

# CHAPTER 6: E. 59<sup>TH</sup> STREET/SECOND AVENUE SHAFT SITE

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## 6.1 PROJECT DESCRIPTION

### 6.1.1 Introduction

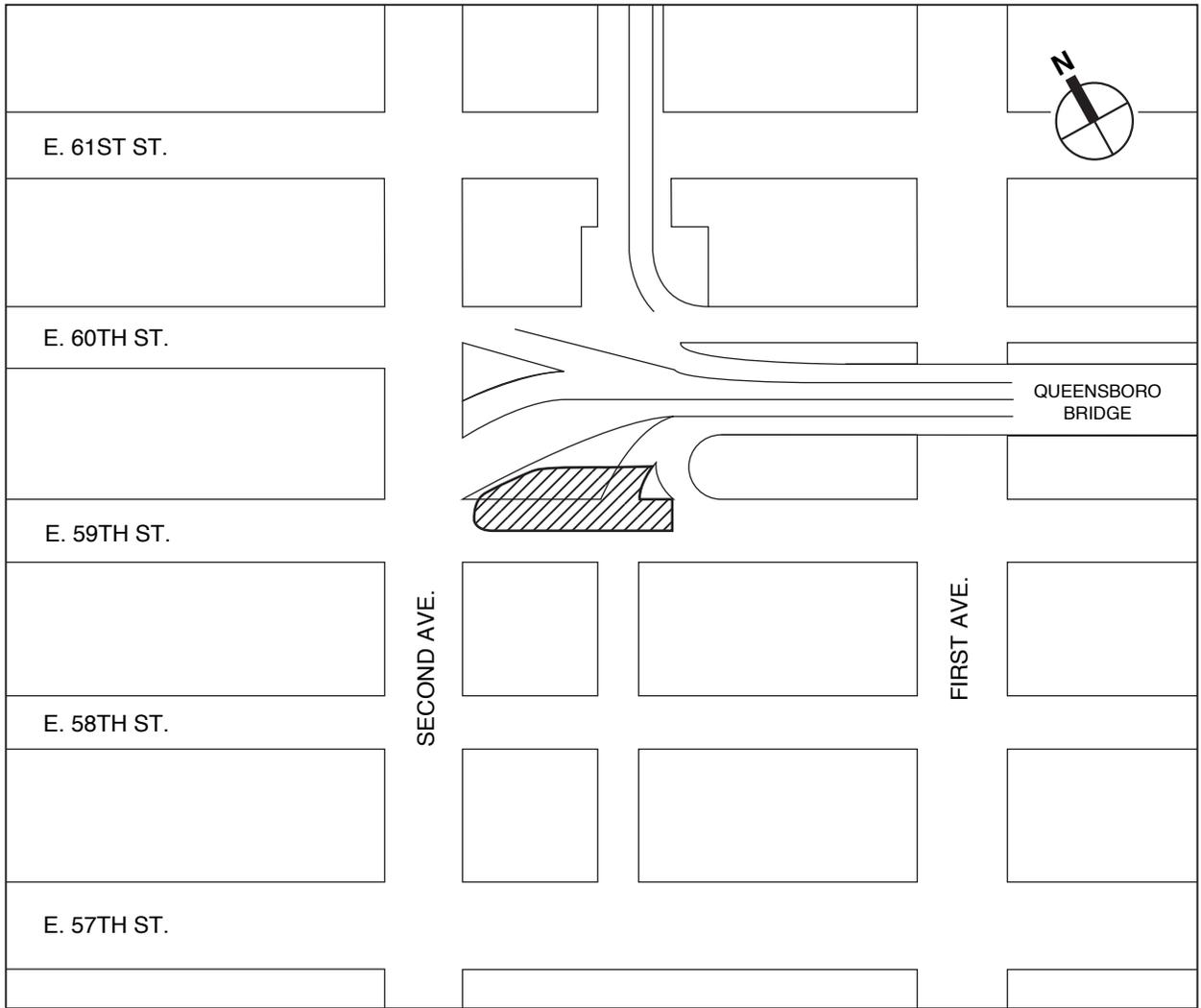
The New York City Department of Environmental Protection (NYCDEP) is proposing to construct a vertical water supply shaft, Shaft 33B, to bring water from City Tunnel No. 3 to the local water distribution system in East Midtown and the Upper East Side in Manhattan. Chapter 2 of this EIS, “Purpose and Need and Project Overview,” describes the purpose and need for Shaft 33B. As discussed in Chapter 2, this new water shaft is needed in the general vicinity of the northeastern portion of the New York City water distribution system’s Middle Intermediate Pressure Zone (MIPZ), which is roughly bounded by Tenth Avenue to the west, the East River to the east, 34<sup>th</sup> Street to the south, and approximately 54<sup>th</sup> Street to the north. The shaft would provide water to the MIPZ and to the adjacent water pressure zone, the Northern Intermediate Pressure Zone (NIPZ). NYCDEP has identified a preferred location for Shaft 33B, at the northwest corner of E. 59<sup>th</sup> Street and First Avenue, as well as three alternative feasible Shaft Site locations.

This Chapter addresses the potential environmental impacts associated with the construction and operation of Shaft 33B at the alternative Shaft Site location of E. 59<sup>th</sup> Street and Second Avenue (the “E. 59<sup>th</sup> Street/Second Avenue Shaft Site”). This Section presents an overall description of the E. 59<sup>th</sup> Street/Second Avenue Shaft Site (Section 6.1.2), the proposed site layout of Shaft 33B at the site (Section 6.1.3), the construction activities that would be undertaken at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site to construct Shaft 33B (Section 6.1.4), activation and operation (Section 6.1.5), and the required permits and approvals for this site (Section 6.1.6). The following Sections of this Chapter, Sections 6.2 through 6.17, analyze the potential environmental impacts related to the construction and operation of Shaft 33B at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site.

The water main connections that would connect the E. 59<sup>th</sup> Street/Second Avenue Shaft Site to the existing water distribution system via the Third Avenue trunk main are also described in Section 6.1, and the potential environmental impacts associated with construction and operation of those water main connections are considered in Sections 6.2 through 6.17.

### 6.1.2 Description of E. 59<sup>th</sup> Street/Second Avenue Shaft Site

The E. 59<sup>th</sup> Street/Second Avenue Shaft Site is located on the north side of E. 59<sup>th</sup> Street between First and Second Avenues (Figure 6.1-1). The site is City-owned and is located within an area adjacent to the Queensboro Bridge (Block 1434, Lot 1) that is mapped street. The site also extends into the northern lane of E. 59<sup>th</sup> Street. The site is adjacent to the Queensboro Bridge (Bridge) as it ramps up from Second Avenue. The site extends under an elevated Bridge access ramp to the upper level of the Bridge that crosses E. 59<sup>th</sup> Street, to the curved on-ramp to the lower level of the Bridge from E. 59<sup>th</sup> Street.



NOT TO SCALE

**Legend:**

 Site Boundary



NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3  
 STAGE 2-MANHATTAN LEG  
 E. 59TH STREET / SECOND AVENUE SHAFT SITE

SITE LOCATION

FIGURE 6.1-1

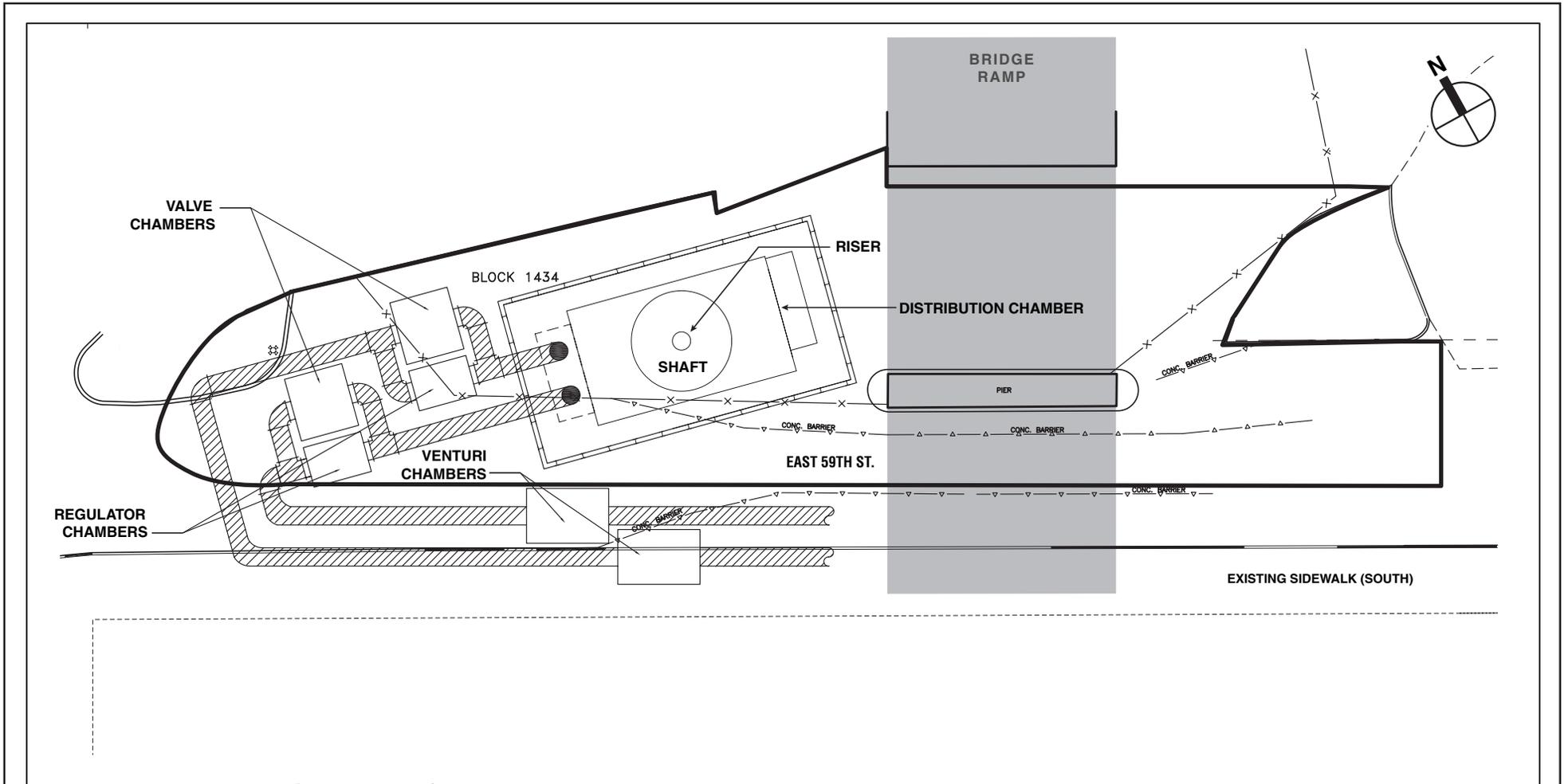
This alternative Shaft Site is currently in use by the New York City Department of Transportation (NYCDOT) for construction activities related to the ongoing rehabilitation of the Queensboro Bridge. NYCDOT has installed temporary fencing and concrete barriers along the edges of the site and on E. 59<sup>th</sup> Street near the site, and is using the alternative Shaft Site for equipment and parked vehicles.

Construction of Shaft 33B at this alternative Shaft Site would be constrained by the site's irregular shape and its location partially beneath a Queensboro Bridge access ramp. In addition, a sensitive Con Edison oil-o-static line would need to be relocated by Con Edison prior to beginning shaft excavation at this site. Due to the site's irregular shape and the presence of the oil-o-static line, the E. 59<sup>th</sup> Street/Second Avenue Shaft Site is not large enough to accommodate two risers. As described in Chapter 2, risers are the vertical pipes that would bring water from City Tunnel No. 3 through the shaft to the surface water distribution system. Providing two risers at Shaft 33B is a critical goal of the project. In addition, Con Edison's relocation of the oil-o-static line prior to construction of Shaft 33B at this site would delay the initiation of Shaft 33B construction by approximately one year. Delays to the construction schedule might mean that rock excavated from this alternative Shaft Site cannot be removed through City Tunnel No. 3, and must be removed by truck from the alternative Shaft Site. If all excavated rock must be removed from this site, this would further delay completion of the shaft at this location. These construction issues are described in more detail in Section 6.1.4 below.

### 6.1.3 Location of Shaft Components on the E. 59<sup>th</sup> Street/Second Avenue Shaft Site

As described in Chapter 2, Shaft 33B would consist of a vertical shaft, approximately 450 feet deep, which would house a single riser pipe to bring water from City Tunnel No. 3 up to the neighborhood water distribution system. At the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, only one riser could be provided due to space constraints. (Because of the presence of multiple underground oil-o-static lines beneath E. 59<sup>th</sup> Street near this site, the chamber cannot be widened beyond 26 feet.) As detailed in Chapter 2, in addition to the riser pipes, Shaft 33B would contain several other below-grade structures required for distribution of water from City Tunnel No. 3 to the local distribution system. These would include two underground chambers at the shaft, the riser valve chamber and the distribution chamber. Above the shaft, two hatchways would provide access to these underground chambers. A 10-foot-high air vent, 14 inches in diameter, would be located permanently on the site (above ground) to provide air into the shaft for maintenance workers, and two standard three-foot-high hydrants would provide air relief from the piping during activation. These hydrants could also be used for fire protection.

Figure 6.1-2 illustrates the potential location of these project elements at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site. As shown in the figure, the 25-foot-wide shaft would be located on the western portion of the site, just west of the elevated Bridge ramp. Near the surface, the shaft would pass through the underground distribution chamber, approximately 26 feet by 45 feet in size and approximately 3 feet below the surface. The riser valve chamber would be located directly beneath the distribution chamber.



NOT TO SCALE

**Legend:**

- Site Boundary
- Building Line
- X- Existing Fence
- == Curbline
- ▨ Cofferdam
- ▽- Existing Concrete Barrier

NOTE: This figure has been updated for the Final EIS



NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3  
 STAGE 2-MANHATTAN LEG  
 E. 59TH STREET / SECOND AVENUE SHAFT SITE

CONCEPTUAL SITE LAYOUT

FIGURE 6.1-2

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Two 48-inch water main connections would extend from the shaft, continuing under the street to connect to a 30-inch trunk main under Third Avenue. Although only one riser could be constructed at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site because of the narrow width of the distribution chamber, this would not preclude provision of two water mains. Two water mains would still be required to service both the MIPZ and the NIPZ. As described in Chapter 2 and in Section 5.1, “Project Description,” in Chapter 5, “Water Main Connections,” the specific route for the water main connections has not yet been determined. The water main route will be selected by NYCDEP after selection of the Shaft Site, for design and construction by the New York City Department of Design and Construction (NYCDDC). NYCDDC is the agency that implements the design and construction of water mains in New York City streets.

Similar to the preferred Shaft Site, water main connections from this alternative Shaft Site could follow many possible routes to the Third Avenue trunk main. For purposes of the EIS, it was assumed that the same potential routes would be followed as for the preferred Shaft Site (described in Section 5.1). These three potential water main routes were developed to evaluate the potential environmental impacts that might occur from water main construction on any selected route in the future. For the preferred Shaft Site, these three water main connection routes are: (1) a First Avenue route, traveling down First Avenue and then over to Third Avenue via E. 55<sup>th</sup> and E. 56<sup>th</sup> Streets (“the reasonable worst-case route”); (2) a Sutton Place route, traveling over to Sutton Place on E. 59<sup>th</sup> Street, down Sutton Place, and then over to Third Avenue via E. 55<sup>th</sup> and E. 56<sup>th</sup> Streets; and (3) an E. 59<sup>th</sup> Street/E. 61<sup>st</sup> Street route, in which one water main would travel to Third Avenue via E. 59<sup>th</sup> Street, and the other would travel up First Avenue two blocks and then over to Third Avenue via E. 61<sup>st</sup> Street. For the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, for purposes of this EIS, it is assumed that water main connections from the alternative Shaft Site would extend east on E. 59<sup>th</sup> Street from the alternative Shaft Site to First Avenue, where they would join the First Avenue or Sutton Place water main connection route analyzed for the preferred Shaft Site. For the E. 59<sup>th</sup> Street/E. 61<sup>st</sup> Street route from this alternative Shaft Site, it is assumed that one water main connection would head west on E. 59<sup>th</sup> Street and one would head east down E. 59<sup>th</sup> Street to First Avenue, where it would join the route described above for the preferred Shaft Site. Figures 2-5, 2-6, and 2-7 in Chapter 2, “Purpose and Need and Project Overview,” illustrate the potential water main connections from this alternative Shaft Site.

Several below-ground chambers related to the water main connections would be located on or close to the Shaft Site. These include valve, regulator, and venturi chambers, providing access to valves and equipment that regulates and monitors the flow to the water main connections that would extend from the shaft. Assuming the water main connection routes described above and given the size and shape of the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, it was assumed for this EIS that the valve and regulator chambers would be located on the alternative Shaft Site, immediately west of the shaft’s distribution chamber, and that the venturi chambers would be located along the water main connection route beneath the street.

#### 6.1.4 Description of Construction at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site

##### Construction Activity

Chapter 2, “Purpose and Need and Project Overview,” describes the construction activities required to install Shaft 33B and its water main connections, and Chapter 4, “Preferred Shaft Site,” discusses these activities as they would occur at the preferred Shaft Site. For the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, the majority of the construction activity would be similar to that described for the preferred Shaft Site. Additional information on specific work that would be conducted at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site is provided below.

Once Shaft 33B construction was initiated at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, the site would be enclosed with a 20-foot-high construction barrier. As shown in Figure 6.1-2, the shaft excavation, including construction of a cofferdam around the excavation area, would occur within the area adjacent to the Queensboro Bridge and the northern portion of E. 59<sup>th</sup> Street. Cranes used during construction would generally be on E. 59<sup>th</sup> Street to the west of the shaft. Cranes would be constrained from moving throughout the site by the elevated Bridge ramp that crosses the site. It is anticipated that truck access to the site would be at the eastern end of the site and along the north side of E. 59<sup>th</sup> Street.

A portion of E. 59<sup>th</sup> Street would be located within the construction barrier. Construction of Shaft 33B at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site would extend into the roadbed of E. 59<sup>th</sup> Street at the western end of the block, close to Second Avenue. A single eastbound lane would be maintained on E. 59<sup>th</sup> Street alongside the construction site, which is the same as in the existing condition. No sidewalk or pedestrian access currently exists at this site, and none would be available during construction. NYCDEP would, however, commit to providing the funding for a traffic enforcement agent (TEA) at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site during its construction to facilitate vehicular and pedestrian flow. More detail regarding truck movements is provided in Section 6.9, “Traffic and Parking.”

Construction at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site could be conducted using either the raise bore method or surface excavation, depending on the anticipated schedule. As described in Chapter 2, the raise bore technique involves excavating the shaft from the bottom, working from City Tunnel No. 3 below. Excavated materials would be removed via the Tunnel. However, City Tunnel No. 3 and its staging area at Shaft 26B may no longer be available for this use after a certain date as construction in that area nears completion. At this time, based on the current Tunnel schedule, it appears that the Tunnel and Shaft 26B will not be available after July 2007. If excavation (Stage 2) for Shaft 33B at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site cannot be completed by that time, then the raise bore technique cannot be used. In this case, the shaft would be constructed from the surface downward (“surface excavation”). If the raise bore technique is used, most of the work on the alternative Shaft Site would occur underground. In contrast, if the surface excavation technique is used, work would occur at the surface of the site. Both techniques are described below.

### *Stage 1*

Stage 1 would begin after necessary utility relocation. At the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, “oil-o-static” lines are located beneath E. 59<sup>th</sup> Street. Oil-o-static lines are bundled high voltage transmission lines that are contained in a steel pipe filled with oil. The oil helps to dissipate heat that is generated as energy (electricity) is transmitted through the lines. One of the existing oil-o-static lines and an associated chamber would need to be relocated before other construction activities could occur. Removal of this oil-o-static line (eight inches in diameter) would require a lane closure for six months along the northern side of E. 59<sup>th</sup> Street. The process of relocating this oil-o-static line, including planning and implementation, may take a total of 10 to 12 months. Depending on the construction start date, City Tunnel No. 3 may not be available for removal of excavated rock from Shaft 33B at this location.

Stage 1 would consist of securing the site, removing the pavement in the work area, installing the support walls (the “cofferdam”) around the shaft area, and excavating the soils from that area. At the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, bedrock is more than 15 feet deep. An excavator would be used to remove the soil that exists on top of the bedrock and place it into dump trucks. As the depth of the excavation increases, a crane with a clamshell attachment may be used in lieu of the excavator. The excavation would be completed once bedrock is reached. During a typical day during Stage 1, one to three trucks would arrive at and depart from the site, bring deliveries and taking away debris. A maximum of three trucks would arrive at and depart from the site in a peak hour. Stage 1 would have a total duration of four months.

### *Stage 2*

Stage 2 would involve excavation of the shaft and distribution chamber at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site. The work involved and the schedule for Stage 2 would be substantially different depending on whether the raise bore method or surface excavation is used, as described below.

#### *Raise Bore Method*

During Stage 2A (with a duration of 3 months), a pilot hole would be drilled from the top of the shaft down to City Tunnel No. 3 below. A power supply would be established off-site, with power supplied via the pilot hole. A 10-foot-wide shaft would be excavated from the tunnel upward using the raise bore machine. Excavated material would be removed from the bottom of the shaft and transported to an off-site location using City Tunnel No. 3.

In Stages 2B and 2C, controlled drilling and blasting would be used to excavate the rock to form the distribution chamber near the top of the shaft (Stage 2B) and to enlarge the diameter of the shaft to its full width of approximately 22 to 27.5 feet (Stage 2C). Blasting would not occur at the surface, since bedrock at the preferred Shaft Site is more than 15 feet below ground. The rock loosened during blasting of the distribution chamber and shaft would be removed through City Tunnel No. 3. During the eight-month period when blasting would be conducted (Stages 2B and 2C), blasting procedures would be the same as those described in Chapter 2, “Purpose and Need and Project Overview.” As determined necessary by FDNY, warning whistles would be used to

alert the area that blasting was about to begin. For approximately the first four months of blasting (until a depth of approximately 100 feet), flag persons would halt vehicular and pedestrian flow at designated locations prior to blasting. Blasting would be conducted only once the area near the site is clear of traffic and pedestrians.

Stage 2C would also involve pouring concrete at the site to line the shaft walls. During Stage 2 and Stage 3, the E. 59<sup>th</sup> Street/Second Avenue Shaft Site would have an enclosed, ventilated structure that would house the concrete trucks operating at the site.

Using the raise bore method at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, Stage 2 would last an estimated 11 months. During this period, one to three trucks would arrive at and depart from the site during the peak hour.

#### *Surface Excavation*

If City Tunnel No. 3 could not be used for removal of excavated material, Shaft 33B could not be constructed from below using the raise bore method. In that case, all excavation for the chambers and shaft at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site would have to be conducted from the surface (the “surface excavation method”). The surface excavation method would use controlled drilling and blasting and other excavation techniques to create the shaft from the surface level, rather than a raise bore machine. Excavated soil and rock would be removed from the site by trucks for the entire shaft excavation.

During Stage 2A (6 months) using surface excavation, the distribution chamber would first be excavated using controlled drilling and blasting. No pilot hole would be drilled for the shaft, and power would not be provided from City Tunnel No. 3 below; instead, the contractor would obtain power from Con Edison for the construction activities at the site. During Stage 2B, the shaft would be excavated by blasting and the shaft and chamber would be lined with concrete. No Stage 2C (widening the shaft) would be necessary using surface excavation techniques. During the 24-month period when blasting would be conducted (Stages 2A and 2B) using surface excavation, blasting procedures would include use of the warning whistle protocol to stop vehicular and pedestrian flow at designated locations prior to blasting. This would occur for approximately the first 12 months of blasting (until a depth of approximately 100 feet).

In addition to the trucks arriving at and departing from the site each day bring materials, including concrete, an additional 5 to 10 trucks per day would haul away excavated rock from the site during Stage 2 using surface excavation. This would add a small number of trucks to the estimated three trucks in the peak hour using raise bore method.

#### *Stage 3*

During Stage 3, riser piping would be installed in the shaft and the distribution chamber’s floor, walls, columns, and roof would be constructed. Both of these activities would involve pouring of concrete at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site. Concrete trucks would operate within the enclosed, ventilated structure on the site. As explained in Section 6.8, “Infrastructure and Energy,” concrete trucks would be rinsed on-site and the resulting discharge would be passed through a sediment trap prior to entering the catch basin. Throughout Stage 3, it is estimated that

three trucks might arrive at and depart from the site during the peak period on a given day. A maximum of 30 concrete trucks per day would be expected on the peak days.

#### *Stage 4*

Following Stage 3, the site would be secured and inactive for 8 months while equipment is procured. Once that equipment is available, Stage 4 would consist of installation of distribution pipes, valves, and mechanical and electrical equipment, construction of regulator and valve chambers for the water main connections, and final site clean-up and restoration. Stage 4B would include construction of the regulator and valve chambers required for the water mains. Construction of these chambers would take approximately 2 to 3 months. As explained in Chapter 4, “Preferred Shaft Site,” NYCDDC would construct the regulator and valve chambers. Soil would be excavated and concrete floors would be placed, followed by installation of the 48-inch piping. Concrete walls and roofs would be poured into the chambers and the open excavations would be backfilled. During a typical day during Stage 4, one to three total trucks would arrive at and depart from the E. 59<sup>th</sup> Street/Second Avenue Shaft Site, bringing deliveries and taking away debris.

#### **Construction Equipment**

Using preliminary engineering information, estimated equipment usage factors were developed for the major pieces of equipment to be used during construction of Shaft 33B at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site. These equipment usage factors are estimates of the percentage of time that each piece of equipment would be used during each construction stage (assuming a 16-hour work day). The equipment usage factors for the E. 59<sup>th</sup> Street/Second Avenue Shaft Site using the raise bore method are presented in Table 6.1-1, and the factors using the surface excavation method are presented in Table 6.1-2. As discussed in Section 6.11, “Air Quality,” NYCDEP will require the contractor for Shaft 33B to use control measures to ensure the construction is conducted in a manner protective of air quality. More specific information regarding equipment to be used at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site and their usage factors is presented in the air quality, noise, and vibration analyses in Sections 6.11, 6.12, and 6.13.

#### **Water Main Construction**

Construction of water main connections from the E. 59<sup>th</sup> Street/Second Avenue Shaft Site would require additional excavation in E. 59<sup>th</sup> Street, in addition to the work required in the northern part of E. 59<sup>th</sup> Street for Shaft 33B and its distribution chamber. Assuming two water main connections are installed in E. 59<sup>th</sup> Street adjacent to the site, as would be required for the First Avenue and Sutton Place routes, a trench approximately 14 feet in width would be needed along E. 59<sup>th</sup> Street, along with a construction barrier and an equipment lane. A total of 16.5 feet of roadway and/or sidewalk width on E. 59<sup>th</sup> Street between First and Second Avenues would be closed during this construction during the morning and evening peak periods, and 24.5 feet of roadway and/or sidewalk during the midday. This work would have to be carefully sequenced so

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**Table 6.1-1**  
**E. 59<sup>th</sup> Street/Second Avenue Shaft Site:**  
**Average Equipment Usage Assumptions for Construction With Raise Bore Excavation**

| Equipment             | Percentage of Time Equipment is Used in Each Construction Stage* |                      |                      |                      |                      |                       |                      |                      |
|-----------------------|--|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|
|                       | Stage 1<br>(4 mos.)  | Stage 2A<br>(3 mos.) | Stage 2B<br>(2 mos.) | Stage 2C<br>(6 mos.) | Stage 3<br>(12 mos.) | Stage 4A<br>(12 mos.) | Stage 4B<br>(3 mos.) | Stage 4C<br>(2 mos.) |
| Rock Drill (Two)      |  |                      | 15 (per)             |                      |                      |                       |                      |                      |
| Concrete Truck        |  |                      |                      | 15                   | 25                   | 5                     | 25                   |                      |
| Paver                 |  |                      |                      |                      |                      | 5                     | 15                   | 5                    |
| Pneumatic hammer      |  |                      | 5                    |                      |                      |                       |                      |                      |
| Jackhammer            | 5  |                      |                      |                      |                      |                       | 10                   |                      |
| Rock Drill            |  |                      |                      | 25                   |                      |                       |                      |                      |
| Backhoe               | 10   |                      |                      |                      |                      |                       | 25                   |                      |
| Pile Drilling Rig     | 25   |                      |                      |                      |                      |                       |                      |                      |
| Excavator             | 25   |                      | 15                   |                      |                      | 5                     |                      |                      |
| Front End Loader      | 30   | 10                   | 10                   | 5                    | 5                    | 10                    | 10                   | 10                   |
| Dump Truck at Idle    | 25   | 10                   | 10                   |                      |                      | 10                    | 25                   | 10                   |
| Flatbed Truck at Idle | 15   | 5                    | 10                   | 5                    | 20                   | 20                    | 10                   | 10                   |
| Derrick Crane         |  | 5                    | 5                    | 20                   | 25                   | 10                    |                      |                      |
| Telescoping Crane     | 20   |                      |                      |                      |                      |                       | 10                   |                      |
| Pavement Cutter       |  |                      |                      |                      |                      |                       | 10                   |                      |
| Compactor             |  |                      |                      |                      |                      | 5                     | 10                   |                      |
| Welder                | 10   | 5                    | 5                    | 5                    | 20                   | 20                    | 10                   |                      |
| Saw, electric         | 10   | 5                    | 5                    | 5                    | 15                   | 20                    | 25                   |                      |
| Compressor (NYC)      | 5  |                      | 70                   | 70                   | 5                    | 5                     | 25                   |                      |
| Raise Bore Machine    |  | 80                   |                      |                      |                      |                       |                      |                      |
| Concrete Pump         |  |                      |                      | 10                   | 25                   |                       |                      |                      |

**Note:** Usage factors are based on a 16-hour workday.

**Table 6.1-2**  
**E. 59<sup>th</sup> Street/Second Avenue Shaft Site: Average Equipment Usage Assumptions for Construction**  
**With Surface Excavation**

| Equipment             | Percentage of Time Equipment is Used in Each Construction Stage* |                      |                       |                      |                       |                      |                      |
|-----------------------|--|----------------------|-----------------------|----------------------|-----------------------|----------------------|----------------------|
|                       | Stage 1<br>(4 mos.)  | Stage 2A<br>(6 mos.) | Stage 2B<br>(18 mos.) | Stage 3<br>(12 mos.) | Stage 4A<br>(12 mos.) | Stage 4B<br>(3 mos.) | Stage 4C<br>(2 mos.) |
| Rock Drill (Two)      |  |                      | 15 (per)              |                      |                       |                      |                      |
| Concrete Truck        |  |                      | 10                    | 25                   | 5                     | 25                   |                      |
| Paver                 |  |                      |                       |                      | 5                     | 15                   | 5                    |
| Pneumatic hammer      |  | 10                   | 10                    |                      |                       |                      |                      |
| Jackhammer            | 5  |                      |                       |                      |                       | 10                   |                      |
| Rock Drill            |  |                      | 25                    |                      |                       |                      |                      |
| Backhoe               | 10   |                      |                       |                      |                       | 25                   |                      |
| Pile Drilling Rig     | 25   |                      |                       |                      |                       |                      |                      |
| Excavator             | 25   | 30                   | 30                    |                      | 5                     |                      |                      |
| Front End Loader      | 30   | 10                   | 10                    | 5                    | 10                    | 10                   | 10                   |
| Dump Truck at Idle    | 25   | 30                   | 30                    |                      | 10                    | 25                   | 10                   |
| Flatbed Truck at Idle | 15   | 5                    | 5                     | 20                   | 20                    | 10                   | 10                   |
| Derrick Crane         |  | 20                   | 20                    | 25                   | 10                    |                      |                      |
| Telescoping Crane     | 20   |                      |                       |                      |                       | 10                   |                      |
| Pavement Cutter       |  |                      |                       |                      |                       | 10                   |                      |
| Compactor             |  |                      |                       |                      | 5                     | 10                   |                      |
| Welder                | 10   | 5                    | 5                     | 20                   | 20                    | 10                   |                      |
| Saw, electric         | 10   | 5                    | 5                     | 15                   | 20                    | 25                   |                      |
| Compressor (NYC)      | 5  | 70                   | 70                    | 5                    | 5                     | 25                   |                      |
| Concrete Pump         |  |                      | 10                    | 25                   |                       |                      |                      |

**Note:** Usage factors are based on a 16-hour workday.

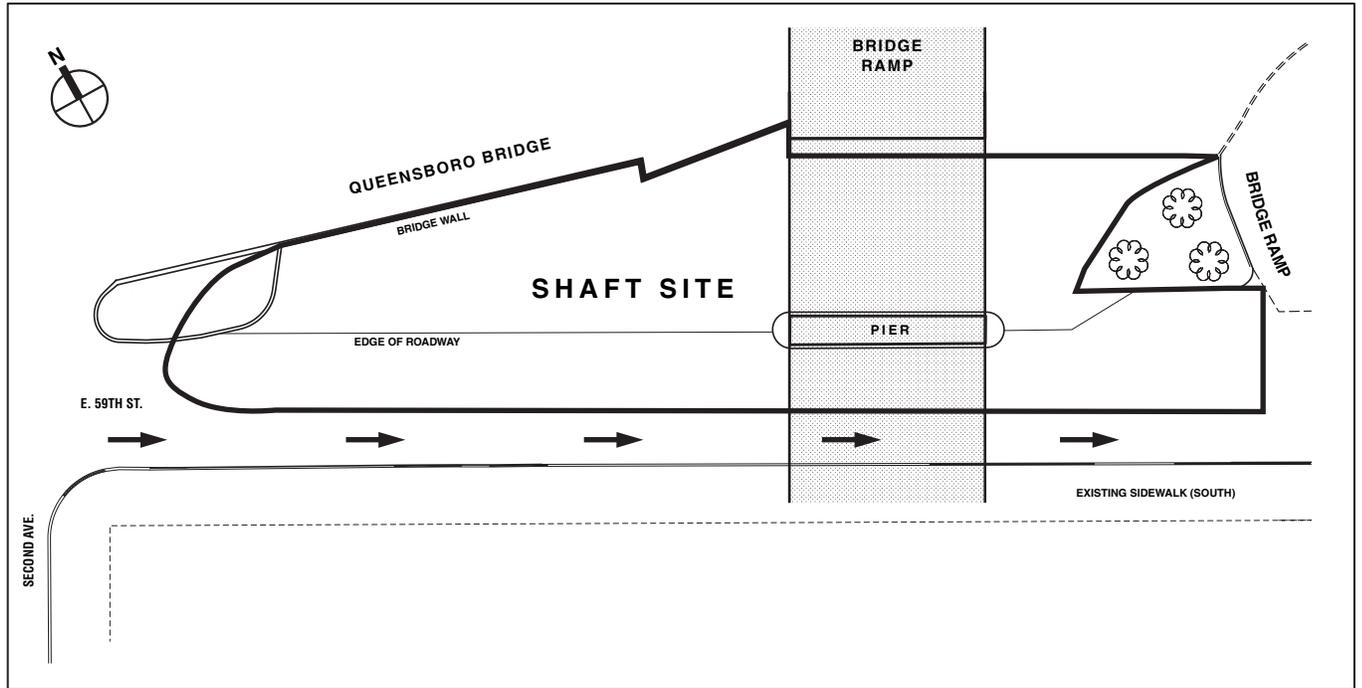
that it occurred during a period when the northern portion of E. 59<sup>th</sup> Street could be reopened to traffic (e.g., after Stage 3, during the 8-month equipment procurement period, or after completion of the shaft). To maintain traffic flow on E. 59<sup>th</sup> Street for the 20 weeks while construction of the water mains is occurring in the southern portion of the streetbed, eastbound traffic from Second Avenue could be temporarily routed to the north side of E. 59<sup>th</sup> Street, passing over the location of the shaft (Figure 6.1-3). This traffic would have to pass north of the pier supporting the elevated Queensboro Bridge ramp, then curve back to the southern side of E. 59<sup>th</sup> Street farther east on the block. This northern detour would therefore pass through the small traffic island immediately east of the elevated Bridge ramp. Three honey locust trees on the traffic island would have to be removed to allow creation of the detour. More information on this detour route for traffic is provided in Section 6.9, "Traffic and Parking."

Once the water main construction from this alternative Shaft Site reached E. 59<sup>th</sup> Street and First Avenue, it would join the water main connection routes developed for water main connections from the preferred Shaft Site. These water main connection routes are analyzed in Chapter 5 of this EIS. Construction of water main connections from the E. 59<sup>th</sup> Street/Second Avenue Shaft Site would take an estimated 47 months using the First Avenue route (the reasonable worst-case route), 57 months using the Sutton Place route (an additional representative route), and 31 months using the E. 59<sup>th</sup> Street/E. 61<sup>st</sup> Street route (an additional representative route).

### **Construction Schedule**

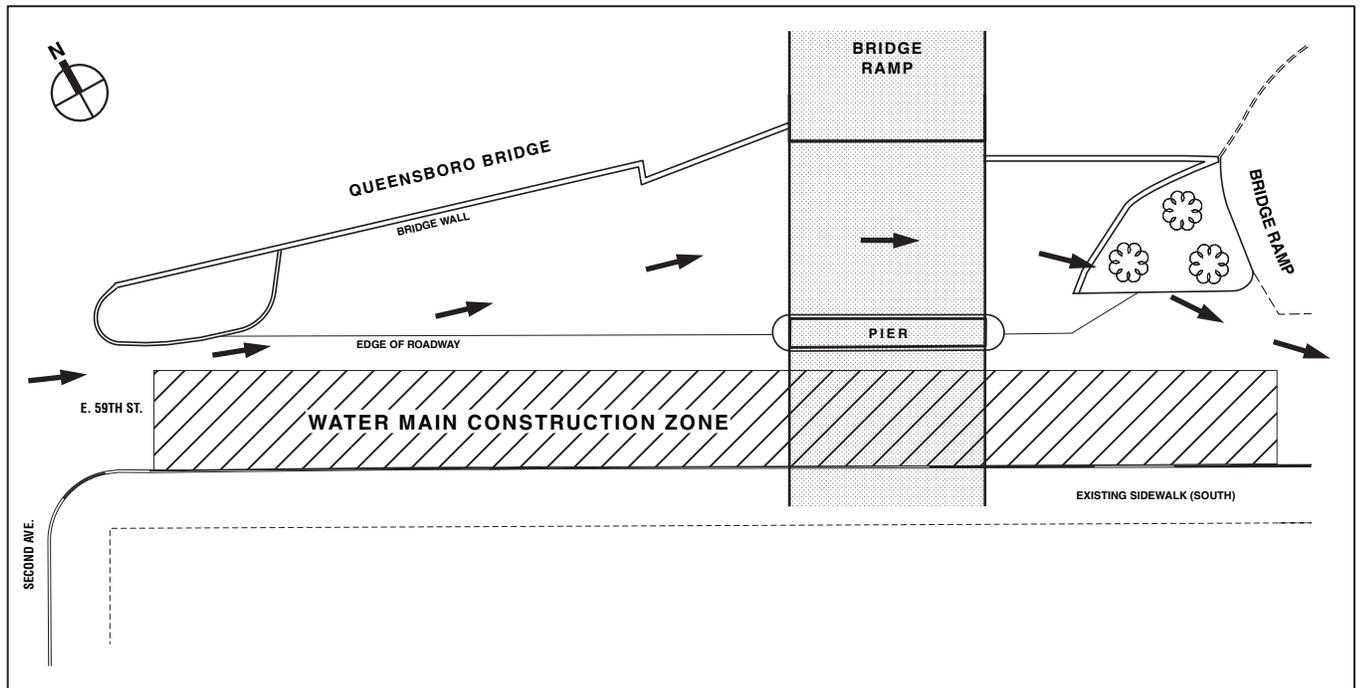
As shown in Table 6.1-3, construction activities at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site would require the same approximately 52-month period as at the preferred Shaft Site, if the raise bore technique can be used. Up to 12 months could be required for relocation of the oil-o-static lines in E. 59<sup>th</sup> Street. Assuming an estimated schedule of 10 months for the relocation of the oil-o-static lines and assuming that the relocation would commence on approximately March 1, 2006 (the same estimated start date as for the preferred Shaft Site in Section 4.1), construction would last through April 2011.

However, if the relocation of the oil-o-static line delays construction enough that raise bore excavation cannot be used, the use of surface rather than raise bore excavation would lengthen the construction period substantially. While raise bore operations during Stage 2A would be conducted 24 hours a day for three months from within the shaft, the drilling and blasting associated with the surface excavation method would typically occur only during specified daytime hours (as discussed in Chapter 2). This would substantially reduce the speed at which the shaft could be excavated during this stage, extending the duration of Stage 2 from a total of approximately 11 months to 24 months. In this case, again assuming 10 months for the relocation of the oil-o-static lines and assuming a construction start date of March 1, 2006, construction would last through May 30, 2012.



**TRAFFIC ROUTE DURING SHAFT CONSTRUCTION**

NOT TO SCALE



**TRAFFIC ROUTE DURING WATER MAIN CONSTRUCTION**

NOT TO SCALE

**Legend:**

- Shaft Site Boundary
- Building Line
- Existing Honey Locust Trees
- Curblines
- Temporary Detour Path



NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3  
 STAGE 2-MANHATTAN LEG  
 E. 59TH STREET / SECOND AVENUE SHAFT SITE

**TEMPORARY ROADWAY DETOURS**

**FIGURE 6.1-3**

**CHAPTER 6: E. 59<sup>TH</sup> STREET/SECOND AVENUE SHAFT SITE**  
**6.1 PROJECT DESCRIPTION**

**Table 6.1-3**  
**Shaft Construction Stages at E. 59<sup>th</sup> Street/Second Avenue Shaft Site**  
**Raise Bore vs. Surface Excavation**  
**(Assuming Estimated Start Date of March 2006)**

| Stage  | Activity  |   | Conceptual Schedule |                    |                                     |                                   |
|--|---|---|---------------------|--------------------|-------------------------------------|-----------------------------------|
|  | Raise Bore  | Surface Excavation                                    | Months              |                    | Dates                               |                                   |
|  |   |   | Raise Bore          | Surface Excavation | Raise Bore                          | Surface Excavation                |
|  | Con Edison's relocation of oil-o-static line in street  |   | 10                  | 10                 | March 1, 2006 – December 31, 2006   | March 1, 2006 – December 31, 2006 |
| 1  | Cut/demolish sidewalk and asphalt pavement; install excavation support, excavate soil                                   |   | 4                   | 4                  | January 1, 2007 – April 30, 2007    | January 1, 2007 – April 30, 2007  |
| 2A   | Drill pilot hole; raise bore the shaft  | Excavate distribution chamber by blasting             | 3                   | 6                  | May 1, 2007 – July 31, 2007         | May 1, 2007 – October 31, 2007    |
| 2B   | Distribution chamber excavation (blasting)  | Shaft excavation (blasting); line shaft with concrete | 2                   | 18                 | August 1, 2007 – September 30, 2007 | November 1, 2007 – April 30, 2009 |
| 2C   | Slashing/lining the shaft (blasting)  | No Stage 2C   | 6                   | NA                 | October 1, 2007 – March 31, 2008    | NA                                |
| 3  | Riser piping installation, refill with concrete; distribution chamber construction (form and place reinforced concrete) |   | 12                  | 12                 | April 1, 2008 – March 31, 2009      | May 1, 2009 – April 30, 2010      |
| <i>Contracting and Equipment Procurement</i>   |   |   | 8                   | 8                  | April 1, 2009 – November 30, 2009   | May 3, 2010 – December 30, 2010   |
| 4  | Equipment installation; construction of regulator and valve chambers and water main connections at site                 |   | 17                  | 17                 | December 1, 2009 – April 29, 2011   | December 31, 2010 – May 30, 2012  |
| Total, excluding Con Edison utility relocation |   |   | 52                  | 65                 |                                     |                                   |

As a result, Shaft 33B would be completed an estimated 10 to 23 months later at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site than at the preferred Shaft Site, depending on whether raise bore operations can be conducted there or not. The schedule for construction at this site using either method is presented in Table 6.1-3. As shown in the table, use of the E. 59<sup>th</sup> Street/Second Avenue Shaft Site could substantially delay the time when Shaft 33B and the associated segment of City Tunnel No. 3 can be operational. It is anticipated that this Shaft Site would be completed approximately in mid-2011 or mid-2012, compared to approximately mid-2010 for the preferred Shaft Site.

### 6.1.5 Activation and Operation

Activation and operation procedures would be consistent among all potential Shaft Site locations and are described in Chapter 2, "Purpose and Need and Project Overview."

### 6.1.6 Permits and Approvals

Construction of Shaft 33B at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site would require similar permits and approvals from State and City agencies as the preferred Shaft Site (described in Section 4.1):

- FDNY Blasting Permits: FDNY regulates the transport and use of explosives within the City to ensure their safe usage. All blasting at the Shaft Site would be conducted in coordination with FDNY.
- NYCDOT Construction Activity Permits, Sidewalk Construction Permits, and Street Opening Permits: NYCDOT permits would be required for construction-related activities on sidewalks and within streets. These permits typically provide detailed stipulations for traffic and pedestrian control during construction.
- NYCDEP Tunneling Permit: These permits are required for all tunnel construction in the City and set specific limits on blasting and noise levels, construction area layout, muck removal, and other aspects of tunnel construction.
- NYCDEP Sewer Discharge Permit: A permit would be required for discharge into the sewer during the dewatering and Shaft activation process. This permit would specify the quality and quantity of water that can be discharged into a City sewer.
- NYCDEP Air Permit: A permit may be required pursuant to the City's Air Pollution Code for operation of a ventilation system for the concrete truck enclosure.
- Memorandum of Understanding between NYCDEP and NYCDOT: This document would outline the two agencies' agreement regarding NYCDEP's usage of NYCDOT property at the E. 59<sup>th</sup> Street/Second Avenue Shaft Site.
- New York City Landmarks Preservation Commission (NYCLPC) review: An advisory letter from NYCLPC would be sought regarding construction activities adjacent to the Queensboro Bridge, which is a New York City Landmark. In addition, NYCLPC review regarding methodology and potential impacts of the project on historic resources was sought during the CEQR process.

