

2008 Regional Air Quality Conference

Project Level Analysis:
An Example Project
And Comments Received

April 24, 2008



Who We Are:

- a multidisciplinary firm founded in Louisville, Kentucky in 1974
- satellite offices currently located in IN, WV, TN, and GA
- providing design and environmental services (air and noise modeling, NEPA) to KYTC for over twenty years



An Example of Project Level Analysis

Elizabethtown to Radcliff Connector (E2RC)

Hardin County, Kentucky

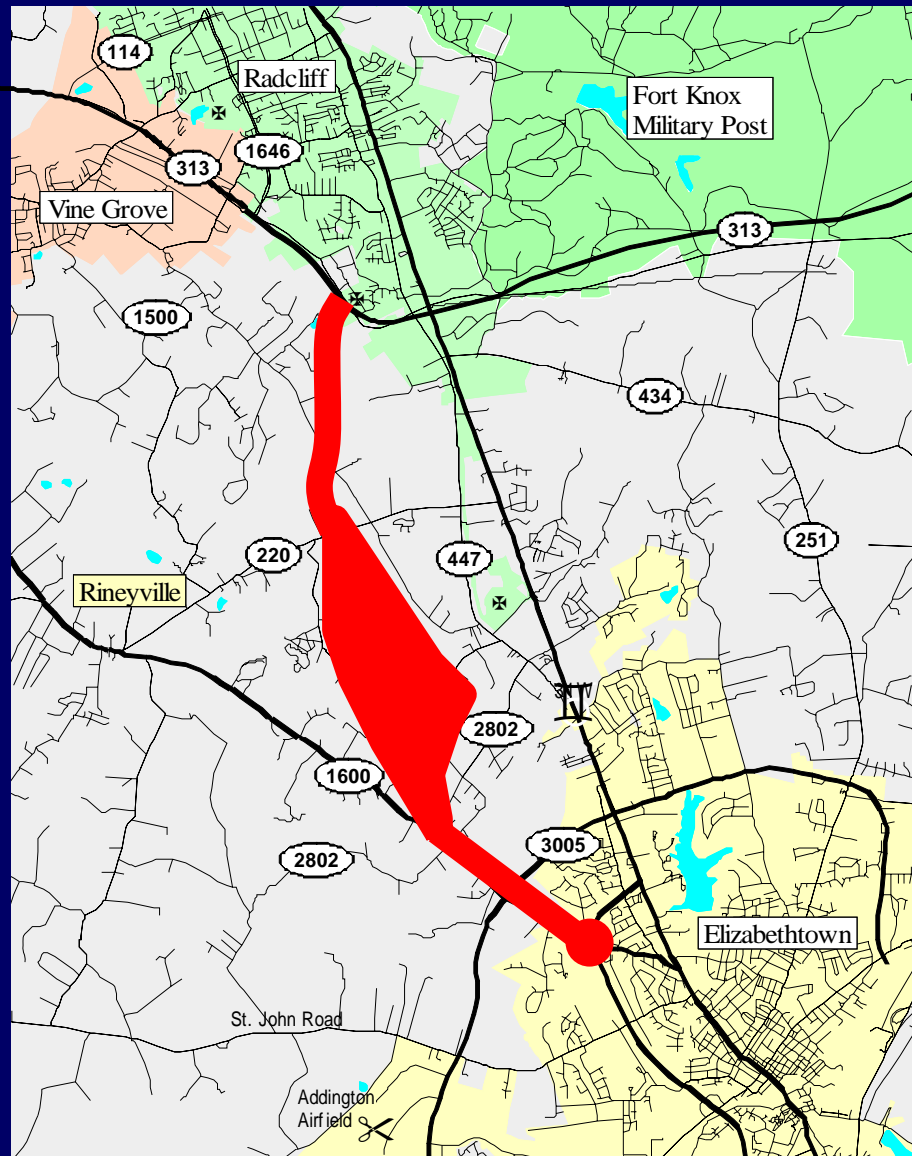


Project Description

- A new connector road on new alignment west of US 31W and east of KY 1600, linking Elizabethtown and Radcliff
- Begins at US 31W Bypass, and ends at KY 313
- Involves reconstructing 1.9 miles of KY 1600 and the KY 1600/US 31W interchange



Project Area

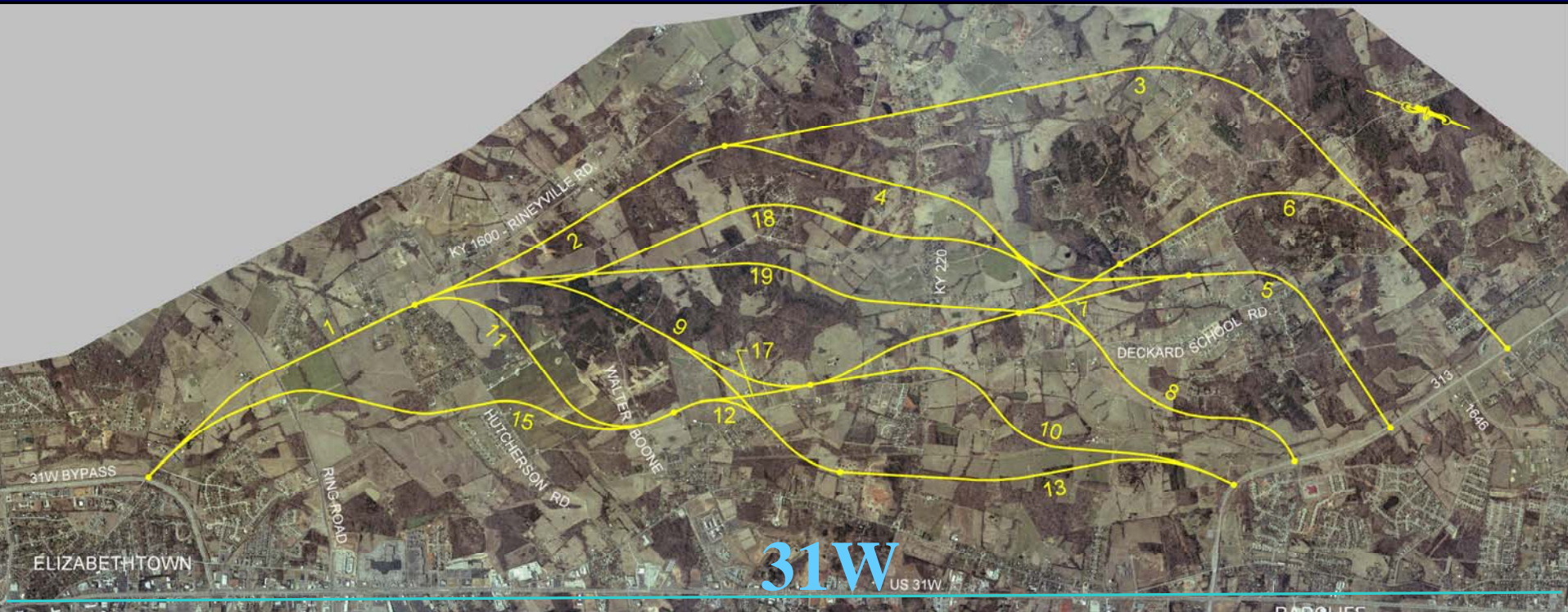


Project History

- An Alternatives Planning Study was completed in 2001
- Following that study, an EA/FONSI was prepared for a broad range of alternative alignments (54)
- The public involvement process was employed to develop a short-list of alternatives
- After another public meeting, the short-list of alternatives was further reduced (3), and the detailed environmental investigations were completed
- On May 6, 2005, the FONSI, with a selected alternative, was approved



Typical Section Alignments



Step 1: Collect Data

- Traffic Data (ADT, DHV, percent trucks for existing, no-build, and build conditions)
- Roadway Data (Lane and R-O-W Widths, Number of Lanes, Posted Speeds)
- Signal Timing Data (if any signalized intersections)



Step 2: Run MOBILE6.2 Model

```
* Filename: U:\01103\AirModel\MOBILE6\E2RC.in
* This input uses the AVERAGE SPEED command to generate
* fleet-average CO emission factors for calendar years
* 2001 and 2025 for freeway (non-ramp) operation.

***** Header Section *****
MOBILE6 INPUT FILE
REPORT FILE      : U:\01103\AirModel\MOBILE6\E2RC.out
POLLUTANTS       : CO
RUN DATA

***** Run Section *****
FUEL RVP         : 8.6
MIN/MAX TEMP     : 41.8 41.8

***** Scenario Section *****
* A separate scenario must be written for each freeway
* average speed to be analysed.

SCENARIO RECORD  : Fleet-Average Emissions 2.5mph- CY2001
CALENDAR YEAR    : 2001
AVERAGE SPEED   : 2.5 non-ramp

SCENARIO RECORD  : Fleet-Average Emissions 20mph- CY2001
CALENDAR YEAR    : 2001
AVERAGE SPEED   : 20.0 non-ramp

SCENARIO RECORD  : Fleet-Average Emissions 25mph- CY2001
CALENDAR YEAR    : 2001
AVERAGE SPEED   : 25.0 non-ramp

SCENARIO RECORD  : Fleet-Average Emissions 30mph- CY2001
CALENDAR YEAR    : 2001
AVERAGE SPEED   : 30.0 non-ramp

SCENARIO RECORD  : Fleet-Average Emissions 35mph- CY2001
CALENDAR YEAR    : 2001
AVERAGE SPEED   : 35.0 non-ramp

SCENARIO RECORD  : Fleet-Average Emissions 40mph- CY2001
CALENDAR YEAR    : 2001
AVERAGE SPEED   : 40.0 non-ramp
```

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*****
* MOBILE6.2 (31-Oct-2002)
* Input file: U:\01103\MOBILE6\E2RC.IN (file 1, run 1).
*****

* # # # # #
* Fleet-Average Emissions 2.5mph- CY2001
* File 1, Run 1, Scenario 1.
* # # # # #
MS81 Warning:
The user supplied freeway average speed of 2.5
will be used for all hours of the day. 100% of VMT
has been assigned to the freeway roadway type for
all hours of the day and all vehicle types.
M 48 Warning:
there are no sales for vehicle class HDGV8b

Calendar Year: 2001
Month: Jan.
Altitude: Low
Minimum Temperature: 41.8 (F)
Maximum Temperature: 41.8 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 8.6 psi
Weathered RVP: 8.6 psi
Fuel Sulfur Content: 299. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type: LDGV LDGT12 LDGT34 LDGT (All) HDGV LDDV LDDT HDDV MC All Veh
GWR: <6000 >6000
VMT Distribution: 0.4775 0.2952 0.1009 0.0357 0.0009 0.0016 0.0820 0.0061 1.0000

Composite Emission Factors (g/mi):
Composite CO : 72.73 87.57 132.76 99.32 142.23 4.850 4.503 17.521 106.21 81.732

* # # # # #
* Fleet-Average Emissions 20mph- CY2001
* File 1, Run 1, Scenario 2.
* # # # # #
```



Step 3: Run CAL3QHC Model

- Receptors (232 for this project)
- Roadway links (173-212, depending on Build Alternative)
- Intersection links (one per signalized movement, 12 intersections)
- Signal timing (total phase length and red phase length)
- Traffic volumes for each link (DHV)
- CO Emission factors for each traffic speed (from MOBILE)
- Stability class (for urban or rural settings)
- Background CO (also based on setting)



Step 3: Run CAL3QHC Model

Special Issues

- Both urban and rural settings in project area
- High number of roadway links
- High number of receptors
- Build alternatives crossing each other, interweaving



Step 3: Run CAL3QHC Model

Special Issue Resolutions

- Split project into two regimes: urban and rural, based on roadway links
- Two separate runs for each regime, based on urban and rural receptors
- Post-processing to determine extent of cross-influence on CO levels between regimes
- Placement of receptors to avoid Build Alternatives



Step 3: Run CAL3QHC Model

Analysis Results

Proposed project did not significantly contribute to violation of NAAQS by itself

Two of the existing intersections had CO levels that were close to NAAQS for 8-hour CO levels under all of the conditions analyzed (existing, no-build, and all three build alternatives)

How Close?

Existing: 8.7 ppm; No-Build: 7.5 ppm; Build: 6.8

8-hr NAAQS: 9.0 ppm



Air Quality-Related Public Comments Received on NEPA Docs

EPA: The County of the project is in attainment for NAAQS and PMs.

However, you need to provide data as to the existing conditions.

Response: Obtained CO and PM data from KY DAQ .



Air Quality-Related Public Comments Received on NEPA Docs

KY DAQ: No Fugitive Emissions, no Open Burning, and Follow Local Government Regs.

Response: Will comply with requirements as per 401 KAR 63:010, 005, will follow local government laws, reference the TIP (if in an MPO), and in general use BMP.



Air Quality-Related Public Comments Received on NEPA Docs

Public 1: The NEPA doc did not address MSATs.

Response: Added substantial qualitative language to address MSATs. Noted, however, MSAT emissions are projected to decrease substantially in the future as a result of new EPA programs to reduce MSAT emissions nationwide.



Air Quality-Related Public Comments Received on NEPA Docs

Public 2: The Project Qualifies as a MSAT
Category 3 “rigorous assessment.”

Response: Category 3 applies to: Major Intermodal Freight Facilities, Future AADT must be in range of 140,000 or greater; AND in proximity to populated areas or rural vulnerable population.



Air Quality-Related Public Comments Received on NEPA Docs

Public 3: You must quantify global warming a/k/a “climate change.” 31% of CO₂ emission in U.S. are from transportation sources.



Air Quality-Related Public Comments Received on NEPA Docs

Response: Carbon dioxide emissions, together with other greenhouse gases (GHG), contribute to global warming—“climate change.” USEPA website’s “Climate Change – Science: State of Knowledge” section notes that it is virtually certain that human activities such as the burning of fossil fuels to power cars, industries, utilities, etc., have added to the amount of GHG in the atmosphere, “enhancing the natural greenhouse effect, and likely contributing to an increase in global average temperature and related climate changes.” What is not certain, according to USEPA site, is



Air Quality-Related Public Comments Received on NEPA Docs

Response: continued...

...how much warming will occur, how fast...and how the warming will affect the rest of the climate system. Answering these questions will require advances in scientific knowledge in a number of areas:

- Improving understanding of natural climatic variations, changes in the sun's energy, land-use changes, the warming or cooling effects of pollutant aerosols, and the impacts of changing humidity and cloud cover.
- Determining the relative contribution to climate change of human activities and natural causes.
- Projecting future greenhouse emissions and how the climate system will respond within a narrow range.
- Improving understanding of the potential for rapid or abrupt climate change.

(www.epa.gov/climatechange/science/stateofknowledge)



Air Quality-Related Public Comments Received on NEPA Docs

Response continued:

From a policy standpoint, FHWA's current approach on the issue of global warming is as follows: To date, no national standards have been established regarding greenhouse gases, nor has EPA established criteria or thresholds for greenhouse gas emissions. On April 2, 2007, the Supreme Court issued a decision in *Massachusetts et al. v.*

Environmental Protection Agency et al. that the USEPA does have authority under the Clean Air Act to establish motor vehicle emissions standards for CO₂ emissions. USEPA is currently determining the implications to national policies and programs as a result of the Supreme Court decision. However, the Court's decision did not have any direct implications on requirements for developing transportation projects.



Air Quality-Related Public Comments Received on NEPA Docs

Public 4: No qualitative or quantitative evaluation of indirect and cumulative effects to air quality were provided in the NEPA document.



Air Quality-Related Public Comments Received on NEPA Docs

Response: No direct air quality impacts are anticipated as a result of the project; therefore, indirect and cumulative air quality impacts were not assessed. Further, any induced developments and their air quality impacts cannot be reasonably foreseen, nor addressed.

