ES-1 INTRODUCTION AND SUMMARY

The New York City Department of Environmental Protection (DEP) is proposing the Water for the Future Program: Delaware Aqueduct Rondout-West Branch Tunnel Repair (proposed program) to address the known leaks in the Rondout-West Branch Tunnel (RWBT), a section of the Delaware Aqueduct that currently conveys more than 50 percent of the daily drinking water for New York City and is the primary source of water for residents and businesses of the Towns of Newburgh and Marlborough (see **Figure S-1**).

There are two areas of significant leakage in the RWBT, the Wawarsing and Roseton crossings. Together, they leak approximately 35 million gallons of water per day. The Wawarsing crossing can be repaired from within the tunnel; however, the Roseton crossing poses additional challenges. Therefore, DEP plans to construct a bypass tunnel around the leaking areas in Roseton, which would consist of a new tunnel segment to bypass the leaking section, and two shafts at each end—one in the Town of Wappinger, Dutchess County, New York (east connection site), and one in the Town of Newburgh, Orange County, New York (west connection site). This work would begin in 2013 and be completed in 2020 and is referred to as Project 1. Once the shafts and bypass tunnel are constructed, the aqueduct would be shut down and unwatered. At that time the leaks in Wawarsing would be repaired, and the bypass tunnel would be connected to the existing tunnel. The bypassed portion of the RWBT would no longer be used, and no water would flow through the bypassed section of the RWBT. This work would begin in 2020 and take between 6 and 15 months; this portion of the proposed program is referred to as Project 2B.

However, to support a shutdown of the aqueduct and connection of the bypass, the city must also implement a number of additional projects to supplement DEP's water supply during the shutdown period. The city is currently planning to implement the following projects—referred to as Project 2A—which would be in place by 2020:

- Conservation (Demand Management)
- Optimization of the Catskill Aqueduct to increase its capacity
- Reactivation of the Queens groundwater system
- Interconnections to New Jersey and Nassau County, New York

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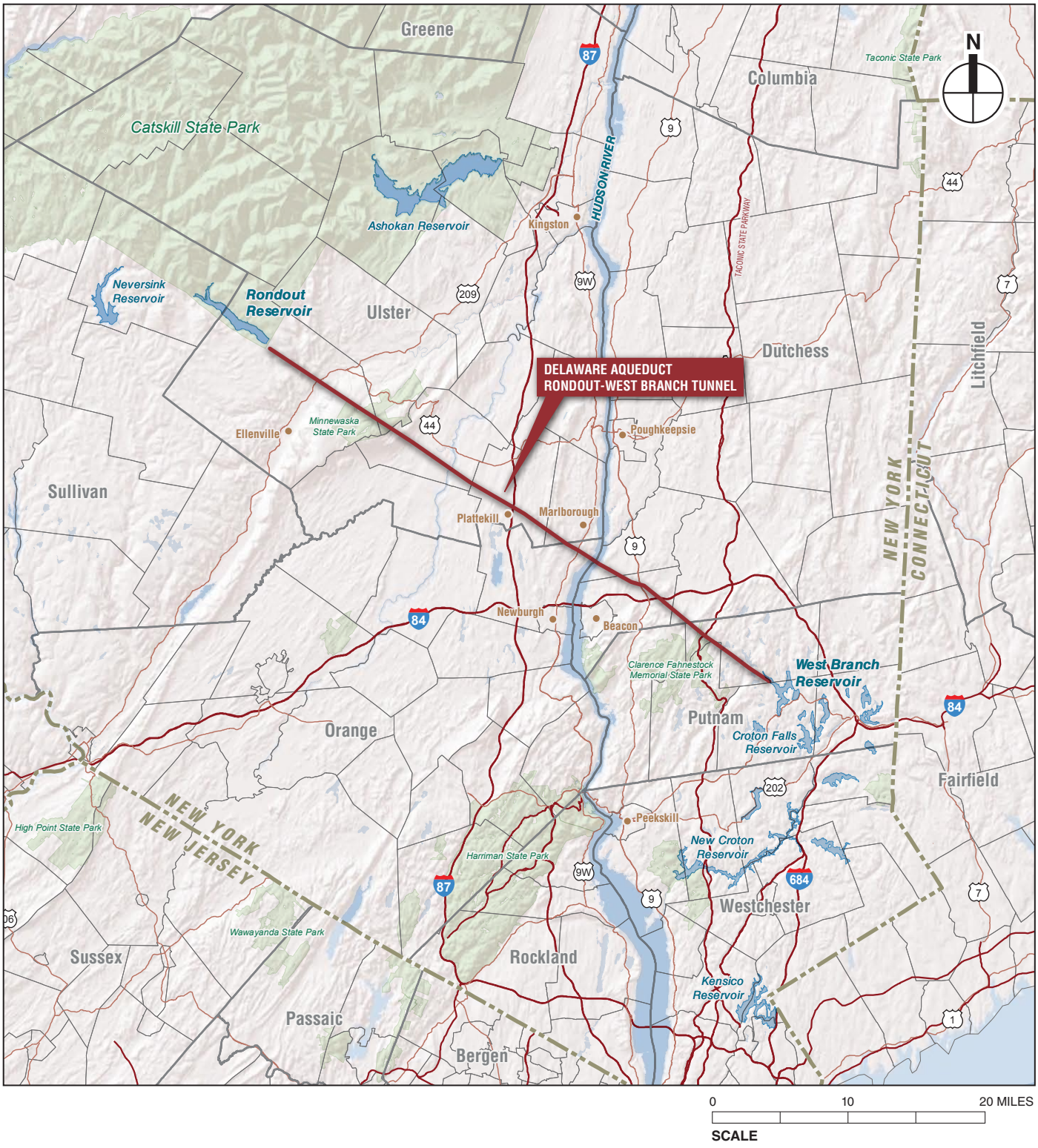

Figure S-1

Project Location

Before moving forward with the proposed program, however, DEP (as the lead agency) is required to examine the environmental effects and, to the maximum extent practicable, avoid or mitigate significant adverse impacts on the environment. To accomplish this, DEP is undertaking a two-part approach to the EIS. This EIS provides a detailed analysis of Project 1, shaft and bypass tunnel construction. A second EIS or a subsequent environmental review, as appropriate, will provide a detailed analysis of the supplemental water supply projects and the connection of the bypass tunnel; however, this EIS does include a generic description of those projects and associated potential impacts are described.

In disclosing impacts, the EIS uses an analytical approach that considers the proposed program's potential adverse impacts on the environment. Therefore, the technical analyses in an EIS typically describes conditions today, and then forecasts these conditions to the future, first without, and then with the proposed project. A project's potential to result in significant adverse impacts once completed and operational is also analyzed.

This EIS assessed potential impacts to a number of technical areas. Based on the analyses, it was determined that construction of Project 1 would not result in significant adverse impacts on land use, zoning, public policy and open space; visual character; historic and archaeological resources; socioeconomic conditions; community facilities; natural resources and water resources; hazardous materials; air quality; energy and greenhouse gas emissions; infrastructure; solid waste; coastal zone consistency; or public health.

However, during Project 1 construction, predicted temporary significant adverse impacts on traffic and noise were determined for both the east and west of Hudson study areas. In addition, a neighborhood character impact was determined in the east of Hudson study area. Mitigation measures to lessen these impacts are proposed and would be incorporated, and many measures have been included in the design that reduced the potential for additional temporary significant adverse impacts. Mitigation measures proposed include signal retimings, upgrading traffic signal controller and detectors, and traffic control plans at impacted intersections, and noise control measures at the construction sites, such as implementation of a Conceptual Noise Mitigation Plan (CNMP) (see Appendix 2.19-2) to ensure that the proposed program's noise during construction is decreased and construction noise impacts are minimized to the extent practical and feasible.

While DEP acknowledges that there are some unmitigated temporary significant adverse impacts as part of Project 1, without the Water for the Future Program, the RWBT would continue to leak in both the Roseton and Wawarsing areas, and additional leaks along the RWBT could occur. With the proposed program in place, DEP would be able meet its mandate to provide safe and reliable transmission of drinking water from the watershed in sufficient quantity to consumers to meet all current and future water demands.

~~DEP encourages the public to comment on this EIS. Public hearings are as follows:~~

~~Monday, January 23, 2012~~
~~Town of Newburgh Town Hall~~
~~1496 Route 300, Newburgh, NY 12550~~
~~7:00 – 9:00 PM~~
~~(snow date Monday, January 30, 2012)~~

~~Tuesday, January 24, 2012~~
~~Wappingers Junior High School~~
~~30 Major McDonald Way~~
~~Wappingers Falls, NY 12590~~
~~7:00 – 9:00 PM~~
~~(snow date Tuesday, January 31, 2012)~~

~~Wednesday, January 25, 2012~~
~~Wawarsing Town Hall~~
~~108 Canal Street, Ellenville, NY 12428~~
~~6:00 – 9:00 PM.~~
~~(snow date Wednesday, February 1, 2012)~~

~~The public comment period closes on Friday, February 17, 2012.~~

The proposed program is located in the State of New York and is an action to be undertaken by an agency of the City of New York; it is subject to environmental review pursuant to the New York State Environmental Quality Review Act (SEQRA) and New York City Environmental Quality Review (CEQR) process. This EIS has been prepared in conformance with applicable laws and regulations, including Executive Order No. 91, and follows the guidance of the *CEQR Technical Manual* (January 2012). It contains a description of the proposed program and its environmental setting; the short- and long-term environmental impacts of the proposed program during its construction and operation; the identification of any significant adverse environmental impacts; a discussion of alternatives to the proposed program; any irreversible and irretrievable commitments of resources as a result of the proposed program; and a description of any mitigation measures necessary to minimize significant adverse environmental impacts that could occur with the proposed program. DEP is the lead agency in this environmental review process.

Comments can also be submitted in writing to:

Jennifer Farmwald, Project Manager
Office of Water Supply Infrastructure and Watershed Assessment
Bureau of Environmental Planning and Analysis
New York City Department of Environmental Protection
59-17 Junction Boulevard, 11th Floor, Flushing, New York 11373
Phone: (718) 595-3287
Fax: (718) 595-4479
Email: jfarmwald@dep.nyc.gov

This Executive Summary is organized as follows:

- Section ES-2, "Background and Planning Context," provides information on the background and planning context for the proposed program, including an overview of New York City's water supply system, and a brief summary of how the RWBT was originally constructed, its current conditions, and the planning for its repair.

- Section ES-3, "Purpose and Need for the Proposed Program," presents the reasons for DEP's proposal to advance the tunnel repair program, most notably to address the RWBT leaks and ensure the safe and reliable transmission of drinking water.
- Section ES-4, "RWBT Repair Program," describes the key aspects of Projects 1, 2A, and 2B, with a focus on the construction activity on the west and east connection sites and a summary of potential impacts on the surrounding communities.
- Section ES-5, "Program Schedule and Phasing," summarizes the timing of the construction efforts by phase; the permits and approvals that would be required from various local, state, and federal agencies; the public participation process to ensure surrounding communities were kept informed and could provide feedback on the proposed program; and how the environmental review for the proposed program is conducted.
- Section ES-6, "Probable Impacts of Project 1 Construction and Mitigation Measures," discusses the potential temporary significant adverse traffic, noise, and neighborhood character impacts that could result from Project 1 and the measures that would be incorporated into Project 1 construction to eliminate or minimize as much as possible these impacts on surrounding communities.
- Sections ES-7, 8, and 9 briefly explain how Projects 2A and 2B will be more fully analyzed in a second EIS or a subsequent environmental review, as appropriate, and that operation of the bypass tunnel would have no environmental impacts, respectively.
- Section E-10, "Cumulative Effects of the Water for the Future Program," discusses the potential for the proposed program to result in two or more individual effects on the environment that, combined, could increase other environmental impacts.
- Section E-11, "Alternatives," presents summary tables that compare the potential benefits and impacts of other alternatives to the proposed program that were evaluated as part of the EIS.
- Section E-12, "Unavoidable Adverse Impacts," discusses the potential temporary significant Project 1 traffic, noise, and neighborhood character impacts that could not be fully eliminated by the mitigation measures that would be part of Project 1 construction.
- Section E-13, "Irretrievable and Irreversible Commitment of Resources," explains how the proposed program would involve the use of certain resources that would then not be able to be used for other projects.

ES-2 BACKGROUND AND PLANNING CONTEXT

ES-2.1 NEW YORK CITY WATER SUPPLY SYSTEM

DEP operates and maintains the New York City water supply system and is responsible for providing drinking water to more than 8 million customers in New York City as well as

approximately 1 million upstate customers. The system consists of 19 reservoirs and three controlled lakes with a total storage capacity of approximately 580 billion gallons. The average total system demand is approximately 1.1 billion gallons of water a day (gpd).

There are three upland reservoir systems in New York City's water supply system: the Croton, Catskill, and Delaware systems (see **Figure S-2**), which provide approximately 10, 40, and 50 percent, respectively, of the water supply on an annual average basis. Together, these watersheds encompass a 1,968-square-mile area and all or parts of eight counties in New York and a small portion of western Fairfield County in Connecticut. From these upland storage reservoirs, water flows by gravity to New York City through three aqueducts—New Croton Aqueduct, Catskill Aqueduct, and the Delaware Aqueduct (including the RWBT)—and four tunnels—City Tunnel Nos. 1, 2, and 3, and the Richmond Tunnel.

The Delaware watershed consists of four reservoirs: Cannonsville, Pepacton, Neversink, and Rondout. At the Rondout Reservoir, the water is conveyed approximately 45 miles via the RWBT portion of the Delaware Aqueduct to the West Branch Reservoir, located east of the Hudson River in Putnam County (see **Figure S-3**). The RWBT is 13.5 feet in diameter, lined with concrete, and varies in depth from 300 to 2,300 feet below ground (crossing the Hudson River at nearly 600 feet beneath the water surface). The tunnel is a deep rock, pressurized aqueduct that has been in nearly continuous service since 1944. It can convey up to approximately 900 million gallons per day (mgd) of water and delivers an average of 600 mgd annually. All water from the Delaware system flows through the RWBT. Two upstate municipalities are supplied with water from the RWBT: the Town of Newburgh, Orange County, and the Town of Marlborough, Ulster County.

ES-2.2 EXISTING RWBT CONSTRUCTION AND GEOLOGY

During the construction of the RWBT, in zones where the rock was weak or disintegrated, heavy reinforcement and steel interlinings were installed in the tunnel to guard against rupture, excessive leakage and potential collapse. These tunnel sections are known as the *Roseton and Wawarsing crossings*. The Roseton crossing, just west of the Hudson River, includes two sections totaling about 1,030 feet long. The Wawarsing crossing is approximately 600 feet long with multiple contact zones between various rock types. Eleven shafts were excavated along the tunnel route to provide access and/or ventilation during construction (see Figure S-3).

ES-2.3 OVERVIEW AND CONDITION OF THE RWBT

The RWBT was last unwatered and physically inspected in 1957-1958. DEP monitors the RWBT and, since the 1990s, has been investigating the Roseton and Wawarsing crossings in particular. These two RWBT sections appear to be leaking a total of between 10 and 35 mgd of water, depending on the amount of water the aqueduct is carrying. DEP's monitoring efforts have included visual inspections of the tunnel using an unmanned autonomous inspection device

Schematic Not To Scale

Figure S-2
Water Supply System

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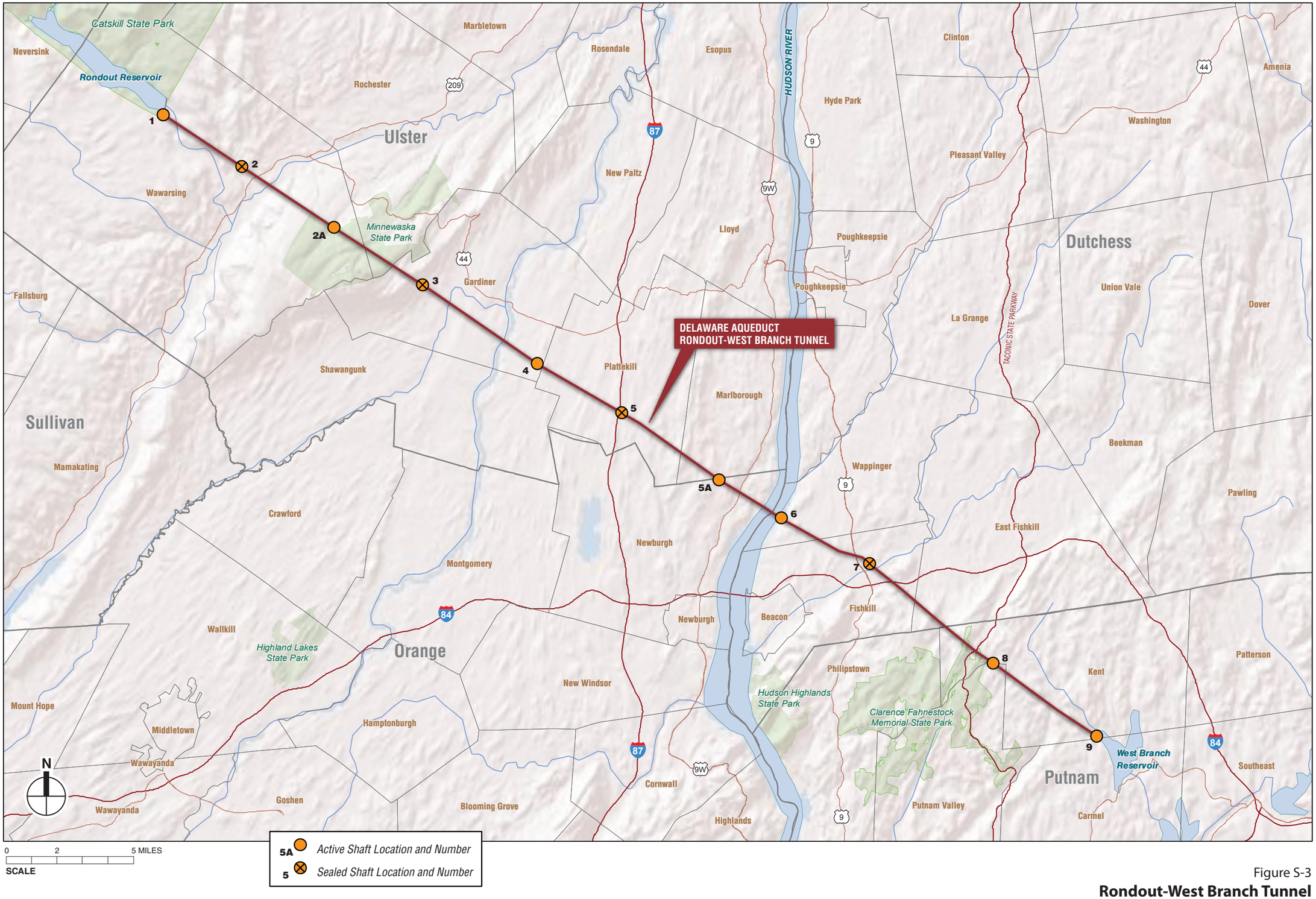

Figure S-3

Rondout-West Branch Tunnel

and tunnel leakage investigations to determine the amount and specific location of the leaks. These monitoring efforts serve as a baseline by which to assess any changes in the tunnel condition and to determine priorities for tunnel repair.

ES-2.4 PLANNING FOR THE REPAIR OF THE RWBT

DEP has undertaken a multitude of planning and design efforts to prepare for the RWBT repair as part of its emergency and long-term planning. Some RWBT improvements have already been constructed or are under construction, others are planned, and others are being evaluated. These projects include: pumping improvements and shaft rehabilitation of Shaft 6 to improve capability to unwater the tunnel (completion expected in 2013); flow metering, instrumentation, and control improvements to allow DEP to continue to investigate the tunnel's condition; and other projects to modernize and improve the water supply system's reliability and aid in Project 2B planning, including the Croton Filtration Plant in the Bronx, NY (completion expected in 2012), Croton Falls, NY, Pumping Station Plant Improvements (Shaft 11) (expected to be complete in 2014), and Cross River, NY, Pumping Station (Shaft 13) (expected to be finished in 2012).

ES-3 PURPOSE AND NEED FOR THE PROPOSED PROGRAM

DEP is responsible for ensuring the safe and reliable transmission of drinking water from the watershed to consumers in sufficient quantity to meet all present and future water demands. As described above, the RWBT is a critical component of DEP's Delaware water supply system and is currently leaking between 10 and 35 mgd in two critical areas in the vicinity of the Wawarsing and Roseton crossings. DEP considered repairing the existing RWBT from within the tunnel. However, this alternative was not selected due to the length of time that this repair method would require the RWBT to be out of service. Construction of the bypass tunnel is anticipated to minimize the time that the RWBT is taken out of service, thereby reducing risks, supporting inspections of other tunnel segments, and providing greater flexibility to inspect and repair the RWBT itself.

This project is also consistent with the water network initiatives detailed in the Mayor's Office of Long Term Planning and Sustainability's *PlaNYC: A Greener, Greater New York*, by enabling DEP to continue to reliably deliver drinking water to upstate and New York City consumers.

ES-4 RONDOUT-WEST BRANCH TUNNEL REPAIR PROGRAM: DESCRIPTION OF PROJECTS 1, 2A, AND 2B AND BYPASS TUNNEL OPERATION

ES-4.1 PROJECT 1: SHAFT AND BYPASS TUNNEL CONSTRUCTION

OVERVIEW

Project 1 would entail the construction of the bypass tunnel around the RWBT's highest leakage section in Roseton. Bypass tunnel construction would occur underground using a tunnel boring machine (TBM), with staging and support activities at the west and east connection sites (see **Figure S-4**). A TBM is similar to a large diameter drill that excavates a circular tunnel section without disturbance at the surface. A shaft at each connection site would also be required (see **Figure S-5**). These shafts would be excavated to the north of the existing aqueduct alignment along the bypass tunnel to approximately 600 or 900 feet below ground, depending on the RWBT's depth at each shaft site. During Project 1, the west connection shaft would be used to launch the TBM and the east connection shaft would receive it. The shafts would also be used by workers to access the bypass tunnel, for equipment delivery, and to remove excavated materials.

In addition, a 300-foot "starter tunnel" would be constructed at the bottom of each shaft; the starter tunnel would be larger than the bypass tunnel to allow room to assemble the TBM and prepare it for tunneling. Next, construction of "connector tunnels" would begin at both connection sites. The connector tunnels are the relatively short tunnels that would ultimately serve as the connection from the bypass tunnel to the existing aqueduct during Project 2B. Finally, "inundation plugs" would also be commenced at the sites; these inundation plugs would be used to block off the leaking area of the RWBT in Roseton in the event that water inflow exceeds DEP's ability to pump water out of the tunnel during construction of Project 2B.

The following sections describe existing conditions at the west and east connection sites and the Project 1 work in more detail.

WEST AND EAST CONNECTION SITES—EXISTING CONDITIONS

West Connection Site

The west connection site is located on the west of New York State Route 9W approximately 1,100 feet north of Old Post Road in the Town of Newburgh in Orange County. The approximately 32.9-acre site comprises multiple parcels that have been or are in the process of being acquired by DEP (see **Figure S-6**).

Most of the steeply sloped site is wooded and undeveloped, and a stream runs across part of it. There are several vacant buildings on the eastern portion of the site, including a former restaurant and bar, and a single-family home with a barn, a cinderblock outbuilding, and several trailers. The western portion of the site contains a vacant single-family home and a shed.

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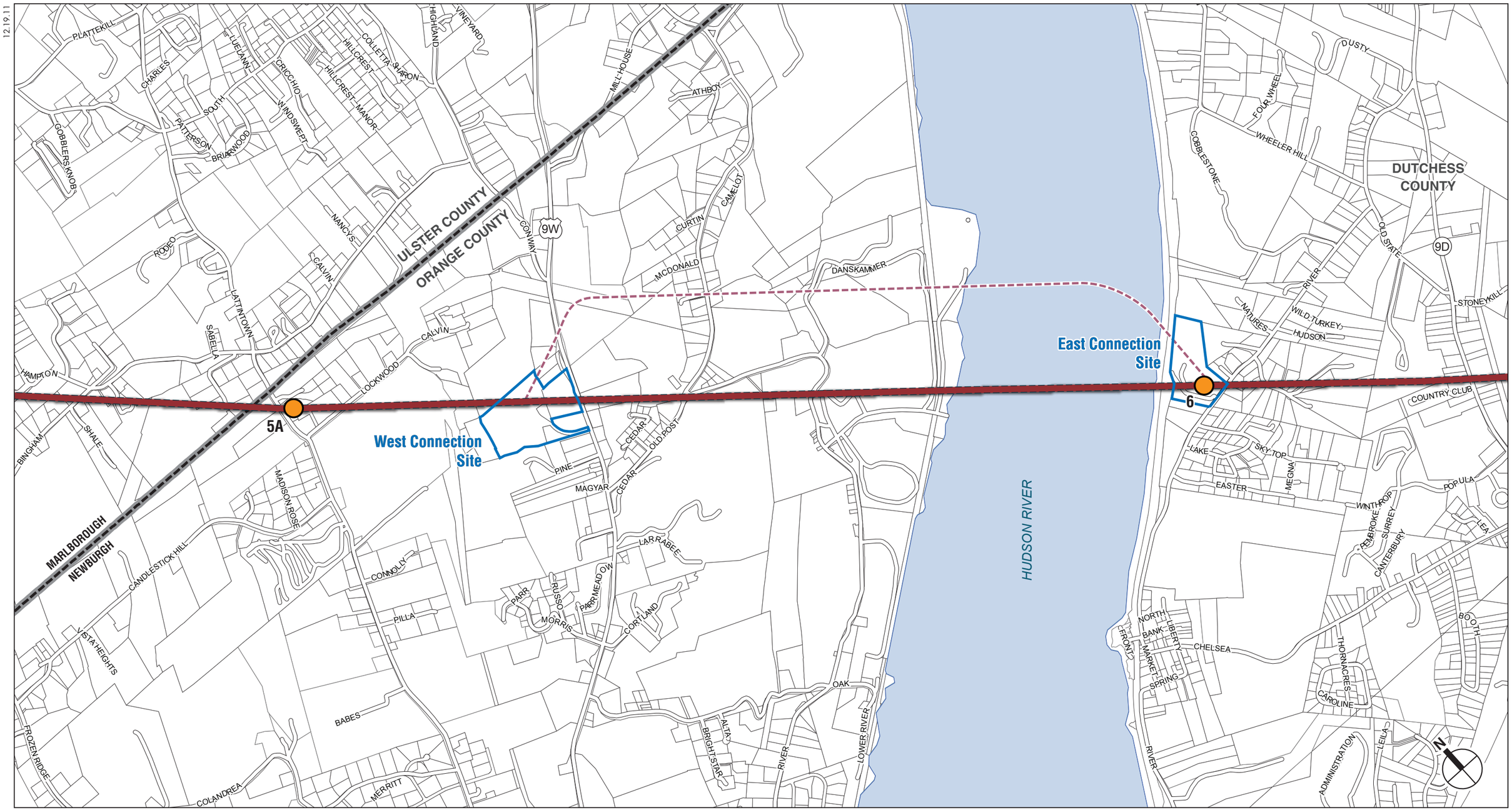


Delaware Aqueduct Rondout-West Branch Tunnel

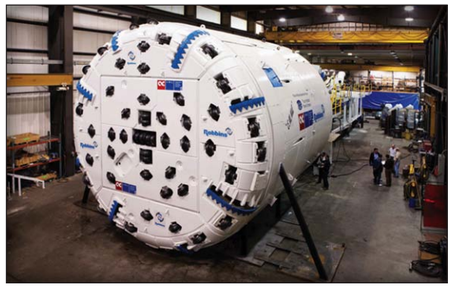
Connection Sites

5A *Active Shaft Location and Number*

Baseline Bypass Tunnel Alignment

Figure S-4

Project 1: Shaft and Bypass Tunnel Construction



Tunnel Boring Machine (typical)

Tunnel Boring Machine (typical)

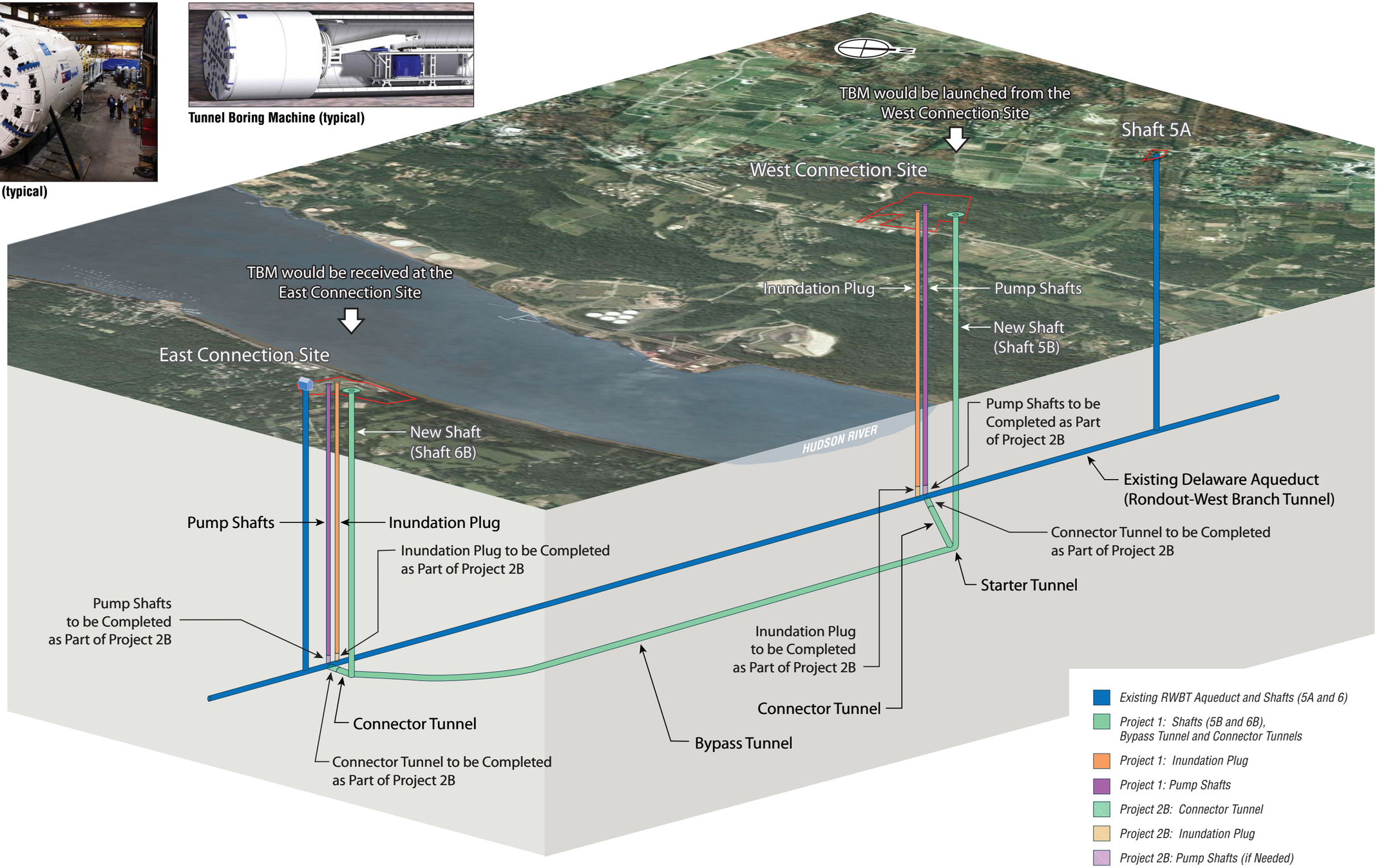


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Figure S-5

Bypass Tunnel: Major Components (Illustrative View)

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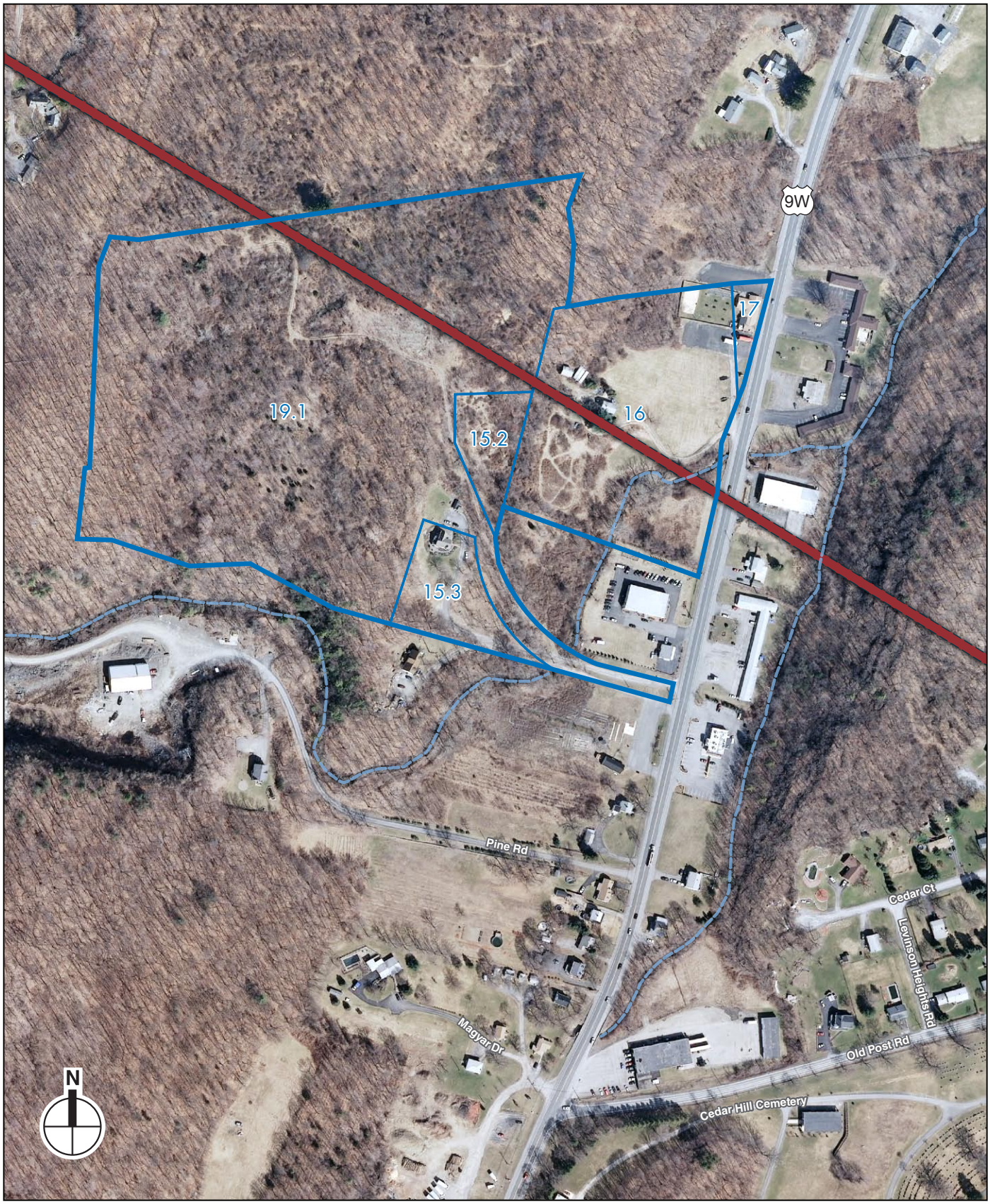

Delaware Aqueduct Rondout-West Branch Tunnel

West Connection Site

15.3 *Parcel Boundary and Lot Number*

Stream

0 200 400 FEET

SCALE

Figure S-6

West Connection Site: Existing Conditions

East Connection Site

The east connection site is located in the Town of Wappinger in Dutchess County on the west side of River Road. Owned by DEP, the approximately 20.1-acre site is developed with a number of DEP facilities and offices related to the New York City water supply system, including the Delaware Aqueduct Shaft 6 superstructure, Hudson River Pump Station, power supply facilities, roads and parking areas, and stormwater infrastructure (see **Figure S-7**). Construction is currently underway at the east connection site as part of the pumping improvements and rehabilitation of Shaft 6 project. DEP is currently under negotiations to purchase two residences on the east side of River Road (lot 6056-01-302882-0000 and lot 6056-01-319891) to provide nighttime sleeping quarters for the project's construction management staff during the construction period

DESCRIPTION OF PROJECT 1 CONSTRUCTION PROGRAM

Construction Schedule and Phasing

All construction for Project 1 is expected to be completed over an approximately 7½-year period between 2013 and 2020. Project 1 construction can be organized into four primary phases that would be carried out at or between both the west and east connection sites:

- Phase 1: Site Preparation
- Phase 2: Shaft Construction
- Phase 3: Bypass Tunnel Excavation
- Phase 4: Bypass Tunnel Lining, Project 1 Demobilization, and Preparation for Project 2B

The overall schedule shown on **Figure S-8** illustrates the anticipated timeline for the four primary construction phases described below by connection site.

Description of Project 1 Construction Phases—West Connection Site

Phase 1: Site Preparation: On the west connection site, Phase 1: Site Preparation is expected to begin in early 2013 and be complete in the first quarter of 2014 (see **Figures S-9 and S-10**). Phase 1 would consist of the demolition of certain on-site structures, the clearing and grading of a large portion of the site, and the construction of certain facilities in preparation for future construction phases. These facilities would consist of a new site access road, a stormwater management system, and some of the infrastructure necessary for later construction phases.

Phase 2: Shaft Construction: Site preparation activities would be followed by Phase 2: Shaft Construction, which would include the construction of a new shaft on the west connection site (Shaft 5B) (see **Figure S-11**). Shaft construction is expected to commence in the first quarter of 2014 and be complete in the first quarter of 2015.

Phase 3: Bypass Tunnel Excavation would follow. **Figure S-12** shows the potential site layout during Phase 3. Work during Phase 3 would consist of the construction of the bypass tunnel, the

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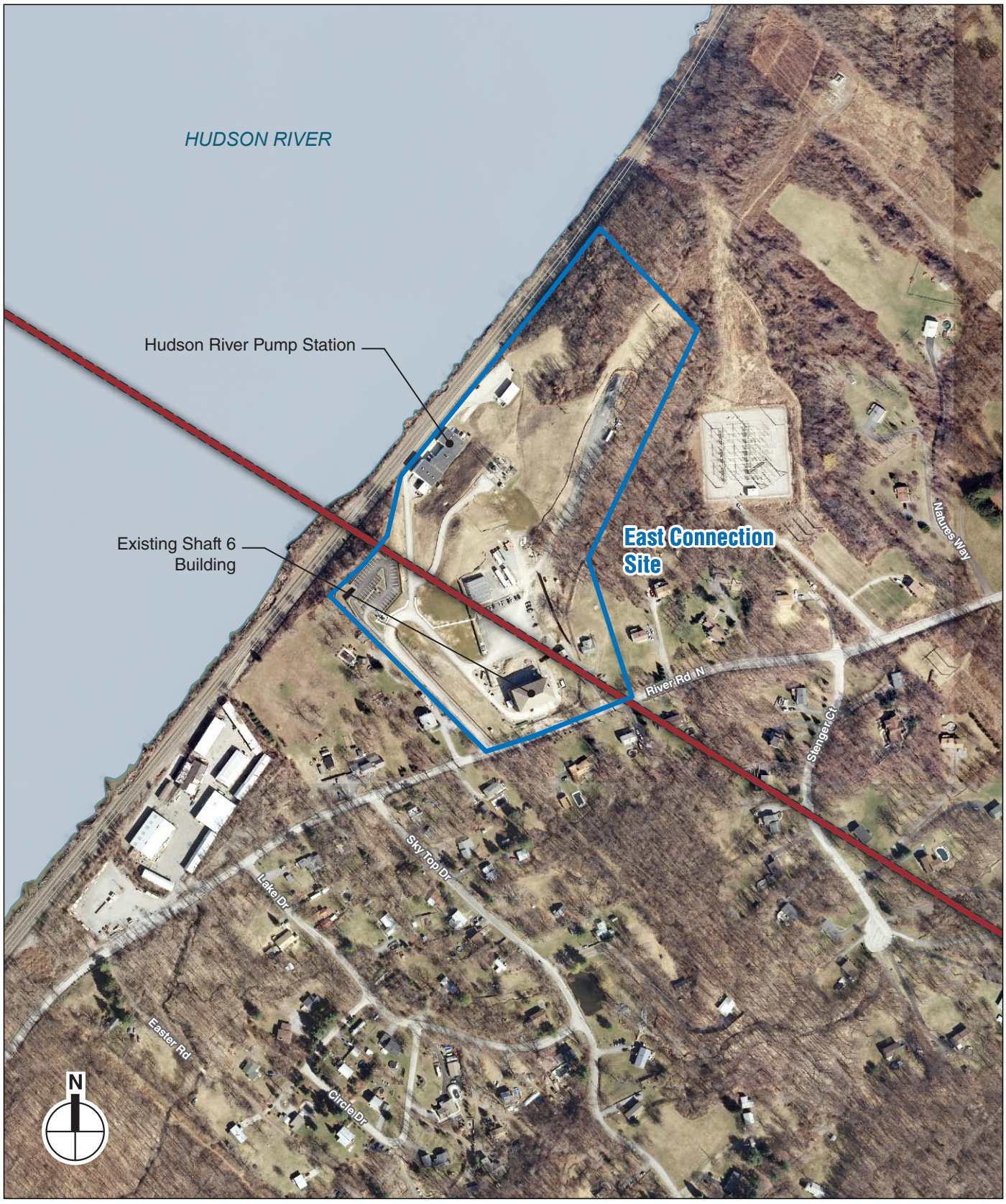
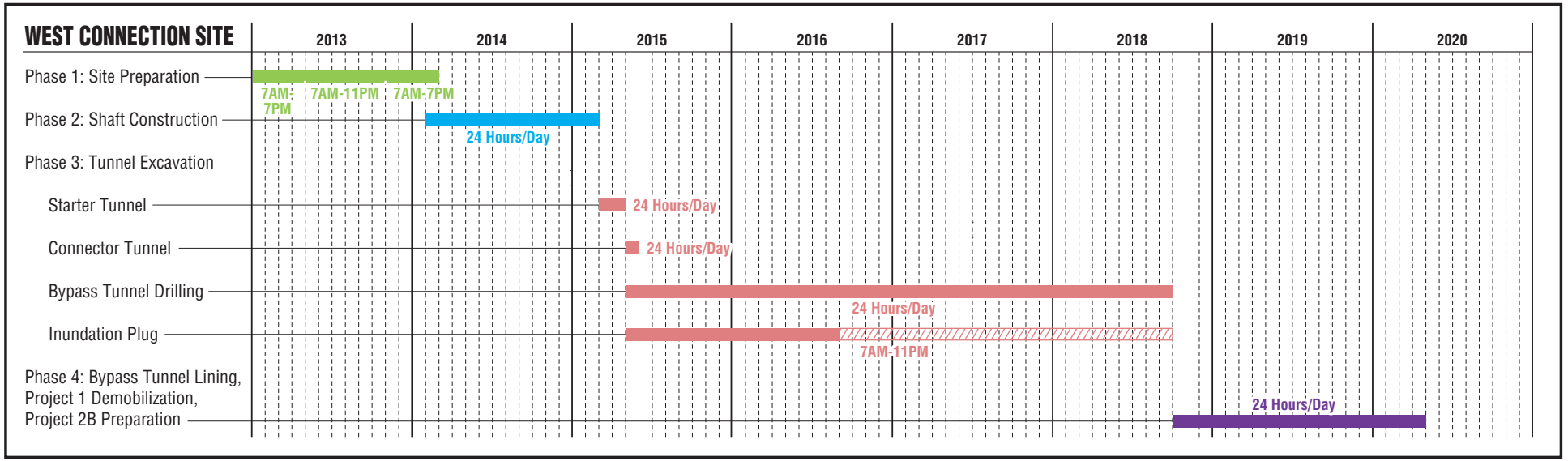


Figure S-7

East Connection Site: Existing Conditions



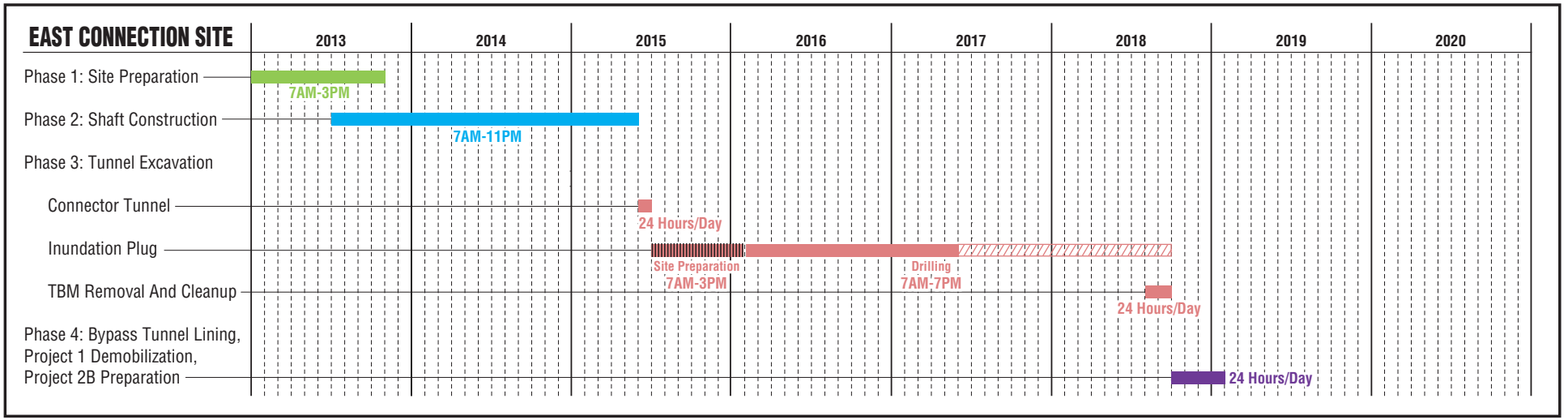


Figure S-8

Construction Schedule and Work Hours

KEY MAP

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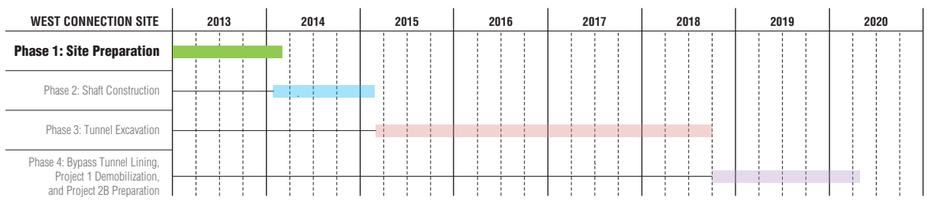
CONSTRUCTION SCHEDULE



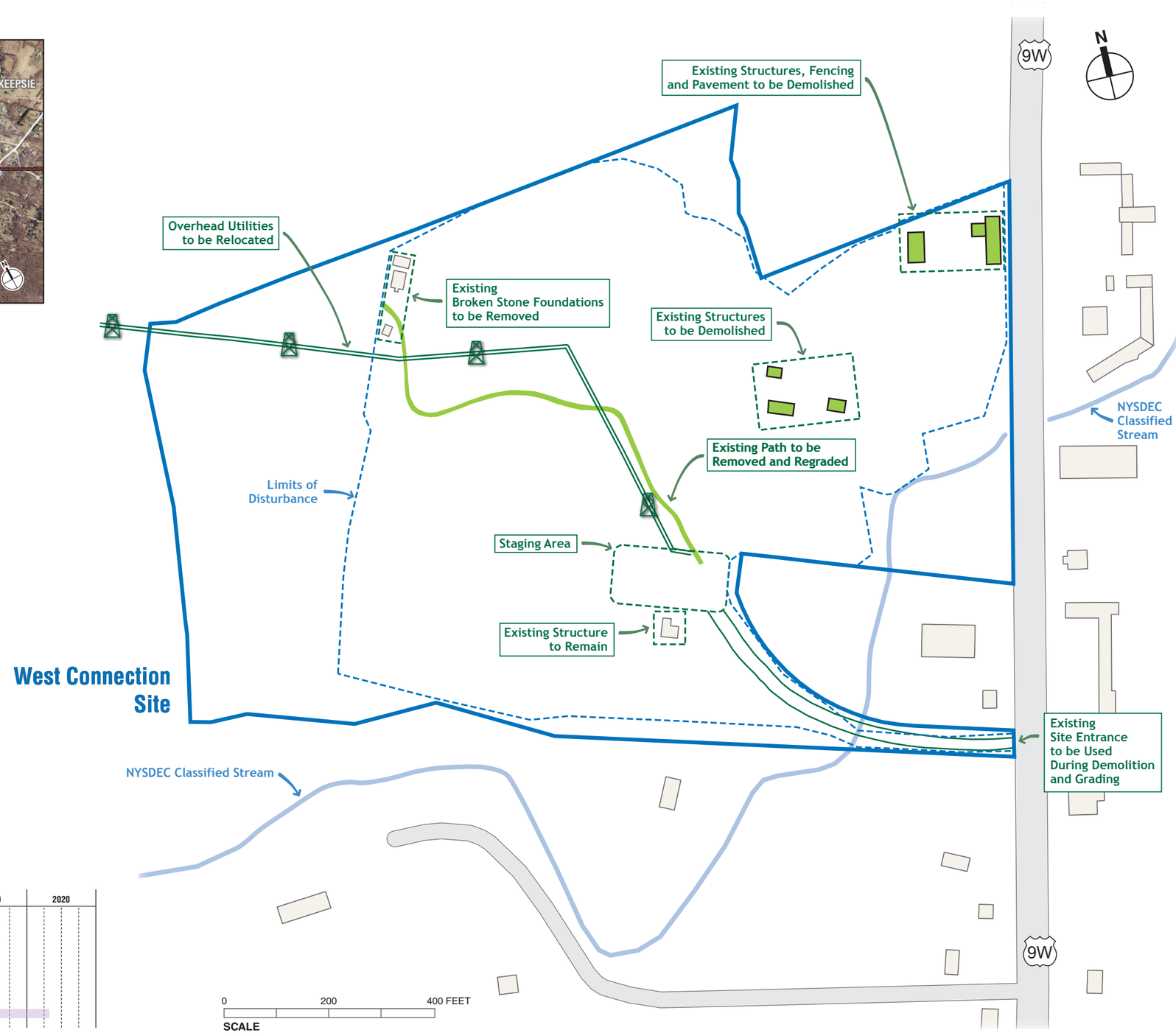


Figure S-9

West Connection Site

Phase 1: Site Preparation (Demolition and Clearing)

KEY MAP

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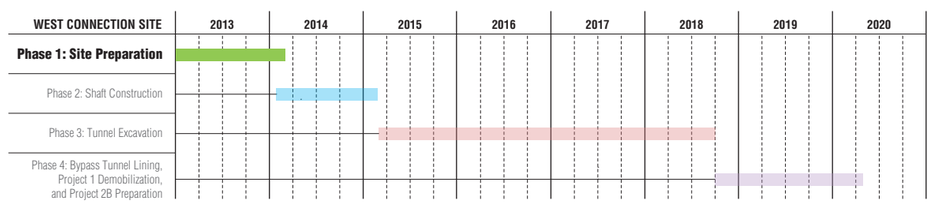
CONSTRUCTION SCHEDULE



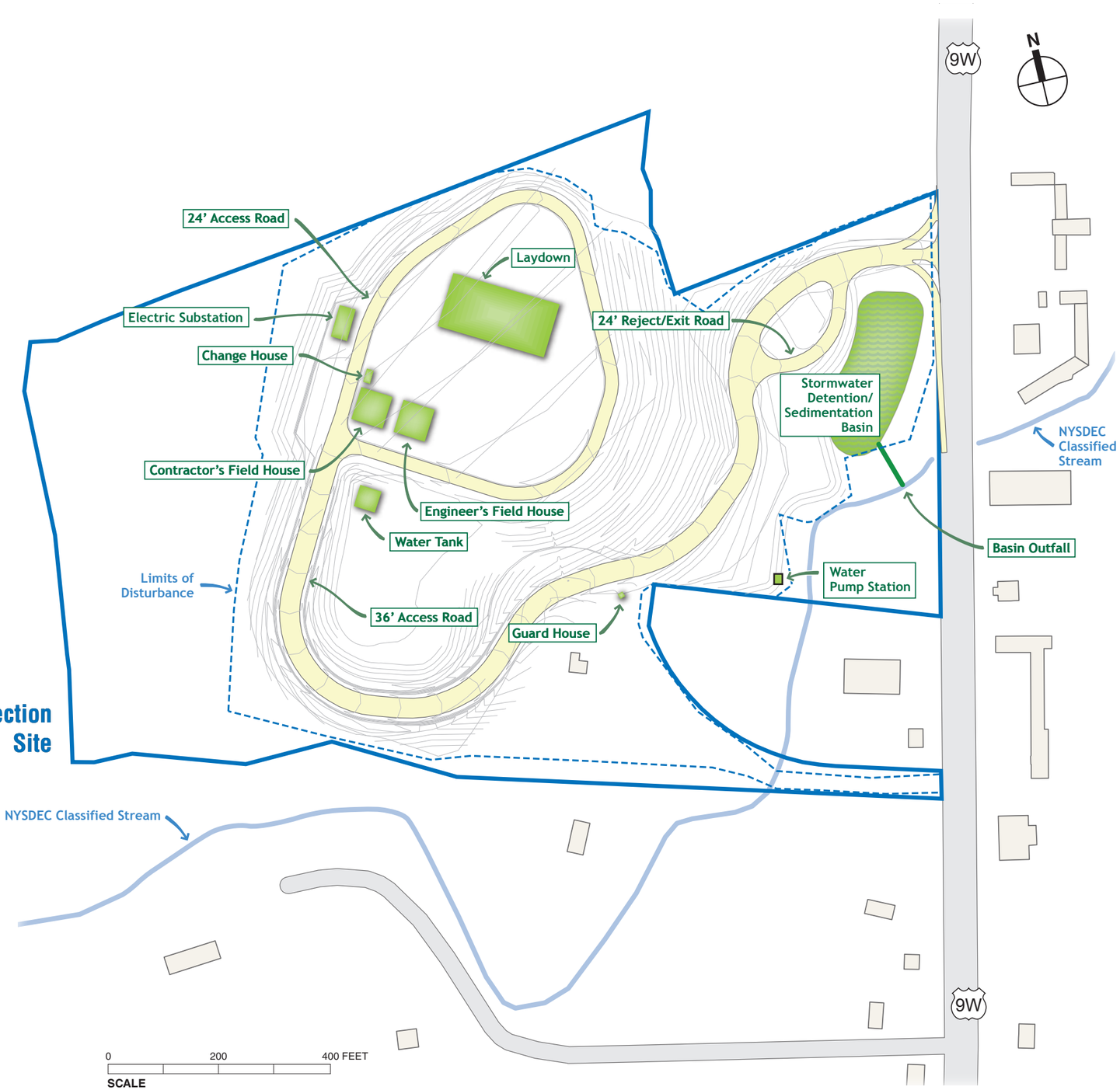


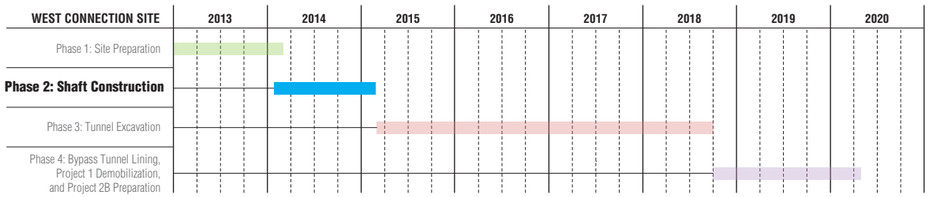
Figure S-10

West Connection Site

Phase 1: Site Preparation (Site Infrastructure)

KEY MAP

CONSTRUCTION SCHEDULE



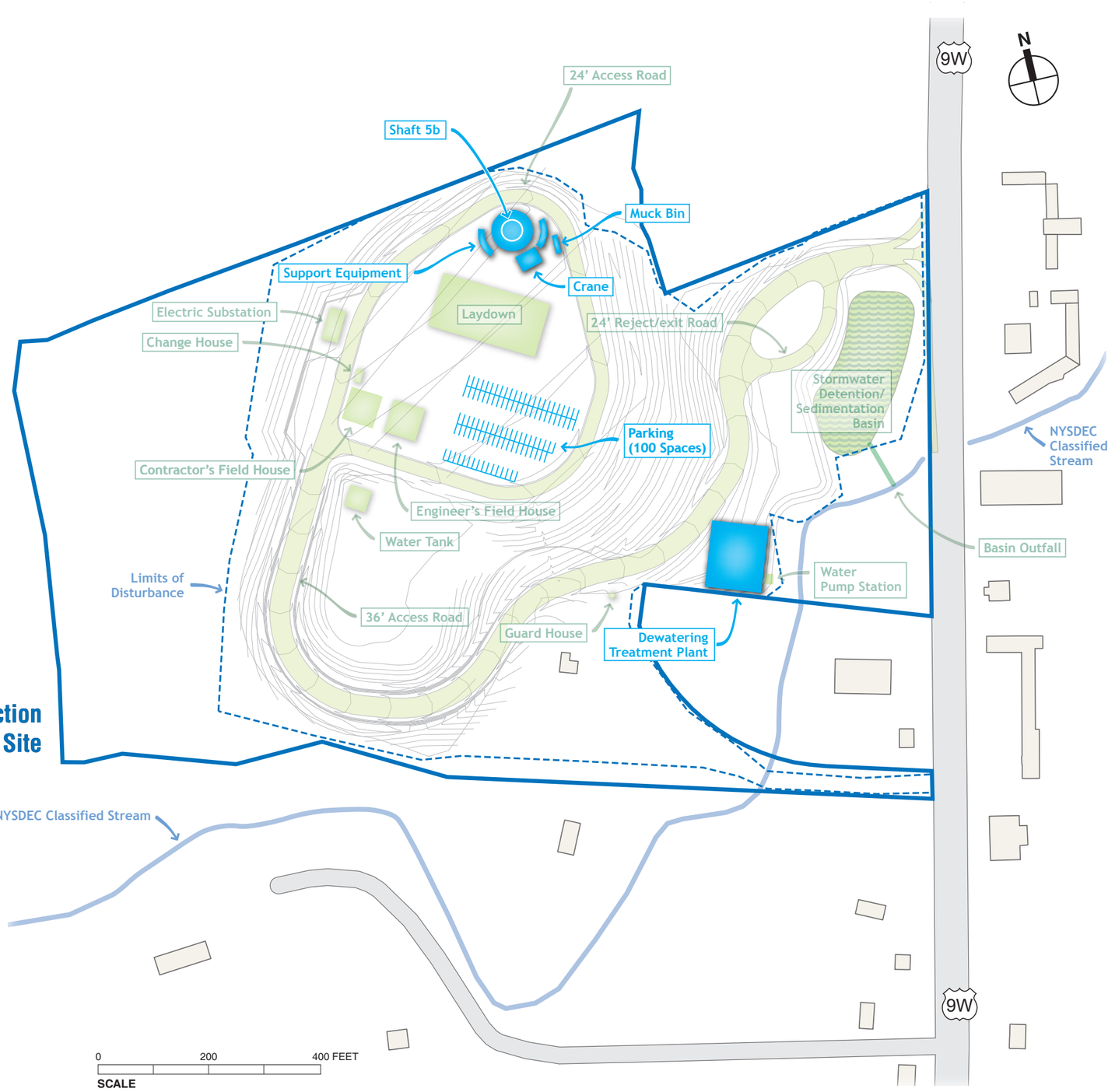


Figure S-11
West Connection Site
Phase 2: Shaft Construction

KEY MAP

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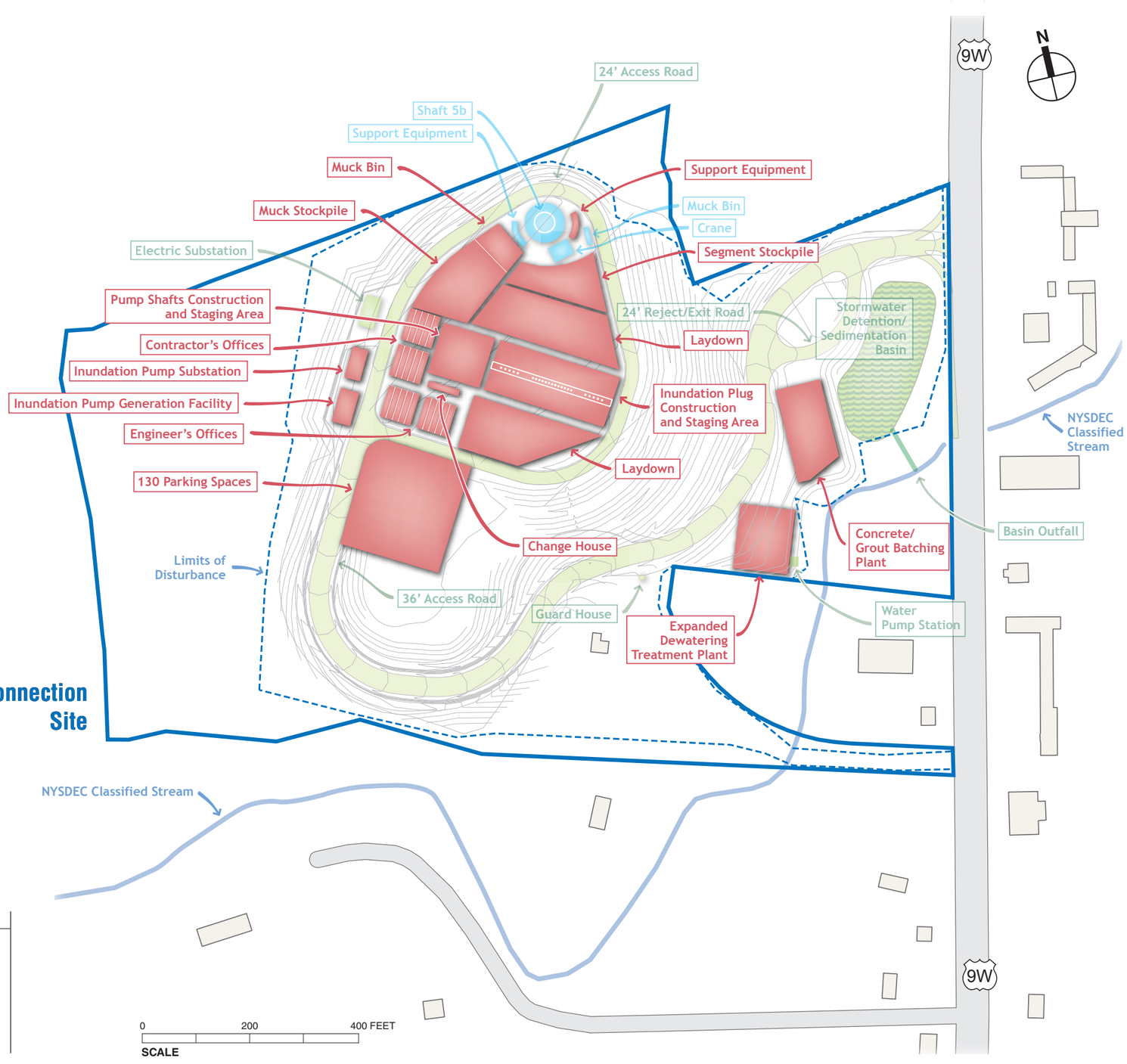


CONSTRUCTION SCHEDULE

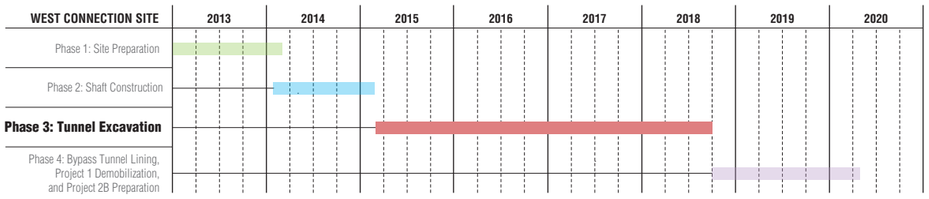


Figure S-12

West Connection Site

Phase 3: Bypass Tunnel Excacation

starter tunnel, a portion of the connector tunnel, and a portion of the inundation plug (see Figure S-5). All the Phase 3 work is expected to be undertaken between the first quarter of 2015 and the third quarter of 2018.

Phase 4: Bypass Tunnel Lining, Project 1 Demobilization, and Preparation for Project 2B is expected to start in the fourth quarter of 2018 and would extend through the second quarter of 2020. Phase 4 would consist of the installation of the final liner through the length of the bypass tunnel, construction of a shaft plug and distribution chamber, the demobilization from the west connection site, and preparation to support Project 2B, Bypass Tunnel Connection and RWBT Inspection and Repair, including Wawarsing. **Figure S-13** shows the potential site layout during Phase 4.

Level of Activity at the West Connection Site (Workers, Trucks, and Equipment)
Table S-1 provides a summary of the number of shifts per day, the number of days per week in which work would take place, work hours, and the length of time each phase is expected to last at the west connection site.

Truck trip estimates would vary over the construction phases, with the greatest amount of truck trips during Phase 3: Tunnel Excavation, when there would be ~~a~~an maximum average of 90 truck trips per day for the duration of the schedule ~~(i.e., 45 trucks, one in and one out of the site totaling two trips per truck)~~.

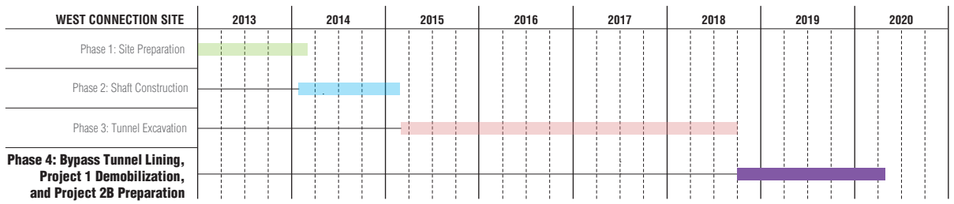
Table S-1
West Connection Site Construction Activity

Phase	Shifts/Day	Days/Week	Work Hours
Phase 1: Site Preparation (One shift for first and last 4 months and two shifts for 6 months)	1 or 2[1]	6	1 Shift: 7 AM to 7 PM 2 Shifts: 7 AM to 11 PM
Phase 2: Shaft Construction (13 months, with 1 month overlap with Phase 1)	3	5	24 hours/day
Phase 3: Tunnel Excavation (except Inundation Plug work) (43 months)	3	5	24 hours/day
Phase 3: Tunnel Excavation (Inundation Plug work) (13 months; longer if fewer than three drill rigs employed)	2	5	7 AM to 11 PM
Phase 4: Bypass Tunnel Lining, Project 1 Demobilization, and Preparation for Project 2B (19 months)	3	5	24 hours/day
Note: [1] During Phase 1: Site Preparation, activities such as demolition, tree clearing, and log hauling would generally occur during one shift, while rock cutting, breaking, blasting, grading, and paving activities would occur over two shifts.			

The number of workers on-site would vary with the various work shifts and would also vary over the construction phases. The peak number of workers on the west connection site per day would occur during Phase 3: Bypass Tunnel Excavation and would total 228 workers (81 workers

KEY MAP

CONSTRUCTION SCHEDULE



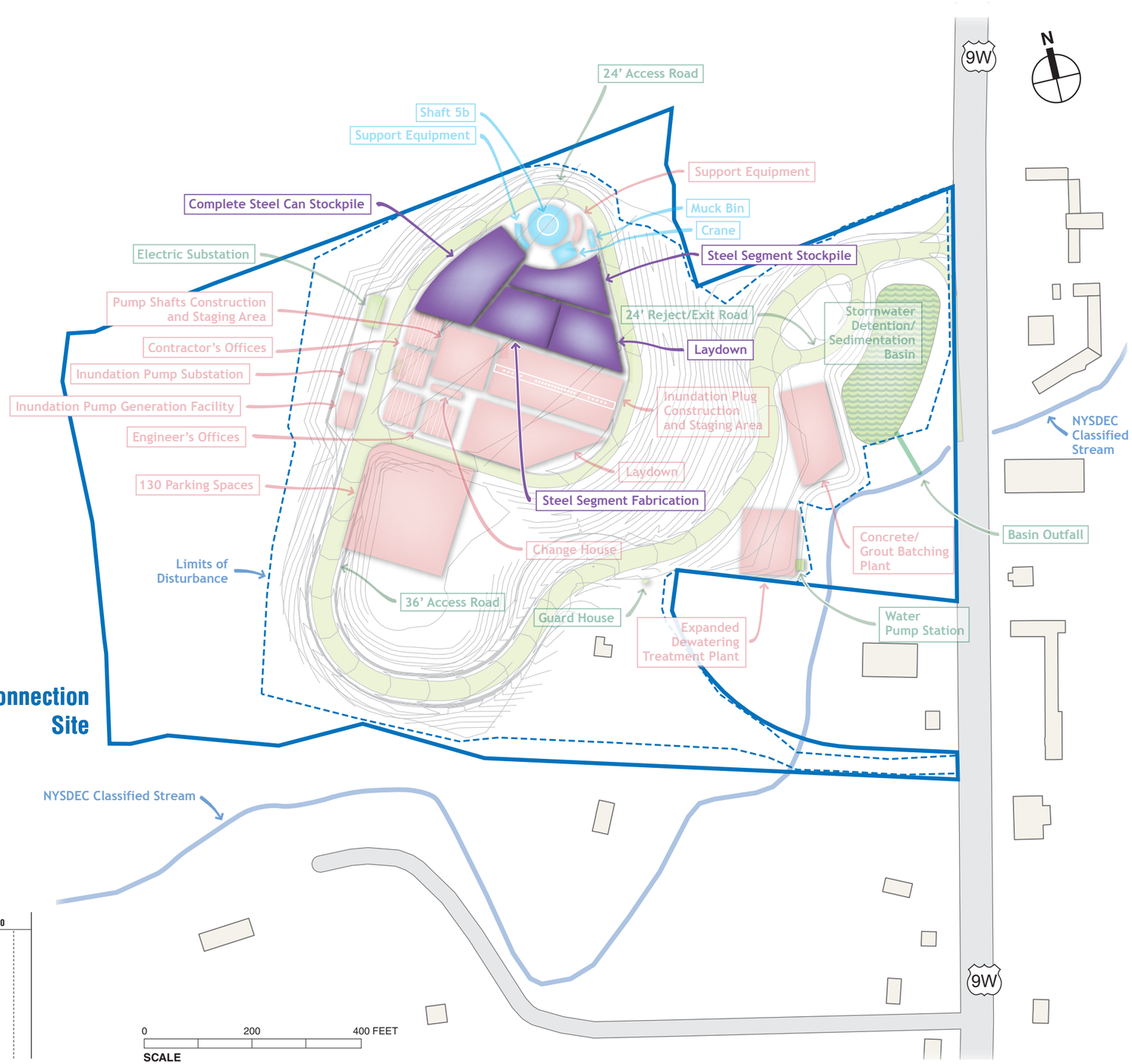


Figure S-13

West Connection Site

Phase 4: Bypass Tunnel Lining

during both the 7 AM to 3 PM and 3 PM to 11 PM shifts and 66 workers during the 11 PM to 7 AM shift).

Description of Project 1 Construction Phases—East Connection Site

Phase 1: Site Preparation would consist of the removal or relocation of certain on-site buildings, trailers, and storage containers that would be on-site in connection with DEP's tunnel and shaft rehabilitation construction effort (see **Figure S-14**).[1] In addition, certain facilities would be constructed in preparation for future construction phases (see **Figure S-15**). It is expected to begin in early 2013 and be complete in the fourth quarter of the same year.

Phase 2: Shaft Construction, which would consist of the construction of a new shaft, would overlap with Phase 1, and is expected to commence in mid-2013 and continue to mid-2015 (see Figure S-15).

Phase 3: Bypass Tunnel Excavation would consist of three main efforts: the construction of the first part of a connector tunnel,[2] the construction of the first part of an inundation plug, and the extraction of the TBM. As described above, the bypass tunnel would be excavated from the west connection site, where the TBM would be launched; the TBM would be extracted at the east connection site at the end of this phase. **Figure S-16** shows the potential site layout during Phase 3. Phase 3 is expected to extend from mid-2015 through the end of the third quarter of 2018.

Phase 4: Bypass Tunnel Lining, Project 1 Demobilization, and Preparation for Project 2B would consist of lining a portion of the bypass tunnel and connector tunnel using concrete, constructing a shaft plug and shaft access chamber, and preparing the site for Project 2B (see Figure S-16). Phase 4 is expected to commence in late 2018 and be complete in early 2019.

Level of Activity at the East Connection Site (Workers, Trucks, and Equipment)

Table S-2 below provides a summary of the number of shifts per day, the number of days per week in which work would take place, work hours, and the length of time each phase is expected to last at the east connection site. Truck trip estimates would vary over the construction phases, with the greatest amount of truck trips generated during Phase 2 ~~1~~: Shaft Construction, when there would be a~~n~~ maximum average of 48 truck trips per day for the duration of the schedule ~~(i.e., 24 trucks, one in and one out of the site totaling two trips per truck)~~.

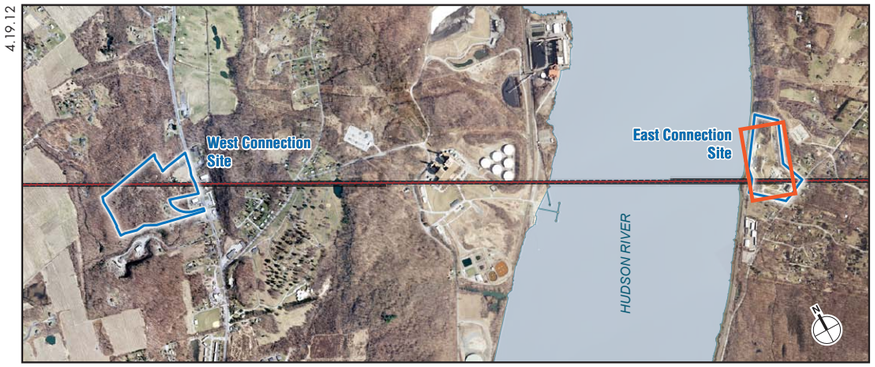
The number of workers on-site would vary with the various work shifts and would also vary over the construction phases. The peak number of workers on the east connection site per day would

[1] The tunnel and shaft rehabilitation work will improve DEP's capability to unwater the tunnel and is expected to be complete in 2013.

[2] The connector tunnel is the relatively short tunnel that would provide the ultimate connection from the bypass tunnel to the existing aqueduct. In this phase, only a portion of the connector tunnel would be constructed. The remaining segment would be constructed during the connection of the bypass tunnel to the existing Delaware Aqueduct (Project 2B).

4.19.12

KEY MAP



CONSTRUCTION SCHEDULE

EAST CONNECTION SITE	2013	2014	2015	2016	2017	2018	2019
Phase 1: Site Preparation							
Phase 2: Shaft Construction							
Phase 3: Tunnel Excavation							
Phase 4: Bypass Tunnel Lining, Project 1 Demobilization, and Project 2B Preparation							

East Connection Site

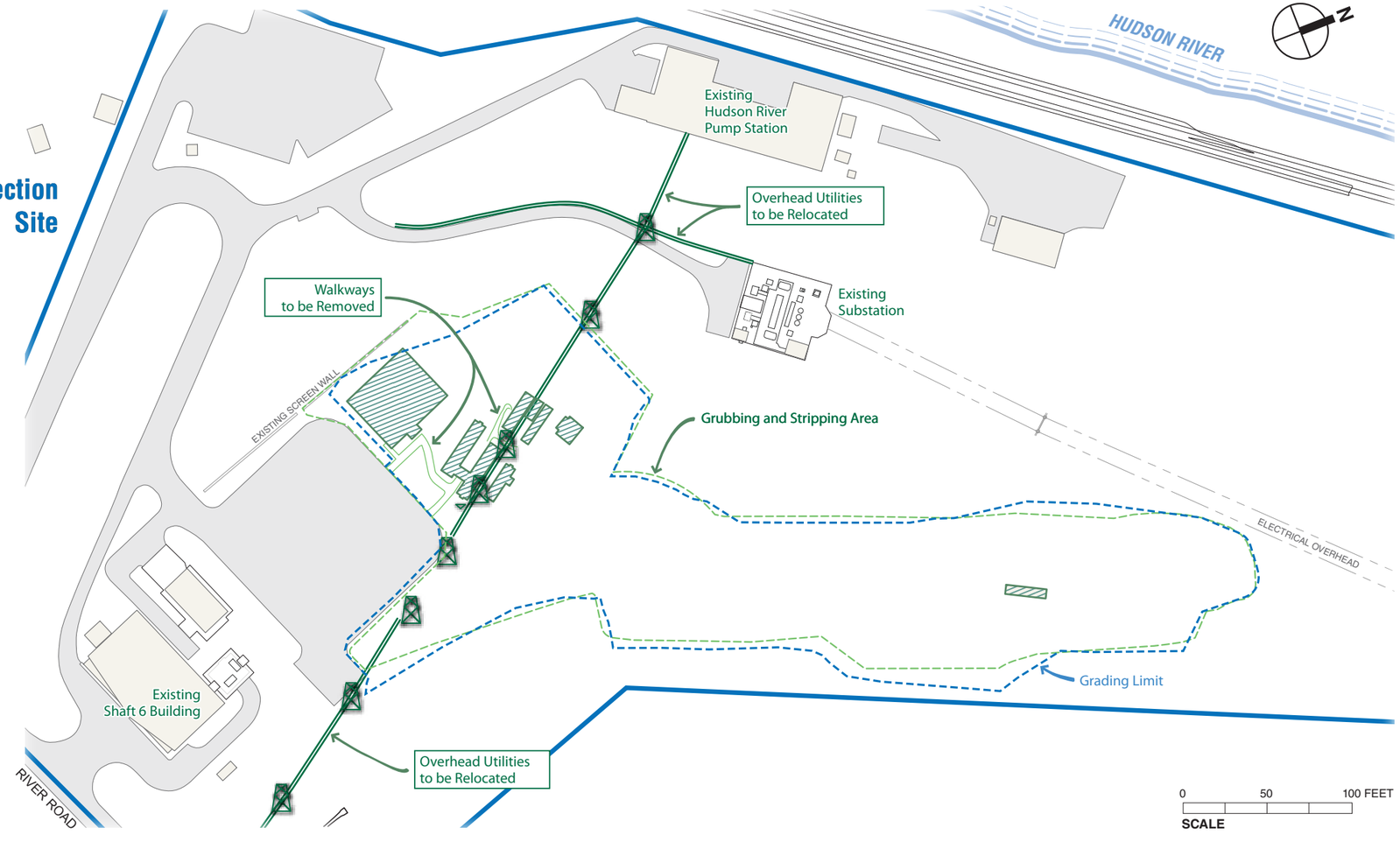


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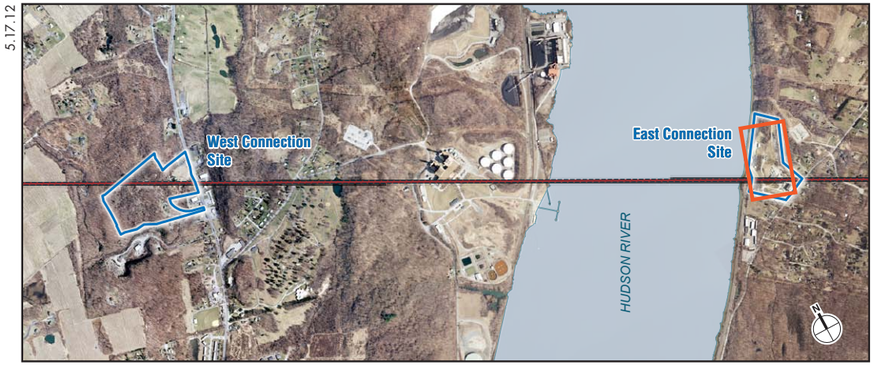
Figure S-14

East Connection Site

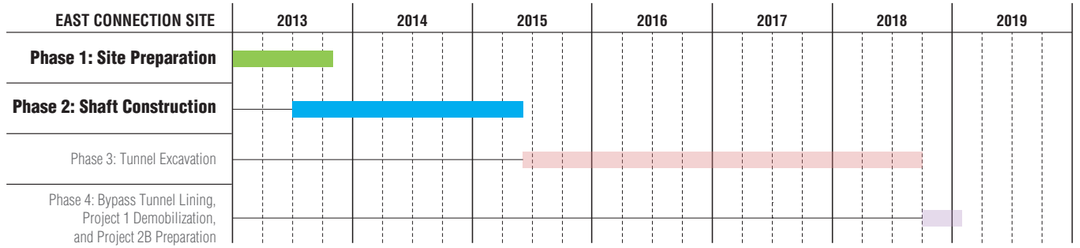
Phase 1: Site Preparation (Demolition and Clearing)

KEY MAP

5.17.12



CONSTRUCTION SCHEDULE



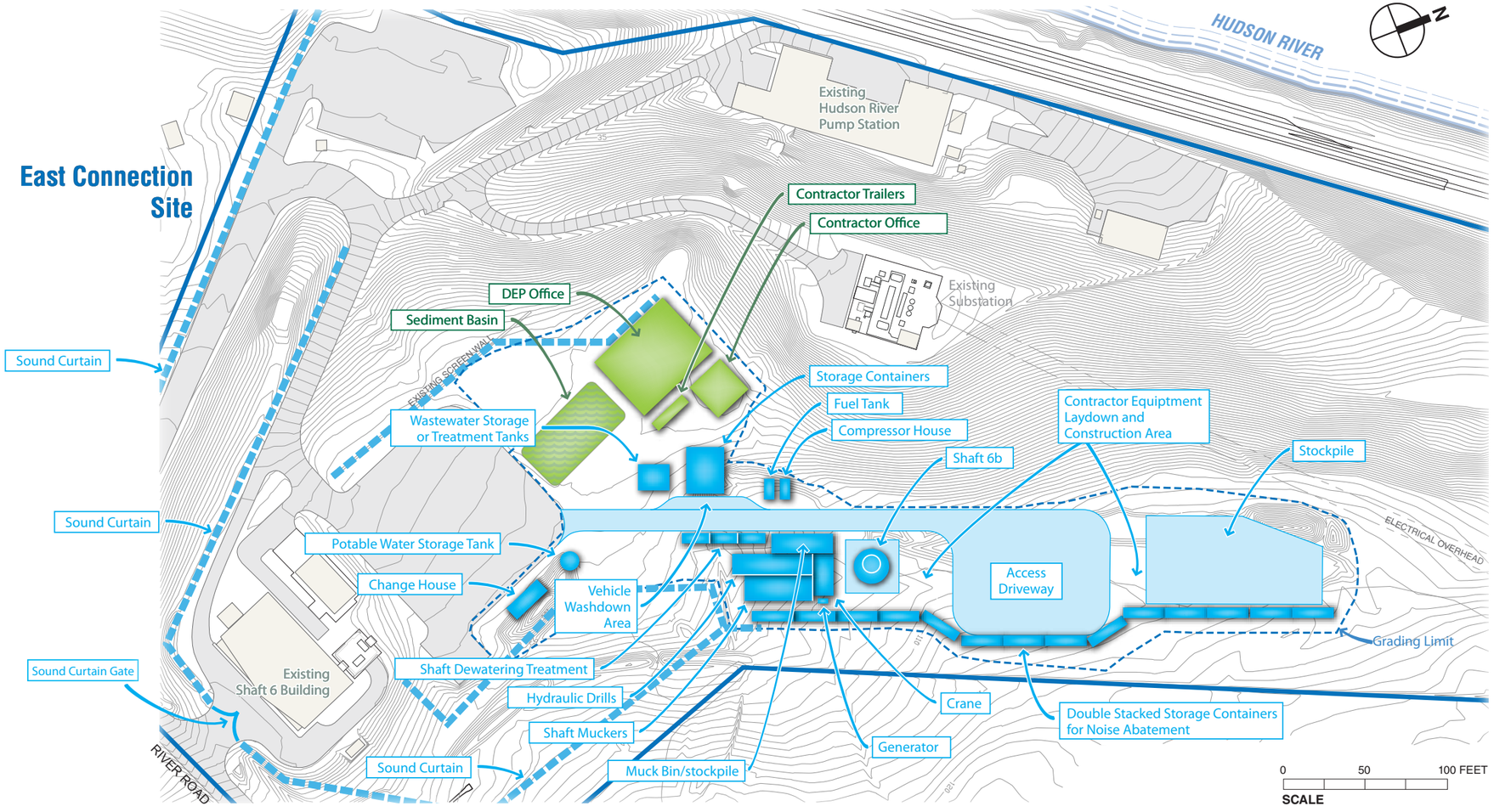


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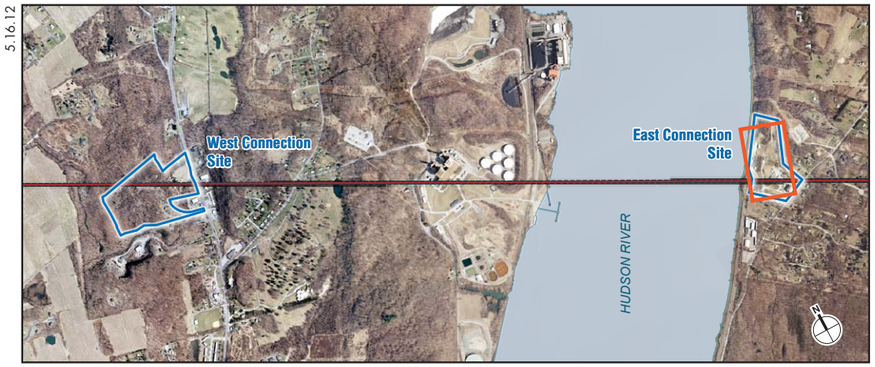
Figure S-15

East Connection Site

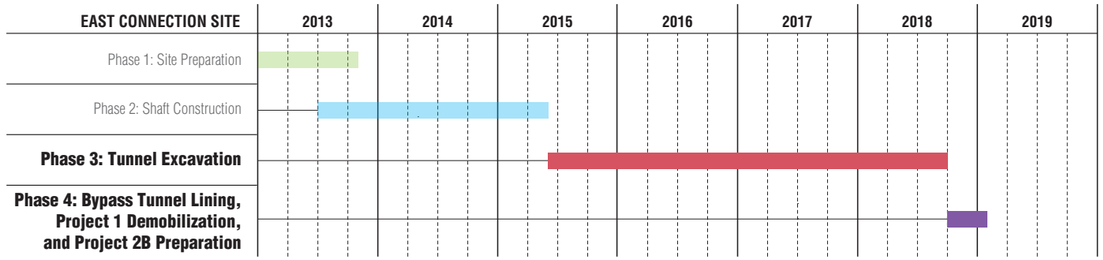
Phase 1: Site Preparation (Site infrastructure) and Phase 2: Shaft Construction

KEY MAP

5.16.12



CONSTRUCTION SCHEDULE



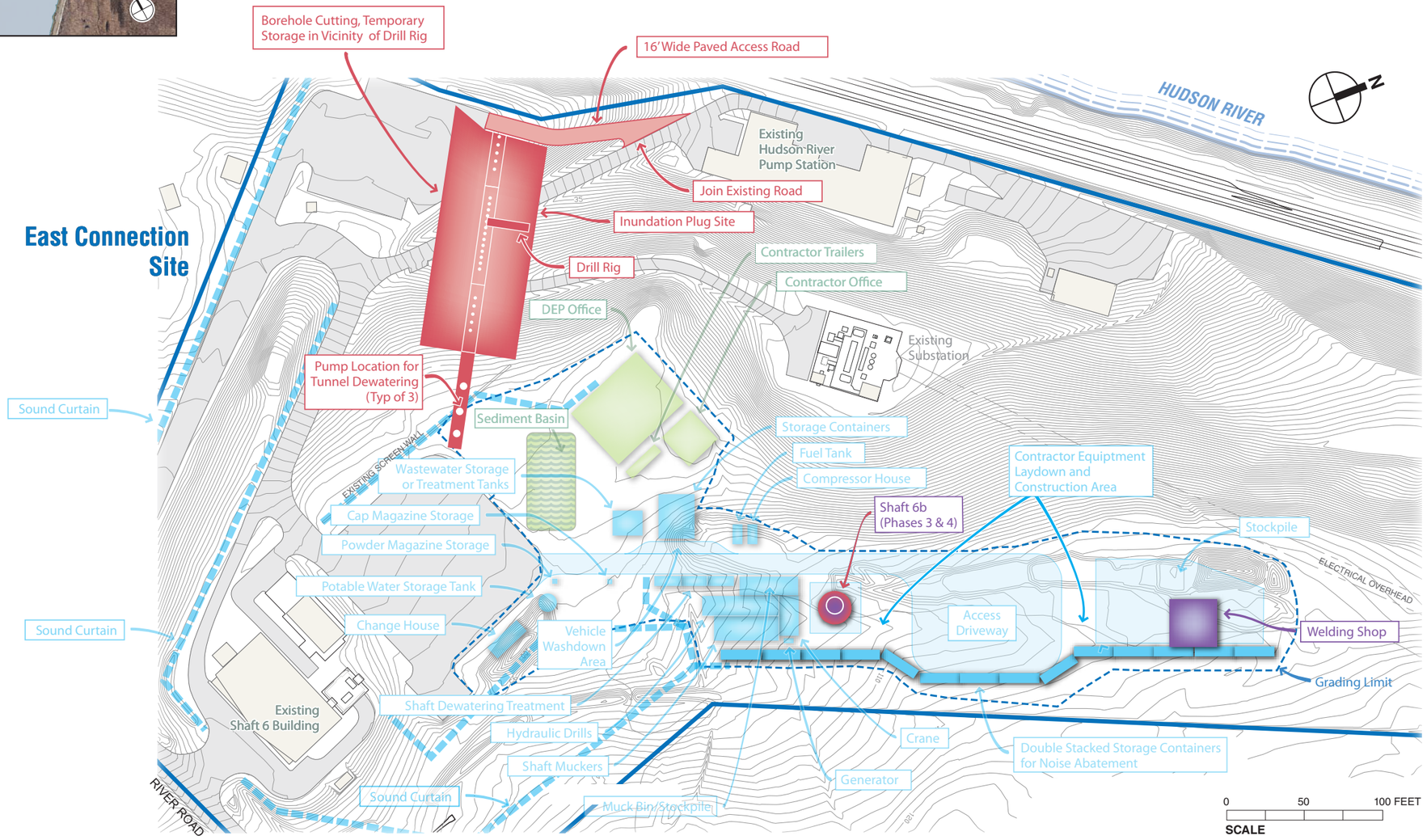


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Figure S-16

East Connection Site — **Phase 3: Bypass Tunnel Excavation and Phase 4: Bypass Tunnel Lining, Project 1 Demobilization, and Preparation for Project 2B**

occur during Phase 2: Shaft Construction and would total 116 workers (58 workers during both the 7 AM to 3 PM and 3 PM to 11 PM shifts).

Table S-2
East Connection Site Construction Activity

Phase	Shifts/Day	Days/Week	Work Hours
Phase 1: Site Preparation (8 months)	1	5	7 AM to ~~3~~ 7 PM[3]
Phase 2: Shaft Construction (23 months)	2	5	7 AM to 11 PM
Phase 3: Bypass Tunnel Excavation (Connector Tunnel and TBM Removal) (Total of 3 months)	3	5	24 hours/day
Phase 3: Bypass Tunnel Excavation (Inundation Plug work) (at least 19 months, longer if fewer than three drill rigs employed)	~~2~~ 1	5	7 AM to ~~11~~ 7 PM
Phase 4: Bypass Tunnel Lining, Project 1 Demobilization, and Preparation for Project 2B (4 months)	3	5	24 hours/day

General Construction Practices

Certain activities would apply throughout Project 1, including community relations, coordination with appropriate governmental and regulatory agencies, and site security. A DEP field representative would be at each connection site throughout the entire construction period. The representative would serve as the contact point for the community and local leaders to voice any concerns about construction activities. Security staff would be on-site 24 hours a day, 365 days a year. DEP staff and a construction management firm contracted by DEP for oversight of contractors will enforce contract stipulations and project requirements and mitigation (within the control of DEP) as included in the FEIS.

Infrastructure and Work Areas

Supporting infrastructure and work areas would be needed at the two connection sites, as summarized in **Table S-3**.

Blasting

West Connection Site. Blasting would be needed intermittently for approximately 3 to 6 months during Phase 1: Site Preparation for site grading. Blasting would also be required for the full duration of Phase 2: Shaft Construction, for a total of between 22 and 25 months. One or two blasts can be expected on a given day. The Town of Newburgh regulates blasting in §66-9 of the

[3] Site preparation would be undertaken in a single daily 8-hour shift; however, the work window is over a 12-hour period from 7 AM to 7 PM.

Town Code. The Town Code limits blasting activity to the hours of 8 AM to 7 PM. The selected contractor would need to apply for a local blasting permit from the Town of Newburgh. A preconstruction survey would be undertaken for all structures and facilities located within 500 feet horizontal distance of the centerline of the west connection site shaft for shaft blasting and 500 feet horizontal distance from the location of surface blasting at the west connection site. Subsidence surveys and preconstruction inspections for these facilities would be undertaken before blasting proceeded at the west connection site.

East Connection Site. Blasting during shaft construction at the east connection site would occur during Phase 2 over a 21-month period, during which one or two blasts can be expected on a given day. The Town of Wappinger Town Code permits blasting activity between the hours of 8:30 AM and 3 PM and requires that notice be given to adjacent property owners 7 days prior to a scheduled blast. The selected contractor and/or licensed blaster would apply for a blasting permit to conduct all necessary blasting activity. A preconstruction survey would be undertaken for all structures and facilities located within 500 feet horizontal distance of the centerline of the east connection site shaft and any additional properties subject to the well monitoring program. Subsidence surveys and preconstruction inspections for these facilities would be undertaken before blasting proceeded at the east connection site.

Lighting Plan

Lighting plans for both the west and east connection sites would be subject to the local town codes and standards as well as operational performance requirements. Where local regulations or specific limits for site lighting are undefined, professional best-practice recommendations would be followed.

Site Security During Construction

Site security would be the contractor's responsibility. Where not already installed, fencing would be erected around the east and west connection work sites. Security gates would be installed at both the main site entrance of the west connection site and the access road used during site preparation.

Sustainable Design Guidelines Related to Construction

Erosion and sediment control practices would be implemented for all construction activities where any excavation, stripping, filling, grading, or earth movement takes place in compliance with state requirements.

Table S-3
Summary of Key Project 1 Elements

Project Element	West Connection Site	East Connection Site
Construction use	Shaft and TBM launch site for bypass tunnel construction.	Shaft and TBM receiving site for bypass tunnel construction.
Stormwater infrastructure	New stormwater management system to include stormwater basin to detain and treat runoff during clearing, grading, site preparation, and shaft and tunnel construction, with discharge to existing on-site stream.	Existing stormwater collection system to be modified to accommodate Project 1 and 2B construction.
Site access, roads, and parking	A new site entrance would be constructed at the northern portion of the site, and a new access road would be constructed from the entrance to the work site. Existing southern driveway to be used in early stages of Phase 1: Site Preparation; upon completion of the new site entrance and access road, existing driveway would provide emergency access. Site security provided. Route 9W reconfigured to provide exclusive left-turn lane for northbound traffic to access site and exclusive right-turn lane for southbound traffic to access the site. New traffic signal to be installed. Internal roadway system to provide access to construction locations. Parking to be provided within the limits of disturbance for maximum number of construction workers, managers and visitors.	Existing driveway to be used during construction of Project 1 and Project 2B. Internal roadway system to be modified to provide access to various work areas. Parking to be provided for maximum number of construction workers, managers, and visitors.
Work and/or office areas	Areas for temporary storage of excavated muck, TBM staging and equipment storage, precast concrete segments and tunnel lining materials, drill rigs and other pieces of equipment, and grout/concrete batching plant. Space also provided for maintenance and for contractor and engineer offices.	Areas for temporary storage of excavated muck, support construction equipment and vehicles, and drill rigs. Space also provided for maintenance and for contractor and engineer offices.
Power supply	Two new electric substations to connect to CHG&E's network. Before substation is in use, power to be supplied by on-site engine generator; later, they would be used for emergency backup power.	Power supplied by new supply feeder from CHG&E. Back-up power generation for life safety reasons only.
Water supply	Potable and non-potable water to be supplied by a combination of a connection to the Town of Newburgh water supply system and recycled water. A well monitoring program would be implemented for the existing well to remain on the west connection site and the well located at 5505 Route 9W, Newburgh. Coordination would be undertaken with the off-site property owner to install a well filter, and well level sensor and provide filter maintenance. If any of the wells being monitored are impacted by the construction of Project 1, such that the well production or the water quality is less than satisfactory, an alternate supply of potable water to each household impacted, up to 300 gallons per household per day, would be provided until the issue has been sufficiently resolved.	Potable water to be trucked in. Non-potable water to be supplied by an existing tunnel riser during Project 1 and from Hudson River during Project 2B. A well monitoring program would be implemented for properties located within 500 feet horizontal distance of the centerline of the east connection site shaft and properties located at 179, 191, 192, 198, 212, 216, 217, 219, and 225 River Road North in the Town of Wappinger. Coordination would be undertaken with these property owners to install well filters, and well level sensors and provide filter maintenance services. If any of the wells being monitored are impacted by the construction of Project 1, such that the well production or the water quality is less than satisfactory, an alternate supply of potable water to each household impacted, up to 300 gallons per household per day, would be provided until the issue has been sufficiently resolved. An alternate option to provide a reliable potable water supply to the east connection site would involve the potential installation of a water main between the site and the Town of Wappinger water supply (United Wappinger Water District [UWWD]), prior to construction of the east connection shaft under Project 1.

Table S-3 (cont'd)
Summary of Key Project 1 Elements

Project Element	West Connection Site	East Connection Site
Pre-blasting surveys	A preconstruction survey would be undertaken for all structures and facilities located within 500 feet horizontal distance of the centerline of the west connection site shaft for shaft blasting and 500 feet horizontal distance from the location of surface blasting at the west connection site. Subsidence surveys and preconstruction inspections for these facilities would be undertaken before blasting proceeded at the west connection site.	A preconstruction survey would be undertaken for all structures and facilities located within 500 feet horizontal distance of the centerline of the east connection site shaft and any additional properties subject to the well monitoring program. Subsidence surveys and preconstruction inspections for these facilities would be undertaken before blasting proceeded at the east connection site.
Wastewater disposal	Sanitary wastewater to be pumped and hauled from site.	Sanitary wastewater to be pumped and hauled from site.
Dewatering treatment and disposal	Dewatering treatment and disposal system to be implemented to control quality of water discharged from shafts and tunnel during construction. During shaft construction, recovered water would be treated and either reused or discharged to the existing on-site stream. During tunnel construction, dewatering pipeline extending along existing rights-of-way and through some private property to convey groundwater infiltrating the RWBT tunnel from the west connection site to new Hudson River outfall (see **Figure S-17**). ~~Two route options to be considered.~~	Dewatering treatment and disposal to be implemented during shaft construction. Existing outfall would be used.
Off-site roadway improvements	New turn signal at the west connection site access road and new travel lanes described above (see "Site access, roads, and parking").	None
Off-site muck disposal	Muck from shaft construction and bypass tunneling activities to be transported off-site. Destination not yet known.	Muck from shaft construction activities to be transported off-site by truck. Destination not yet known.

ES-4.2 PROJECT 2A: WATER SUPPLY SYSTEM AUGMENTATION AND IMPROVEMENT

As discussed above, the Delaware Aqueduct is critical to the New York City water supply system. Shutting down the Delaware Aqueduct during Project 2B would require DEP to first implement Project 2A, which would comprise a number of additional projects to supplement DEP's water supply sources and ready the water supply system for the effects of the shutdown period. To date, DEP has identified and is currently evaluating five supplemental water supply sources that could be activated during the shutdown to ensure the available water supply during the shutdown period. These potential augmentation projects are: Demand Management, Upper Catskill Aqueduct Optimization, Queens Groundwater Reactivation, New Jersey Interconnection, and Nassau County Interconnection.

In addition, during the shutdown period, water flowing into the Delaware watershed reservoirs would not be diverted to the RWBT. Therefore, potential projects may be necessary to accommodate the cessation of flow in the RWBT, since water that would normally flow through the RWBT would flow to the existing basins downstream of the diversion dams.

Figure S-17

West Connection Site: Water Main Extension and Dewatering Pipeline

These projects are varied in scope and location (see **Figure S-18**). DEP is continuing to evaluate these projects to determine the most cost-effective strategies to meet its water supply demands. The projects are in the preliminary stage of facility planning and are conceptual at this time. It is possible that as project planning continues, one or more of the projects identified in this EIS may not move forward and/or additional projects may be identified. As stated above, DEP will undertake a second EIS or a subsequent environmental review, as appropriate, that will provide further details and will quantitatively assess the potential impacts from Project 2A in detail.

Prior to the approval and implementation of any of these projects, additional environmental review as part of a second EIS or a subsequent environmental review, as appropriate, would be undertaken to evaluate and disclose the potential environmental impacts.

DEMAND MANAGEMENT

DEP's policy and experience is that saving water is usually the most cost-effective and environmentally benign method of ensuring an ample supply of water for the region. DEP has previously implemented and is currently implementing a number of water demand management programs including, but not limited to, distribution of water saving kits, implementation of a toilet rebate program, and public educational campaigns. The installation of the city-wide Automated Meter reading (AMR) system, which began in 2008, provides a source of detailed water use information on a customer level. It also enables DEP's Water Leak Notification Program, which can detect unknown leaks by monitoring spikes in usage. In addition, new water use rules took effect on June 22, 2009. The changes address several water quality and leak prevention issues in addition to a number of technical and procedural changes. DEP would continue to develop both short-term and long-term strategies that could reduce demand during Project 2B.

UPPER CATSKILL AQUEDUCT OPTIMIZATION

The goal of the Upper Catskill Aqueduct Optimization project is to increase the carrying capacity of the aqueduct by improving the speed at which water flows. It would consist of three main components: (1) cleaning and/or lining the aqueduct, (2) chemical addition, and (3) constructing and replacing air vents. These components would occur in the section of the aqueduct between the Ashokan and Kensico Reservoirs.

QUEENS GROUNDWATER REACTIVATION

Since 1996, DEP has owned and operated the Queens groundwater supply system that was formerly part of the Jamaica Water Supply Company. At the time of purchase, the groundwater supply system consisted of 68 wells. The well supply has been slowly phased out of operation, and no well has been operated to distribution since 2007. The source of this water is largely the Magothy Aquifer, located approximately 200 feet below sea level.

Projects Proposed to Supplement the DEP Water Supply System

Delaware Watershed Reservoir Improvements

Figure S-18

Water Supply System Augmentation and Improvement

NEW JERSEY INTERCONNECTION

This project would consist of constructing a hydraulic connection between New Jersey and New York City. The proposed interconnection with New Jersey water systems would allow DEP to use excess capacity in the system, when it is available, during the tunnel outage. There is a potential for multiple connections to more than one New Jersey water supply entity.

NASSAU COUNTY INTERCONNECTION

This project would consist of the construction of a hydraulic connection to source water from Nassau County. The proposed interconnections with adjacent Nassau County water systems would allow DEP to use Nassau County's excess well and treatment capacity during the tunnel outage. There is a potential of multiple connections to more than one Nassau County water supply entity.

ES-4.3 PROJECT 2B: BYPASS TUNNEL CONNECTION AND RWBT INSPECTION AND REPAIR, INCLUDING WAWARSING

Project 2B would consist of the connection of the new bypass tunnel to the existing tunnel, and the inspection and repair of the leaking area at Wawarsing and the remainder of the RWBT.

BYPASS TUNNEL CONNECTION

To connect the bypass tunnel to the existing RWBT, the final bypass connector tunnels would be constructed. These connector tunnels would likely be several hundred feet in length and would extend between the shaft and the existing tunnel. Before making the connection, however, flows within the RWBT would be stopped and the tunnel unwatered. As described above, inundation plugs could be constructed to seal off the existing tunnel in the event of excessive inflow from the Hudson River. Initial construction of the inundation plugs would begin during construction of Project 1; if needed, the inundation plugs themselves would then be completed during Project 2B.

It is anticipated that this work would begin in 2020 and between 6 and 15 months would be required to complete the bypass tunnel connection. A range for the duration of Project 2B has been estimated to reflect the potential conditions that may be encountered during this phase of the project. In addition, the start and duration of the work would be dependent on a number of factors: the season, whether the year of commencement is a wet or dry year, and the overall readiness of the water supply system.

Construction activities would occur at the east and west connection sites but would occur primarily underground within the shafts, the RWBT, and the bypass tunnel. Construction activity at the surface is anticipated to be more limited than during Project 1.

RWBT INSPECTION AND REPAIR, INCLUDING WAWARSING

During the period when flows are stopped and after the tunnel has been unwatered, inspections and repairs would be made at the leaking area at Wawarsing and to various areas of the RWBT. It is anticipated that Shafts 1, 2A, 8, and 9 of the Delaware Aqueduct would be used during inspection and repair of the RWBT for ventilation of, or access to, the tunnel.

Methods of repair could range from patching and grouting to repairing or adding sections of interliners, which are permanent liners used to support the tunnel. Further inspections would take place along the entire length of the RWBT to assess if additional repairs are necessary along the length of the approximately 45-mile tunnel.

ES-4.4 BYPASS TUNNEL OPERATION

When the connection and the repairs are completed, water flow would be restored to the Delaware Aqueduct, and water would flow through the RWBT and the newly constructed bypass tunnel. The bypassed portion of the RWBT would no longer be used, and no water would flow through the bypassed section of the RWBT.

No additional workers or substantial vehicle trips would result from the project at the east or west connection sites or within the water supply system once the bypass tunnel is operational. Maintenance of the west connection site would generate only a minimal increase in on-site vehicular activity. These maintenance activities would include security inspections, maintenance of site landscaping, and annual visual inspections of the shaft. Maintenance of the east connection site (Shaft 6) would be similar to existing conditions since this site is in active use by DEP.

WEST CONNECTION SITE

On the west connection site at the conclusion of Project 2B, the construction offices, storage trailers, and construction equipment and support facilities would be removed, and no above-grade structures would remain other than a fence around the below ground shaft. At the entrance to the site, the traffic signal installed for construction would be removed. The northbound left-turn lane would be converted to a painted median opposite the southbound left-turn lane, and southbound right- and left-turn lanes would remain in place. A portion of the interior roadway would be retained to provide future access to shaft 5B should it be necessary; the shaft itself would be capped and then covered with a concrete cover and soil. In the areas not occupied by the internal roadway and the shaft, the site would be restored with a combination of planting meadow habitat, with shrubs and some trees (see **Figure S-19**).

Upon completion of construction (Project 1 and Project 2B), it is possible that DEP would sell tax parcel 8-1-15.3; it is assumed that the existing vacant house on this parcel would be re-occupied and used as a private residential property.

0 100 200 FEET

SCALE

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Figure S-19

West Connection Site: Post Construction Plan

The dewatering pipeline and water main extension would no longer be in use by DEP. If suitable alternative purposes are found for use by the Town of Newburgh, a separate assessment would be conducted by the town.

EAST CONNECTION SITE

At the conclusion of Project 2B, the shaft on the east connection site (Shaft 6B) would be capped with a concrete cover and soil. The construction offices, storage trailers, and equipment would be removed. Both the lower parking area and the upper parking area, as well as the graded surface for the inundation plug, would be removed and areas regraded and replanted. The main site driveway would be retained and would continue to provide access to the Hudson River Pump Station at the lower portion of the site and the Shaft 6 superstructure on the upper portion of the site. The internal driveway providing access to the Shaft 6B area would be retained to allow for any future access to the shaft should it be necessary. Shaft 6B itself would be capped and then covered with a concrete cover and soil, and would not be visible from the property line. A restoration program would be completed for portions of the site, including areas of steep meadow perennials installed on the sloped portions of the site around the substation, pump station, and the existing Shaft 6 building. In addition, the parking area in the southwest corner of the site and other areas north of the pump station garage and north and east of Shaft 6B would be reforested. Certain areas would also be maintained as lawn area to allow for future access (see **Figure S-20**).

If DEP purchases two residences on the east side of River Road (lot 6056-01-302882-0000 and lot 6056-01-319891) to provide nighttime sleeping quarters for the project's construction management staff during the construction period, upon completion of construction (Project 1 and Project 2B), it is anticipated that these properties would be sold as residential parcels.

WAPPINGER CONNECTION TO RWBT

Upon completion of Projects 1, 2A, and 2B, DEP would make available to the Town of Wappinger a connection to the RWBT. ~~This would consist of a tap only~~ An alternate option to provide a reliable potable water supply to the east connection site would involve the potential installation of a water main between the site and the Town of Wappinger water supply (UWWD) prior to construction of the east connection shaft under Project 1. This water main could potentially provide the town with a connection to the RWBT and a long-term source of potable water. The Town of Wappinger will conduct its own environmental analyses, including an analysis of the impact of construction and use of any distribution lines, additional piping, or treatment necessary for the distribution of water within the Town of Wappinger.

ES-4.5 PROGRAM APPROVALS AND COORDINATION

The proposed program would require permits and approvals from federal, state, and local agencies. Anticipated permits and approvals are listed in **Tables S-4 through S-6**, and are organized by project.

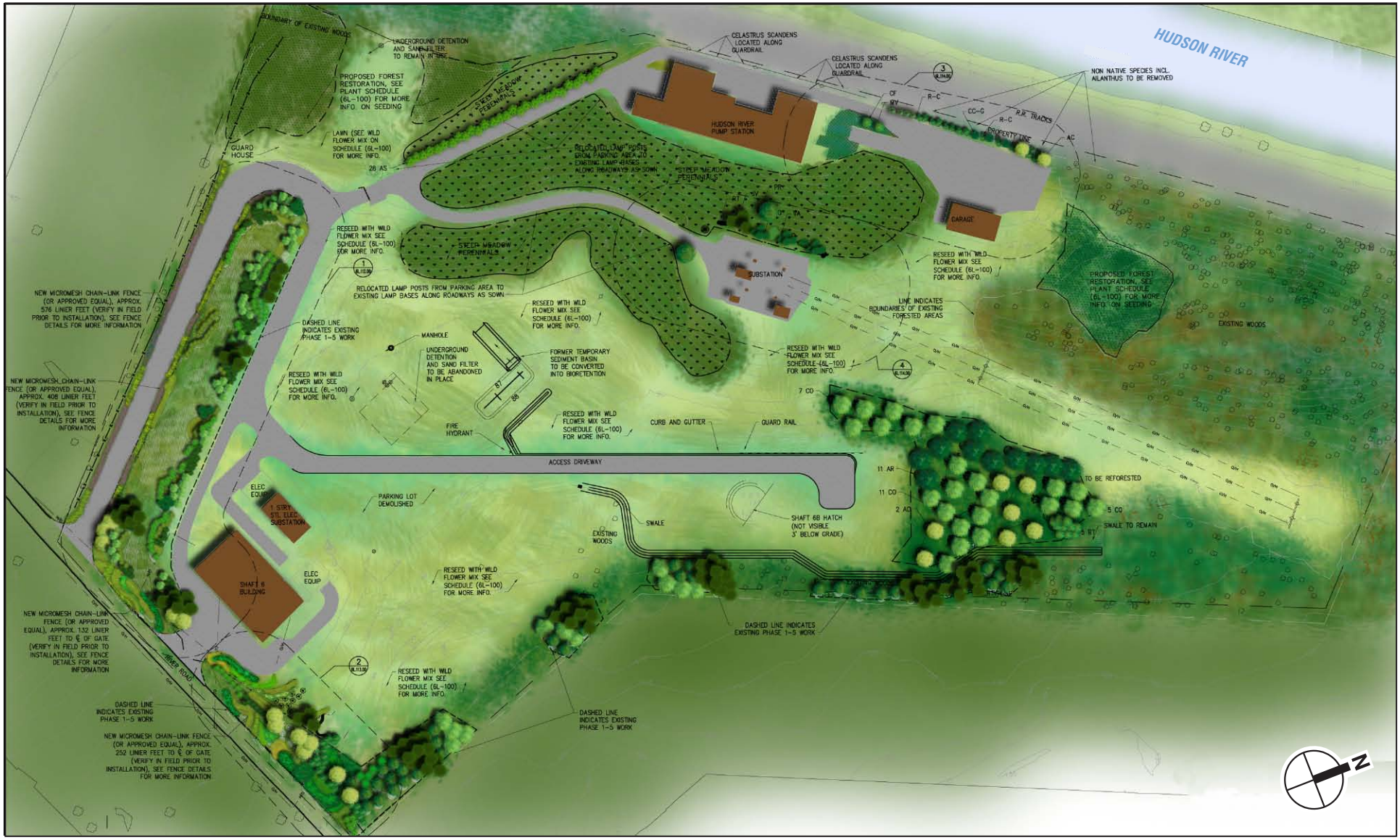

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Figure S-20

East Connection Site: Proposed Site Restoration Plan (Illustrative)

The proposed program would also require the use of eminent domain (N.Y. Eminent Domain Procedure Law; N.Y. Public Authorities Law §§1266, 1267) related to the sub-surface easements needed for the bypass tunnel route. At this time, the exact route of the proposed bypass tunnel has not been determined. When the exact route of the bypass tunnel has been finalized, owners would be contacted to start the process of obtaining subsurface easements.

Table S-4
Potential Major Permits, Approvals, Consultation, and Coordination—
Project 1: Shaft and Bypass Tunnel Construction

4Agency/Entity	Permit/Approval/Consultation/Coordination
FEDERAL	
Coastal Zone Management Act	Projects affecting New York's coastal zone must be consistent with the Coastal Zone Management Act, through the New York State Department of State's Coastal Management Program and approved Local Waterfront Revitalization Plans
U.S. Army Corps of Engineers (USACE)	Individual Permit for water main extension dewatering pipeline, and outfall ~~into Hudson River~~; and construction of the bypass tunnel under the Hudson River. ~~Nationwide Permit 12—Utility Line Activities; Nationwide Permit 7—Outfall Structures and Associated Intake Structures for work in/adjacent to wetlands.~~
United States Fish and Wildlife Service	Consultation under Section 7 of the Endangered Species Act~~; Biological Assessment; Federal Fish and Wildlife Permit~~
Advisory Council on Historic Preservation	Consultation under Section 106 of the National Historic Preservation Act of 1966
STATE	
New York State Department of State (NYSDOS)	Coastal Zone Management Consistency
New York State Department of Environmental Conservation (NYSDEC)	State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity - GP-0-10-001 (Erosion and Sediment Control for construction activities)
	SPDES Multisector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-06-002)
	Individual SPDES Permit or Application Form NY-2C for Industrial Facilities (Shaft dewatering activities requiring discharge to surface water)
	Stormwater Pollution Prevention Plan for Stormwater Discharges
	Section 401 Water Quality Certification
	Protection of Waters Permit for the construction of a dewatering pipeline outfall
	Sanitary Wastewater Pump and Haul Approval
	Air Facility Registration
	Waste Transporter Permit for transport of excavated materials, as necessary
	Hazardous Substance Bulk Storage Registration (Chemical Bulk Storage Registration)
	Petroleum Bulk Storage Facility Registration
	Natural Heritage Program Consultation—consultation to determine potential presence of threatened or endangered species listed in New York State
	~~Consultation to determine potential presence of archaeological and/or historic resources and determine project's potential effects~~
New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP)	~~Application for Use of Lands Underwater~~ Consultation to determine potential presence of archaeological and/or historic resources and determine project's potential effects
New York State Office of General Services (OGS)	~~Approval of Plans for Public Water Supply Improvement~~ Permit for use of state-owned land underwater
New York State Department of Health (NYSDOH)	State Environmental Review Certification for New York State Revolving Fund Approval of Plans for Public Water Supply Improvement
New York State Department of Transportation (NYSDOT)	~~Major Traffic Generator Permit~~
	Special Hauling and Load Overweight Permit
	Highway Work Permit
	Use and Occupancy Permit

Table S-4 (cont'd)
Potential Major Permits, Approvals, Consultation, and Coordination—
Project 1: Shaft and Bypass Tunnel Construction

Agency/Entity	Permit/Approval/Consultation/Coordination
AREA MUNICIPALITIES	
New York City	
Public Design Commission of New York City	Design Commission Approval
Dutchess County	
Dutchess County Planning Approval and Public Works Coordination	Highway Work and Traffic Enhancement Permits; General Coordination
Dutchess County Health Department	Potable Water Supply
Dutchess County Health Department	Sanitary Wastewater Pump and Haul Approval
Orange County	
Orange County Planning Approval and Public Works Coordination	Highway Work and Traffic Enhancement Permits; General Coordination
Orange County Health Department	Potable Water Supply
Orange County Health Department	Sanitary Wastewater Pump and Haul Approval
Town of Wappinger	
Town of Wappinger Planning Board	Site Plan Approval and related permits
Town of Wappinger Zoning Board of Appeals	Area variance for lot coverage; possible additional variances required
Town of Wappinger Building Department	Blasting Permits; Tree Harvesting Registration
Town of Wappinger Highway Superintendent	Highway Work and Traffic Enhancement Permits; General Coordination
Town of Wappinger MS4 Official	Stormwater Pollution Prevention Plan (SWPPP) Acceptance and Monitoring
Town of Newburgh	
Town of Newburgh Planning Board	Site Plan Approval~~; Clearing and Grading Permits~~ and related permits
Town of Newburgh Zoning Board of Appeals	Variance from Noise code; possible additional variances required
Town of Newburgh Building Department	Blasting Permits
Town of Newburgh Highway Superintendent	Highway Work and Traffic Enhancement Permits; General Coordination
Town of Newburgh MS4 Official	Stormwater Pollution Prevention Plan (SWPPP) Acceptance and Monitoring
OTHER ENTITIES	
MTA Metro-North Railroad	~~Coordination~~ Approval for Crossing Tracks
DEP Police	Coordination
Midtown Tracking Ventures	Coordination
CSX Transportation Inc.	Coordination
Central Hudson Gas & Electric	Coordination
Dynegy	Access Agreement

Table S-5
Potential Major Permits, Approvals, Consultation, and Coordination—
Project 2A: Water Supply System Augmentation and Improvement

Regulatory Agency	Upper Catskill Optimization	Queens Groundwater Reactivation	Nassau County Interconnection	New Jersey Interconnection
Federal Emergency Management Agency			X	X
U.S. Army Corp of Engineers				X
U.S. Environmental Protection Agency		X		
U.S. Fish and Wildlife Service	X			X
Delaware River Basin Commission				X
Office of the Governor – New Jersey				X
New Jersey Department of Environmental Protection				X
New York State Department of Environmental Conservation	X	X	X	X
New York State Department of Health	X	X	X	X
New York State Department of State			X	X
New York State Department of Transportation	X	X	X	X
New York State Office of General Services				X
New York State Office of Parks, Recreation & Historic Preservation	X	X	X	X
Nassau County			X	
Nassau County Department of Health			X	
Orange County	X			
Ulster County	X			
Putnam County	X			
Westchester County	X			
Village of New Paltz	X			
City of Newburgh	X			
Town of Marlborough	X			
Village of Cornwall-on-Hudson	X			
Town of New Windsor	X			
Village of Cold Spring	X			
Town of Putnam Valley	X			
Continental Village	X			
City of Peekskill	X			
Town of Cortlandt	X			
Village of Buchanan	X			
Town of Yorktown	X			
Town of New Castle	X			
Village of Pleasantville	X			
Town of Mount Pleasant	X			
New York City Council		X	X	X
New York City Department of Health and Mental Hygiene	X	X	X	X
New York City Department of Transportation		X	X	X
New York City Department of City Planning		X	X	X
New York City Landmarks Preservation Commission		X	X	
New York City Department of Parks and Recreation		X	X	X
New York City Department of Small Business Services			X	X
New York City Design Commission	X	X	X	X
NYC Community Boards		X	X	X
NYC Borough Presidents		X	X	X

Table S-6
Potential Major Permits, Approvals, Consultation, and Coordination—Project 2B: Bypass Tunnel Connection and RWBT Inspection and Repair, including Wawarsing

Agency/Entity	Permit/Approval/Consultation/Coordination
FEDERAL	
U.S. Army Corps of Engineers(USACE)	Joint Permit Application (for ~~Freshwater Wetlands~~ Waters of the United States, related to elimination of leaks)
STATE	
New York State Department of Environmental Conservation (NYSDEC)	Joint Permit Application (for Freshwater Wetlands/Protection of Waters, related to elimination of leaks)
New York State Department of State (NYSDOS)	Joint Permit Application (for Coastal Consistency Concurrence, related to elimination of leaks)
New York State Department of Health (NYSDOH)	Water Supply Improvement Approval
AREA MUNICIPALITIES	
New York City	
New York City Department of Health and Mental Hygiene	Water Supply Improvement Approval
Ulster County	
Ulster County Department of Health	Coordination
Town of Wawarsing	Coordination
Orange County	
Orange County Department of Health	Coordination
Dutchess County	
Dutchess County Department of Health	Coordination
Putnam County	
Town of Putnam Valley	Coordination
Town of Kent	Coordination

ES-5 PROBABLE IMPACTS OF PROJECT 1 CONSTRUCTION AND MITIGATION MEASURES

ES-5.1 MEASURES INCORPORATED INTO PROJECT 1

Since DEP is concurrently undertaking design of the proposed bypass tunnel construction and connection while the EIS was under preparation, many measures have been incorporated into the Project 1 design that have substantially reduced the potential for additional temporary significant adverse impacts resulting from the construction of Project 1. These included the decision to employ inundation plugs at both connection sites instead of constructing additional shafts at each site; limiting work hours at the east connection site for phases of work that do not delay completion of Project 1; limiting the inundation plug installation at the east connection site to one 12-hour shift from 7 AM to 7 PM; limiting truck traffic to and from the east connection site between 11 PM and 7 AM; committing to tree clearing at both connection sites during seasonal periods that would not disturb potential Indiana bat populations; and utilizing connection sites already under DEP ownership or sold to DEP by willing sellers.

In addition, within technical study areas, initial evaluations of potential impacts from the construction of Project 1 were developed, and where potential temporary significant adverse impacts were identified, measures to reduce such impacts were evaluated.

ES-5.2 SUMMARY OF PROBABLE IMPACTS FROM PROJECT 1

The EIS examined the full range of technical areas. Based on the EIS analyses, it was determined that Project 1 would not result in significant adverse impacts on land use, zoning, public policy and open space; visual character; historic and archaeological resources; socioeconomic conditions; community facilities; natural resources and water resources; hazardous materials; air quality; energy and greenhouse gas emissions; infrastructure; solid waste; coastal zone consistency; or public health.

Project 1, Shaft and Bypass Tunnel Construction is expected to result in several predicted temporary significant adverse impacts on traffic and noise in both the west and east of Hudson study areas, and on neighborhood character in the east of Hudson study area while construction activities are under way.

Mitigation measures to reduce these impacts and minimize disruptions to the surrounding communities would be incorporated as part of Project 1 construction. Additional feasible measures that could fully mitigate or further lessen any remaining predicted temporary significant adverse impacts from the construction of Project 1 have been identified (see "Unavoidable Adverse Impacts," below, for a discussion of Project 1 construction impacts that could not be fully mitigated).

Subsequent to the issuance of the DEIS, DEP met with NYSDOT representatives to discuss the proposed mitigation measures. DEP has reached general agreements with NYSDOT on the types of upgrades at the impacted intersections that DEP will fund, and gained concurrence from NYSDOT that these measures will mitigate the temporary significant adverse impacts from Project 1 and 2B construction traffic. However, while the intersection of Route 9W and Fostertown Road would benefit from upgraded controllers and detectors funded by DEP, this intersection would still have an unmitigated predicted temporary significant adverse impact from Project 1 and 2B. Additional signage (including no parking signs) in the east of Hudson study area were also identified as traffic mitigation measures in the FEIS.

As noted in Section 2.13, DEP has committed to an extensive series of noise control measures, which are outlined in the Conceptual Noise Mitigation Plan (CNMP) in Appendix 2.19-2. The CNMP presents from a conceptual standpoint the noise control measures that would be implemented by DEP, its construction management staff, and its contractors as part of Project 1 and Project 2B, RWBT Connection and Repair, including Wawarsing of the proposed program. A goal of the CNMP is to ensure that the proposed program's noise during construction is decreased to the maximum extent practicable and construction noise impacts are minimized to the extent practical and feasible.

The CNMP includes conceptual guidelines for developing noise mitigation in the future when the construction program is formulated in detail, along with some specific noise control measures that can be committed to ahead of time, a performance-based commitment for noise generated by construction of the proposed program, as well as mechanisms for communication with the public about concerns relating to noise from the proposed program. Together, these measures are intended to reduce potential noise impacts resulting from the project to the extent feasible and practicable.

The proactive noise control commitments of the CNMP include source controls, such as quieter backup alarms (where practicable and feasible and as allowed by applicable laws and regulations), maximum noise emission limits for equipment, rubber-lined containers dump truck beds, and scheduling constraints for certain noisy activities. Also included are path controls, such as noise barriers surrounding the east connection site and portable noise barriers surrounding loud stationary construction equipment. Receptor controls are also proposed for some areas in which residents would be eligible for upgrades to bedroom windows facing the construction as well as air-conditioning for such rooms.

The potential impacts and proposed mitigation measures are summarized below in **Table S-7**.

Table S-7
Summary of Project 1
Temporary Significant Adverse Impacts and Mitigation Measures

Technical Area	Potential Impacts		Mitigation Measures		Results	
	West of Hudson	*East of Hudson*	*West of Hudson*	*East of Hudson*	*West of Hudson*	*East of Hudson*
Traffic	Predicted temporary significant adverse impacts at nine signalized approaches (six in AM peak and three in PM peak) at five intersections.	Predicted temporary significant adverse impacts at eight signalized approaches (three in AM peak and five in PM peak) at four intersections.	Signal timing changes, upgrading traffic signal controller and detectors at some intersections, Traffic Management Plan (including outreach/communication plan with towns, schools, police, and other area agencies).	Same as "West of Hudson," plus roadway pavement monitoring on local roads accessed by trucks for east connection site and clearing some vegetation in right-of-way near a few intersections.	All traffic impacts would be fully mitigated, except at intersection of Route 9W and Fostertown Road during AM and PM peak hours.	All traffic impacts would be fully mitigated.
	West of Hudson	*East of Hudson*	*West of Hudson*	*East of Hudson*	*West of Hudson*	*East of Hudson*
Noise	Predicted temporary significant adverse impacts at sensitive receptor locations within the area shown in Figure 2.13-13. ~~two receptor[1] near west connection site: - Pine Road west of Route 9W - 65 Lockwood Lane See **Figure S-21**.~~	Predicted temporary significant adverse impacts at sensitive receptor locations within the area shown in Figure 2.13-14. ~~five receptors[1] near the east connection site: - River Road North at Sky Top Drive - 191 River Road North - 198 River Road North - 217 River Road North - 219 River Road North See **Figure S-22**.~~	Project 1 would comply with DEP's "Notice of Adoption of Rules for Citywide Construction Noise Mitigation," which supplements NYC Noise Control Code. All practical noise control measures would be incorporated. In addition, DEP has committed to extensive noise control measures, outlined in the Conceptual Noise Mitigation Plan (CNMP) in Appendix 2.19-2.	Same as "West of Hudson."	Temporary significant adverse noise impacts could not be fully mitigated.	Same as "West of Hudson."
	East of Hudson		*East of Hudson*		*East of Hudson*	
Neighborhood Character	Temporary significant adverse neighborhood character impact on residences immediately surrounding east connection site from changes to visual character of the east connection site and increases in traffic, lighting, and noise.		See mitigation above for traffic and noise.		Temporary significant adverse neighborhood character impacts could not be mitigated.	
Note: These noise receptors are in residential areas or locations and are representative of other sensitive noise receptors in the immediate study area						

ES-6 PROBABLE IMPACTS OF PROJECT 2A, WATER SUPPLY SYSTEM AUGMENTATION AND IMPROVEMENT

The EIS provides a generic assessment of the Project 2A projects. The potential for the Project 2A projects to result in significant adverse impacts will be assessed in the second EIS or a subsequent environmental review, as appropriate.

ES-7 PROBABLE IMPACTS OF PROJECT 2B, BYPASS TUNNEL INSPECTION AND RWBT CONNECTION AND REPAIR, INCLUDING WAWARSING

This EIS provides a detailed assessment of the potential for Project 2B to result in significant adverse impacts from construction at the west and east connection sites. However, the second EIS or a subsequent environmental review, as appropriate, will assess in detail the potential for impacts from Project 2B construction at Shafts 1, 2A, 8, and 9 (i.e., the tunnel inspection and repair). ~~The second EIS will also assess in detail the potential for a possible intake on the Hudson River on the west side to result in significant adverse impacts on natural resources~~.

ES-7.1 WEST OF HUDSON

The traffic mitigation measures suggested for Project 1 would be equally applicable for Project 2B. The mitigation measures suggested for Project 1 and applied during Project 2B construction would completely eliminate the predicted extended temporary significant adverse traffic impacts in the west of Hudson study area, except at the intersection of Route 9W and Fostertown Road during the AM and PM peak hours, where the proposed mitigation would reduce temporary impacts from Project 2B construction traffic. The mitigation for Project 2B would simply be a continuation of ongoing practices implemented during Project 1.

Construction of Project 2B would have the potential to extend the duration of a predicted temporary significant adverse noise impact in the area ~~represented by the~~ along Pine Road west of Route 9W represented by receptor location 3^{W}.

ES-7.2 EAST OF HUDSON

Project 2B would be expected to extend the temporary significant adverse impact on neighborhood character near the east connection site identified for Project 1.

Like with Project 1, all predicted temporary significant adverse traffic impacts would be fully mitigated.

Construction of Project 2B would have the potential to extend the duration of predicted temporary significant adverse noise impacts at noise sensitive receptors within the area ~~represented by the same five residential receptors~~ that would be affected during Project 1 (as shown in Figure 2.13-14 in Section 2.13, “Noise”).

ES-8 PROBABLE IMPACTS OF BYPASS TUNNEL OPERATION

Operation of the bypass tunnel would not result in any significant adverse impacts.

ES-9 CUMULATIVE EFFECTS OF THE WATER FOR THE FUTURE PROGRAM

Cumulative adverse impacts are two or more individual effects on the environment that, when taken together, compound or increase other environmental impacts, which may then rise to the level of significance. Cumulative adverse impacts can result from a single action or from a number of individually minor but collectively significant actions taking place over a period of time. They may include indirect or secondary impacts, long-term impacts, and synergistic effects.

For the Water for the Future Program, potential cumulative adverse impacts to the extent they can be identified at this time are addressed in the EIS for Project 1, those portions of Project 2B that would occur at the west and east connection sites (i.e., connection), and future operation of the tunnel after repairs.

For example, the greenhouse gas emissions analysis evaluates potential cumulative emissions from the construction of Project 1 and those portions of Project 2B described above.

For the assessment of impacts on water rates, the total cost of Project 1 and those portions of Project 2B described above are included. (However, the second EIS or a subsequent environmental review, as appropriate, will also evaluate the cumulative water rate impact of Project 1 and Project 2).

Additionally, the potential cumulative traffic, air, and noise impacts that could occur from construction on both connection sites are considered in the respective impact evaluations.

The second EIS or a subsequent environmental review, as appropriate, will provide further details on Projects 2A and 2B and will quantitatively assess the potential for cumulative impacts resulting from Project 2 of the proposed program. The second EIS or a subsequent environmental review, as appropriate, will also consider any potential cumulative impacts of the Water for the Future Program.

ES-10 ALTERNATIVES

The EIS considers two categories of alternatives: alternatives to the Water for the Future Program (Projects 1, 2A, and 2B), summarized in **Table S-8**, and alternatives that are specific to Project 1, summarized in **Table S-9**.

For the alternatives to the Water for the Future Program, the alternatives are compared to the proposed program in terms of whether that alternative meets the purpose and need of the proposed program; whether it is feasible and results in lesser or greater risk, cost, and implementation time; whether any additional land would be required to be acquired; and whether the alternative would result in any substantially different environmental effects.

Table S-8
Alternatives to the Proposed Program

Issue	Proposed Program	Alternatives to the Proposed Water for the Future Program						
			Tunnel Repair					
		No Action	Surface Pressure Grouting	Leak Stabilization	Unwatering and Repair with Expanded Project 2A	Modified Project 2B - Completed in Multiple Intervals	Bypass Tunnel in Wawarsing in Addition to Roseton	Third Aqueduct
Purpose and Need	Meets program goals and permanently addresses RWBT leaks and reliability	Does not meet program goals because does not address RWBT leaks and reliability	Does not meet program goals because unlikely to permanently address RWBT leaks and reliability	Does not meet program goals because not proven to permanently address RWBT leaks and reliability	Could meet program goals and permanently address RWBT leaks and reliability	Could meet program goals and permanently address RWBT leaks and reliability	Does not meet program goals because of higher cost to design and construct	Does not meet program goals because of greater time required to design and construct
Feasibility	Feasible	Not feasible	Not feasible	Under investigation	Feasible	Under investigation	Feasible	Feasible
Risk	Acceptable	Much greater than proposed program	Much greater than proposed program	Greater than proposed program	Much greater than proposed program	Under investigation	Similar to proposed program	Greater than proposed program because of additional time required to design and complete
Cost	$2.1 billion	N/A	Less than proposed program	Less than proposed program	Much greater than proposed program	Under investigation	Greater than proposed program	Much greater than proposed program
Time to Complete	8-9 years	N/A	Less than proposed program	Less than proposed program	Greater than proposed program because of longer RWBT shutdown	Under investigation	Similar to proposed program	Much greater than proposed program
Land Acquisition	Necessary for west connection site and possibly for augmentation projects	N/A	Likely less land area needs to be purchased than proposed program, but easements needed on many more properties	Less than proposed program; would not require new shaft sites	Would eliminate land acquisition associated with new shaft sites, but may introduce new land acquisition because of expanded water supply augmentation	Same as proposed program	Greater than proposed program; would require acquisition of properties for additional connection sites	Much greater than proposed program; would require acquisition of numerous shaft sites and subsurface easements
Environmental	Analyzed in first EIS and second EIS or a subsequent environmental review, as appropriate	Possible risk to water supply provided by RWBT	Possibility of contaminating aqueduct, groundwater and surface wetlands with grout	To be analyzed in the second EIS or a subsequent environmental review, as appropriate, if determined to be feasible	Would eliminate impacts associated with new shaft sites, but may introduce new impacts because of expanded water supply augmentation	To be analyzed in the second EIS or a subsequent environmental review, as appropriate, if determined to be feasible	Greater than proposed program; would result in localized impacts at additional connection sites	Much broader range of impacts than proposed program; localized impacts at many new shaft sites

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Table S-9
Alternatives to Project 1

Issue	Project 1 Impacts	Alternatives to Project 1							
		Design Alternatives				Construction Alternatives			Impact Reduction Alternative
		Tunnel Drive Direction	Alternate West Connection Site	Three Shafts at Each Connection Site	No Reception Shaft at East Connection Site, Bury TBM	East Connection Site - Shaft Muck Removal by Barge[1]	East Connection Site - Shaft Muck Removal by Rail[1]	Extended Work Hours and/or Work Week Alternative	
Land Use	No temporary significant adverse impacts	See "Other" below	See "Other" below	See "Other" below	See "Other" below	See "Other" below	Comparable to Project 1	Comparable to Project 1	N/A
Neighborhood Character	Temporary significant adverse impacts (east connection site only)	Impacts would be of longer duration and greater intensity in the area surrounding the east connection site	See "Other" below	Would require additional workers, construction activity, and muck removal, thereby potentially intensifying the neighborhood character impact at the east connection site	See "Other" below	See "Other" below	Comparable to Project 1	See "Other" below	Reductions already achieved to maximum extent practicable through project improvements and mitigation measures
Visual Resources	No temporary significant adverse impacts	See "Other" below	See "Other" below	See "Other" below	See "Other" below	Increased visibility from the Hudson River	Increased visibility from the Hudson River	Comparable to Project 1	N/A
Historic Resources	No temporary significant adverse impacts	See "Other" below	See "Other" below	See "Other" below	See "Other" below	See "Other" below	Comparable to Project 1	Comparable to Project 1	N/A
Socioeconomic Conditions	No temporary significant adverse impacts	Comparable to Project 1	Any alternate west connection site that would require a longer bypass tunnel would result in higher costs	Would result in higher costs	Relative decrease in cost because of eliminating reception shaft; possible increase in cost because of burying TBM and greater construction complexity;	Additional costs associated with design, construction, and operation of the wharf	Additional costs associated with design, construction, and operation of the rail connection	Construction labor costs would be higher	N/A
Community Facilities	No temporary significant adverse impacts	See "Other" below	Comparable to Project 1	See "Other" below	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	See "Other" below	N/A
Natural Resources	No temporary significant adverse impacts	A greater portion of the east connection site would be required for staging and construction activities, necessitating additional clearing and grading	See "Other" below	See "Other" below	See "Other" below	See "Other" below; would introduce in-water natural resource impacts	Comparable to Project 1	Comparable to Project 1	N/A
Hazardous Materials	No temporary significant adverse impacts	Comparable to Project 1	See "Other" below	See "Other" below	See "Other" below	See "Other" below	Comparable to Project 1	Comparable to Project 1	N/A
Transportation	Temporary significant adverse impacts at several locations (west and east connection sites)	See "Other" below	See "Other" below; would result in greater traffic impacts on local roads	See "Other" below	See "Other" below	Potential reduction in truck trips from Project 1 at the east connection site (during Phase 2: Shaft Construction); however, temporary significant adverse traffic impacts would still occur	Comparable to Project 1	See "Other" below	Reductions already achieved to maximum extent practicable through project improvements and mitigation measures
Air Quality	No temporary significant adverse impacts	See "Other" below	See "Other" below	See "Other" below	See "Other" below	See "Other" below	Comparable to Project 1	See "Other" below	N/A
GHG/Energy	Consistent with PlaNYC goals	Comparable to Project 1	Any alternate west connection site that would require a longer bypass tunnel would result in higher GHG emissions	Would result in higher GHG emissions	Relative decrease in GHG emissions because of eliminating reception shaft; possible increase in GHG emissions because of burying TBM and greater construction complexity;	Higher GHG emissions because of construction and operation of the wharf	Higher GHG emissions because of construction and operation of the rail connection	Comparable to Project 1	N/A
Noise	Temporary significant adverse impacts at several locations (west and east connection sites)	See "Other" below	See "Other" below	See "Other" below; would result in greater noise impacts	See "Other" below	See "Other" below	Comparable to Project 1	See "Other" below	Reductions already achieved to maximum extent practicable through project improvements and mitigation measures
Infrastructure	No temporary significant adverse impacts	See "Other" below	See "Other" below	See "Other" below	See "Other" below	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	N/A
Solid Waste	No temporary significant adverse impacts	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	N/A
CZM	No temporary significant adverse impacts	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	Comparable to Project 1	Potential issues with compatibility of wharf with other water-related uses	Comparable to Project 1	Comparable to Project 1	N/A
Public Health	No temporary significant adverse impacts	See "Other" below	See "Other" below	See "Other" below	See "Other" below	See "Other" below	Comparable to Project 1	See "Other" below	N/A
Other	N/A	Would increase impacts and/or need for project improvements at the east connection site, and reduce impacts/need for improvements at the west connection site	Could have localized impacts or require project improvements at the alternate west connection site	Could increase impacts and/or need for project improvements at both connection sites	Would reduce but not eliminate localized impacts and/or need for project improvements in the vicinity of the east connection site -- an inundation plug would still be needed at this location; would increase impacts and/or need for project improvements at the west connection site	Would reduce but not eliminate impacts and/or need for project improvements associated with truck trips, and could introduce new impacts/need for project improvements associated with wharf	N/A	Effects and impacts from construction activities would occur over longer work hours and on Saturdays at both connection sites	N/A

Note: [1] For West Connection Site – Shaft and Tunnel Muck Removal by Barge or Rail, issues would be comparable but still require truck to travel through local streets

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For the alternatives to Project 1, the alternatives are compared to Project 1 for the full range of environmental effects discussed in the EIS.

ES-11 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable significant adverse impacts are defined as those that meet the following two criteria:

- There are no reasonably practicable mitigation measures to eliminate the impacts; and
- There are no reasonable alternatives that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts.

As discussed above, construction of Projects 1 and 2B is expected to result in temporary significant adverse impacts on traffic (both east and west of Hudson study areas), noise (both east and west of Hudson study areas), and neighborhood character (east of Hudson study area near the east connection site). In some cases these temporary significant adverse impacts could not be fully mitigated.

The second EIS or a subsequent environmental review, as appropriate, will also summarize the potential for the project to result in unavoidable adverse impacts from the Water for the Future Program since a determination of unavoidable significant adverse impacts from Project 2A and from certain aspects of Project 2B cannot be made at this time.

ES-11.1 NEIGHBORHOOD CHARACTER

During construction of both Project 1 and 2B, the changes to visual character as well as the increases in traffic, lighting, and noise would temporarily adversely affect the neighborhood character near the east connection site. In particular, residences immediately surrounding the construction site would experience increased activity and light, along with temporary significant adverse noise impacts. Therefore, near the east connection site, construction of Project 1 and 2B is expected to result in a temporary significant adverse impact on neighborhood character. However, these impacts to neighborhood character would be temporary and would not be expected to result in disruptions to neighborhood character once construction is complete. Since these temporary adverse impacts could not be fully mitigated, the impact on neighborhood character in the east of Hudson study area near the east connection site from the construction of Project 1 and 2B would be an unavoidable temporary significant adverse impact.

ES-11.2 TRANSPORTATION

Mitigation measures would reduce temporary impacts from Project 1 and 2B construction traffic at the intersection of Route 9W and Fostertown Road in the west of Hudson study area during the AM and PM peak hours but would not fully mitigate the impact. Therefore, this impact is an unavoidable temporary significant adverse impact from the construction of Projects 1 and 2B.

ES-11.3 NOISE

DEP examined the potential off-site noise impacts from the expected construction activities in each phase of construction, and undertook evaluations of a range of potential measures to eliminate or reduce those impacts. As a result, for both the west of Hudson and east of Hudson study areas, all practical noise control methods would be implemented as part of the project. In addition, DEP will implement a Conceptual Noise Mitigation Plan (CNMP), which presents, from a conceptual standpoint, the noise control measures than would be implemented by DEP and its contractors as part of Project 1 and Project 2B of the proposed program. A goal of the CNMP is to ensure that the proposed program's noise during construction is decreased to the maximum extent practicable. The remaining temporary significant adverse noise impacts at residents adjacent to both connection sites could not be fully mitigated, and are identified as unavoidable temporary significant adverse impacts from the construction of Projects 1 and 2B.

ES-12 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Construction and operation of the proposed program would involve the use of various construction materials, materials for operation and maintenance, fuels and energy for construction and operation, and the land area for Project 1, Project 2A, and Project 2B. Some of these materials that would be used for the proposed program are nonrenewable resources and are considered irretrievably and irreversibly committed, because reuse is not possible or is highly unlikely.

Construction materials include concrete and other materials that would be used to construct the shafts on the west and east connection sites and the bypass tunnel. Maintenance materials include any materials that may be used in final maintenance of the west and east connection sites. During construction, fuel would be used for operation of construction equipment (e.g., various trucks, the TBM, cranes, front end loaders, etc.). The RWBT and bypass tunnel themselves do not require electricity to deliver water from the Rondout Reservoir to the West Branch Reservoir since the water supply system relies on gravity.

Without the Water for the Future Program, however, the RWBT would continue to leak in both the Roseton and Wawarsing areas, and additional leaks along the RWBT could occur. With the proposed program in place, DEP would be able meet its mandate to provide safe and reliable transmission of drinking water from the watershed in sufficient quantity to consumers to meet all current and future water demands.

No potential significant irreversible or irretrievable resources impacts are expected. ✷