

Near-road NO₂ Update

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Near-road NO₂ Resources

- Near-road NO₂ Monitoring Technical Assistance Document (TAD)
 - Pilot Study Report
 - Pilot Study QAPP
 - Webinars

- All available on AMTIC
<http://www.epa.gov/ttn/amtic/nearroad.html>

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Near-road Pilot Study Completed

Pilot Study and TAD partners:

- Broward County (FL) Pollution Prevention Remediation and Air Quality Division
- City of Albuquerque Environmental Health Department
- Hillsborough County (FL) Environmental Protection Division
- Idaho Department of Environmental Quality
- Maryland Department of the Environment
- NACAA Monitoring Steering Committee
- Florida Department of Transportation
- Texas Department of Transportation
- U.S. Department of Transportation Federal Highways Administration
- American Association of State Highway and Transportation Officials
- Sonoma Technology, Inc. (contract)

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Near-road NO₂ TAD Objectives

- The primary objective of the TAD:
 - Provide a set of technical approaches, and their rationale, for the near-road NO₂ site selection process by which state and local air monitoring agencies might implement near-road NO₂ monitoring stations in a manner that satisfies 40 CFR Part 58 requirements.
- A secondary objective:
 - Present information on other pollutants of interest in the near-road environment (definitions, reason of interest, and measurement methods).

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Where does the near-road site go?

- Where maximum hourly NO₂ concentrations are expected to occur – considering:
 - Annual Average Daily Traffic (*traffic volume*)
 - Fleet mix (*ratio of diesel to gasoline fueled vehicles*)
 - Roadway Design (*lay of the road, grade, structure, etc.*)
 - Congestion patterns (*at-speed versus stop-and-go traffic*)
 - Terrain (*immediate and larger scale surrounding terrain*)
 - Meteorology (*climatologically based*)
 - *Population exposure is considered subsequent to these 6 factors.*

- Key passage from Appendix E: “...the monitor probe **shall be as near as practicable** to the outside nearest edge of the traffic lanes of the target road segment...”
 - No greater than 50 meters from edge of road

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Siting Criteria

- Station should be as close as practicable to the road

- Vertical probe placement should be as close to breathing height as possible (~ 2m)

- Maintain proper spacing from other structures and land features

Near-Road NO ₂ Siting Criteria (per 40 CFR Part 58, Appendix E)	
Horizontal spacing	Per 40 CFR Part 58 Appendix E: “ <u>As near as practicable</u> 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.” ***The EPA recommends the target distance for near-road NO₂ monitor probes be within 20 meters of the target road whenever possible.
Vertical spacing	Microscale near-road NO ₂ monitoring sites are required to have sampler inlets between 2 and 7 meters above ground level. ***The EPA recommends the target height be as close to 2 meters (i.e. ground-level) as possible.
Spacing from supporting structures	The probe must be at least 1 meter vertically or horizontally away from any supporting structure, walls, parapets, penthouses, etc., and away from dusty or dirty areas.
Spacing from obstructions	For near-road NO ₂ 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.





Site Logistics – Engaging Transportation Agencies

- The following information should be provided to share in advance of engaging transportation agencies regarding ROW access:
 - Air agencies own and are responsible for the monitoring equipment/site
 - The air monitoring site would be used/needed for the long term (permanent)
 - The physical dimensions of the monitoring site and shelter
 - The type of structure (shelter) that would be installed at the site - (Pictures are useful)
 - How often would air monitoring staff need to access the site – (typically weekly)
 - If there are no existing utilities at the candidate site location, the air agency will prepare the request for permit, and subsequently pay for the installation of required utilities
 - Air agencies would be financially responsible for the upkeep of the monitoring station
 - Air agencies would be responsible for any closure, removal, and relocation of the station, if necessary.

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Site Logistics - Safety

- **Air agencies should make safety a top priority**
- Within the ROW, transportation agencies will be concerned about safety of travelling public and the monitoring staff and site
- Based on experience, monitoring sites can be placed very close to major roads in a safe manner through the use of safety devices and/or the consideration of 'clear zones' and other transportation agency safety concepts and recommendations.
- State and local air agencies will likely be able to install safety devices (i.e., guard rails, barriers, etc.) to protect the site and the public, in collaboration with their respective transportation agency
- Encourage not accessing the site from the highway, but find alternative access points through consultation with the transportation department and local land owners

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Final Site Selection - Considerations

- When preparing all available data from which to make a selection, ensure that these considerations are taken into account:
- Population exposure (per rule) – Amongst otherwise similar top-ranked & available candidate sites (targeting peak NO₂ in the near-road environment), go with the site that represents relatively greater population exposure
- Avoid highly unique locations – Considering unique roadway designs or features (i.e., toll booths and tunnels) and larger nearby NO_x sources, it is advised that when possible, avoid near-road locations that are highly unique due to such characteristics or influences

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Multi-pollutant Monitoring

- Unless required (e.g., NO₂ and CO for some locations) the multi-pollutant monitoring concepts presented are optional, but strongly encouraged
- What we think you should measure:
 - **NO₂** (FRM/FEM; consider photolytic method or others?)
 - **CO** (may be required; dependent on CBSA size)
 - Black Carbon
 - Meteorology (10 meter tower if possible; WS/WD/T/RH minimum)

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Multi-pollutant Monitoring (cont.)

- What you should consider measuring:
 - Air toxics (at least BTEX)
 - Ultrafine PM (size distributed {\$\$\$} or total counts {\$\$\$})
 - Traffic data (if not available nearby)
 - PM_{2.5}
 - PM_{coarse}
 - CO₂
 - OC & EC
 - Ozone

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Near-road NO₂ TAD Wrap-up

- Latest version of TAD posted June 2012
 - No major differences between the June 2012 version and the December 2011 version – only editorial corrections and graphics improvements
 - <http://www.epa.gov/ttnamti1/files/nearroad/NearRoadTAD.pdf>
- The TAD reflects input from state and local air agencies, associations, transportation agencies, in addition to multiple EPA offices: Regions, Office of Transportation Air Quality, Office of Research and Development, and OAQPS
- CASAC Ambient Monitoring and Methods Subcommittee consulted 2 times (September 2010 & September 2011)
 - [http://yosemite.epa.gov/sab/sabproduct.nsf/8732AE5524171F75852579AD00716A85/\\$File/EPA-CASAC-12-003-unsigned.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/8732AE5524171F75852579AD00716A85/$File/EPA-CASAC-12-003-unsigned.pdf)

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What's next?

- OAQPS has developed a draft proposal that would phase in the near-road monitoring deadlines over a longer term period. Our current thinking is as follows (annual monitoring network plans due 6 months earlier):
 - CBSA's $\geq 1M$ (52 sites): January 1, 2014
 - CBSA's $\geq 2.5M$ or AADT $\geq 250K$ (23 sites): January 1, 2015
 - CBSA's $\geq 500K$ (51 sites): January 1, 2017