpaved Parking Lots	33,100	21,184	-36.00	4.53
Native Desert Fugitive Dust	9,520	9,520	0.00	2.04
Stabilized Vacant Lands Dust	3,640	3,640	0.00	0.78
Construction Activity Fugitive Dust	23,109	15,252	-34.00	3.26
Windblown Construction Dust	18,381	11,861	-35.47	2.54
Total	89,269	62,976	-30.23	13.47
Nonroad Mobile Sources				
Airport Support Equipment	44	44	0.00	0.01
Commercial Equipment	0.3	0.3	0.00	0.00
Construction & Mining Equipment	428	428	0.00	0.09
Lawn & Garden Equipment	15	15	0.00	0.00
Railroad Equipment	17	17	0.00	0.00
Recreational Equipment	1.0	1.0	0.00	0.00
McCarran International Airport	297	297	0.00	0.06
Henderson Executive Airport	7	7	0.00	0.00
North Las Vegas Municipal Airport	27	27	0.00	0.01
Nellis Air Force Base	31.9	31.9	0.00	0.01
Total	867	867	0.00	0.19
Onroad Mobile Sources				
Paved Road Dust (Includes Construction Track Out)	55,005	50,822	-7.61	10.87
Unpaved Road Dust	18,932	18,932	0.00	4.05
Highway Construction Projects Activities	2,782	1,836	-34.00	0.39
Highway Construction Projects - Wind Erosion	1,470	951	-35.29	0.20
Vehicular Sulfate PM	489	469	0.00	0.10
Vehicular Tire Wear	100	100	0.00	0.02
Vehicular Brake Wear	163	163	0.00	0.03
Vehicular Exhaust	346	346	0.00	0.07
Total	79,287	73,638	-7.12	15.75
Background				16.5
Total	170,625	138,683	-18.95	46.20

Source: PM_{10} State Implementation Plan for Clark County, June 2001.

TABLE A-6
2006 24-HOUR BLM DISPOSAL AREA CONTROLLED PM_{10} EMISSIONS AND ATTAINMENT CONCENTRATION CONTRIBUTIONS

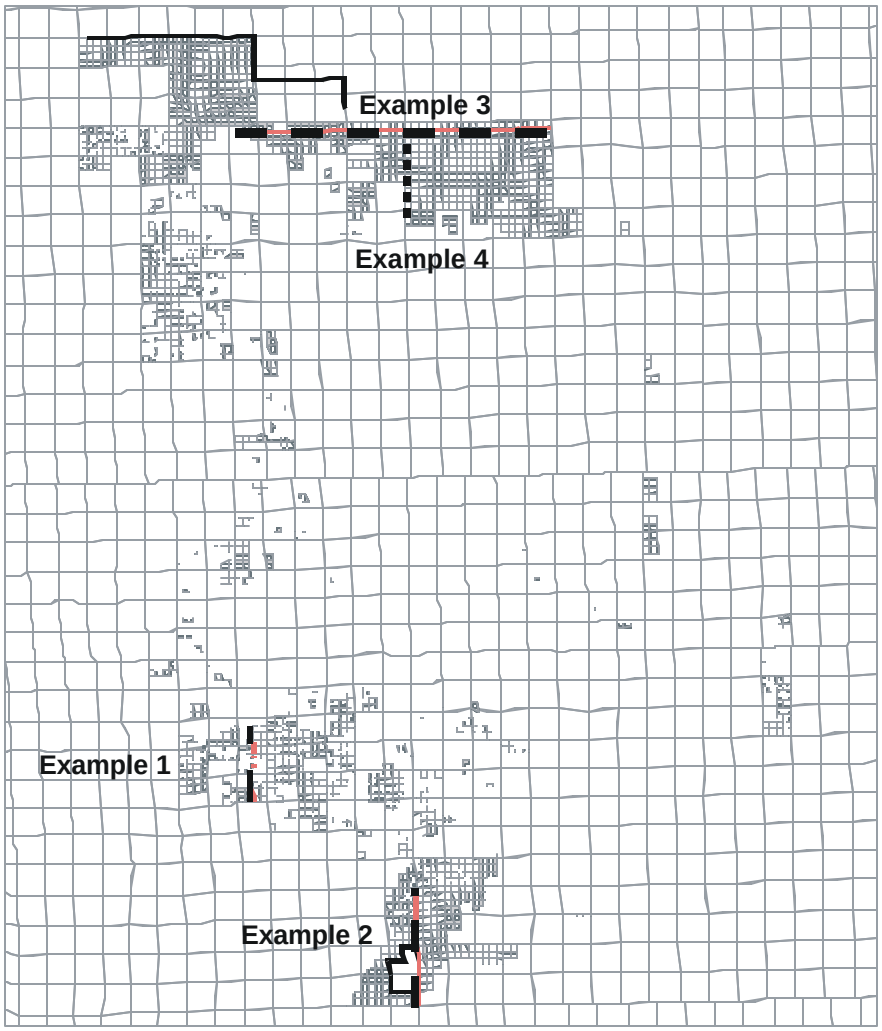
SOURCES	PM_{10} (TPD)	Controlled PM_{10} (TPD)	Percent Reduction	Impact on Attainment Concentration ($\mu g/m^3$)
Stationary Point Sources				
Sand & Gravel Operations	1.72	1.72	0.00	1.18
Utilities - Natural Gas	0.55	0.55	0.00	0.37
Asphalt Concrete Manufacture	0.47	0.47	0.00	0.32
Industrial Processes	0.22	0.22	0.00	0.15
Other Sources	0.34	0.34	0.00	0.23
Total	3.29	3.29	0.00	2.25
Stationary Area Sources				
Small Point Sources	0.50	0.50	0.00	0.35
Residential Firewood	1.12	1.12	0.00	0.77
Residential Natural Gas	0.25	0.25	0.00	0.17
Commercial Natural Gas	0.09	0.09	0.00	0.06
Industrial Natural Gas	0.04	0.04	0.00	0.03
NG - Purchased at the Source - Carried by SWG	0.58	0.58	0.00	0.39
Structural / Vehicle Fires / Wild Fires	0.07	0.07	0.00	0.04
Charbroiling / Meat Cooking	2.84	2.84	0.00	1.94
Disturbed Vacant lands/ Unpaved Parking lots	19.30	5.40	-72.00	3.70
Native Desert Fugitive Dust	0.00	0.00	0.00	0.00
Stabilized Vacant lands Dust	1.09	1.09	0.00	0.75
Construction Activity Fugitive Dust	40.70	13.02	-68.00	8.93
Windblown Construction Dust	90.34	27.20	-69.89	18.64
Total	156.91	52.00	-66.73	35.77
Nonroad Mobile Sources				
Airport Support Equipment	0.14	0.14	0.00	0.10
Commercial Equipment	0.00	0.00	0.00	0.00
Construction & Mining Equipment	1.36	1.36	0.00	0.94
Lawn & Garden Equipment	0.05	0.05	0.00	0.03
Railroad Equipment	0.05	0.05	0.00	0.04
Recreational Equipment	0.00	0.00	0.00	0.00
McCarran International Airport	0.57	0.57	0.00	0.39
Henderson Executive Airport	0.02	0.02	0.00	0.01
North Las Vegas Municipal Airport	0.07	0.07	0.00	0.05
Nellis Air Force 8ase	0.09	0.09	0-00	0.06
Total	2.36	2.36	0.00	1.62
Onroad Mobile Sources				
Paved Road Dust (Includes Construction Track Out)	161.70	114.86	-28.97	78.71
Unpaved Road Dust	55.11	19.50	--64.61	13.36
Highway Construction Projects Activities	4.90	1.57	-68.00	1.07
Highway Construction Projects - Wind Erosion	7.20	2.22	-69.17	1.52
Vehicular Sulfate PM	1.52	1.52	0.00	1.04
Vehicular Tire Wear	0.32	0.32	0.00	0.22
Vehicular Brake Wear	0.51	0.51	0.00	0.35
Vehicular Exhaust	0.91	0.91	0.00	0.62
Total	232.16	141.40	-39.09	96.90
Background				10.5
Total	394.72	199.25	-49.52	147.04

Source: PM_{10} State Implementation Plan for Clark County, June 2001.

RIGHT-OF-WAY ALIGNMENT ANALYSIS FOR POTENTIAL AIR IMPACTS

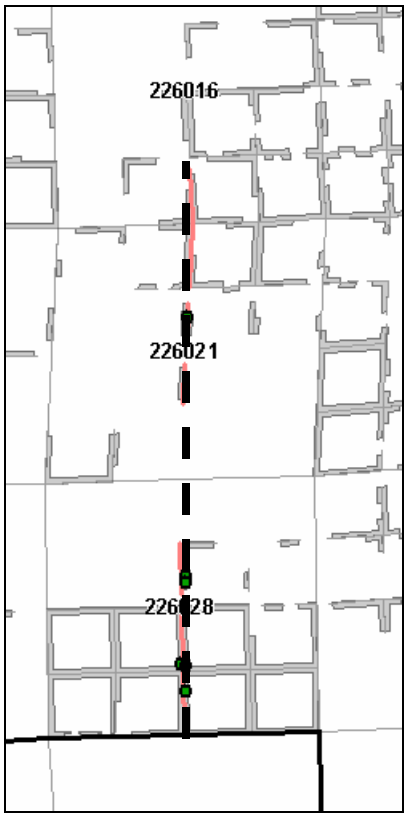
Total acres of BLM land identified in ROW alignments within the disposal boundary equals approximately 24,000.

Representative Analysis



ROW ALIGNMENT EXAMPLE 1

2 miles

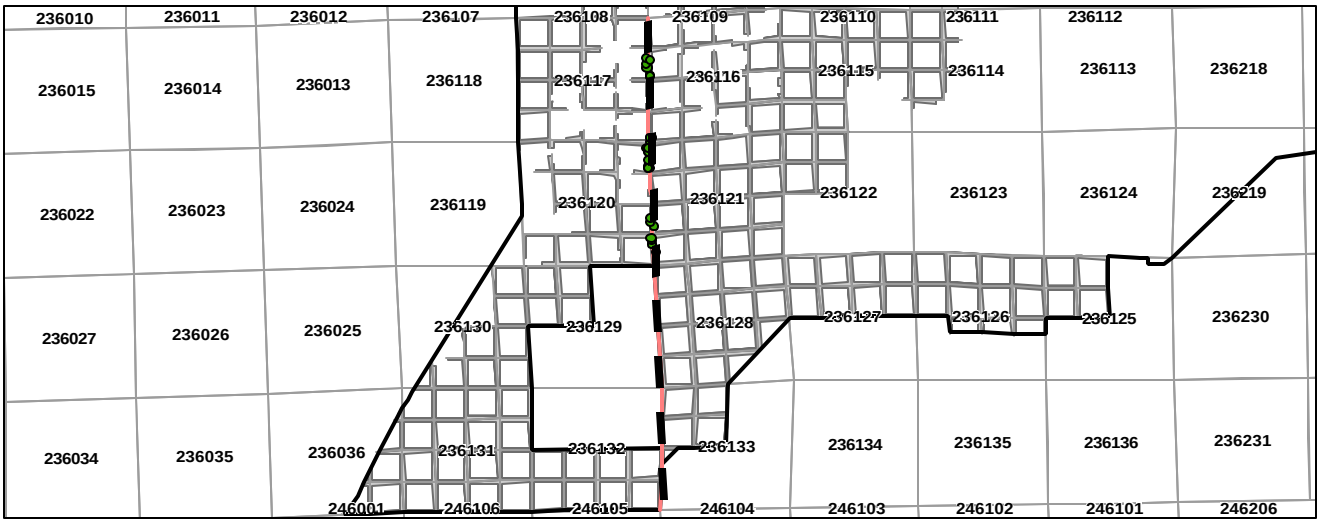


Area within alignment:

Example 1						
LenFeet	LenMiles	Type	ROW	SqFt	Acres	
1011.954	0.1917	1	50			
800.6468	0.1517	1	50			
413.6412	0.0784	1	50			
628.9396	0.1191	1	50			
319.7297	0.0606	1	50			
3174.911	0.6015			158745.6	3.644297	
1276.097	0.2417	2	100			
1276.097	0.2417	2	100			
672.8378	0.1275	2	100			
650.5383	0.1232	2	100			
320.2425	0.0607	2	100			
4195.812	0.7948			419581.2	9.632258	
					13.27655	Total

ROW ALIGNMENT EXAMPLE 2

4 miles

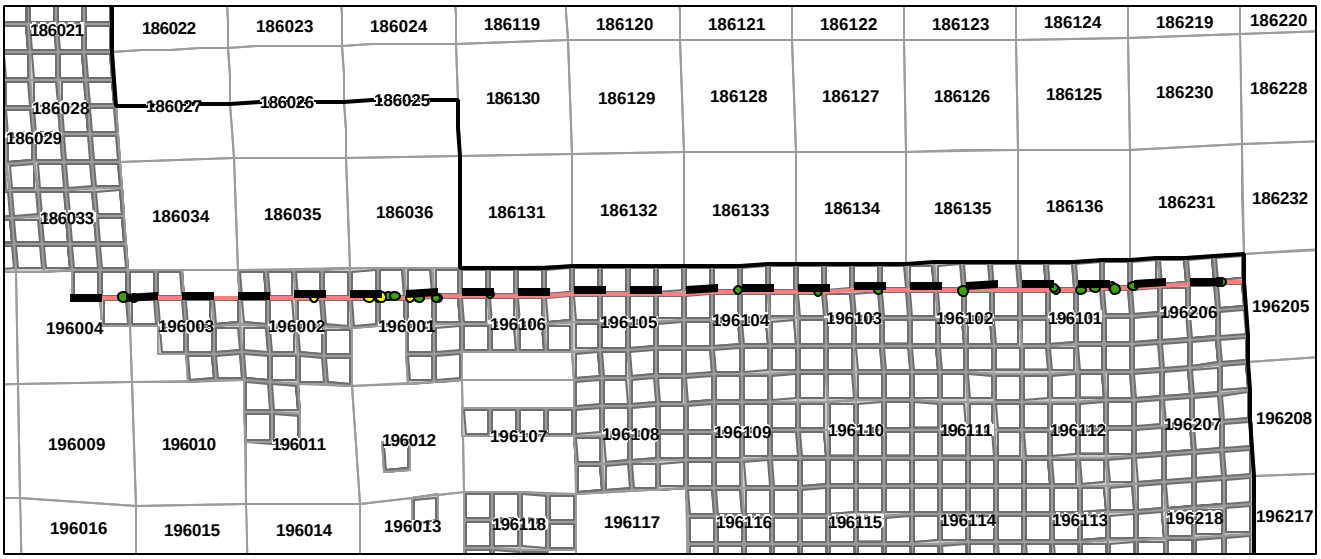


Area within alignment:

Example 2						
LenFeet	LenMiles	Type	ROW	SqFt	Acres	
1314.581	0.249	1	50			
1314.581	0.249	1	50			
1314.581	0.249	1	50			
1315.87	0.2493	1	50			
1315.87	0.2493	1	50			
1315.87	0.2493	1	50			
1315.87	0.2493	1	50			
304.6747	0.0577	1	50			
296.3164	0.0561	1	50			
342.8393	0.0649	1	50			
1009.074	0.1911	1	50			
670.7851	0.1271	1	50			
313.5877	0.0594	1	50			
658.402	0.1247	1	50			
12802.9	2.4252			640145.1	14.69571	
1315.779	0.2492	2	100			
1315.779	0.2492	2	100			
1315.779	0.2492	2	100			
1050.584	0.199	2	100			
1058.943	0.2006	2	100			
652.9337	0.1237	2	100			
359.4862	0.0681	2	100			
346.1849	0.0656	2	100			
331.4059	0.0628	2	100			
656.179	0.1243	2	100			
8403.054	1.5917			840305.4	19.29076	
					33.98647	Total

ROW ALIGNMENT EXAMPLE 3

10.5 miles



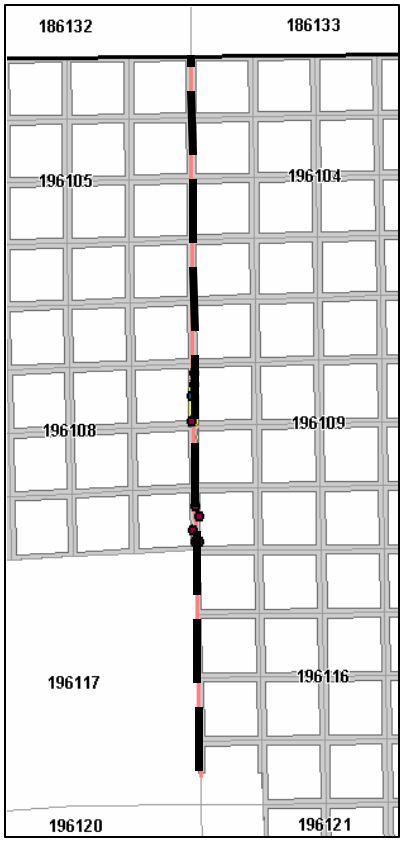
Area within alignment:

Example 3						
LenFeet	LenMiles	Type	ROW	SqFt	Acres	
1326.483	0.2513	1	50			
1318.158	0.2497	1	50			
1318.158	0.2497	1	50			
3962.799	0.7507			198139.9	4.548667	
1326.483	0.2513	2	100			
1318.158	0.2497	2	100			
1313.723	0.2489	2	100			
1318.158	0.2497	2	100			
1313.723	0.2489	2	100			
1314.172	0.2489	2	100			
1313.723	0.2489	2	100			
1313.723	0.2489	2	100			
1314.173	0.2489	2	100			
1314.173	0.2489	2	100			
1314.172	0.2489	2	100			
1326.411	0.2513	2	100			
1326.41	0.2513	2	100			
1326.41	0.2513	2	100			
1326.411	0.2513	2	100			
1328.155	0.2516	2	100			
1328.155	0.2516	2	100			
1328.155	0.2516	2	100			
1328.155	0.2516	2	100			
1330.685	0.2521	2	100			
1330.686	0.2521	2	100			
1330.685	0.2521	2	100			

Example 3						
LenFeet	LenMiles	Type	ROW	SqFt	Acres	
1330.686	0.2521	2	100			
1327.35	0.2514	2	100			
1327.35	0.2514	2	100			
1327.35	0.2514	2	100			
1327.35	0.2514	2	100			
1321.596	0.2503	2	100			
1321.596	0.2503	2	100			
1321.596	0.2503	2	100			
1321.596	0.2503	2	100			
1320.615	0.2502	2	100			
1320.615	0.2502	2	100			
1320.615	0.2502	2	100			
1320.615	0.2502	2	100			
1355.492	0.2568	2	100			
1355.491	0.2568	2	100			
1355.491	0.2568	2	100			
1355.491	0.2568	2	100			
51715.59	9.7967			5171559	118.7227	
					123.2713	Total

ROW ALIGNMENT EXAMPLE 4

3 miles



Area within alignment:

Example 4						
LenFeet	LenMiles	Type	ROW	SqFt	Acres	
760.3556	0.144	1	50			
1356.862	0.257	1	50			
1356.862	0.257	1	50			
1356.862	0.257	1	50			
4830.941	0.915			241547.1	5.545158	
1331.816	0.2523	2	100			
1331.815	0.2523	2	100			
1331.816	0.2523	2	100			
1331.815	0.2523	2	100			
1302.77	0.2468	2	100			
1302.77	0.2468	2	100			
1302.77	0.2468	2	100			
1302.77	0.2468	2	100			
10538.34	1.9964			1053834	24.1927	
					29.73786	Total