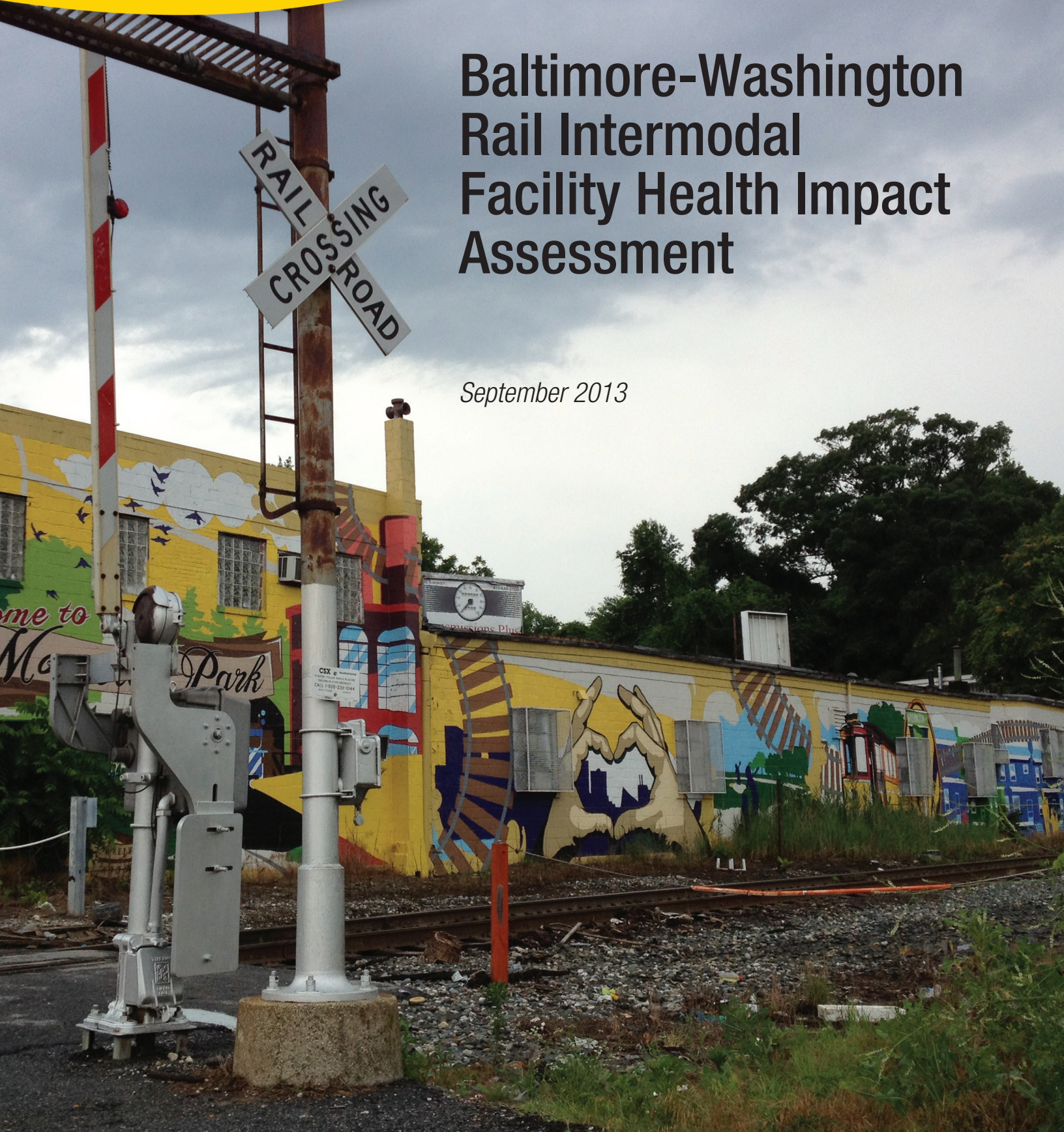




National Center for
Healthy Housing

Baltimore-Washington Rail Intermodal Facility Health Impact Assessment

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Cover Photo: Mural on Washington Boulevard.

Executive Summary

Background

Decision-makers at the state and local levels are evaluating a proposed Baltimore-Washington Rail Intermodal Facility at the existing Mount Clare Yard in southwest Baltimore. The purpose of the facility is to transfer goods “between trucks and trains for either ‘long-haul’ rail service to markets outside of the region or ‘short-haul’ truck delivery to local warehouses, retailers, and other businesses within the region” in response to the growing demand for consumer goods movement (Maryland Department of Transportation, n.d.). The intermodal facility at the Mount Clare Yard will allow CSX Transportation, Inc. (CSX) and its affiliates to double-stack freight containers arriving into the Seagirt Marine Terminal after they have passed through the Howard Street Tunnel, before shipping to markets outside of Baltimore.

The National Center for Healthy Housing (NCHH), a national nonprofit organization based in Columbia, Maryland, received funding from the Health Impact Project in December 2011 to conduct a health impact assessment (HIA) of the potential health effects of the proposed Baltimore-Washington Rail Intermodal Facility. HIA brings together scientific data, health expertise, and public input to identify the potential – and often overlooked – health effects of proposed projects, policies, and programs.

NCHH used a combination of qualitative and quantitative methods, including literature review, quantitative forecasting, focus groups, and stakeholder interviews to assess the potential positive and negative impacts of the development on the health of the community.

Health determinants are economic, social, and environmental conditions that influence the health of people and communities. Based on input from community residents and agency stakeholders, NCHH identified six health determinants for study:

- Air Quality;
- Employment;
- Neighborhood Resources (e.g., property values, tax revenue, and community resources such as schools, emergency services, and parks and recreational spaces);
- Noise;
- Traffic Safety; and
- Light

Findings

The findings from the HIA include:

Community Demographics and Health

- The Morrell Park/Violetville Community Statistical Area¹ (CSA), where the proposed intermodal facility would be located, has a greater population of white residents and

¹ Community Statistical Areas are clusters of neighborhoods developed by the Baltimore City Planning Department.

residents age 65 or older than that of the city, Baltimore County, and the state as a whole. The median household income for the area is \$39,931—slightly higher than the city as a whole, but substantially lower than Baltimore County (\$65,411) and the state (\$72,419).

- The residents living in the CSA have higher rates of age-adjusted mortality and heart disease, all cancer and lung cancer deaths, and deaths linked to chronic diseases of the lower respiratory system (e.g., chronic obstructive pulmonary disease, emphysema, bronchitis, and asthma) compared with Baltimore City and Maryland residents as a whole.

Air Quality

- The introduction of the intermodal facility at the Mount Clare site will increase the frequency of freight transport moving through the surrounding residential areas, resulting in emissions of numerous hazardous chemicals. These include particulate matter (PM), nitrogen oxides (NO_x), sulfur oxides (SO_x), volatile organic compounds (VOCs), and carbon monoxide (CO).
- Our air quality analysis examined the baseline levels of particulate matter less than 2.5 micrometers in diameter (PM_{2.5}). We found that the area surrounding the proposed site is currently in attainment with the U.S. Environmental Protection Agency's (EPA's) National Ambient Air Quality (NAAQ) standard for PM_{2.5}, but is already level with the more health protective World Health Organization (WHO) air quality threshold for the pollutant. Measuring from the nearest air quality monitoring station (four miles away), the present conditions in the community for PM_{2.5} annually average 10 micrograms per cubic meter (µg/m³), which compares with EPA's annual NAAQ standard of 12 µg/m³ and the WHO annual guideline of 10 µg/m³ (World Health Organization, 2000).
- Using conservative models,² we found that air quality near the proposed site will worsen due to increased truck traffic. If trucks were concentrated in two peak hour periods (morning and evening), the maximum additional exposure of residents to PM_{2.5} would be an estimated 0.8 µg/m³ during a peak period on any given day.
- Using data from the census block groups surrounding the proposed site location for 3,933 individuals over age 30, we calculated the excess annual mortality rate attributable to PM_{2.5} exposure that could result from the facility. The maximum modeled changes in air quality emissions due to increased truck traffic could result in an excess annual mortality risk of 10 deaths per 100,000 individuals attributable to PM_{2.5} exposure if the Desoto Road³ access option is selected. The Bernard Drive⁴ access option could result in an

² The air quality models assume 300 truck trips per day and do not project any growth in truck trips. They also exclude emissions from rail and equipment at the facility, and do not include emissions from idling vehicles at or around the site. The models also do not include the contribution of additional emissions that could result from new industries associated with the facility, such as warehousing or truck repair businesses, siting in the neighborhood.

³ In the Desoto Road access option, trucks would travel to and from the site via I-95, South Caton Avenue., Wilkens Avenue, and Desoto Road.

excess annual mortality risk of four deaths per 100,000 individuals attributable to PM_{2.5} exposure. Over 50 years, PM_{2.5} exposure would be expected to result in 14 excess deaths in the Desoto Road option, and eight excess deaths in the Bernard Drive option.

Employment

- Income is one of the most important and consistently documented predictors of health status, including premature death, low birth weight, chronic disease, suffering from injuries or violence, heart disease, and depression, among many other health outcomes (Yen & Syme, 1999; Yarnell et al., 2005; Berube & Katz, 2005).
- The current unemployment rates in two of the census tracts surrounding the proposed facility are substantially higher than those of the city of Baltimore and the state of Maryland when comparing demographically similar populations. For example, unemployment rates of white residents in Morrell Park/Violetville census tracts 2502.06 and 2503.03 (9.3 percent and 15.7 percent, respectively) are significantly higher than those in both the city of Baltimore and Maryland (6.5 percent and 5.5 percent, respectively). Similarly, 31.5 percent of African-Americans in census tract 2503.03 are unemployed, compared with 16.4 percent of African-Americans in the city and 11.0 percent in the state.
- A study by Towson University predicted that the intermodal facility will create 45 jobs onsite, which will be transferred directly from existing jobs at the Seagirt Marine Terminal. The study estimated that the facility will produce 192 direct jobs for contractors who transport goods, 490 jobs during the construction phase, and 84 jobs induced from spending in local economies (Irani et al., 2012). Focus group findings revealed concerns that those who are unemployed or underemployed in the community may not be eligible for the jobs that are created by the facility due to a misalignment in skills and training.

Neighborhood Resources

- Neighborhood resources, including police and fire services, parks and open space, and schools, have an impact on public health and quality of life by impacting individual exposure to injuries and violence, educational outcomes and associated health outcomes, physical activity, and mental health. Park facilities provide opportunities for recreation and facilitate physically active lifestyles (Transportation Research Board & Institute of Medicine of National Academies, 2005).
- A vibrant neighborhood environment is one type of setting for social interaction, which can lead to an increased sense of community and less crime. Social networks and interaction have been linked to improvements in physical and mental health through multiple mechanisms (Sullivan et al., 2004).

⁴ In the Bernard Drive access option, trucks would travel to and from the site via I-95, South Caton Avenue, Wilkens Avenue, South Dukeland Street, Wilmarco Avenue, and Bernard Drive.

- Property values are indicative of community wealth, which has potential health implications. Significant changes in property values, as demonstrated through the recent literature generated on housing foreclosures, can enact economic hardships on homeowners through loss of home equity and impacts on housing stability (Immergluck & Smith, 2005).
- Based on the literature, we predict the facility could decrease residential property values for homes adjacent to the proposed site. Studies show a correlation between increased roadway traffic and diminished residential property values. Parts of the CSA are already rated as stressed housing markets by the City of Baltimore. Decrements in housing value could further exacerbate the market conditions in certain parts of the CSA.
- Increased traffic on truck transit routes to the Mount Clare site is a potential threat to the use of park spaces, including a small memorial garden on Washington Boulevard. In addition, Gibbons Commons, which is expected to be a significant community asset with its recreational facilities and a baseball field, is slated for construction on Wilkens Avenue, one of the roads that will be used as a thoroughfare for facility truck traffic.

Noise

- According to the World Health Organization, industries, construction, and road, rail, and air traffic are main sources of community noise (Berglund et al., 1999).
- Focus group participants describe the current neighborhood conditions as quiet and peaceful. CSX is completing a noise study to predict changes in noise levels caused by operation of the facility, but these data were not available at the time of publication.
- A causal effect of noise on annoyance⁵ has been well established at 50-55 dBA (Berglund et al., 1999), and sleep disturbance begins at 55-60 dBA. For comparison, a truck with more than three axles going 37 mph creates 83 dBA of noise (Annecke et al., 2008). Facility operations are expected to produce an average of 300 additional truck trips through the Morrell Park/Violetville neighborhoods daily.
- Sensitive receptors⁶ that line Wilkens Avenue – a high school, a hospital, and senior care facilities – will not have any barrier to the increased noise emissions of trucks moving to and from the facility. The new facilities of Gibbons Commons, which are expected to include green spaces, recreational facilities, and grand housing (housing for grandparents raising their grandchildren), will also sit along the intended truck access route for the facility.

⁵ Noise annoyance is defined as a feeling of resentment, displeasure, discomfort, dissatisfaction, or offense when noise interferes with someone's thoughts, feelings, or actual activities (Passchier-Vermeer, 2000).

⁶ Sensitive receptors are places where populations that may be particularly vulnerable to the impacts of a particular project reside or spend significant amounts of time, including schools, hospitals, residences, parks, and other areas.

- The children in the seven schools located within a mile of the Mount Clare site may be exposed to higher noise levels both in school and, for those also living near operations, at home. As a result, many school-age children could be at increased risk of deficits in attention span, concentration and memory, and reading ability (Evans & Lepore, 1993).

Traffic Safety

- The Baltimore City Department of Transportation's Traffic Impact Study of the proposed facility indicates that the baseline conditions of traffic already push the threshold of acceptable quality; the Level of Service rating⁷ at the intersection of Caton Avenue and Wilkens Avenue is currently a *D*, which is the considered the lowest acceptable rating of quality of service for Baltimore City intersections.
- Focus group participants predicted that the addition of trucks that will accompany the operation of the new intermodal facility will exacerbate their current traffic problems with congestion. Safety was a concern, as drivers were worried about sharing roadways with more tractor trailers. Efforts to obtain baseline vehicular crash data from the City of Baltimore for the Morrell Park/Violetville area were unsuccessful and therefore quantitative predictions of the impact of the increased truck traffic on injuries and fatalities are not provided in this report.

Light

- Study of the health effects of light exposure is relatively new. Although the relationships between exposure to Light at Night (LAN) and the onset of a number of negative health outcomes are not yet entirely clear, there is sufficient evidence of associations between LAN and negative health effects to warrant concern over the potential impacts of the intermodal facility's lighting system on the health of nearby residents.
- Recent studies indicate that humans react to artificial light at both low and high intensities; the light intensity used for illuminating house interiors and worksites is sufficient to alter circadian rhythms, which can influence sleep-wake cycles, hormone release, and other important bodily functions (Navara & Nelson, 2007).
- Experimental studies with rodents suggest that even small amounts of LAN may have major impacts on physical and psychological well-being, including irritability, anxiety-like and depressive-like behaviors, learning and memory deficits, inhibition of melatonin secretion, accelerated tumor growth, propensity to obesity, and cardiovascular disease (Salgado-Delgado et al., 2011).
- Lighting was raised by several focus group participants as an issue of concern. Homeowners with properties directly adjacent to the Mount Clare Yard described

⁷ Level of Service (LOS) reflects the quality of service by assigning a letter grade based on the average delay experienced by motorists at an intersection and ranges from *LOS A* (minimal delay) to *LOS F* (significant delay). *LOS D* is typically used to represent the acceptable LOS threshold in Baltimore City (Baltimore City Department of Transportation, 2013).

concerns about light from the facility site flooding their properties at night. Residents also described negative impacts on privacy and safety attributable to the lighting and hours of facility operation.

Priority Recommendations

The HIA predicted potential health effects of the proposed facility and identified strategies for mitigating those effects. Section 8 provides a complete list of these recommendations. Based on feedback from agency officials and community leaders, NCHH has prioritized the following recommendations:

Design/Planning Phase:

1. CSX should pay the City of Baltimore a facility regulatory and site infrastructure fee to at least partially offset any potential negative impacts on access to neighborhood resources. For example, the fees could be used to provide local jurisdictions with block grants for improvements to neighborhood resources (e.g., libraries, schools, parks, community centers) that could be impacted by the project. The fees would be used to mitigate costs borne by the City to mitigate the impact of the trucks on the roads, the potential loss of tax revenue resulting from decreased property assessments, and to pay for pedestrian and bicycle safety programs. The fees would provide a sustainable stream of funding to mitigate unforeseen impacts of the facility in the future. These amounts should increase by five percent each year and would automatically increase by 20 percent if the State or City takes any enforcement action related to the construction or operation of the facility.
2. CSX and the Maryland Department of the Environment should complete the air quality models begun in this HIA to more fully assess the existing air quality in the community (including existing train emissions) and project the added impacts of the facility (including idling, train emissions, machinery, congestion, etc.) on air quality and excess mortality.
3. The community should be involved in decisions and priority setting for the community improvements CSX plans to make with project funds. Improvements related to the construction and operations of the facility and mitigations related to the facility should be included in CSX's construction budget rather than as part of the community improvement budget.
4. The City of Baltimore should develop a plan to monitor and enforce the truck routes to ensure trucks traveling to and from the facility do not use prohibited, local roads. All truck routes should be well defined and marked with clear signs indicating approved routes. The City of Baltimore should also make provisions for enforcement of truck idling regulations in the planning process.
5. Once noise models from CSX are available, the Baltimore Health Department or the Maryland Department of Health and Mental Hygiene should analyze the magnitude of impacts on annoyance and sleep disturbance. NCHH provides protocols in appendices G and H that the agencies could use to conduct this analysis. If excessive noise levels are noted,

CSX should install sound-proofing/noise-reducing windows for homes and schools in close proximity to the facility and along the routes servicing the facility.

6. CSX should provide a site lighting plan that accounts for impacts on residents' privacy and is subject to a third-party review. To the extent possible while ensuring occupational safety, CSX should reduce the facility's lighting at night to minimize disturbance to nearby residents. If possible, the color spectrum of lighting sources should also be adjusted towards low-level red lighting and away from high-energy blue lighting, which has been found to be highly disruptive to human biological cycles (Navara & Nelson, 2007).

Construction Phase:

7. The City of Baltimore should assess the current pedestrian infrastructure and coordinate with CSX to provide a complete network of sidewalks to any roads where truck traffic will increase as a result of the facility. Signalized, stop controlled, or otherwise protected crosswalks should be included in the plans for upgrading the pedestrian infrastructure.
8. The City of Baltimore should work with CSX to establish a rodent control program during the excavation, construction, and operations phases.

Operations Phase:

9. CSX should make all efforts to reduce air pollution resulting from on- and off -site equipment and vehicles. For example, the City and CSX should pursue opportunities to require and encourage that all trucks entering the facility be 2008 or newer.⁸ CSX should pursue opportunities to ensure that all diesel trains associated with the intermodal facility are low emitting or retrofitted to provide the lowest possible emissions. Wherever possible, container cranes, loaders, and forklifts should be either electrically powered or equipped with low-emitting engines. CSX should ensure that no unnecessary truck or train idling occurs.
10. CSX should restrict activities that are likely to produce noise and light pollution before 7:00 a.m. and after 7:00 p.m. and on weekends.

Communications:

11. CSX, the City of Baltimore, and the Maryland Department of Transportation should develop clear and transparent procedures through which residents may raise and address issues regarding noise, lighting, air quality, or other concerns once the project is operational.
12. CSX, the City of Baltimore, and the Maryland Department of Transportation should improve the transparency and timeliness of information during the design, planning, and construction phases by maintaining an up-to-date public website, providing Town Hall-style forums to respond to community questions, and providing timely responses to emails received through the address provided on the project website (intermodal@mdot.maryland.gov).

⁸ Note: The Port Authority operates a program to assist fleets with upgrading their trucks to reduce emissions and improve air quality.

Monitoring:

13. CSX should provide funding to the Maryland Department of the Environment to install and operate air quality monitors at several locations, including: near residences directly adjacent to the project site and associated truck routes; at locations ¼ mile and ½ mile from the site and associated truck routes; and at sensitive receptor sites, such as schools, community centers, libraries, senior facilities, parks, and playgrounds. These data should be monitored at least annually following the opening of the site, should be made public, and should be provided directly to residents of the Morrell Park/Violetville CSA.
14. If indoor or outdoor pollutant levels at sites such as schools, libraries, and community and senior centers rise above standards published by the World Health Organization (World Health Organization, 2000),⁹ CSX should seek to reduce emissions through pollution control technology and by improving the building performance (e.g., through reduced air leakage and improved ventilation), reducing emissions through pollution control technologies, and installing additional natural buffers and barriers.

Policy Recommendations:

15. As part of the City's consolidated planning process, the City should create a neighborhood revitalization plan for the Morrell Park/Violetville CSA. The plan should improve the community's infrastructure and services and encourage businesses to remain in the intermodal corridor communities through financial incentives. Such investment would help maintain property values, promote social cohesion, and mitigate the potential stigma of the facility on the surrounding neighborhood. The City should preferentially consider strategies to divert increasing tax revenue resulting from the Baltimore-Washington Rail Intermodal Facility into infrastructure and services for the Morrell Park/Violetville CSA.

⁹ Note that the WHO standards are for outdoor pollutants. No established standards exist for indoor air pollutants. However, if pollutant levels are at or above outside thresholds in indoor spaces, mitigations would be prudent.