

Air Quality Modeling of Rail Yard

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Background

- Citizen complaints on train idling.
- DEP begins modeling and risk assessment.
- Railyard announces Idling Minimization Program.
- DEP continues to refine modeling.
- Railyard announces more stringent Idling Minimization Program.

Assumptions

- **EPA Dispersion Model – AERMOD**
- **Number of idling trains, hours of idling, type of train engine, fuel**
- **5 Years of Hourly Meteorological Data from the Newark Airport NWS Station**
- **Background PM-2.5 Air Quality from NJDEP's Chester Monitor**

Public Health Concerns Evaluated

- **Fine Particulate (PM-2.5) National Ambient Air Standards (NAAQS)**

annual NAAQS = 15 ug/m³

24-hour NAAQS = 35 ug/m³

- **Incremental Cancer Risk**

- assumes 70-year continual exposure
- only diesel particulate from train yard included

Risk Management Procedures for Facility-Wide Risk (Existing Sources)

- Cancer risk greater than 1,000 in a million – Unacceptable risk, requires immediate action to reduce.
- Cancer risk from 100 to 1,000 in a million – Significant risk, pursue short-term (less than 1 year) risk minimization strategy.
- Cancer risk from 10 to 100 in a million – Significant risk, pursue long-term (more than 1 year) risk minimization strategy.
- Cancer risk less than 10 in a million – Negligible

Idling Minimization Program

- **Previous Idling Practice**

Total of approx. 88 hours of idling each weekday.

Total of approx. 152 hours of idling each weekend day.

- **Idling Minimization Program** (implemented when nighttime temperatures above 0° F)

Total of approx. 21 hours of idling each weekday.

Total of approx. 15 hours of idling each weekend day.

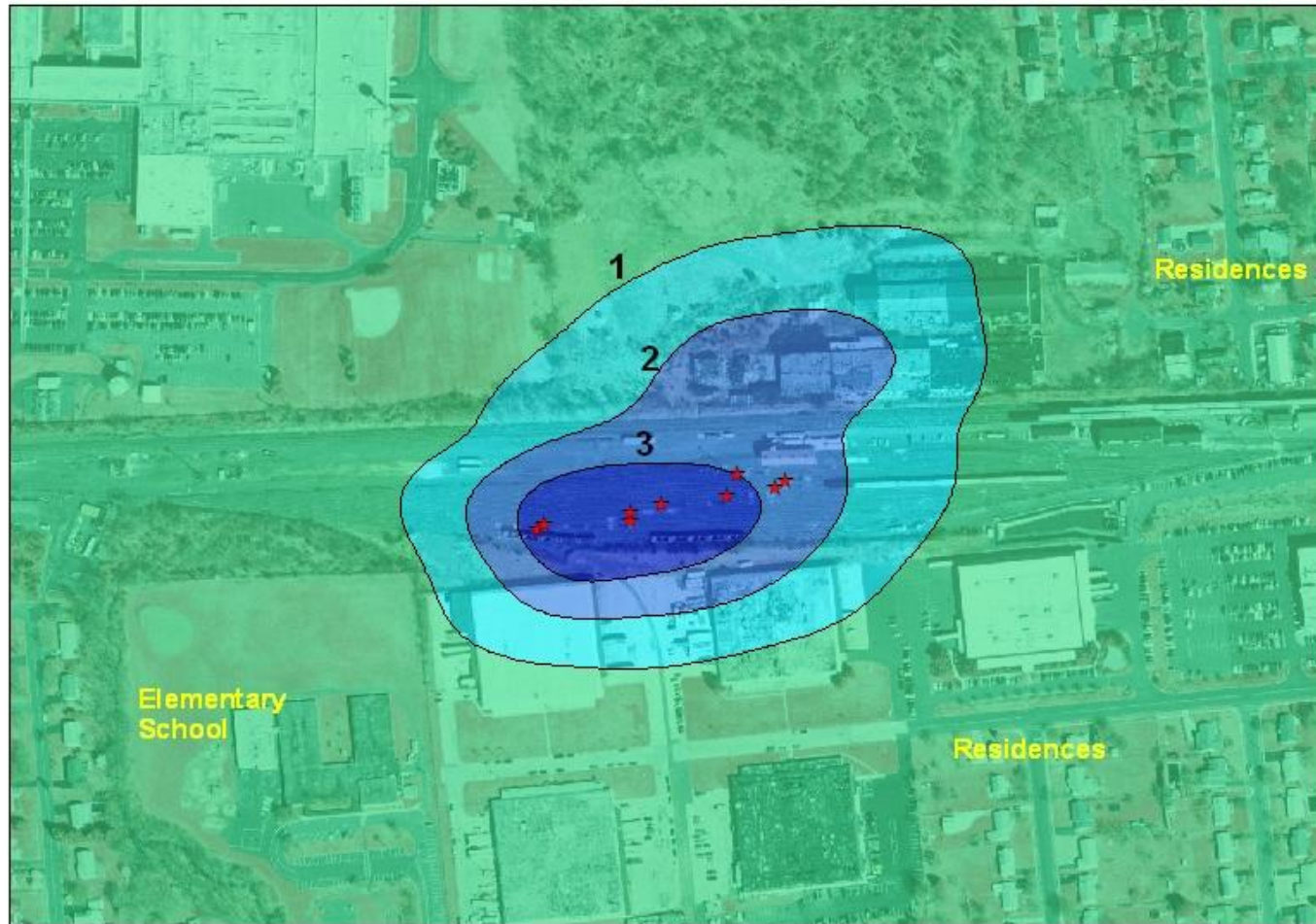
THE NEW JERSEY TRANSIT RAILYARD AT RARITAN



0 220 440 880 1,320 1,760 Feet



Predicted Annual PM-2.5 Concentration with Previous Train Idling Practice



Legend

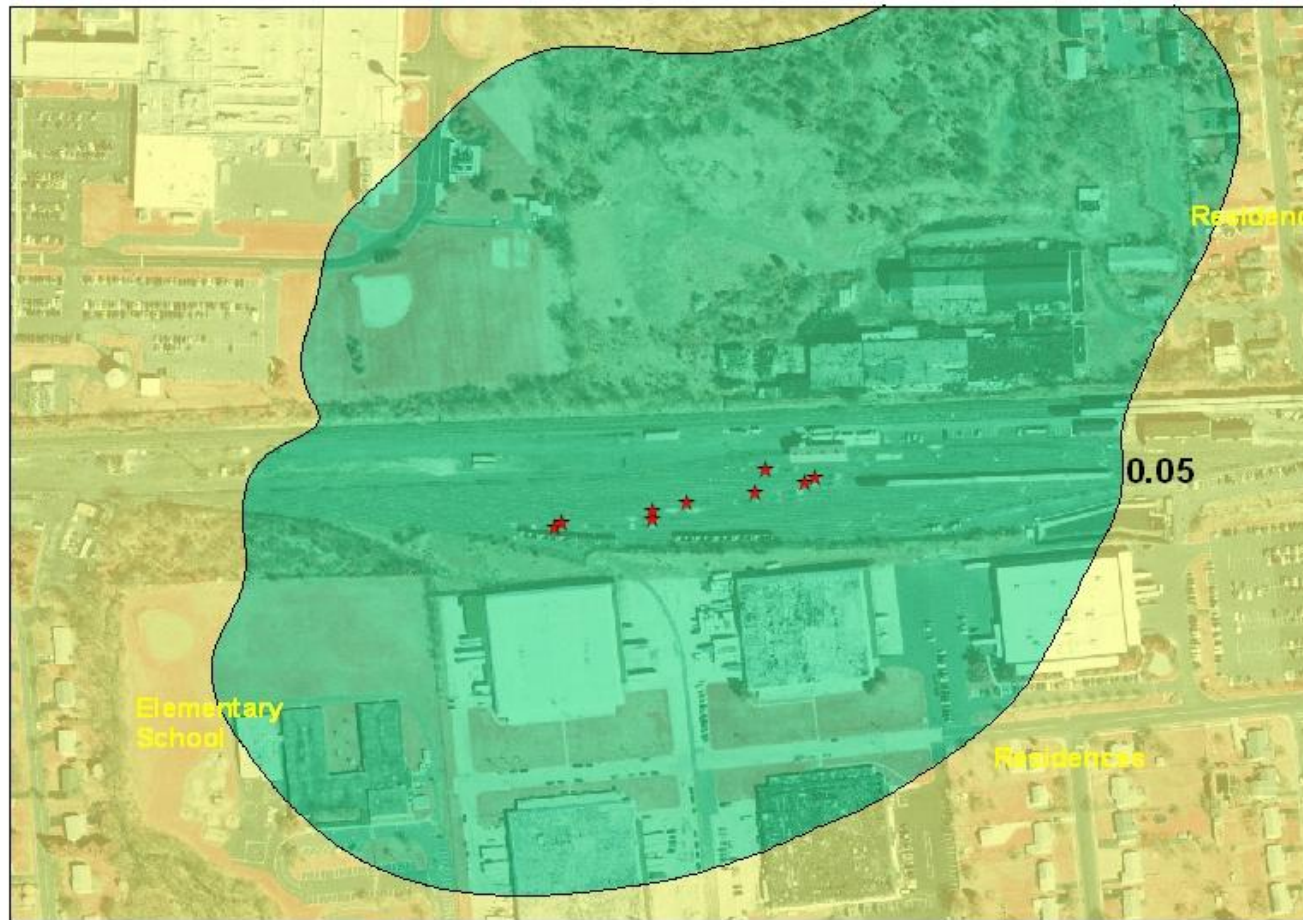
- ★ Locomotives
- 0.0 - 0.05 ug/m³
- 0.05 - 1 ug/m³
- 1 - 2 ug/m³
- 2 - 3 ug/m³
- 3 - 4 ug/m³



NAAQS=15 ug/m³; Background levels (not included in figure) = 10.0 ug/m³



Predicted Annual PM-2.5 Concentration with Idling Minimization Program (Temperatures above 0° F)



Legend

- ★ Locomotives
- 0.0 - 0.05 ug/m³
- 0.05 - 1 ug/m³
- 1 - 2 ug/m³
- 2 - 3 ug/m³
- 3 - 4 ug/m³



NAAQS=15 ug/m³; Background levels (not included in figure) = 10.0 ug/m³

0 125 250 500 750 1,000 Feet

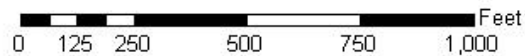
Maximum Predicted 24-hour PM-2.5 Concentration with Idling Minimization Program (Temperatures above 0° F)



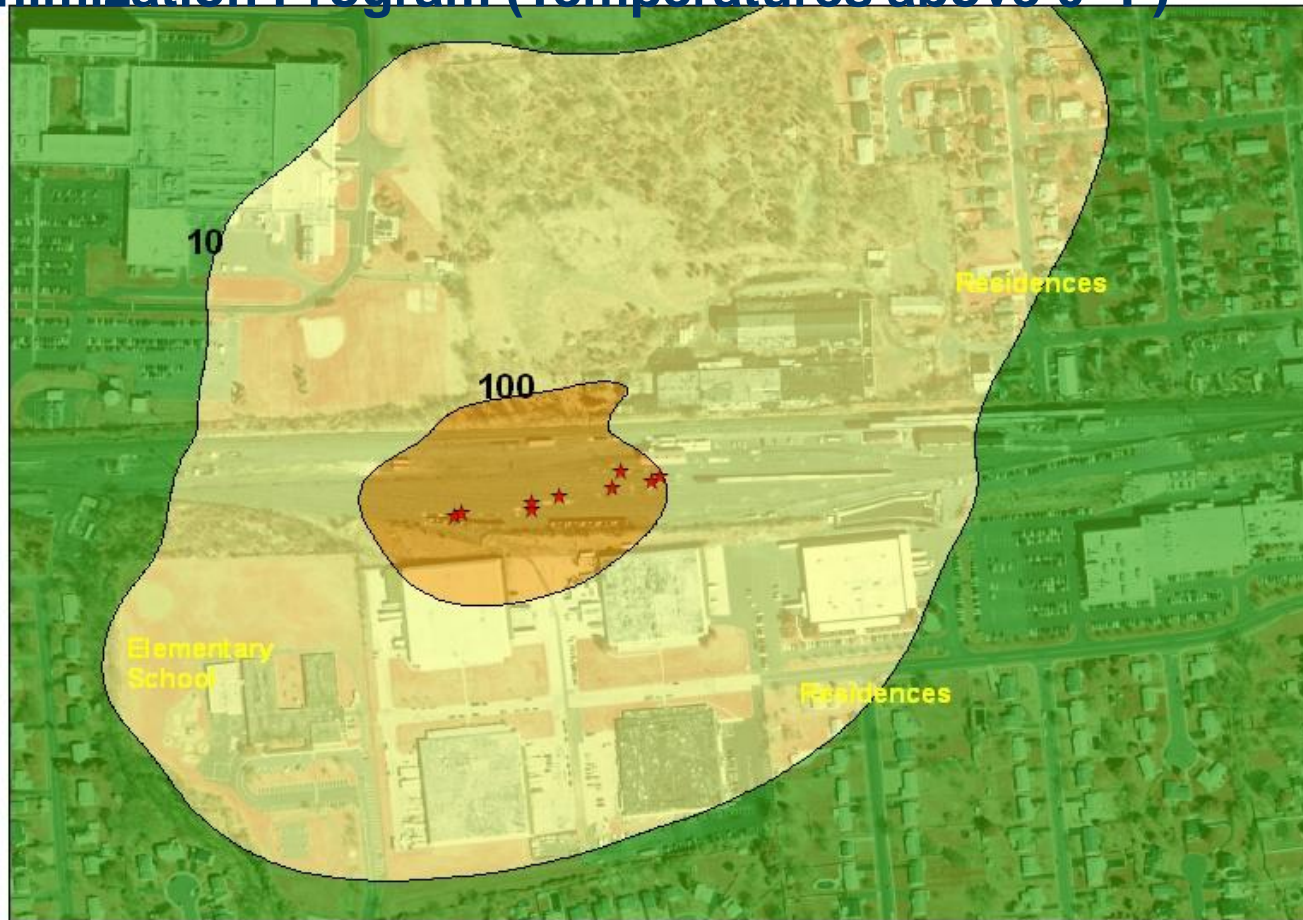
Legend

- ★ Locomotives
- 0 - 5 ug/m³
- 5 - 10 ug/m³
- 10 - 15 ug/m³
- 15 - 20 ug/m³
- Above 20 ug/m³

NAAQS= 35 ug/m³; Background levels (not included in figure) = 30.3 ug/m³



Incremental Cancer Risk due to Train Idling with Idling Minimization Program (Temperatures above 0° F)



Legend

- ★ Locomotives
- Below one in a million risk
- 1 - 10 in a million risk
- 10 - 100 in a million risk
- 100 - 1000 in a million risk
- Above 1000 in a million risk



Note: Exposures at the Elementary School are expected to be less than a life time and so the risk will be less (see text for further explanation).

No background values included in estimated cancer risk

