

# Near-road Monitoring

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# Objectives

- Review CFR requirements
- Discuss forthcoming Technical Assistance Document
- Discuss Near-road NO<sub>2</sub> pilot
- Provide an example version of the draft site selection process in action
- Wrap-up and take questions

# Reviewing what's in the rule...

- 40 CFR Part 58 Appendix D and E have network design requirements and siting criteria, respectively (<http://ecfr.gpoaccess.gov>).
- Requirements based on CBSA populations (available from US Census Bureau [[www.census.gov](http://www.census.gov)])
- Objectives are to monitor maximum NO<sub>2</sub> concentrations in an area – with a component of the network design specifically focusing on mobile source impacts due to related exposure risks.
- Required near-road (NR) monitoring stations:
  - 1 NR site in CBSAs with populations  $\geq$  500,000
  - 2 NR sites in CBSAs with populations  $\geq$  2.5 million
  - 2 NR sites in CBSAs with one or more road segments having  $\geq$ 250,000 Annual Average Daily Traffic (AADT)
- Estimated to require 127 sites in 103 CBSAs.

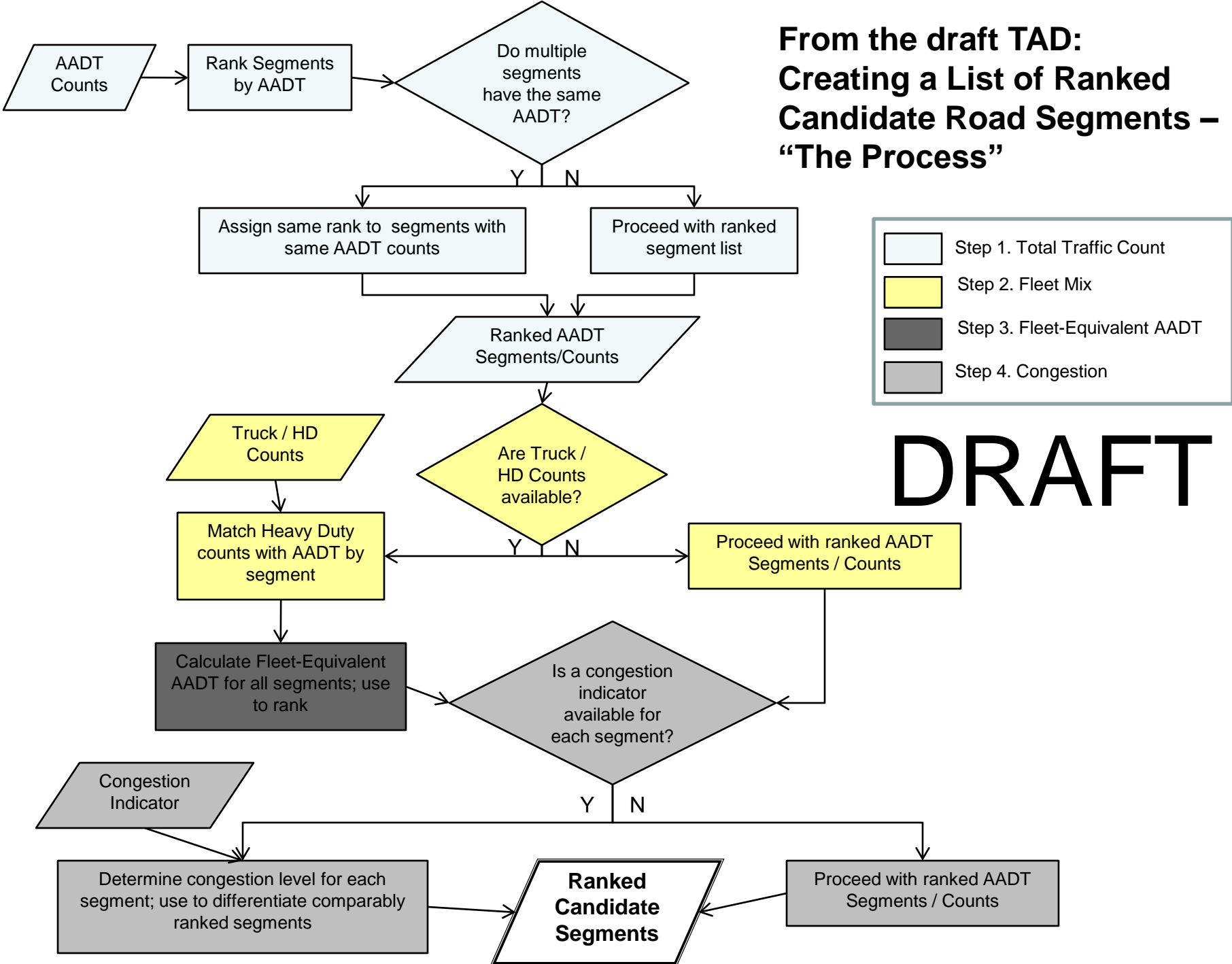
# Monitor Location & Siting

- Key passage from Appendix D: The near-road NO<sub>2</sub> monitoring stations shall be selected by ranking all road segments within a CBSA by AADT and then identifying a location or locations adjacent to those highest ranked road segments, considering fleet mix, roadway design, congestion patterns, terrain, and meteorology, where maximum hourly NO<sub>2</sub> concentrations are expected to occur...”
- Key passage from Appendix E: “In siting near-road NO<sub>2</sub> monitors as required in paragraph 4.3.2 of appendix D of this part, the monitor probe shall be as near as practicable to the outside nearest edge of the traffic lanes of the target road segment; but shall not be located at a distance greater than 50 meters, in the horizontal, from the outside nearest edge of the traffic lanes of the target road segment.

## Near-road Monitoring Technical Assistance Document (TAD)

- In response to public response to the rule for further guidance on implementing the near-road NO<sub>2</sub> network, EPA committed to creating the near-road monitoring TAD.
- The TAD will provide a ‘cookbook’ suggesting concepts for use by State and Locals to implement the network in a way that meets the intentions and physical requirements of the NO<sub>2</sub> rulemaking.
- The TAD will also discuss the merits, methods, and approaches for making near-road NO<sub>2</sub> stations multi-pollutant monitoring stations.
- Draft version due May/June – specifically for review by CASAC-Ambient Air Monitoring and Methods Subcommittee.
- Final version expected Fall of 2011
- In addition to the TAD, some State and local agencies are conducting a near-road NO<sub>2</sub> pilot, collaborating with EPA...

# From the draft TAD: Creating a List of Ranked Candidate Road Segments – “The Process”



	Step 1. Total Traffic Count
	Step 2. Fleet Mix
	Step 3. Fleet-Equivalent AADT
	Step 4. Congestion

# DRAFT

# Near-road NO<sub>2</sub> Pilot Study

The pilot is intended to:

- 1) Allow state and local air monitoring stakeholders to evaluate, improve, and document (with EPA) the near-road monitor siting process, and
  - 2) Provide first-hand experience in the full installation of a near-road monitoring station to share with the air monitoring community.
- 5 Pilot CBSAs: Albuquerque, Baltimore, Boise, Miami, and Tampa
    - Pilot partners plan to conduct some passive monitoring at select roadside locations
    - Boise and Miami (Broward Co.) will install permanent near-road monitoring stations to further meet our second pilot objective
    - EPA plans to model select road segments

## Near-road NO<sub>2</sub> Pilot Study (cont.)

- In the TAD we intend to discuss different approaches and methods for evaluating candidate near-road sites including: passive monitoring, periodic continuous (or saturation type) monitoring, mobile (on-road) monitoring, and modeling.
- EPA plans to utilize any information and experience gained in the pilot study to bolster TAD development.
  - In particular, we hope that information from the pilot can be used to compare the traffic data based selection “process” against passive NO<sub>2</sub> monitoring data and some AERMOD modeling results of individual road segments.



# Case Study - Tampa

- The Tampa CBSA is comprised of 4 counties wrapped around the East, North, and Western sides of Tampa Bay, which includes the cities of Tampa and St. Petersburg.
- The Tampa CBSA has a population of approximately 2.7 million persons, and therefore will be required to operate 2 near-road NO<sub>2</sub> monitoring stations.
- There are three major interstates in the area:
  - I-75 running North-South (on the eastern fringes of Tampa)
  - I-4 running roughly East-West
  - I-275 which runs N-S through Tampa, across the bay to St. Pete, and continues south and east to rejoin I-75
- We were able to compare HPMS data versus local FL DOT data in the following slides.

# Case Study -Variables Presented

- For this example (Tampa CBSA), we are providing a list of the top ranked road segments (using available data) based on:
  - AADT (total traffic volume)
  - Heavy Duty(HD) vehicle counts (e.g. trucks/buses)
  - Estimate of congestion by calculating total AADT/# lanes on each road segment (akin to Level of Service [LOS] provided by DOTs)
  - Fleet Equivalent (FE) AADT – which accounts for AADT and fleet mix when data are available
    - $FE\ AADT = (AADT - HD\ counts) + (HD\ counts * 10)$
    - The “10” value in the equation is the Heavy Duty to Light Duty vehicle NOx emission ratio. This is based on an interpretation of NOx emission factors from EPA’s regulatory MOVES (MOTOR Vehicle Emissions Simulator) model using national defaults

	<b>HPMS</b>	<b>Florida DOT</b>
<b>Source</b>	<a href="http://www.bts.gov/publications/national_transportation_atlas_database/2010/">http://www.bts.gov/publications/national_transportation_atlas_database/2010/</a>	<a href="http://www.dot.state.fl.us/planning/statistics/trafficdata/">http://www.dot.state.fl.us/planning/statistics/trafficdata/</a>
<b>Year</b>	2008	2011
<b>Highest AADT (Roadway)</b>		
<b>1<sup>st</sup></b>	204,000 (I-275)	192,000 (I-275)
<b>2<sup>nd</sup></b>	201,000 (I-275 & ramp to I-4)	176,500 (I-275)
<b>3<sup>rd</sup></b>	187,000 (I-275)	170,500 (I-275)
<b>4<sup>th</sup></b>	175,500 (I-275)	169,000 (I-275 & ramp to I-4)
<b>5<sup>th</sup></b>	172,500 (I-275)	167,000 (I-275)

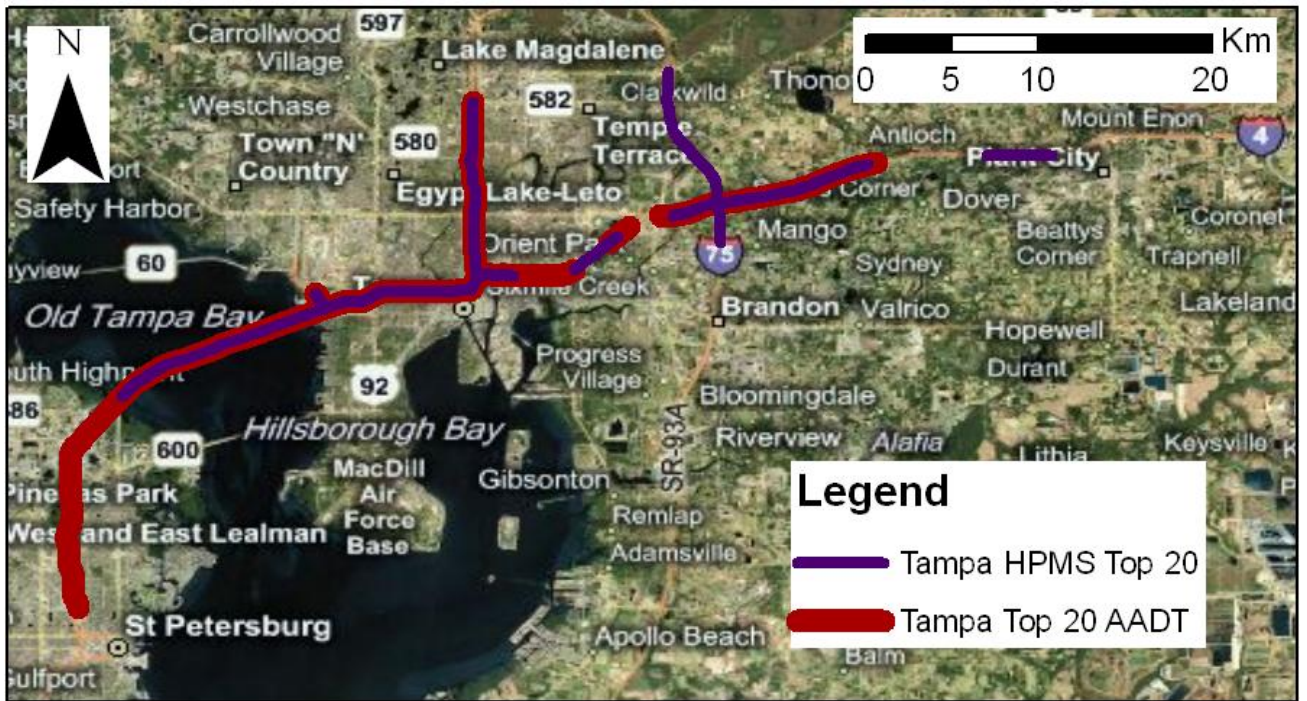
# Example of Differences Between HPMS and Local Counts



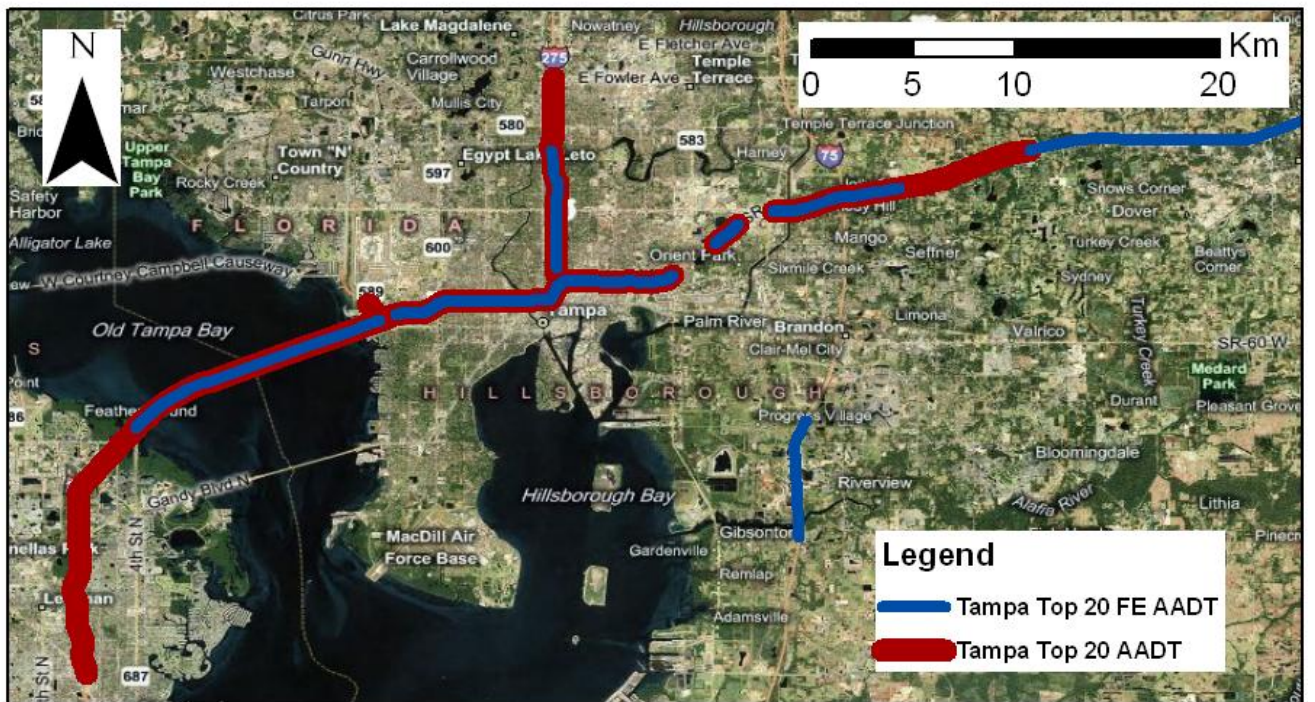
# Tampa: Top 20 Fleet-Equivalent (FE) AADT Counts (Local Data)

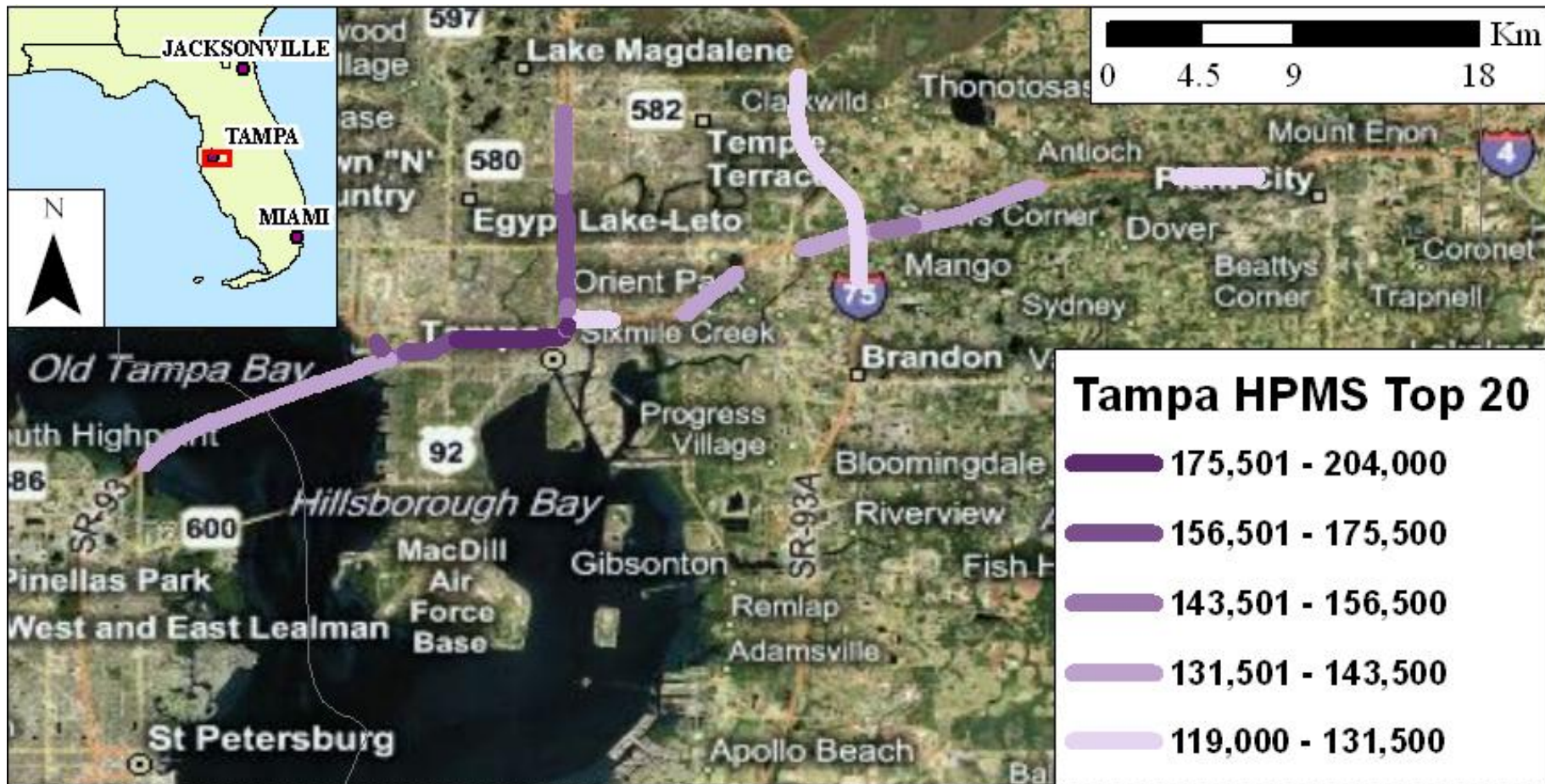
COSITE	Route	From	To	AADT Rank	AADT	Truck Rank	Truck AADT	AADT/Lane	FE AADT	FE AADT Rank
102028	I-4	10320000/10320001	Bridge No-100658	6	164,000	10	12,251	16,400	274,259	1
102016	I-275	Bridge No-100128	Bridge No-100110	1	192,000	27	8,467	19,200	268,203	2
100091	I-4	US 301 / SR 43	I-75/SR 93A	15	136,500	5	14,073	17,063	263,157	3
102026	I-4	Bridge No-100658	US 41/SR 599/50th St	13	151,000	11	12,050	18,875	259,450	4
105353	I-4	SR 93A/I-75	Mango Rd	15	136,500	6	13,172	22,750	255,048	5
105609	I-275	S600/U92/Dale Mabry	Bridge No-100128	3	170,500	25	8,713	21,313	248,917	6
100087	I-4	Bridge No-100599	S566/Thonotosassa Rd	25	110,000	3	15,279	13,750	247,511	7
100084	I-4	Bridge No-100607	Hills/Polk Co Line	28	105,000	1	15,719	17,500	246,471	8
102006	I-275	Sligh Ave	Bridge No-100219	5	167,000	26	8,684	27,833	245,156	9
102015	I-275	Bridge No-100138	10320000/10320001	4	169,000	29	8,298	12,071	243,682	10
102015	I-275	Bridge No-100110	Bridge No-100138	4	169,000	29	8,298	16,900	243,682	10
102009	I-275	Floribraska Ave	Bridge No-100203	8	160,500	21	9,229	20,063	243,561	11
102019	I-275	CR587/Westshore Blvd	Bridge No-100120	2	176,500	36	7,413	29,417	243,217	12
100112	I-4	Bridge No-100605	Bridge No-100607	29	103,000	3	15,388	17,167	241,492	13
102018	I-275	Bridge No-100120	S600/U92/Dale Mabry	7	163,000	32	7,824	20,375	233,416	14
100106	I-4	Mcintosh Rd	Bridge No-100599	22	117,932	8	12,595	19,655	231,287	15
150062	I-275	East End Br 150107	Bridge No-100115	14	147,000	22	9,026	18,375	228,234	16
150062	I-275	4th St N	End Bridge 150107	14	147,000	22	9,026	14,700	228,234	16
100086	I-4	S566/Thonotosassa Rd	Bridge No-100605	30	98,000	4	14,396	16,333	227,564	17
102007	I-275	SR 600 / Hills Ave	Sligh Ave	10	156,500	34	7,669	26,083	225,521	18
100146	I-75	GibsontonDr	SR 43 / US 301	24	111,500	9	12,577	11,150	224,693	19
102023	I-4	SR 574/ML King Blvd	Orient Rd	20	122,000	13	11,236	20,333	223,124	20
102008	I-275	Bridge No-100203	SR 600 / Hills Ave	11	153,500	33	7,736	25,583	223,124	20

National  
Counts  
vs.  
Local Counts



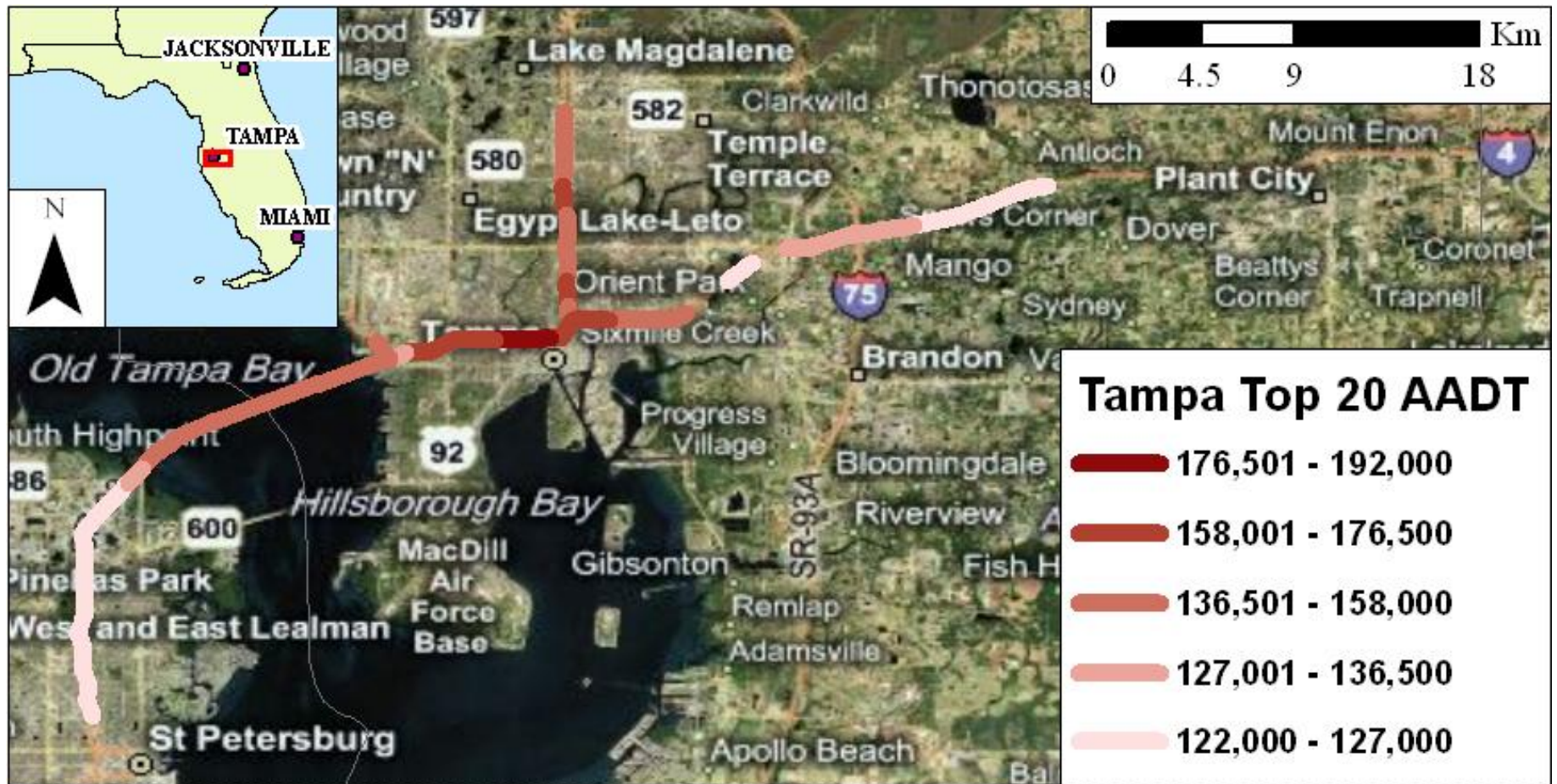
Local Counts  
vs.  
Local FE AADT  
Counts



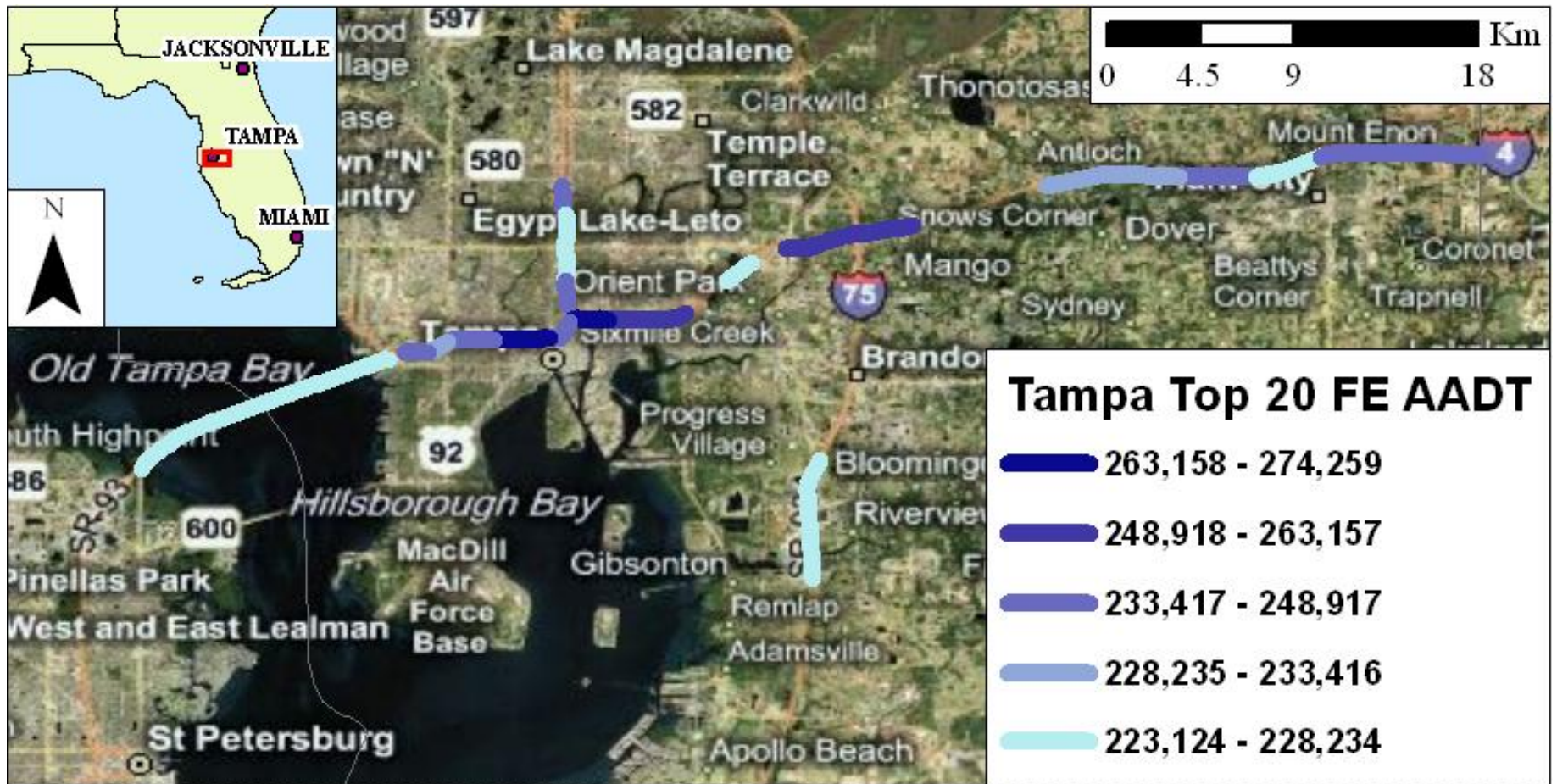


### Tampa HPMS Top 20

- 175,501 - 204,000
- 156,501 - 175,500
- 143,501 - 156,500
- 131,501 - 143,500
- 119,000 - 131,500







## After ranking traffic data...

- Using the road segment lists generated by traffic data analysis, the next steps would be for a State or Local agency to begin road segment evaluation through reconnaissance.
- Reconnaissance objectives would relate to:
  - Roadway design (from the rule)
  - Terrain (from the rule)
  - Meteorology (from the rule)Plus:
  - Logistical (site placement) feasibility
  - Population exposure (as a secondary factor)

# DRAFT Reconnaissance Objectives

- For a given road segment under consideration as a near-road NO<sub>2</sub> site, EPA expects state and locals should characterize or assess the following:
  - What kind of road is it? Specifically, is it a controlled access highway such as an interstate, freeway, toll-way, etc or an arterial type road.
  - Is there an interchange as part of or on the end of the segment?
  - Does the road have noise barriers along part or all of either side of the road?
  - What type of vegetation exists along side of the road? Would any existing vegetation inhibit siting for monitoring?
  - Is the target road segment at-grade, below or above grade, or lie in terrain that has a variety in relative elevations?
  - What type of roadway safety features are along side the target road? Examples would be guard rails, fencing, berms, etc.
  - How close are surrounding buildings, or other such non-road features, estimated to be from the edge of the target road?
  - Characterize the surrounding land use. Examples are residential, commercial, industrial, etc.
  - Population exposure – related to surrounding land use; how much near-road exposure is there along a segment, also, is this an Environmental Justice area?
  - Characterize the local meteorology that would be representative of a given road segment
  - Assess power availability in the area
  - Construction – Ongoing? In a DOT's (which they all typically have) near- and long-term plans, would a site be affected?
  - Intangibles – notes on a given road segment's candidacy to a permanent monitoring station.

## Site Selection

- After any reconnaissance, EPA envisions states would have sufficient information to begin identifying viable near-road site locations, having considered all the factors in the rule.
- EPA also envisions that record-keeping of “the list” of road segments and subsequent reconnaissance would go a long way in providing rationale to Regions on why certain sites may or may not be chosen.

## Wrap-up

- We hope the TAD will aid in streamlining the near-road implementation process, and facilitate network implementation in a similar fashion across the entire country.
- Look for your State and Local counterparts participating in the pilot study to present their experiences at upcoming conferences, particularly the 2011 Monitoring Conference – date/location TBD.

# Questions?

