

Appendix H. Off-Model Analysis for Incident Detection, Notification and Response Programs on Interstate Highways and Freeways in Durham and Wake Counties

The Incident Management Program reduces congestion by removing inoperable vehicles due to crashes, mechanical break-downs or other reasons. Reducing nonrecurring congestion is the goal of this program.

The Triangle Regional Transportation Management Center (TRTMC) in Raleigh monitors and operates 44 CCTV cameras, 17 DMS, and 5 HAR along Triangle area freeways.

The motorist assistance patrol normal patrol routes include 78 miles on I-85, I-40, I-440, and US 1 and responds to an additional 42 miles on I-40, I-85, I-540, US 64, US 15-501 and NC 147.

The effort is supplemented with the following Regional Traveler Information activities:

- Internet Web Sites – www.ncsmartlink.org, Traffic Patrol Broadcasting through WRAL-TV online
- Call-in Telephone – Traffic Patrol Broadcasting
- Cooperative Agreements for use of live video images– NCSHP, WRAL- TV, WTVD –TV, NBC-17, Time-Warner, Curtis Media Group, Town of Cary, City of Durham, and City of Raleigh
- 511 – Statewide Traveler Information Phone number

The following assumptions and methods (in accordance with the FHWA Region IV's *Off-Model Air Quality Analysis: A Compendium of Practice*, which provided guidance on estimating emissions effects of these projects) were used to quantify the emission benefits from this program:

- Incident management program with components such as the surveillance, motorist assistance patrol and traveler information activities described above has 50% effectiveness.
- Emissions caused by nonrecurring congestion accounts for 4.9% of total emissions.
- The incident management system is assumed to affect only the Interstates and Freeways.
- Interstates and Freeways VMT subject to the non-recurring congestion conditions and program activities is as follows: 50% of VMT in 2015, 75% of VMT in 2025 and 100% of VMT in 2035.

Incident management analysis was calculated for the years 2015, 2025 and 2035 and was interpolated for other years.

The tables on the following pages show the application of these parameters in Durham and Wake Counties; a sample calculation is given for Durham County NO_x in 2015

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Durham County Regional Freeway Emissions			
Year	Pollutant		
	NOx	CO	
2015 Total	2,897	36,327	(this table shows the total emissions, by pollutant, from freeway travel in the county)
2025 Total	1,416	38,391	
2035 Total	1,331	42,252	

Emissions Caused by Nonrecurring Congestion (4.9% of total).

Year	Pollutant		
	NOx	CO	
2015 Total	142	1,780	(this table is 4.9% of the emissions from the previous table; the amount attributable to non-recurring congestion due to crashes, break-downs, etc. assuming 100% of VMT is subject to non-recurring congestion)
2025 Total	69	1,881	
2035 Total	65	2,070	

Program Type			Effectiveness		Program in Use =	2015 Total	
Incident Detection and Response			50%	1			2025 Total
Motorist Assistance Patrol			25%	2			2035 Total
Surveillance			15%	3			Total

Emissions Reduction

Year	Total Freeway VMT	Percent of VMT Subject to Program	NOx (KG/Day)	CO (KG/Day)
2015 Total	4,305,334	50%	35	445
2025 Total	5,617,071	75%	26	705
2035 Total	6,261,361	100%	33	1,035

Note: Freeway VMT is the total of Urban Interstate, Urban Freeway and Rural Interstate VMT.

Durham Sample calculation (NO_x in Year 2015): Total freeway emissions of 2,897 kg/day are multiplied by 4.9% to get the 142 kg/day of emissions that would be due to non-recurring congestion if all Freeway VMT were subject to non-recurring congestion. These emissions are then multiplied by 50% to get the 71 kg/day of emissions actually due to non-recurring congestion in 2015 in the absence of any incident management program. These emissions are then multiplied by the 50% effectiveness of the incident management program to get the 35 kg/day of NO_x emissions reduction due to the incident management program.

Wake County Regional Freeway Emissions			
Year	Pollutant		
	NOx	CO	
2015 Total	6,782	86,120	
2025 Total	3,220	86,694	
2035 Total	3,694	84,029	

Emissions Caused by Nonrecurring Congestion (4.9% of total).

Year	Pollutant	
	NOx	CO
2015 Total	332	4,220
2025 Total	158	4,248
2035 Total	181	4,117

Program Type	Effectiveness		
Incident Detection and Response	50%	1	1
Motorist Assistance Patrol	25%	2	1
Surveillance	15%	3	1

Program in Use = 0
2015 Total
2025 Total
2035 Total

Emissions Reduction

Year	Total Freeway VMT	Percent of VMT Subject to Program	NOx (KG/Day)	CO (KG/Day)
2015 Total	10,485,002	50%	83	1,055
2025 Total	13,196,133	75%	59	1,593
2035 Total	13,224,368	100%	91	2,059

Note: Freeway VMT is the total of Urban Interstate, Urban Freeway and Rural Interstate VMT.