

Chapter 19: Public Health and Electromagnetic Fields

19.1 INTRODUCTION

This chapter of the Environmental Impact Statement (EIS) presents the assessment the Federal Railroad Administration (FRA) and the New Jersey Transit Corporation (NJ TRANSIT) conducted of the potential effects on public health from the No Action Alternative and construction and operation of the Preferred Alternative. The determination of impacts is based on the analysis results reported in the other relevant chapters of this Environmental Impact Statement (EIS). As detailed below, the potential effects could be influenced by air quality, water quality, contaminated materials, or noise within the study areas. The associated analyses pertaining to the overall public health conditions of the study areas are summarized below, along with an evaluation of the potential for predicted temporary construction or permanent operational adverse impacts of the Preferred Alternative.

This chapter also presents the FRA and NJ TRANSIT's evaluation of the potential for public health impacts resulting from Electromagnetic Fields (EMFs).

The Port Authority of New York and New Jersey (PANYNJ), in its role as Project Sponsor, has accepted and relied on the evaluations and conclusions of this chapter.

Following completion of the Draft Environmental Impact Statement (DEIS), the PANYNJ became the Project Sponsor for the Hudson Tunnel Project (see Chapter 1, "Purpose and Need," Section 1.1.2, for more information). Consistent with the roles and responsibilities defined in Section 1.1.1 of that chapter, as the current Project Sponsor, the PANYNJ will comply with mitigation measures and commitments identified in the Record of Decision (ROD).

This chapter reflects the following changes made since the Draft Environmental Impact Statement (DEIS) for the Hudson Tunnel Project:

- The chapter incorporates design modifications related to the permanent features of the Project (e.g., modifications to surface tracks and tunnel alignment) and changes to construction methods and staging.
- The chapter provides additional information on air monitoring that the Project Sponsor will require at each construction site during construction to protect public health.
- The chapter includes an expanded discussion of measures that the Project Sponsor will implement to protect the public and workers from potential exposure to contaminated and hazardous materials during construction, including construction activities on sites where contaminated soils or groundwater may be present and trucking of excavated soils that may include contaminants or hazardous materials.
- The chapter includes expanded discussion of construction-related noise impacts and how those might affect public health.

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19.2 PUBLIC HEALTH

19.2.1 ANALYSIS METHODOLOGY

During development of this EIS, FRA and NJ TRANSIT developed methodologies for evaluating the potential effects of the Hudson Tunnel Project in coordination with the Project's Cooperating and Participating Agencies (i.e., agencies with a permitting or review role for the Project). The methodologies used for analysis of public health effects of the Project are summarized in this chapter.

19.2.1.1 REGULATORY CONTEXT

The FRA's *Procedures for Considering Environmental Impacts*¹ indicate that public health should be considered in environmental reviews of proposed actions. In addition, for projects undergoing environmental review by New York City agencies, the *New York City Environmental Quality Review (CEQR) Technical Manual* states that if adverse impacts that cannot be mitigated are identified in other analysis areas, such as air quality, water quality, contaminated materials, or noise, an assessment is appropriate.

19.2.1.2 ANALYSIS TECHNIQUES

For this public health impacts assessment, *CEQR Technical Manual* assessment methodologies have been applied to both the New Jersey and New York study areas because this is the most conservative, comprehensive methodology available for projects proposed in the New York City area and provides a consistent corresponding assessment of health impacts for New Jersey. FRA and NJ TRANSIT therefore also used these criteria for conclusions about public health impacts for the review of this Project in accordance with the National Environmental Policy Act (NEPA). The *CEQR Technical Manual* states that if unmitigated adverse impacts are identified in other analysis areas—and particularly in the areas of air quality, contaminated materials, noise, and water quality (which is included as a component of the Natural Resources evaluation)—the public health implications should be analyzed. For those analysis areas where unmitigated adverse impacts would occur, the evaluation of public health considers whether contaminated materials might harm people, whether working or living nearby might affect their health, or whether the proposed project may result in other dangers, such as physical hazards.

19.2.1.3 STUDY AREA

The public health impacts and EMFs assessment addresses the overall effects of the Preferred Alternative, and therefore does not have a particular geographic study area.

¹ 64 Federal Register 28545, May 26, 1999.

19.2.2 AFFECTED ENVIRONMENT: EXISTING AND FUTURE CONDITIONS

Following the *CEQR Technical Manual* guidance, the analysis of public health effect, for the purpose of this chapter, is focused solely on the baseline descriptions of air quality, water quality, contaminated materials, or noise in the respective EIS chapters.

19.2.3 IMPACTS OF NO ACTION ALTERNATIVE

For purposes of analysis in this EIS, FRA and NJ TRANSIT have assumed that with the No Action Alternative, the existing North River Tunnel would remain functional and in operation at least through the EIS analysis year of 2033, with continued maintenance as necessary to address ongoing deterioration to the extent possible. However, without a full rehabilitation of the North River Tunnel, damage to the tunnel caused by Superstorm Sandy would continue to degrade systems in the tunnel. This deterioration, combined with the tunnel's age and intensity of use, would likely lead to increasing instability of rail operations in the tunnel, the need for increasingly frequent unplanned maintenance and repairs, and may lead to its eventual closure, as discussed in Chapter 1, "Purpose and Need," Section 1.4.2.

As discussed in Chapter 5B, "Transportation Services," the No Action Alternative would result in adverse transportation impacts to trans-Hudson bus service as passenger rail service disruptions transfer more riders from rail to buses, overburdening a system that is also close to capacity. In addition, under the No Action Alternative, if Northeast Corridor (NEC) North River Tunnel passenger rail service is disrupted for emergency repairs, passengers may also be diverted to trans-Hudson ferry services or into private or for-hire automobiles, resulting in potential overcrowding on trans-Hudson ferry routes if additional services (routes and/or vessels) are not added. Accordingly, there is the potential for worsening local air quality concentrations in the vicinity of the Project site under the No Action Alternative as a result of the mode shift from electrically powered trains, which are less of a concern in terms of localized air quality emissions, to buses, ferries, and automobiles, which could result in increased emissions from fossil fuel combustion (e.g. diesel or gasoline), from increases in usage of these modes and potential increases in service needed to accommodate additional bus or ferry passengers. As a result of increased emissions, local air quality conditions could worsen along roadways connecting New Jersey and New York that would be used by commuters and others that otherwise would have used rail services. Collectively, these shifts from rail to on-road modes would also increase traffic congestion in the area, which in many locations, is already overburdened and at or near capacity, particularly during peak commuting hours. These increases in vehicular traffic would also have corresponding increases in noise levels, which in some locations, could result in additional impacts, especially if new routes are used because more direct or regular routes are experiencing oversaturated conditions as a result of the modal shift from rail to on-road vehicles (e.g., private automobiles and buses). As discussed in Chapter 11, "Natural Resources" and Chapter 16, "Contaminated Materials," the No Action Alternative would not result in any adverse water quality or contaminated materials impacts.

19.2.4 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

Potential effects on public health could be influenced by air quality, water quality, contaminated materials, or noise within the study areas. The associated analyses pertaining to the overall public health conditions of the study areas during construction of the Preferred Alternative are summarized below.



19.2.4.1 AIR QUALITY

As discussed in Chapter 13, “Air Quality,” Section 13.6, construction of the Preferred Alternative would result in a temporary increase in air emissions near construction sites. The sources of these emissions would be construction-related traffic and on-site construction-related mobile and stationary sources. The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. To demonstrate compliance with these standards, maximum predicted off-site incremental concentrations from estimated emissions during construction of the Preferred Alternative were added to conservative background conditions. With the Preferred Alternative, the maximum predicted total concentrations of carbon monoxide, sulfur dioxide, nitrogen dioxide, PM₁₀, and PM_{2.5} would be below the applicable NAAQS within the New Jersey and New York portions of the study area.

New York and New Jersey do not require permits to control the emissions from construction engines. However, mitigation measures would be implemented during construction of the Preferred Alternative to reduce pollutant emissions in accordance with all applicable laws, regulations, and best management practices (BMPs). For example, the Project Sponsor will develop and implement a Project-specific emissions reduction program to minimize the air quality effects from construction under the Preferred Alternative as described in detail in Chapter 13, “Air Quality,” including the following: dust control measures; use of clean fuels; requiring idling restrictions; use of best available tailpipe reduction technologies; utilization of newer equipment; and reduction of use of diesel equipment. The lead Federal agency will be responsible for ensuring that the Project Sponsor implements these measures, which will be identified in the Record of Decision (ROD). With the implementation of these measures to reduce pollutant emissions identified in the air quality analysis, there would be no adverse impacts to air quality from construction of the Preferred Alternative.

As dust control from sites with known contamination is of particular concern, the Project Sponsor will include provisions in the construction contracts for monitoring ambient air around Project construction/staging areas to prevent exposure of workers, the public, and the environment to respirable particulates and other contaminants of concern. The principal contaminants of concern in historic fill—metals and polycyclic aromatic hydrocarbons (PAHs)—are adsorbed onto soil particles, and thus real-time dust monitoring would address potential exposure to these contaminants. At each construction work zone, the Project Sponsor will conduct air monitoring to alert when dust levels have exceeded the pre-determined action levels, which would be based on applicable law and guidance. The air monitoring will be conducted with fixed monitoring stations and/or portable equipment, as warranted, capable of displaying real-time levels of particulate matter. If triggered, work practices and localized engineering controls will be evaluated and corrected (as needed). If exceeded for specified periods of time, additional measures would be implemented, such as limiting the extent of areas of exposed soil, increasing the application of dust control measures, or ceasing work until levels have fallen below the action levels. Therefore, no public health impacts would occur relating to changes to air quality during construction of the Preferred Alternative.

19.2.4.2 WATER QUALITY

As described in Chapter 11, “Natural Resources,” Section 11.6, the Preferred Alternative would not result in any adverse impacts to water quality in the Project area during construction. Therefore, no public health impacts would occur relating to water quality during construction of the Preferred Alternative.

19.2.4.3 CONTAMINATED MATERIALS

As described in Chapter 16, "Contaminated Materials," Section 16.6, construction of the Preferred Alternative could result in temporary adverse impacts related to contaminated materials. To avoid any potential adverse impacts to public health from contaminated materials during construction of the Preferred Alternative on sites with known or potential contamination of soil or groundwater, the Project Sponsor will implement a number of preventative measures to minimize exposure as described in detail in Chapter 16, Section 16.8, and summarized below:

- Phase II Site Investigation (SI) soil and groundwater sampling activities, as well as testing building materials for hazardous substances (i.e., asbestos), will be performed at certain locations along the Project site where existing information is insufficient and/or where the potential for contamination exists based on available data, and where project construction could encounter the contamination. These activities will determine the presence or absence of contaminants, and assess their chemical and physical characteristics to determine the exposure potential, if any, associated with the work to be performed, and thus any corollary health hazards. Based on the collective findings of these initial investigations, additional investigations may be undertaken to further determine the extent and level of contamination at affected properties, and how any resulting potential health hazards can be avoided.
- Based on data obtained from Phase II SIs and the building materials testing, the Project Sponsor will develop and implement appropriate remedial actions, including contingencies for unforeseen conditions, to avoid the potential for adverse impacts to construction workers, surrounding communities and the environment. Remedial actions or measures may include excavation or in-situ treatment of contaminated soil, and off-site disposal or treatment of contaminated groundwater or liquid from dewatering. The Project Sponsor would manage groundwater generated during dewatering activities in accordance with applicable permits from NJDEP in New Jersey and from NYCDEP and/or NYSDEC in New York, depending on the location of discharge.
- The Project Sponsor will develop and implement a Project-wide Soils and Materials Management Plan (SMMP), which would stipulate procedures for materials handling during construction activities including Best Management Practices (BMPs) to be implemented during construction. The Project Sponsor will also develop and implement a Health and Safety Plan (HASP) prior to earth-disturbing activities to protect workers and the public from potential exposure to contaminated materials. The HASP will set out procedures for handling contaminated materials, conditions triggering the use of personal protective equipment, response plans, appropriate personnel training and monitoring, and procedures to minimize dust generation.
- The Project Sponsor will characterize excavated material for onsite reuse, offsite "beneficial use," or for off-site disposal, as appropriate. The Project Sponsor will develop protocols during final design that will be followed during construction to identify spoils that may contain contaminated materials, so that they can be handled appropriately and disposed of at a suitable location. The SMMP would set out the required testing procedures to comply with applicable regulatory requirements and guidelines. Testing is most frequently conducted on stockpiles of excavated material, but can sometimes be conducted "in situ", i.e., in the ground prior to excavation. During construction, whenever contaminated soils or groundwater or hazardous vapors or new areas of concern are encountered (e.g., unknown tanks), the Project Sponsor will implement appropriate site remediation techniques or other measures to prevent exposure, based on the procedures set forth in the SMMP. The Project Sponsor will develop protocols for the transport of spoils from the construction sites in accordance with all applicable Federal, state, and local regulations to ensure the safe handling and disposal of these materials and wastes. The protocols will include procedures to contain materials so they do

not spill off trucks. Following hazardous waste management regulations (Federal, state, and local), including acquiring necessary permits to generate, store, treat, transport, and/or dispose of contaminated materials and/or hazardous waste encountered during construction.

- Following construction, the Project Sponsor will restore areas that had and were disturbed using new engineering controls that would prevent direct human exposure to any contaminated materials. The Project Sponsor will restore construction staging areas to preconstruction conditions or cap them. Site restoration activities that require the import of fill material will be performed in accordance with state and Federal regulations, including in accordance with a state-approved Beneficial Use Determination (BUD), if applicable.

With the implementation of these preventative measures, construction of the Preferred Alternative would not result in temporary adverse impacts related to contaminated materials in any portion of the study area. Therefore, no public health impacts would occur related to contaminated materials during construction of the Preferred Alternative.

19.2.4.4 NOISE

The noise analysis presented in Chapter 12A, “Noise,” evaluates impacts according to criteria established by the Federal Transit Administration (FTA) in its methodology for evaluating noise impacts of transit projects (*Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123, September 2018). In addition, the analysis also considers noise impacts for the study area in New York City according to the criteria established by New York City’s *CEQR Technical Manual*. As described in Chapter 12A, “Noise,” Section 12A.6, construction of the Preferred Alternative would result in adverse noise impacts during construction of the Project, including along the truck routes (“haul routes”) serving the Tonnelle Avenue and Hoboken staging areas and at locations near Project staging areas and construction sites in New Jersey and New York. The noise analysis of construction activities at the Hoboken staging area specifically accounted for the presence of a 25-foot-noise wall buffering the site from the nearby neighborhood. If a lower wall is provided, sufficient noise control measures (e.g., noise barriers, quieter equipment selections, equipment layout configuration, etc.) would be provided to ensure that exterior noise levels at the residences nearest to the construction site do not exceed FTA construction noise impact thresholds.

Specifically, the noise analysis identified the potential for the following adverse construction noise impacts:

Vicinity of the Surface Alignment in/near the Meadowlands

- Pile driving conducted overnight along the NEC would result in noise levels that exceed the FTA residential construction noise impact threshold for approximately two months for the residences near the NEC on Henry Street at Secaucus Road in Secaucus, New Jersey, during overnight hours. This would constitute an adverse impact despite its short duration because it would occur overnight.

Vicinity of the Tonnelle Avenue Staging Area

- Construction activities at the Tonnelle Avenue staging area related to the new Hudson River Tunnel would have the potential to result in adverse construction noise impacts, including during nighttime hours, at residential receptors along Paterson Plank Road and along Grand Avenue between 19th Street and 23rd Street and at the BAPS Shri Swaminarayan Mandir Hindu temple on the east side of Tonnelle Avenue in North Bergen, New Jersey, for up to approximately four years during new tunnel construction. This would occur during pile installation at the Tonnelle Avenue portal and underpass and during activities related to tunnel mining.

- Construction activities at the Tonnelle Avenue staging area related to the rehabilitation of the North River Tunnel would have the potential to result in adverse construction noise impacts, including overnight, for up to four years, at residential receptors in North Bergen, New Jersey, along Paterson Plank Road, along Grand Avenue between 19th Street and 23rd Street, and along Tonnelle Avenue extending approximately 550 feet north of the existing North River Tunnel portal for approximately four years (the full duration of the North River Tunnel rehabilitation).

Vicinity of the Truck Routes Leading To/From the Tonnelle Avenue Staging Area

- Trucks traveling to and from the Tonnelle Avenue staging area would have the potential to result in an adverse noise impact at the residences along Tonnelle Avenue between 10th Street and Secaucus Road in North Bergen, New Jersey, for up to approximately seven years during construction of the new tunnel and four additional years during rehabilitation of the North River Tunnel. This estimate of the duration of the adverse impact is conservative, and the actual duration of this impact would likely be shorter, since intensive trucking activity would not be required for all stages of construction. As discussed in Chapter 5A, "Traffic and Pedestrians," Section 5A.8.1.1, FRA and NJ TRANSIT evaluated a potential new traffic signal on Tonnelle Avenue to mitigate the traffic impacts resulting from construction traffic associated with the Tonnelle Avenue staging area. With this measure, truck traffic associated with the construction of the Preferred Alternative would no longer head southward on Tonnelle Avenue to make a U-turn, and heavy volumes of construction trucks would no longer pass the residences on Tonnelle Avenue between 10th Street and Secaucus Road. This would eliminate the adverse noise impact due to construction of the Project at these receptors and no sound-reducing windows would be required. Implementation of this mitigation measure requires approval from the NJDOT, so the analysis in this chapter describes the noise impacts both with and without the new signal.

Vicinity of the Weehawken Truck Routes Leading To/From the Hoboken Staging Area

- Trucks traveling to and from the Hoboken staging area would have the potential to result in an adverse noise impact at the residences in Weehawken, New Jersey along the truck routes used for access to and from the Hoboken staging site for up to seven years. Depending on the routes used, this would include residences on Willow Avenue south of 19th Street, on Park Avenue south of 19th Street, and along Harbor Boulevard south of 19th Street. This estimate of the duration of the adverse impact is conservative, and the actual duration would likely be shorter, since intensive trucking activity would not be required for all stages of construction.

Vicinity of the New York Staging Areas and Associated Truck Routes

- Pile installation in the Twelfth Avenue shaft site and as part of the relocation of the sewer line under West 30th Street as well as the overlap of multiple construction activities at the Twelfth Avenue staging area would result in noise levels that exceed the FTA construction noise impact threshold for approximately 2.5 years at the new residential buildings currently in construction at 606 West 30th Street and 601 West 29th Street. If the potential EMS facility (or one-story garage) on West 29th Street (Block 675 Lot 12) is delayed because of the construction activities for the Preferred Alternative and its construction occurs later, the total duration when noise levels would exceed impact thresholds on these residential buildings would increase by a year, to approximately 3.5 years. These noise levels would constitute adverse noise impacts at these buildings according to FTA noise impact criteria and significant adverse impacts according to *CEQR Technical Manual* noise impact criteria. However, because these buildings would be constructed with contemporary standard façade construction techniques resulting in at least 30 dBA façade attenuation, interior noise levels during construction of the Project would be in the low to mid 40s dBA during nighttime hours,

which would be considered acceptable for residential use according to *CEQR Technical Manual* noise exposure guidelines.

- Pile installation at the Twelfth Avenue shaft site and as part of the relocation of the sewer line under West 30th Street, as well as the overlap of multiple construction activities at the Twelfth Avenue staging area, would result in noise levels that exceed the CEQR impact threshold within 400 feet of the construction zone for approximately four years in New York at the High Line, which would constitute a significant adverse impact according to *CEQR Technical Manual* noise impact criteria. This noise level would not exceed the FTA construction noise impact threshold. The predicted noise impact would not extend throughout the full length of the High Line, most of which would be substantially farther from the construction zone. If cut-and-cover excavation with pile driving occurs in West 30th Street, the pile driving would result in noise levels that exceed FTA noise impact threshold within 200 feet of the construction zone for approximately seven months at the High Line. This noise level would not constitute an adverse impact on the High Line according to the FTA impact threshold, because of the relatively short duration of the activity (i.e., less than 12 months).

Although FRA and NJ TRANSIT predict that the FTA thresholds for adverse noise impacts and the *CEQR Technical Manual* thresholds for significant adverse impacts would be exceeded at certain locations and times during construction of the Project, these exceedances would not necessarily constitute significant adverse public health impacts according to the thresholds for public health presented in the *CEQR Technical Manual*. The FTA and *CEQR Technical Manual* impact thresholds for construction noise are based on quality-of-life considerations and not on public health considerations. An impact related to a quality-of-life framework (e.g., an adverse construction noise impact) does not necessarily correlate to an adverse impact on public health. The *CEQR Technical Manual* identifies public health concerns from noise related to three factors:

- 1) Chronic exposure to high levels of noise (i.e., high levels of noise that occur indefinitely and do not fluctuate or abate);
- 2) Prolonged exposure to noise levels above 85 dBA² (the *CEQR Technical Manual* recommended threshold for potential hearing loss); and
- 3) Episodic and unpredictable exposure to short-term impacts of noise at high decibel levels.

To determine whether public health impacts could occur as a result of the construction noise related to the Preferred Alternative, the predicted construction noise exposure levels were evaluated for their potential to impact the health of the affected population using the three criteria provided in the *CEQR Technical Manual*. FRA and NJ TRANSIT compared the predicted construction noise exposure levels with the relevant health-based noise criteria as described in the *CEQR Technical Manual*. While the *CEQR Technical Manual* was developed specifically for use in New York City, FRA and NJ TRANSIT applied these criteria to noise exposure levels in New Jersey and New York to evaluate whether public health impacts may occur, since no specific criteria exist for evaluation of public health impacts in New Jersey and these criteria reflect a reasonable and appropriate methodology for urban environments. For construction sites in New York, construction associated with the Preferred Alternative will include sufficient mitigation to meet the New York City Noise Control Code construction noise limit at the exteriors of any adjacent residential properties.

² The A-weighted sound level, or dBA, is a decibel measurement that is weighted to account for those frequencies most audible to the human ear. This noise descriptor is typically used for evaluations of community noise. For more information, see Chapter 12A, "Noise," Section 12A.2.1.

19.2.4.4.1 Chronic Exposure to High Levels of Noise

Noise in and around homes may decrease quality of life by disrupting sleep or interfering with conversations. Chronic noise exposure may raise blood pressure and research suggests that it may also contribute to other negative health effects. For these reasons, an examination of the predicted noise exposure from construction activity is examined to determine if it is considered to be a chronic condition.

19.2.4.4.1.1 Surface Alignment Construction (New Jersey)

At Henry Street near Secaucus Road on the north side of the NEC, impact pile driving that would be conducted during nighttime hours over a period of approximately a year would result in significant adverse noise impacts. The noise impacts would occur when pile installation work is conducted within approximately 1,000 feet of the receptors, i.e., for approximately two months, which is when the maximum predicted construction noise levels (up to the mid 90s dBA) would occur. The predicted temporary noise impacts identified would not constitute chronic exposure to high levels of noise because of this limited duration. Moreover, as described in Chapter 12A, "Noise," Section 12A.9.2, the Project Sponsor will coordinate with the occupants of the residential buildings on Henry Street at Secaucus Road in Secaucus, New Jersey, regarding appropriate mitigation such as temporary accommodations elsewhere while pile driving is occurring overnight within 1,000 feet of these residences. Consequently, construction of the Project would not have the potential to result in chronic exposure to high levels of noise.

19.2.4.4.1.2 Tonnelle Avenue Staging Area (New Jersey)

At residential receptors in North Bergen, New Jersey along Paterson Plank Road and along Grand Avenue between 19th Street and 23rd Street and at the BAPS Shri Swaminarayan Mandir Hindu temple on the east side of Tonnelle Avenue, the dominant source of noise resulting in exceedances of construction noise impact criteria would be vibratory pile installation associated with the new Tonnelle Avenue underpass, as well as other equipment operation (e.g., forklifts, loaders, compressors) at the Tonnelle Avenue staging area or at the North River tunnel portal during rehabilitation of the North River Tunnel. The predicted temporary noise impacts identified would not constitute chronic exposure to high levels of noise because of the temporary and variable nature of construction, as described in Chapter 3, "Construction Methods and Activities." The maximum predicted construction noise levels (up to the high 70s dBA for the residences, up to the low 80s dBA for the temple) would occur over a limited duration (approximately nine months) during the construction period based on the amount and type of construction work occurring in the construction work areas. In addition, as discussed in Chapter 12A, "Noise," Section 12A.9.3, the Project Sponsor will offer to provide façade improvements for these residences in the form of sound-reducing windows together with air conditioning units to allow for the maintenance of a closed-window condition. Such measures would result in lower levels of construction-generated noise inside these residential buildings, although they would not completely eliminate the predicted construction noise impacts. Since the construction noise would fluctuate in level and would not occur constantly throughout the construction period, which itself is limited in duration, it would not be described as "chronic." Consequently, construction of the Project would not have the potential to result in chronic exposure to high levels of noise.

19.2.4.4.1.3 Tonnelle Avenue Truck Route (New Jersey)

At residential receptors on Tonnelle Avenue between 10th Street and Secaucus Road in North Bergen, New Jersey, the dominant source of noise resulting in exceedances of construction noise impact criteria would be trucks traveling to and from the Tonnelle Avenue staging area.

The predicted temporary noise impacts identified would not constitute chronic exposure to high levels of noise because of the temporary and intermittent nature of construction truck activity. The analysis of noise from construction trucks as presented in Chapter 12A, "Noise," is based on a

conservative assumption of worst-case truck activity throughout the entire construction period. The predicted noise levels associated with construction trucks (up to the mid 80s dBA) would depend on the truck volumes, which would fluctuate in level based on the amount and type of material traveling to and from the construction work areas and would not occur constantly throughout the construction period, it would not be described as “chronic.” In addition, as discussed in Chapter 12A, “Noise,” Section 12A.9.3, the Project Sponsor will offer to provide façade improvements for these residences in the form of sound-reducing windows together with air conditioning units to allow for the maintenance of a closed-window condition. Such measures would result in lower levels of construction-generated noise inside these residential buildings, although they would not completely eliminate the predicted construction noise impacts. Consequently, construction activities for the Project would not have the potential to result in chronic exposure to high levels of noise at the receptors along truck routes to and from the Tonelle Avenue staging area.

19.2.4.4.1.4 Weehawken Truck Routes Leading To/From the Hoboken Staging Area (New Jersey)

At residential receptors in Weehawken, New Jersey along the Project truck routes related to the Hoboken staging area, including on Willow Avenue south of 19th Street, on Park Avenue south of 19th Street, and along Harbor Boulevard south of 19th Street, the dominant source of noise resulting in exceedances of construction noise impact criteria would be trucks traveling to and from the Hoboken staging area.

The predicted temporary noise impacts identified would not constitute chronic exposure to high levels of noise because of the temporary and intermittent nature of construction truck activity. The analysis of noise from construction trucks as presented in Chapter 12A, “Noise,” is based on a conservative assumption of worst-case truck activity throughout the entire construction period. The predicted noise levels associated with construction trucks (up to the low 80s dBA) would depend on the truck volumes, which would fluctuate in level based on the specific construction activities under way and would not occur constantly throughout the construction period, it would not be described as “chronic.” In addition, as discussed in Chapter 12A, “Noise,” Section 12A.9.3, the Project Sponsor will offer to provide façade improvements for these residences in the form of sound-reducing windows together with air conditioning units to allow for the maintenance of a closed-window condition. Such measures would result in lower levels of construction-generated noise inside these residential buildings, although they would not completely eliminate the predicted construction noise impacts. Consequently, construction activities for the Project would not have the potential to result in chronic exposure to high levels of noise at the receptors along truck routes to and from the Hoboken staging area.

19.2.4.4.1.5 Twelfth Avenue Staging Area and Associated Truck Routes (New York)

At the residential buildings now under construction at 606 West 30th Street and 601 West 29th Street on the east end of Block 675, the dominant source of noise resulting in exceedances of construction noise impact criteria would be pile installation in the Twelfth Avenue shaft and as part of the relocation of the sewer line under West 30th Street, which could last up to 12 months. Additional construction activities on the Project’s Twelfth Avenue staging area would also result in adverse noise impacts that exceed FTA noise impact criteria for an additional 1.5 years. The predicted temporary noise impacts at these buildings would not constitute chronic exposure to high levels of noise because of the temporary and intermittent nature of noise related to pile installation, and because the maximum predicted construction noise levels (up to the high 80s dBA) would occur over a limited duration (approximately seven months during pile driving in West 30th Street with the cut and cover option) during the construction period based on the potential schedule for pile installation. Since the construction noise would fluctuate in level and would not occur constantly throughout the construction period, which itself is limited in duration, it would not

be described as “chronic.” Furthermore, as part of a 2018 rezoning, the New York City Planning Commission required the developers of these buildings to ensure that interior noise levels meet acceptable levels for residences in light of the high ambient noise levels of the site, which included the anticipated noise from tunnel construction activities. Both buildings include acoustically rated windows and an alternate means of ventilation so that windows could remain closed. At these buildings, the façade construction will provide approximately 30 dBA window/wall attenuation resulting in interior noise levels in the mid 40s to low 50s dBA. Such levels would not be considered particularly high for New York City. Consequently, construction of the Project would not have the potential to result in chronic exposure to high levels of noise at these receptors.

In addition, if cut-and-cover excavation with pile installation occur in West 30th Street, construction activities for the Preferred Alternative would result in adverse impacts that exceed FTA noise impact criteria for approximately seven months at the High Line. The predicted worst-case noise levels during construction would occur only within a short distance of the construction activity, however, so park visitors overall would not experience chronic exposure to high noise levels.

19.2.4.4.2 Prolonged Exposure to Noise Levels above 85 dBA

For most of the receptors where significant adverse noise impacts would occur, the predicted absolute noise levels would be below the threshold for potential hearing loss of 85 dBA. As shown in Tables 12A-8 through 12A-12 in Chapter 12A, “Noise,” the maximum predicted levels of noise resulting from construction of the Preferred Alternative would be in the low 80s dBA for most receptors. However, several locations would be subject to higher noise levels, including receptor 5, representing two residences on Henry Street alongside the NEC in Secaucus, New Jersey, receptor 1c, representing the park known as 1600 Park in Hoboken, New Jersey, receptor 8a, representing the new residential buildings at the east end of the same block as the Twelfth Avenue staging area in New York, and receptor 9, representing the High Line.

As described in Chapter 12A, “Noise,” Section 12A.6.2.1, for the residences on Henry Street in Secaucus, high noise levels would occur during the overnight period for approximately two months, when pile driving is occurring within 1,000 feet of the residences. During that time, residents would experience lower noise levels inside the building, because the building façade would provide approximately 10 to 25 dBA attenuation (based on typical attenuation achieved by windows and walls of a frame building). The Project Sponsor will coordinate with the occupants of the residential buildings on Henry Street at Secaucus Road in Secaucus, New Jersey, regarding appropriate mitigation such as temporary accommodations elsewhere while pile driving is occurring overnight within 1,000 feet of these residences.

As described in Chapter 12A, “Noise,” Section 12A.6.2.3, high levels of construction noise would occur at receptor 1c, 1600 Park, for approximately two months while new piles are being installed at the Willow Avenue viaduct over the Hudson-Bergen Light Rail, and may also occur at two other nearby parks (the future park to be developed at Harborside/Hoboken Cove Park and the Hudson River Waterfront Walkway. To mitigate for this condition, the Project Sponsor will coordinate with City of Hoboken and Township of Weehawken regarding pile installation for the underpinning of the Willow Avenue viaduct, to avoid disruption to special events at these parks and will provide advance notification of when pile installation would occur, so that the city and township can provide public notification of this activity and its expected duration.

As described in Chapter 12A, “Noise,” Section 12A.6.3.2.2, high levels of construction noise would occur at the new residential buildings (currently under construction) at the east end of the same block as the Twelfth Avenue staging area if excavation in West 30th Street is performed using cut-and-cover techniques with pile installation. However, as noted above, these buildings are being constructed with façades that provide approximately 30 dBA window/wall attenuation resulting in interior noise levels in the mid 40s to low 50s dBA, in recognition of the high ambient noise levels



that would occur on the adjacent tunnel construction site. Consequently, prolonged exposure to high noise levels would not occur at receptor 8a.

As described in Chapter 12A, “Noise,” Section 12A.6.3.2.4, high levels of construction noise would occur at receptor 9, the High Line, for a period of approximately seven months if excavation is performed in West 30th Street using cut-and-cover techniques with pile installation. The predicted worst-case noise levels during construction would occur only within a short distance of the construction activity, however, so park visitors to the High Line would not experience prolonged exposure to high noise levels.

Consequently, based on the information presented above, construction activities for the Preferred Alternative would not result in prolonged exposure to noise levels greater than 85 dBA.

19.2.4.4.3 Episodic/Unpredictable Short-Term Noise at High Decibel Levels

As described in Chapter 12A, “Noise,” in Section 12A.9, at each construction site, the Project Sponsor will implement a comprehensive, active and responsive community outreach program during construction that will include a staffed local, neighborhood outreach office; a dedicated Project liaison who will coordinate with the community about construction activities, address concerns, and work with the community to accommodate special events where possible; a 24-hour hotline for emergencies and construction complaints; and regular meetings and notifications to about construction status and upcoming activities. The Project Sponsor will coordinate construction activities with affected municipalities in New Jersey, New York City, and nearby property owners to schedule construction to avoid or minimize adverse impacts where practicable. In addition, a noise complaint procedure will be established to promptly address community concerns and implement additional control methods where necessary. This level of coordination would minimize unpredictable exposure to noise at high decibel levels for surrounding receptors.

Additionally, at residential buildings where adverse construction noise impacts would occur, the noise exposure for the residents would depend on the amount of façade noise attenuation provided by the buildings. The façade noise attenuation is a factor of the building façade construction as well as whether the building’s windows are able to remain closed. Buildings that have an alternate means of ventilation (e.g., some form of air conditioning) can maintain a closed-window condition, which results in a higher level of façade noise attenuation. At the residential receptors in New Jersey, standard building façade construction, along with an alternate means of ventilation allowing for the maintenance of a closed-window condition, would provide approximately 25 dBA window/wall attenuation,³ and maximum interior noise levels at these receptors during construction would be in the low to mid 40s dBA, up to approximately 2 dBA higher than the 45 dBA threshold recommended for residential areas according to the *CEQR Technical Manual* noise exposure guidelines. For residences that do not already have façade construction that would provide such levels of attenuation, the Project Sponsor will offer to provide sound-reducing windows, as well as air conditioning so that windows can remain closed, for residences in New Jersey predicted to experience significant construction noise impacts to reduce interior noise levels at those residences.

While high noise levels would occur at the High Line during pile driving in West 30th Street if cut-and-cover techniques are used for excavation there, the worst-case construction noise levels would occur only for a short distance, the area within 400 feet of the construction zone. For the rest of the 1.5-mile-long High Line, noise levels would be below the health-based noise threshold of 85 dB(A) throughout construction. The noise associated with pile driving would occur on a scheduled basis, during a specific phase of construction, and would therefore not be unpredictable

³ Interior noise levels would be 25 dBA less than exterior noise levels. Standard façade construction using insulated glass windows typically provides approximately 25-30 dBA window/wall attenuation.

or episodic. Visitors to the High Line could readily avoid the construction zone when pile driving is occurring and therefore would not be subject to these high noise levels.

19.2.4.4.4 Conclusions

As discussed above, construction of the Preferred Alternative would not result in chronic exposure to high levels of noise, prolonged exposure to noise levels above 85 dBA, or episodic and unpredictable exposure to short-term impacts of noise at high decibel levels. Since the area of potential noise impacts is limited and as described above, the noise would not be chronic and would not exceed the threshold of short-term, high-decibel levels, the predicted noise resulting from construction activities for the Preferred Alternative would not constitute a potential significant adverse public health impact according to the criteria of the *CEQR Technical Manual*. Therefore, the Project would not result in potential adverse public health impacts.

19.2.5 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

According to the *CEQR Technical Manual*, when no unmitigated adverse impact from a proposed project is predicted in other CEQR analysis areas—such as air quality, water quality, contaminated materials, or noise—no public health analysis is warranted.

As discussed in the relevant chapters of this EIS, the Preferred Alternative would not result in adverse impacts in any of those areas and therefore no further analysis of public health related to operation of the Project was conducted.

19.3 ELECTROMAGNETIC FIELDS (EMFs)

Magnetic fields are one of the basic forces of nature. Any object having an electric charge has the potential to create an electric field. When electric charges move together (following an electric current), those charges create a magnetic field. The strength of a magnetic field depends on the magnitude of the current, the configuration and size of the source, spacing between conductors, and the distance from the source. Magnetic fields grow weaker as the distance from the source increases. Electromagnetic fields can be a concern because of the potential for damage to human health from exposure.

19.3.1 ANALYSIS METHODOLOGY

During development of this EIS, FRA and NJ TRANSIT developed methodologies for evaluating the potential effects of the Hudson Tunnel Project in coordination with the Project's Cooperating and Participating Agencies (i.e., agencies with a permitting or review role for the Project). The methodologies used for analysis of EMFs are summarized in this chapter.

19.3.1.1 REGULATORY CONTEXT

Federal health standards governing the appropriate levels of human exposure to EMFs do not exist. However, the International Commission of Non-Ionizing Radiation Protection (ICNIRP), a non-governmental organization that is formally recognized by the World Health Organization, provides guidance on the EMF exposure limit for the general public. The ICNIRP recommends a chronic exposure limit to power-related frequency magnetic fields for the general public of 830 milligauss (mG)⁴.

⁴ ICNIRP *Guidelines for Limiting Exposure to Electromagnetic Fields*, 2020, <https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf>.

19.3.1.2 ANALYSIS TECHNIQUES

Previous analyses conducted for the Access to the Region's Core (ARC) Project were reviewed to determine the potential for EMFs from the Preferred Alternative and are incorporated by reference in this analysis. The assessment conducted for the ARC Project is provided in **Appendix 19** of this FEIS. Since the Preferred Alternative would be in the same general area and would be constructed along nearly the same alignment as the ARC Project, the EMFs in the area, and their effects, would be similar.

19.3.1.3 STUDY AREA

The study area for this analysis is the Project site, as defined in Chapter 4, "Analysis Framework," and the immediately adjacent areas.

19.3.2 AFFECTED ENVIRONMENT: EXISTING AND FUTURE CONDITIONS

EMFs near the NEC are generated by current in the catenary and rail structure. Additional fields may be generated by the electric locomotives that power trains and the electric multiple-unit trainsets that run on that line.

An assessment of the EMF levels along the NEC was undertaken as part of the ARC FEIS (August 2008). The ARC FEIS noted that existing measured EMF levels (of 5 mG or less) along the NEC⁵ are significantly below (as much as 200-300 times less than) the exposure levels of 830 mG sanctioned by ICNIRP; this standard has not changed since the ARC analysis was conducted in 2008. Since the Preferred Alternative would be in the same general area and would be constructed along nearly the same alignment as the ARC Project, the EMFs in the area, and their effects, would be similar, and conditions affecting EMFs, such as use of catenary electrical current used by the NEC system, has not changed since 2008. Therefore, adverse conditions relative to EMFs within the study area do not exist.

19.3.3 IMPACTS OF NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no notable change to EMFs in the Project area.

19.3.4 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

Tunnel boring machines (TBMs) used during construction of the Preferred Alternative would be electrically powered. Most of the other equipment that would be used during construction of the Preferred Alternative would be powered by gas or diesel engines, which do not generate EMFs. TBM activity would occur below ground; therefore, the tunneling activity would not expose any public populations (railroad passengers, residents, passers-by, or workers) to EMFs. The TBM equipment would be electrically powered, but well shielded, and would not generate EMFs at levels of concern for workers in the tunnels.

19.3.5 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

With the existing EMFs measured (of 5 mG or less) to be well below the recommended maximum exposure level for health concerns of 830 mG⁶, the additional fields with the Preferred Alternative

⁵ *Montclair Extension: Post Construction Electric and Magnetic Measurements*, NJ TRANSIT, December 2002.

⁶ See footnote 2, above.

would still exhibit exposure below recommended levels. Therefore, adding new track, catenaries, and rail along or near the existing NEC would create no additional health hazard to populations nearest the NEC right-of-way (ranging from distances of 20 to 120 feet or more). Levels would also be considerably below the acceptable ICNIRP levels at further distances from the right-of-way. Therefore, the Preferred Alternative would not result in EMFs that would adversely affect public health.

19.4 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

Construction and operation of the Preferred Alternative would not result in adverse impacts related to EMFs; therefore, no mitigation is proposed. *