

17.1 INTRODUCTION

This chapter evaluates potential long-term and construction-related impacts to utilities serving the Project area; identifies the existing and planned utility infrastructure and services in the study area; and evaluates the impacts of the Preferred Alternative on these services and infrastructure during construction and subsequent operation. This chapter also evaluates the Preferred Alternative's energy consumption and its effect on area power supply systems during construction and operation.

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17.2 ANALYSIS METHODOLOGY

During development of this Environmental Impact Statement (EIS), the Federal Railroad Administration (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 utilities and energy are summarized in this chapter.



17.2.1 REGULATORY CONTEXT

The State of New Jersey regulates utilities in the study area through the Board of Public Utility Commissioners, NJ Statutes, Title 48, Public Utilities. Hudson County and the Project area municipalities in New Jersey regulate utilities under NJ Statutes, Title 40, Municipalities and Counties. Similarly, the New York Public Service Commission regulates utilities in that state¹ under the New York Energy Law.²

17.2.2 ANALYSIS TECHNIQUES

Underground and overhead utility lines that either intersect or run parallel to the Project alignment were evaluated. Utility information was compiled from existing mapping and coordination with local municipalities and utility companies. **Table 17-1** lists the public and private sources of "as-built" drawings of utilities within the study area. The locations of water, sanitary sewer, and fuel lines were identified, along with underground electric lines. Other utilities near or within the study area were identified, including cable television, telephone, communication fiber optics, and overhead electric lines.

The existing utility infrastructure and service locations were evaluated to determine the short-term and long-term impacts expected to result from the construction and operation of the Preferred Alternative. Existing utility lines may require protection, relocation, and/or replacement as a result of construction of the Preferred Alternative. Potential impacts resulting from service disruption were evaluated to determine which utilities would be affected, and to what extent. Potential impacts to any proposed, future utility infrastructure improvements were also evaluated, as applicable.

17.2.3 STUDY AREA

The study area for evaluation of utilities consists of the Project site, as defined in Chapter 4, "Analysis Framework" and the immediately adjacent areas.

¹ "Companies Regulated by the Commission". New York Public Service Commission. October 17, 2013.

² The *New York Consolidated Laws* includes a statutory code called the "Energy Law." The New York Energy Law is the statutory, regulatory, and common law of the State of New York concerning the policy, conservation, taxation, and utilities involved in energy, which became effective on July 26, 1976 as Chapter 17-A of the *Consolidated Laws*.

Table 17-1
Sources of As-Built Utility Information

Analysis Area	Utility Information Sources
New Jersey	Public Sources
	Port Authority of New York & New Jersey (PANYNJ) New Jersey Department of Transportation (NJDOT) Hudson County North Bergen Municipal Utilities Authority Secaucus Municipal Utilities Authority Jersey City Municipal Utility Authority (JCMUA) North Hudson Regional Sewerage Authority
	Private Sources
	United Water Company (Suez Environment) Williams Gas Pipeline – Transco Public Service Electric & Gas (PSE&G) Comcast Cablevision of New Jersey Hess Corporation MCI AT&T Verizon Communications
New York City	Public Sources
	PANYNJ New York City Department of Transportation (NYCDOT) New York State Department of Transportation (NYSDOT) New York City Department of Environmental Protection (NYCDEP) – Sewers Department NYCDEP – Water Department New York City Police Department (NYPD) New York Unified Court System
	Private Sources
	Consolidated Edison (Con Edison) Empire City Subway Company XO Communications Qwest Communications Lightspeed Fiber Network Level 3 Communications Verizon Communications

17.3 AFFECTED ENVIRONMENT: EXISTING CONDITIONS

17.3.1 POWER FOR RAILROAD OPERATIONS

Traction power (electric power to propel trains along the tracks) is currently provided by the National Railroad Passenger Corporation (Amtrak) along the Northeast Corridor (NEC) from a catenary wire system above the tracks. This power is provided as alternating current (AC), 12 thousand volts (kV) at a frequency of 25 cycles per second, or Hertz (Hz). Trains obtain the power from the catenary system through an apparatus known as a pantograph, which is mounted on the top of locomotives or cars. Power is then transferred to electric motors on the train. The North River Tunnel also includes a third rail at track level to provide traction power for maintenance and rescue trains in the event that the catenary system is deactivated. The third



rail traction power is supplied as direct current (DC). Electric power is provided along the NEC to operate signals along the tracks from wires running from the substation located at Tonnelle Avenue. In addition, Amtrak maintains a 138 kV transmission system along the NEC on wires located above the catenary system over the tracks to provide power to the substations, which in turn provide power to the catenary systems, signals, and other railroad operations.

Traction and signal power is currently provided along the portion of the NEC in the study area from two substations operated by Amtrak: Substation 42, located adjacent to the existing tunnel portal in North Bergen, New Jersey and Substation 43, located at Penn Station New York (PSNY) in New York City.

Both substations contain power transformers to step down voltage from the transmission source to the appropriate voltage for traction and signal power. They also contain circuit breakers to control transfer of the electric power to the catenary and signal systems along the tracks. At Substation 42, where four transformers are located, much of the equipment appears to date from the electrification of the Pennsylvania Railroad in the 1930s and new equipment added during the expansion of the tracks for the Frank R. Lautenberg Secaucus Junction Station construction in the 2000s. Independent of the Preferred Alternative, Amtrak currently has plans make modifications in and around Substation 42, as described in Section 17.4.

Substation 43 at PSNY contains two separate substations: the Seventh Avenue Switching Station and the 31st Street Switching Station. Both substations are located underground and adjacent to PSNY. The 31st Street Switching Station has its own control house.

17.3.2 NEW JERSEY

Utility facilities located within the Project area in New Jersey that have the potential to be affected by the Preferred Alternative are listed in **Table 17-2**.

Table 17-2
Existing Utilities Serving the Project Area, New Jersey

Location	Utility	Owner	Size
Secaucus Road	Electric – underground	PSE&G	5" duct bank
Secaucus Road	Gas	PSE&G	16" cast iron main
Secaucus Road	Communication – underground	Comcast	3" duct bank
Conrail-NYSW ¹ crossing	Electric – underground	NYSW	3" conduit
Conrail-NYSW Crossing	Telephone – underground	NYSW	3" conduit
Conrail-NYSW Crossing	Electric – underground	Conrail	3" conduit
Conrail-NYSW Crossing	Telephone – underground	Conrail	3" conduit
Tonnelle Avenue	Electric – underground	PSE&G	5" duct bank
Tonnelle Avenue	Electric – overhead	PSE&G	Transmission
Tonnelle Avenue	Gas	PSE&G	24" main
Tonnelle Avenue	Telephone – overhead	Verizon	Cable
Tonnelle Avenue	Cable – overhead	Cablevision	Cable
Tonnelle Avenue	Water	SUEZ	8" and 12" ductile iron pipe
Tonnelle Avenue	Sewer	North Bergen MUA ²	8" clay pipe
Portal Site	Electric – underground	PSE&G	5" conduit
Hoboken fan plant site	Sewer	NHSA	24" reinforced concrete pipe
Willow Avenue	Gas	PSE&G	4" and 20" high pressure gas

Notes:

¹ New York, Susquehanna & Western Railway.

² North Bergen Municipal Utilities Authority.

Source: *Conceptual Engineering Hudson Tunnel Project Utility Impacts*, Gateway Trans-Hudson Partnership, September 30, 2016.

17.3.3 HUDSON RIVER

The private utility companies and public utility agencies that have provided information about existing infrastructure have indicated that these utilities are either contained in existing rail and vehicle tunnel crossings of the Hudson River, or located outside the study area. A 16-inch steel pipeline crosses the Hudson River just south of the Lincoln Tunnel between King's Bluff in Weehawken, New Jersey and Jacob Javits Convention Center in Manhattan, New York. In addition, a private electric transmission line crosses the Hudson River near West 49th Street, which is owned by New York Power Authority (NYPA).

There is only one designated "Pipeline Area" on the National Oceanic and Atmospheric Administration (NOAA) navigation chart (New York Harbor; #12327). It is located well outside the Project area, in the vicinity of Piers 25-29 near the Battery.

17.3.4 NEW YORK

Utility facilities located in the Project area in New York City that have the potential to be affected by the Preferred Alternative are listed in **Table 17-3**.



Table 17-3

Existing Utilities Serving the Project Area, New York

Location	Utility	Owner	Size
West 30th Street	Electric	Con Edison	10" transmission
West 30th Street	Gas	Con Edison	6" cast iron
West 28th Street/Twelfth Avenue	Electric/Gas	Con Edison	Electric/Gas Service Facility
West 30th Street	Water	NYCDEP	12" and 20" mains
West 30th Street	Combined sewer	NYCDEP	5'x6', 6'x10'
West 30th Street	Storm sewer	NYCDEP	Inlet
Tenth Avenue	Electric	Con Edison	3" and 4" conduit
Tenth Avenue	Gas	Con Edison	Three 20" mains
Tenth Avenue	Combined sewer	NYCDEP	4' x 2' – 8" brick egg-shaped
Tenth Avenue	Water	NYCDEP	12", 20", and 36" mains

Source: *Conceptual Engineering Hudson Tunnel Project Utility Impacts*, Gateway Trans-Hudson Partnership, September 30, 2016.

In addition to the utilities within the Project site, Con Edison’s West 28th Street facility occupies an entire city block between West 28th and West 29th Streets between Eleventh and Twelfth Avenues in Manhattan, immediately south of the Project site’s Twelfth Avenue staging area and fan plant site. The facility, which includes electrical and natural gas operations, equipment and materials storage space, and parking for 250 Con Edison trucks and other service vehicles, is a critical component of Con Edison’s system for the maintenance and repair of its electric and gas distribution infrastructure and for the provision of reliable service in Manhattan. The West 28th Street facility’s location and direct access to Twelfth Avenue allows crews to respond quickly to emergencies and other necessary service, repair, and maintenance work throughout Manhattan.

17.4 AFFECTED ENVIRONMENT: FUTURE CONDITIONS

One notable utility installation is proposed in the vicinity of the Project area in Hudson County, New Jersey, the NJ TRANSITGRID Traction Power System Project (NJ TRANSITGRID Project). This project will create a microgrid³ to provide highly reliable power to support a core segment of NJ TRANSIT’s critical transportation services and infrastructure needs. The proposed project will include a natural gas-fired electric power generating plant, with a net generation of approximately 110 megawatts (MW). The electric power generating plant component of the NJ TRANSITGRID Project is proposed on a site Kearny, New Jersey, west of the study area for the Hudson Tunnel Project. It will be connected to the Public Service Electric and Gas Company (PSE&G) system, which currently provides power to NJ TRANSIT and Amtrak facilities in the area. The project will also include new infrastructure to provide traction power (i.e., electricity needed to electrify railroad tracks) to enable trains to operate during widespread power failures on a portion of the NJ TRANSIT and Amtrak systems. This will include a natural gas pipeline connection; electrical lines to Mason substation; electrical lines and a new Kearny substation; electrical lines and a new NJ TRANSITGRID Hoboken East substation; circuit feeder connections to NJ TRANSIT’s Caven Point facility; and power distribution to the individual traction power substations along the HBLR right-of-way. Under normal conditions the microgrid

³ A microgrid, as defined by the U.S. Department of Energy (DOE), is a local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously (per DOE web page found at <http://energy.gov/articles/how-microgrids-work>).

will have the capacity to import from and export into the larger commercial grid 24 hours per day, seven days per week.

In New York, Con Edison plans to improve its West 28th Street facility, including adding substation equipment, such as large transformers and switchgear, to meet the growing electric demand in the Hudson Yards and Chelsea neighborhoods.

No other known major utility installations are proposed for the New Jersey, Hudson River, or New York City portion of the study area under future conditions. Modifications to utility facilities needed to accommodate demand from future development and infrastructure projects would be undertaken as necessary. At Substation 42, Amtrak currently has plans that are independent of the Preferred Alternative to add a fifth traction power transformer and to build a new control house⁴ in order to relocate equipment from a deteriorating building. In addition, as described in Chapter 6A, "Land Use, Zoning, and Public Policy," additional utilities will be installed at the future development sites on the block where the Preferred Alternative's Twelfth Avenue staging area and fan plant would be located, the block between West 29th and 30th Streets between Eleventh and Twelfth Avenues, as well as elsewhere in the study area to support the ongoing development activity in West Midtown.

17.5 IMPACTS OF NO ACTION ALTERNATIVE

Under the No Action Alternative, the location and use of utility services and facilities would continue as projected. Electric power consumption, and use of other utilities that service the existing North River Tunnel (telecommunications and sewers) associated with the continued operation and maintenance of the existing North River Tunnel would continue similar to the existing condition. In addition, in the No Action Alternative, it is possible that eventually the existing North River Tunnel may become unusable, which would decrease the demand for the utilities used for operating and maintaining the tunnel. The No Action Alternative would not affect the location of any utility infrastructure, nor would it affect provision of utility service or capacity.

17.6 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

17.6.1 OVERVIEW

Underground and overhead utilities lines located within the study area either intersect or run parallel to affected rail lines and several would be impacted by the Preferred Alternative.

In both New Jersey and New York, a number of utilities would need to be relocated as a result of construction of the Preferred Alternative. These relocations would occur during construction and in advance of other construction activities associated with the Preferred Alternative at any given location.

During the final design of the Preferred Alternative, the relevant affected utility owners will be identified, and designs for utility relocations would be developed using information from the facility owners, including determinations of the entity that will be responsible for undertaking the relocations, and how the costs for the relocations are allocated.

⁴ A substation "control house" contains electrical control equipment, including switchboard panels, batteries, battery chargers, supervisory controls, power-line carrier, meters, and relays. A control house provides all weather protection and security for the control equipment.



NYCDEP has defined the requirements associated with construction impacts to their facilities, as follows:

- NYCDEP utilities affected by construction of the Preferred Alternative must be protected, relocated, repaired, and/or replaced as required by NYCDEP.
- After the new Hudson River Tunnel is constructed, NYCDEP utilities must be fully accessible and restored to their pre-construction sizes and alignments.
- All NYCDEP utilities that are not exposed during construction of the Preferred Alternative but are within the zone of influence for ground movement will require monitoring during construction in accordance with § 76 of NYCDEP Bureau of Water and Sewer Operation's Standard Sewer and Water Main Specifications.⁵
- Preliminary and detailed construction impact assessment reports for all NYCDEP utilities affected by the Preferred Alternative should be submitted to NYCDEP. The detailed construction impact assessment report should include contingency plans during emergency or unforeseen conditions.
- The Project Sponsor will be responsible for maintenance of flow in the NYCDEP infrastructure during construction. All maintenance-of-flow plans should be submitted to the NYCDEP Engineering and Construction unit. The Project Sponsor will be responsible for relocations and maintenance of flow.
- The Project Sponsor will be responsible if NYCDEP is required to engage independent consulting firms to review and analyze the effects of the Preferred Alternative on NYCDEP infrastructure.
- Unlimited constructability access for future NYCDEP infrastructure over the new Hudson River Tunnel shall be provided for future maintenance and construction upgrades.
- The Project Sponsor will be responsible for any deviations from NYCDEP's applicable standards during the design and construction of future utilities and modification of existing infrastructure over the new Hudson River Tunnel.
- If piles supporting sewers/interceptors are to be removed as a result of the alignment and location of the new tunnel crossing NYCDEP sewers/interceptors, then the supports for the sewers/interceptors will need to rest on top of the new Hudson River Tunnel. NYCDEP anticipates that the tunnel should be designed to take surcharge loads to account for NYCDEP existing infrastructure and future utility upgrades, as it will be cost-prohibitive for NYCDEP to have long-spanned structures crossing over the new tunnel.
- There should be an agreement between the Project Sponsor and NYCDEP memorializing the responsibilities and liabilities related to NYCDEP infrastructure.

Amtrak and NJ TRANSIT have agreements with utility companies that specify conditions and terms for relocations, and how costs are allocated. If any new agreements are required, they will be identified and executed during the Project's final design. Construction activities, including relocation of utilities, would be coordinated with the various utility companies and agencies to avoid or minimize service disruptions during construction; therefore, there would be little to no impact to the public.

During construction of the Preferred Alternative, increases in energy consumption associated with use of construction equipment, including fuel for vehicles and equipment, and electric power for Tunnel Boring Machines (TBMs). Each of the four TBMs needed for mining of the new tunnel

⁵ http://www1.nyc.gov/assets/ddc/downloads/publications/infrastructure/sewer_and_watermain_std_specs_14-07-01.pdf

would require an estimated 5-6 MW of electric power during their operation (18 to 24 hours per day for five days per week for approximately two years). Specifically, the Project design engineers estimate that the TBMs operating from Tonnelle Avenue to the Hoboken shaft (i.e., the Palisades tunnel) would require an estimated 10 MW of power (based on dual TBMs operating simultaneously, five days per week, for about two years). The TBMs operating from the Hoboken shaft site to mine the Hudson River tunnel would require an estimated 12 MW of power (based on dual TBMs operating simultaneously, five days per week, for about two years). Power requirements in Manhattan would be much lower; with the Twelfth Avenue site requiring an estimated 1 MW of power capacity (700-800 kilowatts [KW] estimated demand for the duration of construction activities at that location.

At the existing NEC Substation 42 in North Bergen, the construction of the new circuit breakers that will be added to an expanded concrete pad south of the existing substation to power the two new Hudson River Tunnel tracks have been accounted for in the construction activities and estimates for the Preferred Alternative at the Tonnelle Avenue staging area.

In addition, during construction roadway traffic would be temporarily affected by construction activities (see Chapter 5A, "Traffic and Pedestrians"), which would result in some additional energy demand as a result of having to reroute to avoid construction activities, and increased idling.

Rail service on the NEC and other interconnected rail lines in New Jersey would be affected by construction adjacent to the NEC, which would cause an increase in energy consumption during periods of delay.

17.6.2 NEW JERSEY

Construction of the Preferred Alternative would affect the following utility infrastructure:

- Substation 42 in North Bergen would be modified to include new circuit breakers that will be added to an expanded concrete pad south of the existing substation;
- 138 kV and 230 kV at-grade and overhead lines with adjoining transmission towers (owned by PSE&G);
- Storm sewers and underdrains owned by the NJDOT and relative municipalities;
- Underground telephone lines owned by various entities; and
- Gas and water lines owned by various entities.

In New Jersey, a number of utilities would be relocated or removed as a result of construction of the Preferred Alternative, including the following:

- At Tonnelle Avenue in North Bergen, PSE&G underground electric conduits, cables, and duct banks would be relocated along the alignment of the Preferred Alternative's new Tonnelle Avenue bridge.
- At Willow Avenue in Hoboken, PSE&G has a 4-inch gas main and a 20-inch high pressure gas main that is in the vicinity of proposed ground treatments.
- The Secaucus Road PSE&G electric line would be relocated to underground conduit duct banks.
- Some unutilized utilities would be removed, such as the abandoned 24-inch PSE&G gas pipe at Tonnelle Avenue.

Any utilities to be relocated would require the appropriate consultation and coordination with the affected utility owners and operators (e.g., PSE&G). These relocations would be undertaken in accordance with existing relocation agreements or with agreements established for the purposes



of this Project, if none exist to cover a needed relocation, and would involve easements where necessary, which would be executed during final design.

Where utilities would be relocated, the new portions of the utility lines would be constructed, and then service would be transferred to the relocated utility facilities. No service disruptions would occur since these affected utilities would either be relocated and reconnected prior to shut off of existing lines, or protected in place with a slab or casing. It is estimated that over 5,500 feet of utility relocations would be needed to construct the Preferred Alternative without disrupting services.

Coordination with affected utility providers would continue throughout final engineering design of the Preferred Alternative to further identify any potential issues and prescribe means to resolve them prior to Preferred Alternative construction. Utilities located under future tracks to be constructed on embankments would be protected by slabs or by steel casing enclosures. Utilities located under future viaducts or in conflict with depressed sections and tunnel approaches of rail lines would require relocation. These affected utilities would be disconnected only after new relocated service would be activated. Existing utilities that would remain in place near the Preferred Alternative would be protected in utility sleeves or concrete encasements.

The Hoboken fan plant would require the construction of a new substation and transformers to meet the power needs of the new facility and would require the construction of new feeder lines from the local utility (PSE&G) to the substation. In addition, where the tunnel alignment would pass beneath PSE&G substations and related equipment south of the Hudson-Bergen Light Rail right-of-way in Hoboken, the Preferred Alternative would include ground improvement and/or foundation support for the affected buildings to ensure that they remain functional.

In addition, construction of various utility connections would be required to provide power to the new rail facilities along the surface alignment and through the new tunnels.

The rehabilitation of the North River Tunnel would commence after completion of the new Hudson River Tunnel, which would include shutting down existing power service to the tunnel, and establishing temporary power sources for construction, including lighting, ventilation, and life-safety systems. Finally, new feeder cables providing traction power for the new tracks in the rehabilitated tunnel, as well as new systems to provide signal power to the rehabilitated tunnel would be constructed. Therefore, there would be no impact on the traction power supply capacity during the North River Tunnel rehabilitation.

During construction of the new tunnel, the TBMs would require a temporary power source. Since the TBMs would be launched in New Jersey and proceed eastward, a temporary substation would be located near the Tonelle Avenue portal site and/or the Hoboken staging site. Power would be provided to the substation by PSE&G, the local utility company. The power required to operate the TBMs is not expected to overburden the capability of PSE&G to provide electrical power to the area. Once construction is completed, the substation would be removed.

17.6.3 HUDSON RIVER

There are no known utilities under the Hudson River that would be impacted by construction of the Hudson River Tunnel or rehabilitation of the North River Tunnel.

17.6.4 NEW YORK

The Preferred Alternative would require cut-and-cover construction on two streets in Manhattan: West 30th Street between Eleventh and Twelfth Avenues, Tenth Avenue between West 31st and West 33rd Streets. In this area, utilities would be relocated out of the excavation area or supported in place prior to excavation of the street. Utility infrastructure affected by cut-and-

cover construction would include gas and electric lines owned by Con Edison, water and sewer lines owned by the City of New York, as well as telecommunications lines.

Where utilities would be relocated, the new portions of the utility lines would be constructed, and then service would be transferred to the relocated utility facilities in order to minimize the duration of any service disruptions. In coordination with the utility companies, additional methods to minimize service disruptions would be employed as appropriate, including scheduling diversions to avoid periods of peak demand.

No extensive service disruptions would occur since the affected utilities would either be relocated and reconnected prior to shut off of existing lines, or protected in place with a slab or casing. Minimal service disruptions would occur during switch overs from existing to relocated lines.

More than 2,500 feet of existing utilities in New York would be relocated during construction of the Preferred Alternative. Some utilities would be temporarily relocated during construction and then placed in a permanent location when construction is complete. The existing NYCDEP 4-foot by 2.75-foot sewer located at Tenth Avenue would be raised and replaced with a 30-inch pipe in accordance with hydraulic calculations to be submitted to NYCDEP for approval. The two existing 12-inch and one existing 36-inch cast iron water mains located at Tenth Avenue would be offset, suspended, insulated, and replaced with ductile iron pipes during the open excavation work. The two existing 12-inch water mains would need to be replaced with 20-inch pipe from the 20-inch by 12-inch reducer at West 31st Street to the northern limit of the open cut excavation. Another DEP facility located underneath Tenth Avenue could be affected by tunneling activities. In collaboration with NYCDEP, the Project Sponsor will need to determine if the facility falls within the zone of influence for ground movement will require monitoring during construction. The existing NYCDEP Flat Top Reinforced Concrete (FTRC) combined sewer boxes (10-foot by 6-foot and 6-foot by 5-foot) located at West 30th Street would be diverted with temporary bypass sewers to the south of their current location and then restored to their original location. Hydraulic calculations for the bypass sewers would need to be submitted to NYCDEP for approval. The existing 12-inch water main and future 20-inch discharge main located at West 30th Street would need to be offset, insulated, suspended, and potentially replaced following the open excavation work. In order to better coordinate work and potential effects to NYCDEP infrastructure on this segment of West 30th Street, the Project Sponsor will obtain as-built drawings from NYCDEP for these mains, when they become available. There is also an existing 8-foot by 8-foot interceptor sewer located at Twelfth Avenue. Prior to any tunneling work, the available clearance from the new Hudson River Tunnel to this interceptor, the width of the tunnel, and the number of piles to be underpinned and removed, would need to be defined. Potential utility service disruptions associated with utility relocations would be minimized or avoided by methods described in Section 17.6.1 above.

The new fan plants at Tenth and Twelfth Avenues would require the installation of new feeder lines and transformers to meet the power needs of these new facilities. The electrical service for these fan plants would be provided from four feeder lines from the local utility (Con Edison), in cables between Substation 42 and Substation 43.

In addition, construction of various utility connections would be required to provide power to the new rail facilities along the surface alignment and through the new tunnels.



17.7 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

17.7.1 OVERVIEW

Once construction is complete, all utilities in the study area would function as they did before construction, with the necessary relocations having been effected during construction of the Preferred Alternative. There would be no permanent effects on the utilities or on service to their customers.

The new Hudson River Tunnel would include a commercial wireless system, providing passengers with cellular voice and data communications services offered by telecommunication carriers Verizon, AT&T, Sprint, and T-Mobile, and potentially others. The tunnel would also include six conduits for third-party communication lines. The telecommunication carriers' head-end equipment would be located in the Hoboken fan plant communications room with separate spaces allocated for each carrier.

The Preferred Alternative would not result in increased rail capacity to PSNY. While trains traveling from New Jersey to PSNY could travel over four tracks after Project completion versus two at present, the total number of peak-hour trains traveling into or out of PSNY would not change as a result of the Preferred Alternative, unless other improvements are also made, such as an expansion to station capacity at PSNY. Therefore, the Preferred Alternative would not result in any significant additional energy consumption from railroad operations within the study area.

17.7.2 NEW JERSEY

The new Hoboken fan plant would house a fully redundant substation (meaning that there would be enough back-up power to ensure continued operation of the fan plant systems if the main system were to fail or needed to be shut down for service). The fan plant substation would have a fully rated Uninterruptible Power Supply (UPS) that would provide emergency power to tunnel lighting and communications systems. The UPS would consist of a large battery plant rated for 90 minutes that would provide reserve power should there be a power interruption, and a fully rated backup diesel generator that would provide backup power during long-term power outages. The substation would include the necessary transformers and connectors, and would be designed to meet PSE&G requirements for high-tension service. The power required to serve the new fan plant could be accommodated by the existing PSE&G electrical power system.

At the Hoboken fan plant, two 26.4 kV electric feeder lines connected to two transformers would supply power to the plant, while three 13.4 kV feeder lines would run in the new tunnel to interconnect with the Twelfth Avenue and A Yard fan plants in New York. Appropriate sectionalizing would be provided at each substation to allow isolation of any section of distribution feeder for service and or repair.

A new 6.9 kV signal power line would branch off of the existing railroad at the Allied Interlocking near the western end of the Project site. At the existing NEC Substation 42 in North Bergen, new circuit breakers will be added to an expanded concrete pad south of the existing substation to power the two new Hudson Tunnel tracks.

The rehabilitated North River Tunnel would include new feeder cables providing traction power for the new tracks, as well as new systems to provide signal power, which would upgrade and replicate existing systems in the tunnel. The new systems would be state-of-the-art, and would be more efficient than the existing systems. There are no changes proposed to the ventilation systems for the North River Tunnel as part of the Preferred Alternative. Therefore, there would

be no adverse impacts to the power supply capacity in the study area once the North River Tunnel rehabilitation is completed.

17.7.3 HUDSON RIVER

The traction and signal power for the new Hudson River Tunnel would be provided through an expansion of Amtrak's NEC existing system as described above.

17.7.4 NEW YORK

There would be two new fan plants for tunnel ventilation in New York: the Twelfth Avenue fan plant and the Tenth Avenue fan plant. Each of these fan plants would include a fully redundant substation. The substations would meet Con Edison requirements for high-tension service, and would include the necessary transformers and connectors. Based on feasibility analyses conducted for the Project, the power required to serve the new fan plants is not expected to overburden the capability of Con Edison to provide electrical power to the area.

The fan plant substations would also have a fully rated UPS that would provide emergency power to tunnel lighting and communications systems. The UPS would consist of a large battery plant rated for 90 minutes that would provide reserve power should there be a power interruption, and a fully rated backup diesel generator that would provide backup power during long-term power outages.

Electrical service would be provided from four 13.4 kV Con Edison feeder lines for the fan plants in New York. At the existing Substation 43, located at PSNY, new circuit breakers would be installed at the Seventh Avenue Motor-Generator (MG) House to provide power.

The Preferred Alternative would include new permanent dewatering discharge from the new Hudson River Tunnel via the Twelfth Avenue fan plant into the NYCDEP outfall downstream from Regulator N45.

17.8 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

17.8.1 UTILITIES

No adverse impacts to utilities are anticipated to occur from construction or operation of the Preferred Alternative; therefore, no mitigation is proposed. A variety of avoidance and minimization measures will be implemented and a number of coordination activities will take place.

Construction activities, including relocation of utilities, will be coordinated with the various utility companies and agencies to ensure that service disruptions are avoided, so that there would be no impact to the public. As described above, no service disruptions would occur since these affected utilities will either be relocated and reconnected prior to shut off of existing lines, or protected in place with a slab or casing. However, if the need for any short-term service interruptions is identified during final design, the timing and durations of such temporary service interruptions will be communicated to the public and utility service users well in advance of the service interruptions. During the final design of the Preferred Alternative, designs for utility relocations will be developed using information from the facility owners. In addition, the following will be undertaken:

- The Project Sponsor and Project contractor will coordinate with affected utility providers throughout final engineering design to identify potential issues and prescribe means to resolve them prior to construction.



- The Project Sponsor will ensure that all NYCDEP utilities affected by construction of the Preferred Alternative will be protected, relocated, repaired, and/or replaced as required by NYCDEP, as necessary.
- The Project Sponsor will determine if the NYCDEP facility within Tenth Avenue is within the zone of influence and requires monitoring in accordance with § 76 of NYCDEP Bureau of Water and Sewer Operation's Standard Sewer and Water Main Specifications.
- Hydraulic calculations and a site connection proposal will be submitted to NYCDEP for approval for the new permanent dewatering discharge from the Hudson River Tunnel via the Twelfth Avenue fan plant into the NYCDEP outfall downstream from Regulator N45.
- The Project Sponsor and Project contractor will implement agreements with utility providers and governmental agencies regarding temporary or permanent relocation of utility transmission lines.
- The Project Sponsor and Project contractor will conduct public outreach in New York City and coordinate with agencies and private utilities with regard to minor, short duration service interruptions.

With these avoidance and minimization measures in place, negligible service disruptions to utilities would occur.

17.8.2 ENERGY

The Preferred Alternative would not cause any adverse long-term impacts to energy supply or consumption; therefore, no mitigation for operation of the Preferred Alternative is proposed.

For construction of the Preferred Alternative, there would be effects on vehicular flow near construction areas and to rail service on the NEC and other interconnected systems as described above. The Project Sponsor will address these effects by implementing the following measures:

- Mitigation for traffic delays is described in Chapter 5A, "Traffic and Pedestrians." As discussed there, Maintenance and Protection of Traffic (MPT) plans will be developed, approved, and implemented to maintain travel lanes, and detour through traffic away from construction activities and equipment to the extent practicable. These measures would reduce additional gasoline consumption caused by slower moving and idling roadway vehicles.
- Rail service plans will be developed to maximize work within and adjacent to the NEC or other rights-of-way during off-peak rail periods, as practicable, to minimize rail service outages or delays. These measures would reduce additional electric and diesel fuel consumption caused by slower rail operating speeds through construction areas.

With these avoidance and minimization measures in place, energy consumption resulting from construction activities would be minimized. *