

Instructions for Sac Metro Air District Minor Project and Strategic Area Project Health Effects Screening Tools

June 15, 2020

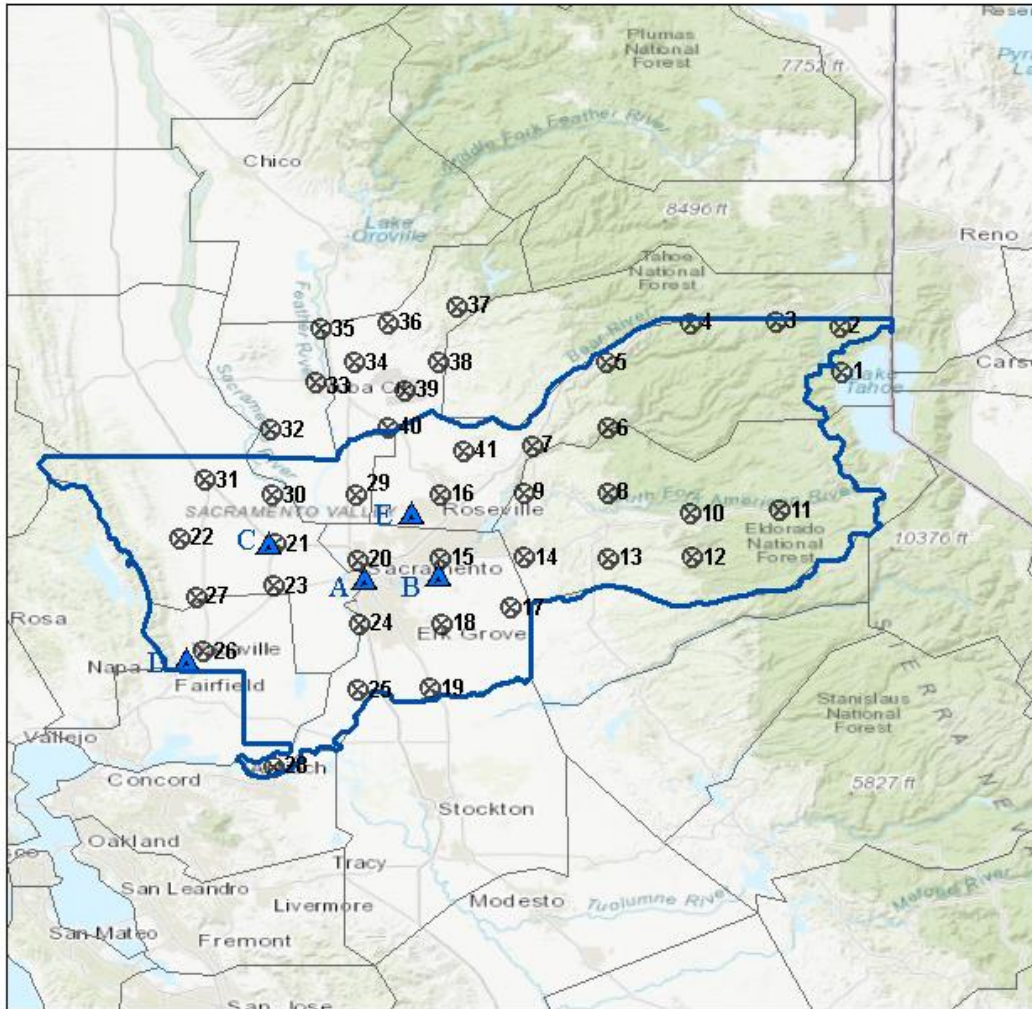
Minor Project Health Effects Screening Tool

Ramboll conducted photochemical and health effects modeling of hypothetical CEQA projects in Sacramento and neighboring counties with NO_x, ROG and PM_{2.5} emissions at the 82 pounds/day threshold of significance (TOS) level. A Minor Project Health Effects Screening Tool (Minor Project Tool) was developed to estimate health effects for proposed projects. The Minor Project Tool only estimates health effects for project locations within the 5-Air-District Region.¹ The user inputs the location of the proposed project in latitude and longitude coordinates using decimal degrees. If the latitude/longitude of the project is not known, a Google Earth "kmz" file is provided that allows the user to identify the latitude/longitude of the project. The Minor Project Tool outputs the estimated health effects at the 82 pounds/day emissions rate by spatial interpolation of the health effects from the 41 hypothetical projects locations (see Figure 1) where photochemical and health effects modeling was conducted.

¹ The 5-Air-District Region consists of Sacramento, Placer, El Dorado, Sutter, Yuba and Yolo Counties and the portions of Solano County that are within the Sacramento Valley.

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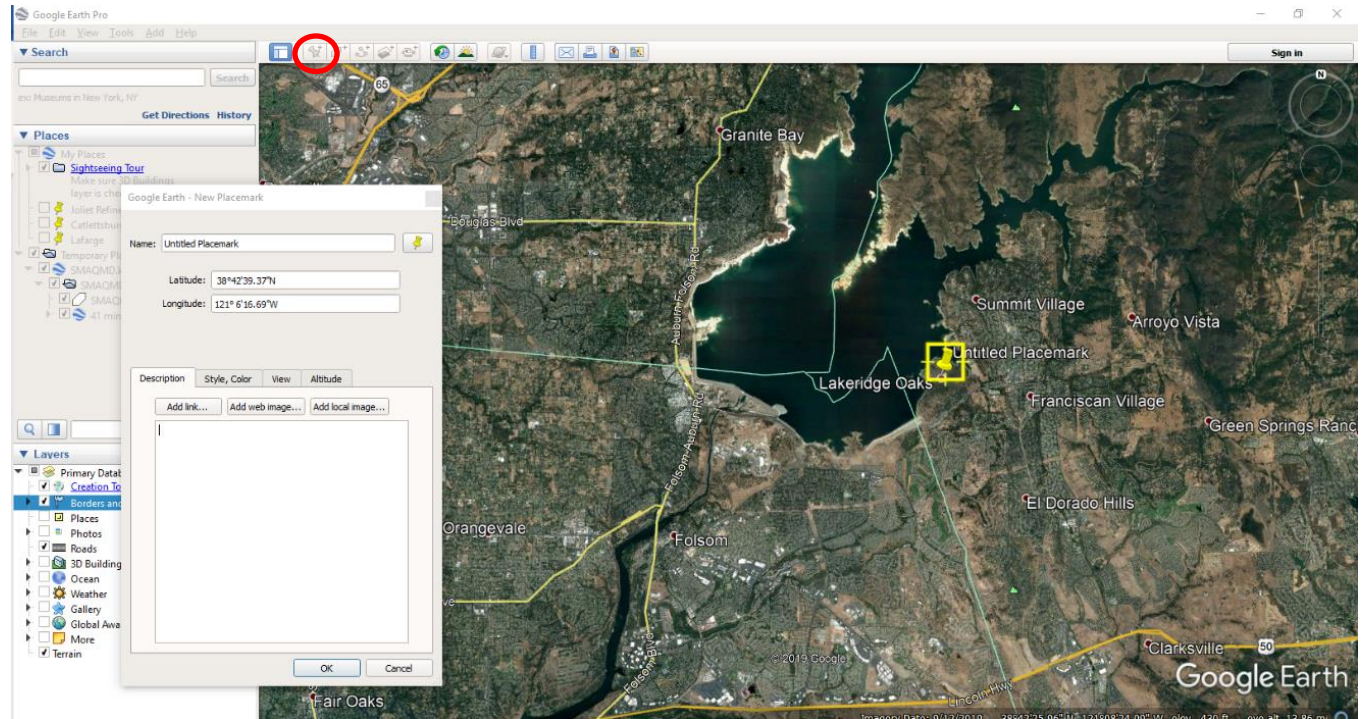
Figure 1. Locations of five strategic area Projects A-E used in the strategic area screening modeling (triangles), along with the 41 hypothetical projects used in the minor project analysis (circles with x). Also shown is the boundary of the SFNA in blue.



A hypothetical project example for the Minor Project Tool follows. Lakeridge Oaks is on the shores of Folsom Lake. To get the latitude/longitude location of the proposed project, use the kmz file to open Google Earth. Use the Add Placemark function (top left of Google Earth) and pin the project location to display the latitude (38°42'39.37") and longitude (121°6'16.69") as shown in Figure 2.

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Figure 2. Use of Google Earth to calculate the latitude/longitude location for a project located at Lakeridge Oaks on the shore of Folsom Lake.



As the Minor Project Tool requires the use of decimal degrees, rather than the degree, minute, second format for latitude and longitude, the location must be converted to decimal formats using the following formulas:

$$38 + (42/60) + (39.37/3600) = 38.71094$$


$$[121 + (6/60) + (16.69/3600)] \times -1.0 = -121.10464$$

Note that longitudes are negative in the western hemisphere, so the Google Earth W longitude needs to be multiplied by -1.0. The latitude and longitude are then input into the Minor Project Tool and the tool interpolates the health effects for the project from the 41 hypothetical projects as shown in Table 1.

In this case, the Minor Project Tool estimates that a project located at Lakeridge Oaks with 82 lbs./day emissions of NOX, ROG and PM2.5 would have 1.50 pre-mature deaths per year in the 5-Air-District Region due to its PM2.5 concentrations, which is a 0.0034% increase in pre-mature deaths over the Background Health Incidence.

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Table 1. Estimated health effects from the Minor Project Health Effects Tool for a source located at Lakeridge Oaks on the shore of Folsom Lake.

 <div style="text-align: center;"> <h2 style="margin: 0;">Minor Project Health Effects Tool</h2> </div>					
Latitude	38.71094	<-- Step 1: Input latitude (Please chose a value between 38.0 and 39.7)			
Longitude	-121.10464	<-- Step 2: Input longitude (Please chose a value between -122.5 and -120.0)			
PM2.5 Health Endpoint	Age Range ¹	Incidences Across the Reduced Sacramento 4-km Modeling Domain Resulting from Project Emissions (per year) ^{2,5} (Mean)	Incidences Across the 5-Air-District Region Resulting from Project Emissions (per year) ² (Mean)	Percent of Background Health Incidences Across the 5-Air-District Region ³	Total Number of Health Incidences Across the 5-Air-District Region (per year) ⁴
Respiratory					
Emergency Room Visits, Asthma	0 - 99	0.55	0.49	0.0027%	18419
Hospital Admissions, Asthma	0 - 64	0.034	0.03	0.0016%	1846
Hospital Admissions, All Respiratory	65 - 99	0.26	0.22	0.0011%	19644
Cardiovascular					
Hospital Admissions, All Cardiovascular (less Myocardial Infarctions)	65 - 99	0.12	0.11	0.00046%	24037
Acute Myocardial Infarction, Nonfatal	18 - 24	0.000048	0.000042	0.0011%	4
Acute Myocardial Infarction, Nonfatal	25 - 44	0.0041	0.0037	0.0012%	308
Acute Myocardial Infarction, Nonfatal	45 - 54	0.0095	0.0086	0.0012%	741
Acute Myocardial Infarction, Nonfatal	55 - 64	0.015	0.014	0.0011%	1239
Acute Myocardial Infarction, Nonfatal	65 - 99	0.073	0.065	0.0013%	5052
Mortality					
Mortality, All Cause	30 - 99	1.8	1.5	0.0034%	44766
Ozone Health Endpoint	Age Range ¹	Incidences Across the Reduced Sacramento 4-km Modeling Domain Resulting from Project Emissions (per year) ^{2,5} (Mean)	Incidences Across the 5-Air-District Region Resulting from Project Emissions (per year) ² (Mean)	Percent of Background Health Incidences Across the 5-Air-District Region ³	Total Number of Health Incidences Across the 5-Air-District Region (per year) ⁴
Respiratory					
Hospital Admissions, All Respiratory	65 - 99	0.063	0.049	0.00025%	19644
Emergency Room Visits, Asthma	0 - 17	0.19	0.14	0.0024%	5859
Emergency Room Visits, Asthma	18 - 99	0.34	0.26	0.0021%	12560
Mortality					
Mortality, Non-Accidental	0 - 99	0.04	0.033	0.00011%	30386

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Strategic Area Project Health Effects Screening Tool

To estimate health effects for larger projects at strategic locations in the Sacramento Federal Ozone Non-attainment Area (SFNA²), Ramboll conducted additional photochemical and health effects modeling for five locations at NO_x, ROG and PM_{2.5} emission rates two times and eight times the 82 lbs./day thresholds of significance level, and developed a Strategic Area Project Health Effects Screening Tool (Strategic Area Project Tool). The user selects one of the five modeled locations and inputs the NO_x, ROG and PM_{2.5} emission rates for the proposed project. The Strategic Area Project Tool interpolates the health effects from the modeled emission rates to generate a health effects summary table for the user supplied emissions at the user selected location. The five modeled project locations are provided in Table 2 and displayed in Figure 1.

Table 2. Coordinates for 5 hypothetical strategic area projects.


ID	Name	Latitude	Longitude	Location
A	Sacramento	38.579336	-121.494119	10 th St. & K St.
B	Rancho Cordova	38.588080	-121.286765	Zinfandel Dr. & White Rock Rd.
C	Woodland	38.677388	-121.765759	Main St. & East St.
D	Vacaville	38.347954	-121.998058	Merchant St. & Lincoln Hwy.
E	West Roseville	38.765833	-121.359299	Fiddymment Rd. & Pleasant Grove Blvd.

A hypothetical example for the Strategic Area Project Tool is in downtown Sacramento. Location A at 10th Street and K Street is selected (see Table 2 and Figure 1 for location). The assumed emissions for this example are two times the thresholds of significance rate for all three pollutants (i.e., 164 pounds/day for NO_x, ROG and PM_{2.5}). Table 3 shows the results from the Strategic Area Project Tool for this hypothetical example. In this case, there are 5.0 pre-mature deaths per year in the SFNA due to the hypothetical example project PM_{2.5} concentrations, which is a 0.013% increase in pre-mature deaths over the Background Health Incidence.

² The Sacramento Federal Ozone Non-Attainment Area (SFNA) includes all of Sacramento and Yolo counties and portions of Placer, El Dorado, Solano, and Sutter counties.

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Table 3. Estimated health effects from the Strategic Area Project Health Effects Tool for a source located in downtown Sacramento (location A at 10th & K streets) with NO_x, ROG and PM_{2.5} emissions of 164 lbs./day.

 Strategic Area Project Health Effects Tool					
Strategic Area Location	A. Sacramento	<-- Step 1: Input the area			
NO _x Emissions	164	<-- Step 2: Input NO _x emissions in lbs./day			
ROG Emissions	164	<-- Step 3: Input ROG emissions in lbs./day			
PM ₂₅ Emissions	164	<-- Step 4: Input PM _{2.5} emissions in lbs./day			
PM _{2.5} Health Endpoint	Age Range ¹	Incidences Across the Reduced Sacramento 4-km Modeling Domain Resulting from Project Emissions (per year) ^{2,5}	Incidences Across the SFNA Region Resulting from Project Emissions (per year) ²	Percent of Background Health Incidences Across the SFNA Region ³	Total Number of Health Incidences Across the SFNA Region (per year) ⁴
		(Mean)	(Mean)		
Respiratory					
Emergency Room Visits, Asthma	0 - 99	2.2	2	0.013%	15381
Hospital Admissions, Asthma	0 - 64	0.14	0.13	0.0081%	1564
Hospital Admissions, All Respiratory	65 - 99	0.77	0.68	0.0042%	16054
Cardiovascular					
Hospital Admissions, All Cardiovascular (less Myocardial Infarctions)	65 - 99	0.39	0.35	0.0017%	20295
Acute Myocardial Infarction, Nonfatal	18 - 24	0.0002	0.00018	0.0051%	4
Acute Myocardial Infarction, Nonfatal	25 - 44	0.017	0.016	0.0059%	266
Acute Myocardial Infarction, Nonfatal	45 - 54	0.038	0.035	0.0055%	637
Acute Myocardial Infarction, Nonfatal	55 - 64	0.064	0.059	0.0057%	1032
Acute Myocardial Infarction, Nonfatal	65 - 99	0.25	0.23	0.0053%	4351
Mortality					
Mortality, All Cause	30 - 99	5.5	5	0.013%	39945
Ozone Health Endpoint	Age Range ¹	Incidences Across the Reduced Sacramento 4-km Modeling Domain Resulting from Project Emissions (per year) ^{2,5}	Incidences Across the 5-Air-District Region Resulting from Project Emissions (per year) ²	Percent of Background Health Incidences Across the 5-Air-District Region ³	Total Number of Health Incidences Across the 5-Air-District Region (per year) ⁴
		(Mean)	(Mean)		
Respiratory					
Hospital Admissions, All Respiratory	65 - 99	0.15	0.11	0.00068%	16054
Emergency Room Visits, Asthma	0 - 17	0.74	0.58	0.012%	4728
Emergency Room Visits, Asthma	18 - 99	1.2	0.96	0.009%	10654
Mortality					
Mortality, Non-Accidental	0 - 99	0.092	0.074	0.00028%	26864