
CASAC – Ambient Air Monitoring and Methods Subcommittee

**Near Road Monitoring to Support Measurement
of Multiple NAAQS Pollutants**

INTRODUCTION & BACKGROUND

September 29th and 30th, 2010

RTP, NC

Background – Revised NO₂ NAAQS

- EPA determined that the existing primary annual average NO₂ standard of 53 ppb alone is not sufficient to protect public health with an adequate margin of safety
- EPA is setting a new 1-hour NO₂ that defines the maximum allowable concentration anywhere in an area - primarily near major roads
 - Set at a level of 100 ppb
 - Expressed as the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations
- EPA is retaining the current annual average NO₂ standard of 53 ppb
- This suite of primary standards will:
 - Limit short-term exposures to peak NO₂ concentrations, which often occur near major roads and could worsen asthma symptoms
 - Maintain community-wide NO₂ concentrations below levels associated with respiratory-related emergency department visits and hospital admissions



Background - Required NO₂ Monitoring Sites

- EPA is requiring changes to the monitoring network that will capture short-term NO₂ concentrations such as those that occur near roads, community-wide NO₂ concentrations, and low income or minority at-risk communities
 - **Near Road**
 - At least one monitor would be located near a major road in any urban area with a population greater than or equal to 500,000 people.
 - A second monitor would be required near a major road in areas with either:
 - population greater than or equal to 2.5 million people, or
 - one or more road segments with an annual average daily traffic count greater than or equal to 250,000 vehicles
 - **Community-Wide**
 - A minimum of one monitor would be placed in any urban area with a population greater than or equal to 1 million people to assess community-wide concentrations
 - **Susceptible and Vulnerable Communities**
 - Working with the states, EPA Regional Administrators will site at least 40 additional NO₂ monitors to help protect communities that are susceptible and vulnerable to NO₂ -related health effects



Near-road NO₂ Monitor Site Selection Requirements

- Per 40 CFR Part 58 Appendix D, section 4.3.2(a)(1):
 - “The near-road 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 NO₂ concentrations are expected to occur and siting criteria can be met in accordance with appendix E of this part. Where a state or local air monitoring agency identifies multiple acceptable candidate sites where maximum hourly NO₂ concentrations are expected to occur, the monitoring agency shall consider the potential for population exposure in the criteria utilized to select the final site location. Where one CBSA is required to have two near-road NO₂ monitoring stations, the sites shall be differentiated from each other by one or more of the following factors: fleet mix; congestion patterns; terrain; geographic area within the CBSA; or different route, interstate, or freeway designation.”
 - The monitoring target is the maximum hourly NO₂ concentrations
 - The key components of this language are that:
 - AADT is used as a focusing mechanism, not the sole driver
 - Fleet mix, roadway design, congestion patterns, terrain, and meteorology are the major factors in determining where sites should go
 - Also inherent (but not stated) are the factors of site access/permissions
 - Population exposure is a secondary objective amongst a pool of otherwise similar near-road candidate sites

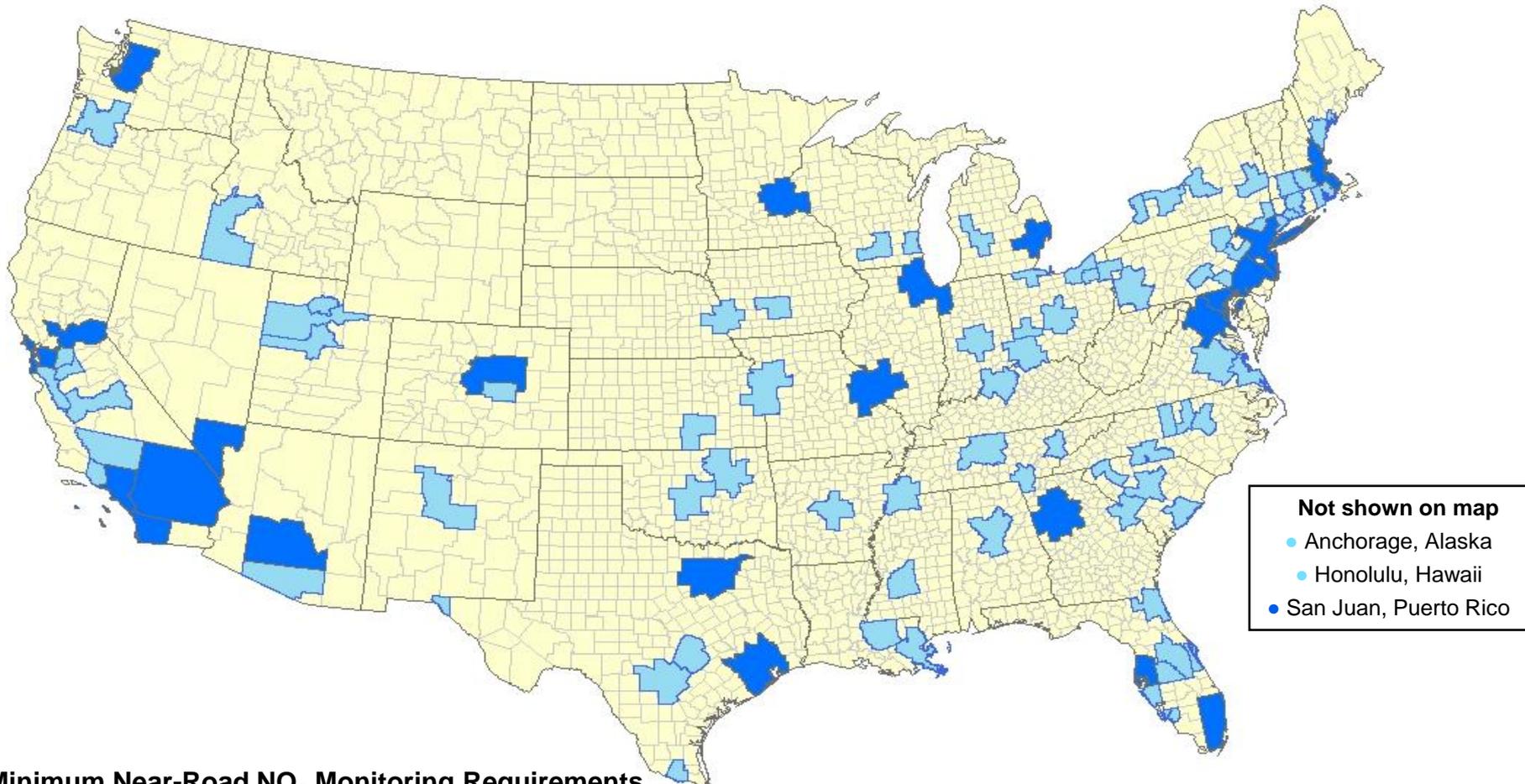


Near-road NO₂ Monitor Site Selection Requirements

- Per 40 CFR Part 58 Appendix E:
 - “For near-road NO₂ monitoring stations, the monitor probe shall have an unobstructed air flow, where no obstacles exist at or above the height of the monitor probe, between the monitor probe and the outside nearest edge of the traffic lanes of the target road segment.”
 - “Microscale near-road NO₂ monitoring sites are required to have sampler inlets between 2 and 7 meters above ground level.”
 - This matches microscale PM_{2.5} siting requirements
 - Note that existing Regulation states that “...inlet probes for microscale carbon monoxide monitors that are being used to measure concentrations near roadways must be +/- 3.5 meters above ground level.”
 - “In siting near-road NO₂ 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 a distance greater than **50 meters**, in the horizontal, from the outside nearest edge of the traffic lanes of the target road segment.”
 - EPA suggests that sites be as near as practicable to roads – We know that logistics and safety considerations will influence the actual distances sites will have from target roads
 - 50 meters is still well within the higher concentration zones of those pollutants, such as CO, that have the sharper gradients between on and near-road concentrations and relative background concentrations
- ❖ Notably, NO₂ inlets CAN be placed on the roadway side of noise barriers (with 1 meter clearance from supporting structures)
 - EPA does not necessarily encourage this approach, but recognizes that ‘cut’ roads or roads with noise barriers could have peak hourly NO₂ concentrations



Near Road NO₂ Monitors Are Required in ~102 Urban Areas



Minimum Near-Road NO₂ Monitoring Requirements

-  78 areas would require 1 monitor
(≥ 500,000 population)
-  24 areas would require 2 monitors
(≥ 2.5 million population or road segments with annual average daily traffic counts ≥ 250,000 vehicles)

NO₂ Monitoring Network – Moving Forward

- EPA is requiring states to submit information on their required near-road NO₂ sites in their annual monitoring plan due July 1, 2012.
- EPA is requiring all new NO₂ monitors to begin operating no later than January 1, 2013.
- EPA estimates the revised NO₂ monitoring requirements will lead to:
 - ~126 NO₂ monitoring sites near major roads in 102 urban areas.
 - ~53 additional monitoring sites to assess community-wide levels across wider urban areas.
 - 40 monitors in low income or minority at-risk communities.
- EPA received public comment that states want guidance on how to implement the near-road NO₂ monitors.
- EPA committed to working with NACAA and individual state and local agencies in developing near-road monitoring guidance in a timely manner.
- Due to set monitoring plan and implementation due dates, guidance is planned to be released, at least in draft form, by late spring/early summer of 2011.



CO and PM2.5 NAAQS Revisions

- The CO NAAQS review is currently in process
 - Court ordered proposal due for signature on January 28, 2011
 - Court ordered final is due for signature on August 12, 2011
- The PM2.5 NAAQS review is also in process
 - Proposal is expected in February 2011
 - Final is expected in October of 2011
- ❖ Some of the charge questions presented are intended to further inform certain monitoring considerations that *may* be considered in these rulemakings



Near-road Monitoring Guidance

- Stakeholders involved in creating this guidance include:
 - NACAA and individual state and local air agencies
 - EPA – Office of Air Quality Planning and Standards
 - EPA – Office of Transportation Air Quality
 - EPA – Office of Research and Development
- Although the NO₂ monitoring requirements prompted the need to develop near-road monitoring guidance, we are approaching this from a multi-pollutant perspective
 - We mean for this guidance to reflect how installing near-road monitors can be executed in a way that makes it suitable for monitoring for multiple mobile-source derived pollutants, while adhering to established monitoring requirements.
- Many of the charge questions presented are intended to steer the initial draft of this near-road guidance document
- The guidance must be available in time for state and locals to be able to use it – thus the projected release of a draft in late spring/early summer
- EPA intends to have our second meeting (Project # 208) with the AAMM Subcommittee, which is slated for the May-June 2011 timeframe, to largely be a review of the draft near-road guidance document



Near-road Monitoring Pilot Study

- In conjunction with the development of near-roadway guidance, EPA and NACAA are collaborating to conduct a near-road monitoring pilot study
- The purpose of the pilot is primarily to allow EPA, state, and local air monitoring stakeholders to evaluate, improve, and document the near-road monitor siting process
- EPA intends to incorporate as much of the information gathered in the pilot into the near-road guidance document
- EPA has approximately \$1 million to complete both the guidance document and conduct the pilot
 - ~\$200k will likely go towards contract support for guidance development and pilot data analysis
 - Remaining ~\$800k will go towards capital equipment purchases for the pilot
 - State and locals who volunteer for the pilot will be providing the O&M for the pilot
- Charge questions 13, 14, and 15 ask for feedback on the pilot, particularly on its design, its locations, and its execution
- EPA and NACAA plan to take immediate action on getting the pilot started upon receipt of AAMM Subcommittee feedback

