8.12 NOISE

8.12.1 Introduction

Construction activities have the potential to produce noise levels that may be annoying or disturbing to humans. This Section describes existing noise conditions in the vicinity of the E. 54th Street/Second Avenue Shaft Site and assesses the potential for construction of Shaft 33B at the Shaft Site to result in noise impacts. The potential for noise impacts during operation of the shaft is also discussed. The methodology used to prepare this analysis is described in Section 3.12, “Noise,” in Chapter 3, “Impact Methodologies.”

In addition to the Shaft Site itself, this alternative would include construction of a water main connection that would travel from the Shaft Site along Second Avenue to the potential First Avenue or Sutton Place route at E. 55th and 56th Streets. Potential noise impacts associated with this extension would be similar to those described for construction of the water mains in Section 5.12, “Noise,” of Chapter 5, “Water Main Connections.” That Section also provides a cumulative assessment of shaft and water main construction.

8.12.2 Existing Conditions

An ambient noise survey was conducted to establish baseline noise levels at sensitive receptors in the vicinity of the E. 54th Street/Second Avenue Shaft Site. The Shaft Site is located in a noisy area that is influenced by vehicular and pedestrian traffic along Second Avenue, which immediately borders the site. Traffic on both Second Avenue and on E. 54th Street is often heavy, particularly during the commuter rush hours. Second Avenue is also a primary commercial route for truck deliveries on the East Side. The surrounding neighborhood is a mix of high-density residential apartment buildings, office space, retail stores and shops, restaurants and bars, and public areas.

Monitoring Locations

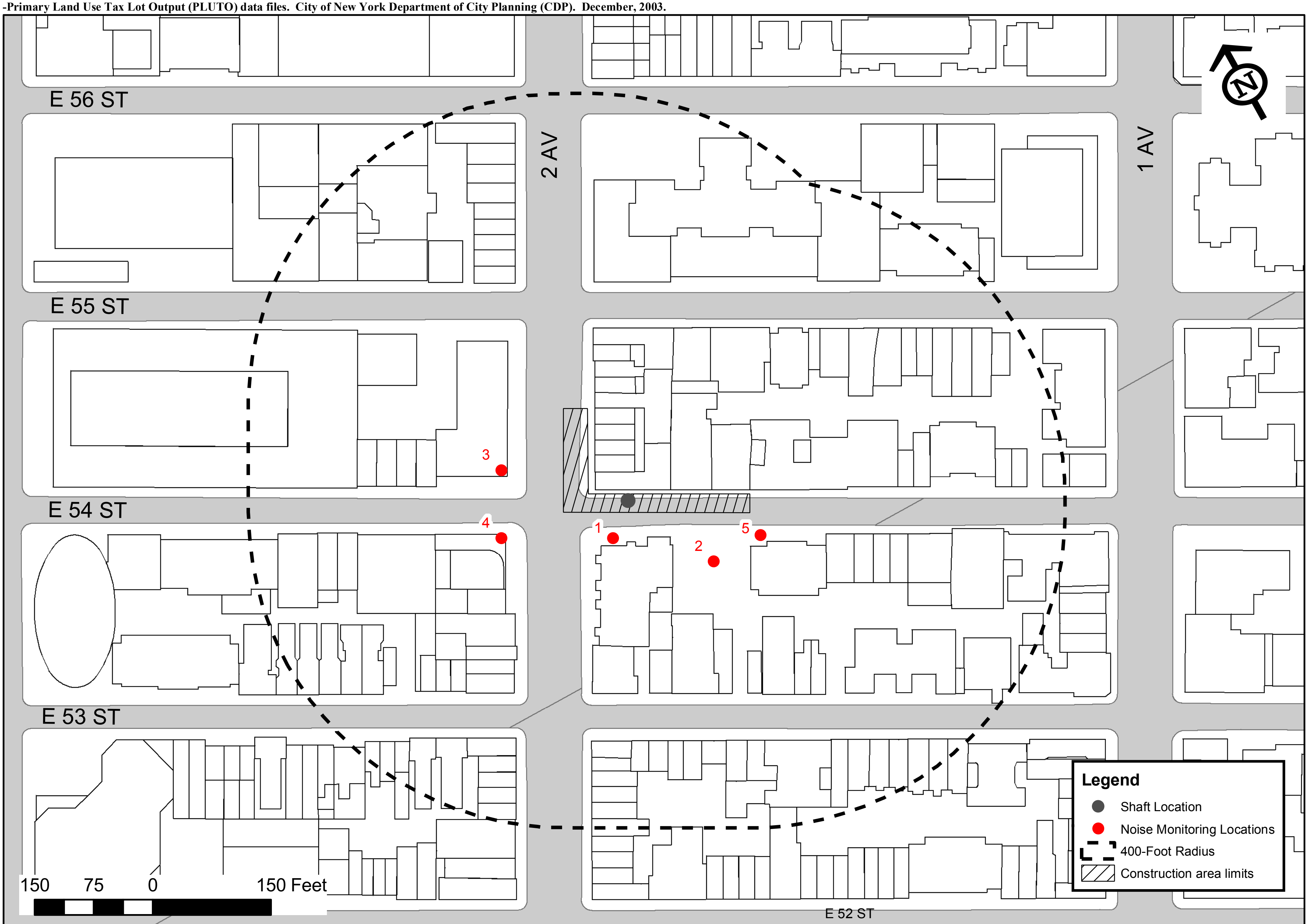
Ambient noise monitoring was performed at five monitoring locations between February 23 and 27, 2004 to assess the existing noise environment surrounding the E. 54th Street/Second Avenue Site. At Location 5, short-term noise monitoring was performed a minimum of three times each day (weather permitting) between 7:00 a.m. to 3:00 p.m., 3:00 pm to 7:00 p.m., and 7:00 p.m. to 11:00 p.m. over a two day period. The five ambient noise monitoring locations near the E. 54th Street/Second Avenue Site are shown in Figure 8.12-1 and include:

Location 1: On the southeast corner of E. 54th Street and Second Avenue adjacent to the residential building.

Location 2: In the Connaught Towers Public Park along E. 54th Street.

Location 3: On the northwest corner of E. 54th Street and Second Avenue adjacent to residential building.

Source:
-Primary Land Use Tax Lot Output (PLUTO) data files. City of New York Department of City Planning (CDP). December, 2003.



NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3
STAGE 2 - MANHATTAN LEG
E. 54TH STREET/SECOND AVENUE SHAFT SITE
NOISE MONITORING LOCATIONS

FIGURE 8.12-1

Map Document: (S:\Projects\2175158\GIS_Figures\Shaft_33B\Site&Traffic\33B_Alt_Orig(NOISE)_RECEPTOR.mxd)
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Location 4: On the southwest corner of E. 54th Street and Second Avenue on the 4th floor terrace of residential building.

Location 5: In front of 320 E. 54th Street, a residential building.

Construction at the Shaft 33B site is expected to occur over two shifts—from 7:00 a.m. to 3:00 p.m. and from 3:00 p.m. to 11:00 p.m. Therefore, the ambient noise monitoring was performed during these periods as described in Section 3.12.

Monitoring Results

Minimum hourly Leq(1) noise levels at each of the five monitoring locations, based on the noise monitoring results, are provided in Table 8.12-1. Minimum hourly Leq(1) levels are provided for each of the two assessment time periods—the first construction shift (7:00 a.m. to 3:00 p.m.) and second construction shift (3:00 p.m. to 11:00 p.m.).

Table 8.12-1
Baseline Ambient Noise Monitoring Results for the E. 54th Street/Second Avenue Shaft site

Noise Monitoring Locations		1st Shift (7am to 3pm) Minimum L_{eq} (dBA)	2nd Shift (3pm to 11pm) Minimum L_{eq}(dBA)
Location 1:	On the southeast corner of E. 54th Street and Second Avenue adjacent to residential building.	71	67
Location 2:	In the In the Connaught Towers Public Park along E. 54th Street.	65	60
Location 3:	On the northwest corner of E. 54th Street and Second Avenue adjacent to residential building.	72	67
Location 4:	On the southwest corner of E. 54th Street and Second Avenue on the 4th floor terrace of residential building.	69	65
Location 5:	In front of 320 E. 54th Street, a residential building.	68	62

For the first shift time period (7:00 a.m. to 3:00 p.m.), at the ground level survey locations (Locations 1, 2, 3, and 5), the minimum hourly Leq(1) noise levels ranged between 65 and 72 dBa. Noise levels were lower at monitoring locations further from Second Avenue (Locations 2 and 5). The elevated survey location (Location 4) had a minimum hourly Leq(1) noise level of 69 dBA. This lower value reflects the distance from ground level noise sources such as vehicular traffic. For the second shift time period (3:00 p.m. to 11:00 p.m.), the minimum hourly Leq(1) noise levels ranged from 62 to 67 dBA.

These ambient noise levels are generally at or above 65 dBA Leq(1) CEQR threshold of acceptability. The primary factor influencing the high existing ambient conditions is vehicular traffic. Detailed noise data recorded at the survey locations is provided in Appendix 12.

8.12.3 Future Conditions Without the Project

As described in Section 8.2, "Land Use and Community Facilities, Zoning, and Public Policy," three new development projects are anticipated in the 400-foot Study Area in the Future Without the Project. The Sutton Hotel, located at 330 E. 56th Street, is undergoing a conversion from a hotel to a 76-unit residential building. A new, 147-unit high-rise apartment building is currently under construction at 310 E. 53rd Street, on the southeast corner of Second Avenue and another residential building planned for the west side of Second Avenue and E. 53rd Street. None of these projects are within the area that would be significantly impacted by the project as discussed in "Future Conditions With the Project" below. Noise levels would be expected to be comparable to those currently existing in the vicinity of the E. 54th Street/Second Avenue Shaft Site.

8.12.4 Future Conditions With the Project

Construction

Blasting

Blasting would result in high instantaneous noise levels. Blasting would be necessary at this Shaft Site to enlarge the shaft. Section 4.12, "Noise," in Chapter 4, "Preferred Shaft Site," discusses blasting procedures, including protective measures that will be implemented to avoid potential construction-related noise impacts from blasting at the preferred Shaft Site. Similar procedures would be put in place at the E. 54th Street/Second Avenue Shaft Site, with one exception. Due to the very close proximity of the residences and restaurant to the site, as close as 11 feet from the edge of the shaft chamber, and because the bedrock is only 3 feet from the surface, blasting would likely not occur until a substantial distance below the top of bedrock was reached. To excavate to this distance, alternative techniques including hydraulic splitting[1] would be employed to minimize the potential for any inadvertent damage to nearby structures. The combination of hydraulic splitting and blasting would add several months to the construction schedule at this Shaft Site.

Hydraulic splitting would have minimal noise emissions. Noise levels from blasting at the Shaft Site would be lower at the surface because blasting would not occur until a substantial distance below the top of bedrock was reached. However, despite these measures, blasting noise could result in startle effects and be intrusive and disturbing to humans.

[1] Hydraulic splitting is a controlled demolition technique that uses a metal device to break concrete or rock. Typically, the splitter includes a cylinder with a control valve and two metal sheets referred to as "feathers." A hole is drilled, the device is inserted, and a piston wedge is used to push the feathers apart and split the material. Typically, several hydraulic splitters are used simultaneously

As described in Section 8.1, depending on the construction schedule for the project at this site, different construction techniques (either the raise bore or method or the surface excavation method) would need to be utilized for shaft construction. Blasting would be expected to occur for roughly six months using the raise bore method. Under the surface excavation method, blasting would occur over a 15-month period. While the time period is longer for the surface excavation method, there would be one, rather than two, blasts per day for the shaft work for most of the blasting period.

Other Construction Activities

Sensitive Receptors Used in the Analysis

As shown in Table 8.12-2 and Figure 8.12-2, receptors were selected at nine ground floor locations in the immediate vicinity of the Shaft Site to assess potential construction noise impacts. In addition, at seven of the residential receptors (Receptors 1, 2, 3, 4, 5, 6, and 8), a number of elevated receptors were selected to determine impacts to residences located on upper floors. Residential receptors were evaluated. These receptors are considered to be representative of other sensitive uses in the area. In several instances, the receptor locations were in the same locations as the ambient noise monitoring locations (see Section 8.12.2, "Existing Conditions," above).

Table 8.12-2
Identification and Description of Selected Shaft Receptor Locations

Receptor Number	Receptor Identification and Description	Approximate Horizontal Distance to Center of Shaft 33B
1	1016 Second Avenue *(Receptors 1A/1B/1C: ground level/50/ 100 feet)*	43
2	350 E 54th St *(Receptors 2A/2B/2C: ground level/ 50/100 feet)*	148
3	1035 Second Avenue *(Receptors 3A/3B/3C: ground level/ 50/100 feet)*	151
4	1024 Second Avenue *(Receptors 4A/4B: ground level/ 50 feet)*	23
5	315 E 54th St *(Receptors 5A/5B: ground level/50 feet)*	148
6	321 E 54th St *(Receptors 6A/6B: ground level/ 50 feet)*	203
7	340 E 54th St (The Neighborhood Playhouse) *(Receptors 5A/5B: ground level/50 feet)*	404
8	320 E 54th St *(Receptor 8A/8B: ground level/ 50 feet)*	187
9	Connaught Towers Public Park	135

Scenarios Analyzed

As detailed in the Section 8.1, "Project Description," construction of the shaft would occur in stages representing specific construction activities and equipment on the Sites. Therefore, an analysis was performed for each shift for each stage of construction

Source:
-Primary Land Use Tax Lot Output (PLUTO) data files. City of New York Department of City Planning (CDP). December, 2003.

Map Document: (S:\Projects\2175158\GIS_Figures\Shaft_33B\Site&Traffic\33B_Alt_Orig(NOISE)_RECEPTOR(2).mxd)
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NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3
STAGE 2 - MANHATTAN LEG
E. 54TH STREET/SECOND AVENUE SHAFT SITE
NOISE RECEPTOR LOCATIONS

FIGURE 8.12-2

Construction at the Shaft 33B site is expected to occur over two shifts—from 7:00 a.m. to 3:00 p.m. and from 3:00 p.m. to 11:00 p.m. and both shifts were analyzed as discussed above under Section 8.12.2, "Existing Conditions." Raise boring the shaft, which would be a 24-hour operation for less than 3 months, would have minimal noise impacts since it takes place below ground and requires little surface activity.

In addition, as described in detail in Section 3.12, "Noise," in Chapter 3, "Impact Methodologies," an 8-hour "average period" analysis and reasonable worst case "peak period" analysis were performed for each stage of construction. The average period analysis is based on average equipment utilization rates over an average 8-hour shift. The peak period analysis is based on a smaller mix of equipment that would typically operate for a greater percentage of time during one or more hours of a shift. See Appendix 12 for average and peak period equipment utilization rates. The average and peak analyses are performed for each shift, for a total of 4 scenarios per stage.

At the E. 54th Street/Second Avenue Shaft Site, there is the potential that shaft construction would be undertaken using the surface excavation method, rather than the raise bore method (see Chapter 2, "Purpose and Need and Project Overview" for a discussion of these methods). The differences between the two methods in relation to potential noise impacts are discussed in "Potential Noise Impacts-Surface Excavation Method," below.

Measures to Reduce Noise at the Site

The analysis includes several measures that would be provided at the Shaft Site to minimize potential noise impacts from construction. This includes a prefabricated 10-foot concrete wall to be constructed around the perimeter of the of the 54th Street leg of the Shaft Site. The wall will be covered with a sound absorptive fabric on the inside to reduce reflective noise. Since concrete operations during Stages 2C, 3, and 4A are among the noisiest operations, the concrete mixing trucks will also be enclosed in an acoustical sound enclosure providing 15 dBA attenuation.

While not assumed in the quantitative assessment, NYCDEP will undertake a number of other measures to minimize noise impacts from the project. The contractor will also be required to have a noise monitoring program in place during all construction activities. A high quality muffler will be used on the crane engine. NYCDEP will also require the contractor to use newer equipment (2003 or later for most equipment) and minimize idling. Other noise abatement measures that the contractor may be required to take as necessary include soundproof housings or enclosures for noise producing machines and other facilities; use of electrically operated hoists and compressor plants; silencers on air intakes and exhaust mufflers on internal combustion engines; maximum sized intake and exhaust mufflers on internal combustion engines; gears on machinery designed to reduce noise to a minimum; hoppers and storage bins lined with sound deadening material; possible prohibition of the use of air or gasoline driven saws and similar equipment; and delivering and removing materials, and the loading and unloading of materials into or from various conveyances in such a manner that will keep noise to a minimum.

Through NYCDEP's authority under the construction contract, the Tunneling Permit, and the New York City Noise Code, NYCDEP can send inspectors to the site, enforce against the

Contractor, and require further attenuation measures or shutdown construction on the site if noise is too excessive.

Potential Noise Impacts—Introduction

Table 8.12-3 and Table 8.12-4 present the results of the modeling for the average and peak periods respectively. For each stage and each shift, the existing ambient noise levels, noise levels generated by the construction equipment, and total combined existing and construction-generated noise levels are provided at each of the ground and elevated receptor locations. Also provided is the increase between the combined level and existing conditions. To determine potential noise impacts, this increase is compared to the 3 dBA CEQR impact threshold; those instances where the 3 dBA threshold is exceeded are shaded on the tables. In addition to the impacts discussed below, pavement cutters and pavers would be used for only a few days during shaft construction. During these short periods, noise levels would be slightly higher than those discussed below; however, the potential impacts would be very short-term and temporary.

Potential Noise Impacts—Average Period Analysis

The average period analysis shows that incremental noise levels from construction would exceed 3 dBA for all stages of construction. Impacts would occur at all receptors analyzed and either Receptor 4 or Receptor 5 would experience the greatest increases in noise levels depending on the stage of construction (see Figure 8.12-2 for a map of the receptor locations). In general, elevated receptors are more likely to exceed the 3 dBA CEQR threshold than ground level receptors, which would be protected by the site's concrete wall. At locations further from the construction site (Receptor 1, 2 and 7) the estimated construction noise levels would be less likely to exceed 3 dBA. The following discussion addresses only those receptors with impacts above the 3 dBA CEQR impact threshold.

Stage 1 (4 months) would include site preparation, initial excavation, and installation of excavation supports and work slabs. The front end loader, excavator, jackhammer, and dump truck are the primary noise contributors during this stage. During Stage 1, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptor 5A by 3.1 dBA during Shift 1 and at Receptors 5A, 6A, 8A, and 9 by between 4.7 and 7.1 dBA during Shift 2. These increases range from marginally noticeable to readily noticeable. At elevated Receptors, noise levels would increase over existing conditions at Receptors 1B, 4B, 5B, 6B, 8B by between 3.1 and 7.1 dBA during Shift 1 and at Receptors 1B, 1C, 2B, 4B, 5B, 6B, 8B) by between 3.1 and 12.5 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 65 and 75 dBA.

Table 8.12-3
Noise Levels - Average Workday

Stage 1 Construction

Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	64.6	72	0.9	1A	67	64.6	69	2.0
1B	71	71.1	74	3.1	1B	67	71.1	73	5.5
1C	71	68.1	73	1.8	1C	67	68.1	71	3.6
2A	69	58.8	69	0.4	2A	65	58.8	66	0.9
2B	69	65.1	70	1.5	2B	65	65.1	68	3.1
2C	69	63.9	70	1.2	2C	65	63.9	67	2.5
3A	72	56.4	72	0.1	3A	67	56.4	67	0.4
3B	72	62.7	72	0.5	3B	67	62.7	68	1.4
3C	72	63.1	73	0.5	3C	67	63.1	68	1.5
4A	71	65	72	1.0	4A	67	65	69	2.1
4B	71	72.5	75	3.8	4B	67	72.5	74	6.6
5A	68	68.2	71	3.1	5A	62	68.2	69	7.1
5B	68	74.2	75	7.1	5B	62	74.2	74	12.5
6A	68	64.9	70	1.7	6A	62	64.9	67	4.7
6B	68	71.3	73	5.0	6B	62	71.3	72	9.8
7	68	54.9	68	0.2	7	62	54.9	63	0.8
8A	68	65.2	70	1.8	8A	62	65.2	67	4.9
8B	68	71	73	4.8	8B	62	71	72	9.5
9	65	63.7	67	2.4	9	60	63.7	65	5.2

Stage 2B Construction

Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	74.4	76	5.0	1A	67	74.4	75	8.1
1B	71	84.1	84	13.3	1B	67	84.1	84	17.2
1C	71	79.9	80	9.4	1C	67	79.9	80	13.1
2A	69	68.4	72	2.7	2A	65	68.4	70	5.0
2B	69	76.7	77	8.4	2B	65	76.7	77	12.0
2C	69	75.4	76	7.3	2C	65	75.4	76	10.8
3A	72	67.8	73	1.4	3A	67	67.8	70	3.4
3B	72	76.5	78	5.8	3B	67	76.5	77	10.0
3C	72	75.3	77	5.0	3C	67	75.3	76	8.9
4A	71	76.6	78	6.7	4A	67	76.6	77	10.1
4B	71	85.9	86	15.0	4B	67	85.9	86	19.0
5A	68	70.4	72	4.4	5A	62	70.4	71	9.0
5B	68	78.2	79	10.6	5B	62	78.2	78	16.3
6A	68	68.5	71	3.3	6A	62	68.5	69	7.4
6B	68	75.3	76	8.0	6B	62	75.3	75	13.5
7	68	63.6	69	1.3	7	62	63.6	66	3.9
8A	68	69.5	72	3.8	8A	62	69.5	70	8.2
8B	68	75.8	76	8.5	8B	62	75.8	76	14.0
9	65	65.3	68	3.2	9	60	65.3	66	6.4

Stage 2A Construction*

Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	43.1	71	0.0	1A	67	43.1	67	0.0
1B	71	51.5	71	0.0	1B	67	51.5	67	0.1
1C	71	46.9	71	0.0	1C	67	46.9	67	0.0
2A	69	37	69	0.0	2A	65	37	65	0.0
2B	69	43.2	69	0.0	2B	65	43.2	65	0.0
2C	69	42.1	69	0.0	2C	65	42.1	65	0.0
3A	72	37	72	0.0	3A	67	37	67	0.0
3B	72	43	72	0.0	3B	67	43	67	0.0
3C	72	41.9	72	0.0	3C	67	41.9	67	0.0
4A	71	43.9	71	0.0	4A	67	43.9	67	0.0
4B	71	53	71	0.1	4B	67	53	67	0.2
5A	68	34.4	68	0.0	5A	62	34.4	62	0.0
5B	68	43.2	68	0.0	5B	62	43.2	62	0.1
6A	68	34.1	68	0.0	6A	62	34.1	62	0.0
6B	68	40.4	68	0.0	6B	62	40.4	62	0.0
7	68	30.1	68	0.0	7	62	30.1	62	0.0
8A	68	36.2	68	0.0	8A	62	36.2	62	0.0
8B	68	41.2	68	0.0	8B	62	41.2	62	0.0
9	65	33.2	65	0.0	9	60	33.2	60	0.0

Stage 2C Construction

Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	65.6	72	1.1	1A	67	65.6	69	2.4
1B	71	75.1	77	5.5	1B	67	75.1	76	8.7
1C	71	70.9	74	3.0	1C	67	70.9	72	5.4
2A	69	59.5	69	0.5	2A	65	59.5	66	1.1
2B	69	67.4	71	2.3	2B	65	67.4	69	4.4
2C	69	66.2	71	1.8	2C	65	66.2	69	3.7
3A	72	58.2	72	0.2	3A	67	58.2	68	0.5
3B	72	66.8	73	1.1	3B	67	66.8	70	2.9
3C	72	66	73	1.0	3C	67	66	70	2.5
4A	71	68.3	73	1.9	4A	67	68.3	71	3.7
4B	71	76.8	78	6.8	4B	67	76.8	77	10.2
5A	68	65.1	70	1.8	5A	62	65.1	67	4.8
5B	68	71.8	73	5.3	5B	62	71.8	72	10.2
6A	68	62.3	69	1.0	6A	62	62.3	65	3.2
6B	68	68.7	71	3.4	6B	62	68.7	70	7.5
7	68	55.3	68	0.2	7	62	55.3	63	0.8
8A	68	63	69	1.2	8A	62	63	66	3.5
8B	68	69	72	3.5	8B	62	69	70	7.8
9	65	61.4	67	1.6	9	60	61.4	64	3.8

*Numbers for Stage 2A have changed from the Draft EIS.

Table 8.12-3 (continued)
Noise Levels - Average Workday

Stage 3 Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	60.5	71	0.4	1A	67	60.5	68	0.9
1B	71	66.8	72	1.4	1B	67	66.8	70	2.9
1C	71	64.3	72	0.8	1C	67	64.3	69	1.9
2A	69	54.7	69	0.2	2A	65	54.7	65	0.4
2B	69	60.7	70	0.6	2B	65	60.7	66	1.4
2C	69	59.6	69	0.5	2C	65	59.6	66	1.1
3A	72	50.9	72	0.0	3A	67	50.9	67	0.1
3B	72	56.7	72	0.1	3B	67	56.7	67	0.4
3C	72	58.5	72	0.2	3C	67	58.5	68	0.6
4A	71	60.7	71	0.4	4A	67	60.7	68	0.9
4B	71	68.1	73	1.8	4B	67	68.1	71	3.6
5A	68	65.1	70	1.8	5A	62	65.1	67	4.8
5B	68	71.2	73	4.9	5B	62	71.2	72	9.7
6A	68	62	69	1.0	6A	62	62	65	3.0
6B	68	68.1	71	3.1	6B	62	68.1	69	7.1
7	68	51.7	68	0.1	7	62	51.7	62	0.4
8A	68	62.3	69	1.0	8A	62	62.3	65	3.2
8B	68	68	71	3.0	8B	62	68	69	7.0
9	65	61.2	67	1.5	9	60	61.2	64	3.7

Stage 4B Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	78	79	7.8	1A	67	78	78	11.3
1B	71	80.7	81	10.1	1B	67	80.7	81	13.9
1C	71	76.1	77	6.3	1C	67	76.1	77	9.6
2A	69	69.8	72	3.4	2A	65	69.8	71	6.0
2B	69	74.6	76	6.7	2B	65	74.6	75	10.1
2C	69	72.7	74	5.2	2C	65	72.7	73	8.4
3A	72	70.4	74	2.3	3A	67	70.4	72	5.0
3B	72	73.8	76	4.0	3B	67	73.8	75	7.6
3C	72	72.5	75	3.3	3C	67	72.5	74	6.6
4A	71	76.6	78	6.7	4A	67	76.6	77	10.1
4B	71	81.2	82	10.6	4B	67	81.2	81	14.4
5A	68	63.9	69	1.4	5A	62	63.9	66	4.1
5B	68	71.1	73	4.8	5B	62	71.1	72	9.6
6A	68	62.8	69	1.1	6A	62	62.8	65	3.4
6B	68	68.8	71	3.4	6B	62	68.8	70	7.6
7	68	60.5	69	0.7	7	62	60.5	64	2.3
8A	68	66	70	2.1	8A	62	66	67	5.5
8B	68	69.9	72	4.1	8B	62	69.9	71	8.6
9	65	50.2	65	0.1	9	60	50.2	60	0.4

Stage 4A Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	62.1	72	0.5	1A	67	62.1	68	1.2
1B	71	68.5	73	1.9	1B	67	68.5	71	3.8
1C	71	65.5	72	1.1	1C	67	65.5	69	2.3
2A	69	56.4	69	0.2	2A	65	56.4	66	0.6
2B	69	62.5	70	0.9	2B	65	62.5	67	1.9
2C	69	61.3	70	0.7	2C	65	61.3	67	1.5
3A	72	53.6	72	0.1	3A	67	53.6	67	0.2
3B	72	59.8	72	0.3	3B	67	59.8	68	0.8
3C	72	60.5	72	0.3	3C	67	60.5	68	0.9
4A	71	62.5	72	0.6	4A	67	62.5	68	1.3
4B	71	69.8	73	2.5	4B	67	69.8	72	4.6
5A	68	66.8	70	2.5	5A	62	66.8	68	6.0
5B	68	72.2	74	5.6	5B	62	72.2	73	10.6
6A	68	63.4	69	1.3	6A	62	63.4	66	3.8
6B	68	69.3	72	3.7	6B	62	69.3	70	8.0
7	68	52.8	68	0.1	7	62	52.8	62	0.5
8A	68	63.6	69	1.3	8A	62	63.6	66	3.9
8B	68	69.1	72	3.6	8B	62	69.1	70	7.9
9	65	61.8	67	1.7	9	60	61.8	64	4.0

Stage 4C Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	58.7	71	0.2	1A	67	58.7	68	0.6
1B	71	64.8	72	0.9	1B	67	64.8	69	2.0
1C	71	61.9	72	0.5	1C	67	61.9	68	1.2
2A	69	53.1	69	0.1	2A	65	53.1	65	0.3
2B	69	59	69	0.4	2B	65	59	66	1.0
2C	69	57.8	69	0.3	2C	65	57.8	66	0.8
3A	72	50.2	72	0.0	3A	67	50.2	67	0.1
3B	72	56.5	72	0.1	3B	67	56.5	67	0.4
3C	72	57.1	72	0.1	3C	67	57.1	67	0.4
4A	71	59.2	71	0.3	4A	67	59.2	68	0.7
4B	71	66.1	72	1.2	4B	67	66.1	70	2.6
5A	68	65.2	70	1.8	5A	62	65.2	67	4.9
5B	68	69.6	72	3.9	5B	62	69.6	70	8.3
6A	68	61.7	69	0.9	6A	62	61.7	65	2.9
6B	68	67	71	2.5	6B	62	67	68	6.2
7	68	50	68	0.1	7	62	50	62	0.3
8A	68	61.6	69	0.9	8A	62	61.6	65	2.8
8B	68	66.6	70	2.4	8B	62	66.6	68	5.9
9	65	59	66	1.0	9	60	59	63	2.5

Table 8.12-4
Noise Levels – Peak Hour

Stage 1 Construction										Stage 2B Construction									
Shift 1					Shift 2					Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	73	75	4.1	1A	67	73	74	7.0	1A	71	79.9	80	9.4	1A	67	79.9	80	13.1
1B	71	79.2	80	8.8	1B	67	79.2	79	12.5	1B	71	89.8	90	18.9	1B	67	89.8	90	22.8
1C	71	75.3	77	5.7	1C	67	75.3	76	8.9	1C	71	85.5	86	14.7	1C	67	85.5	86	18.6
2A	69	67.6	71	2.4	2A	65	67.6	70	4.5	2A	69	74.1	75	6.3	2A	65	74.1	75	9.6
2B	69	74.1	75	6.3	2B	65	74.1	75	9.6	2B	69	82.3	82	13.5	2B	65	82.3	82	17.4
2C	69	72.4	74	5.0	2C	65	72.4	73	8.1	2C	69	81.1	81	12.4	2C	65	81.1	81	16.2
3A	72	67.4	73	1.3	3A	67	67.4	70	3.2	3A	72	73.5	76	3.8	3A	67	73.5	74	7.4
3B	72	73.8	76	4.0	3B	67	73.8	75	7.6	3B	72	82.2	83	10.6	3B	67	82.2	82	15.3
3C	72	72.2	75	3.1	3C	67	72.2	73	6.3	3C	72	81	82	9.5	3C	67	81	81	14.2
4A	71	73.4	75	4.4	4A	67	73.4	74	7.3	4A	71	82.2	83	11.5	4A	67	82.2	82	15.3
4B	71	80.3	81	9.8	4B	67	80.3	80	13.5	4B	71	91.5	92	20.5	4B	67	91.5	92	24.5
5A	68	63.1	69	1.2	5A	62	63.1	66	3.6	5A	68	73.1	74	6.3	5A	62	73.1	73	11.4
5B	68	70.4	72	4.4	5B	62	70.4	71	9.0	5B	68	82.5	83	14.7	5B	62	82.5	83	20.5
6A	68	62.6	69	1.1	6A	62	62.6	65	3.3	6A	68	72.4	74	5.7	6A	62	72.4	73	10.8
6B	68	68	71	3.0	6B	62	68	69	7.0	6B	68	79.5	80	11.8	6B	62	79.5	80	17.6
7	68	59.7	69	0.6	7	62	59.7	64	2.0	7	68	68.9	71	3.5	7	62	68.9	70	7.7
8A	68	64.5	70	1.6	8A	62	64.5	66	4.4	8A	68	73.7	75	6.7	8A	62	73.7	74	12.0
8B	68	68.7	71	3.4	8B	62	68.7	70	7.5	8B	68	80.3	81	12.5	8B	62	80.3	80	18.4
9	65	47.4	65	0.1	9	60	47.4	60	0.2	9	65	67.6	70	4.5	9	60	67.6	68	8.3

Stage 2A Construction*										Stage 2C Construction									
Shift 1					Shift 2					Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	43.1	71	0.0	1A	67	43.1	67	0.0	1A	71	62.3	72	0.5	1A	67	62.3	68	1.3
1B	71	51.5	71	0.0	1B	67	51.5	67	0.1	1B	71	68.2	73	1.8	1B	67	68.2	71	3.7
1C	71	46.9	71	0.0	1C	67	46.9	67	0.0	1C	71	66.3	72	1.3	1C	67	66.3	70	2.7
2A	69	37	69	0.0	2A	65	37	65	0.0	2A	69	56.4	69	0.2	2A	65	56.4	66	0.6
2B	69	43.2	69	0.0	2B	65	43.2	65	0.0	2B	69	62	70	0.8	2B	65	62	67	1.8
2C	69	42.1	69	0.0	2C	65	42.1	65	0.0	2C	69	61.2	70	0.7	2C	65	61.2	67	1.5
3A	72	37	72	0.0	3A	67	37	67	0.0	3A	72	50.3	72	0.0	3A	67	50.3	67	0.1
3B	72	43	72	0.0	3B	67	43	67	0.0	3B	72	54.1	72	0.1	3B	67	54.1	67	0.2
3C	72	41.9	72	0.0	3C	67	41.9	67	0.0	3C	72	59.7	72	0.2	3C	67	59.7	68	0.7
4A	71	43.9	71	0.0	4A	67	43.9	67	0.0	4A	71	62.3	72	0.5	4A	67	62.3	68	1.3
4B	71	53	71	0.1	4B	67	53	67	0.2	4B	71	69.5	73	2.3	4B	67	69.5	71	4.4
5A	68	34.4	68	0.0	5A	62	34.4	62	0.0	5A	68	66.1	70	2.2	5A	62	66.1	68	5.5
5B	68	43.2	68	0.0	5B	62	43.2	62	0.1	5B	68	73.2	74	6.3	5B	62	73.2	74	11.5
6A	68	34.1	68	0.0	6A	62	34.1	62	0.0	6A	68	63.3	69	1.3	6A	62	63.3	66	3.7
6B	68	40.4	68	0.0	6B	62	40.4	62	0.0	6B	68	69.6	72	3.9	6B	62	69.6	70	8.3
7	68	30.1	68	0.0	7	62	30.1	62	0.0	7	68	53.9	68	0.2	7	62	53.9	63	0.6
8A	68	36.2	68	0.0	8A	62	36.2	62	0.0	8A	68	63.9	69	1.4	8A	62	63.9	66	4.1
8B	68	41.2	68	0.0	8B	62	41.2	62	0.0	8B	68	69.9	72	4.1	8B	62	69.9	71	8.6
9	65	33.2	65	0.0	9	60	33.2	60	0.0	9	65	64	68	2.5	9	60	64	65	5.5

*Numbers for Stage 2A have changed from the Draft EIS.

Table 8.12-4 (continued)
Noise Levels – Peak hour

Stage 3 Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	62.2	72	0.5	1A	67	62.2	68	1.2
1B	71	68.2	73	1.8	1B	67	68.2	71	3.7
1C	71	66.3	72	1.3	1C	67	66.3	70	2.7
2A	69	56.3	69	0.2	2A	65	56.3	66	0.5
2B	69	62	70	0.8	2B	65	62	67	1.8
2C	69	61.1	70	0.7	2C	65	61.1	66	1.5
3A	72	50.2	72	0.0	3A	67	50.2	67	0.1
3B	72	54.1	72	0.1	3B	67	54.1	67	0.2
3C	72	59.7	72	0.2	3C	67	59.7	68	0.7
4A	71	62.2	72	0.5	4A	67	62.2	68	1.2
4B	71	69.5	73	2.3	4B	67	69.5	71	4.4
5A	68	66.1	70	2.2	5A	62	66.1	68	5.5
5B	68	73.2	74	6.3	5B	62	73.2	74	11.5
6A	68	63.3	69	1.3	6A	62	63.3	66	3.7
6B	68	69.6	72	3.9	6B	62	69.6	70	8.3
7	68	53.9	68	0.2	7	62	53.9	63	0.6
8A	68	63.9	69	1.4	8A	62	63.9	66	4.1
8B	68	69.9	72	4.1	8B	62	69.9	71	8.6
9	65	63.9	67	2.5	9	60	63.9	65	5.4

Stage 4B Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	76.7	78	6.7	1A	67	76.7	77	10.1
1B	71	83.5	84	12.7	1B	67	83.5	84	16.6
1C	71	79.2	80	8.8	1C	67	79.2	79	12.5
2A	69	71.6	74	4.5	2A	65	71.6	72	7.5
2B	69	77.2	78	8.8	2B	65	77.2	77	12.5
2C	69	75.8	77	7.6	2C	65	75.8	76	11.1
3A	72	76.7	78	6.0	3A	67	76.7	77	10.1
3B	72	77.4	79	6.5	3B	67	77.4	78	10.8
3C	72	75.8	77	5.3	3C	67	75.8	76	9.3
4A	71	82.4	83	11.7	4A	67	82.4	83	15.5
4B	71	84.2	84	13.4	4B	67	84.2	84	17.3
5A	68	67.6	71	2.8	5A	62	67.6	69	6.7
5B	68	74	75	7.0	5B	62	74	74	12.3
6A	68	66.1	70	2.2	6A	62	66.1	68	5.5
6B	68	71.3	73	5.0	6B	62	71.3	72	9.8
7	68	62.1	69	1.0	7	62	62.1	65	3.1
8A	68	67.7	71	2.9	8A	62	67.7	69	6.7
8B	68	73	74	6.2	8B	62	73	73	11.3
9	65	51.7	65	0.2	9	60	51.7	61	0.6

Stage 4A Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	69.9	73	2.5	1A	67	69.9	72	4.7
1B	71	76.1	77	6.3	1B	67	76.1	77	9.6
1C	71	72.4	75	3.8	1C	67	72.4	74	6.5
2A	69	64.5	70	1.3	2A	65	64.5	68	2.8
2B	69	70.9	73	4.1	2B	65	70.9	72	6.9
2C	69	69.3	72	3.2	2C	65	69.3	71	5.7
3A	72	63.9	73	0.6	3A	67	63.9	69	1.7
3B	72	70.3	74	2.2	3B	67	70.3	72	5.0
3C	72	69.1	74	1.8	3C	67	69.1	71	4.2
4A	71	70.2	74	2.6	4A	67	70.2	72	4.9
4B	71	77.1	78	7.1	4B	67	77.1	78	10.5
5A	68	72.7	74	6.0	5A	62	72.7	73	11.1
5B	68	75.9	77	8.6	5B	62	75.9	76	14.1
6A	68	69.1	72	3.6	6A	62	69.1	70	7.9
6B	68	73.6	75	6.7	6B	62	73.6	74	11.9
7	68	58.7	68	0.5	7	62	58.7	64	1.7
8A	68	69	72	3.5	8A	62	69	70	7.8
8B	68	73.4	75	6.5	8B	62	73.4	74	11.7
9	65	64.4	68	2.7	9	60	64.4	66	5.7

Stage 4C Construction									
Shift 1					Shift 2				
Receptor	Baseline	Construction	Combined	Increase	Receptor	Baseline	Construction	Combined	Increase
1A	71	69.9	73	2.5	1A	67	69.9	72	4.7
1B	71	76.1	77	6.3	1B	67	76.1	77	9.6
1C	71	72.4	75	3.8	1C	67	72.4	74	6.5
2A	69	64.5	70	1.3	2A	65	64.5	68	2.8
2B	69	70.9	73	4.1	2B	65	70.9	72	6.9
2C	69	69.3	72	3.2	2C	65	69.3	71	5.7
3A	72	63.9	73	0.6	3A	67	63.9	69	1.7
3B	72	70.3	74	2.2	3B	67	70.3	72	5.0
3C	72	69.1	74	1.8	3C	67	69.1	71	4.2
4A	71	70.2	74	2.6	4A	67	70.2	72	4.9
4B	71	77.1	78	7.1	4B	67	77.1	78	10.5
5A	68	72.7	74	6.0	5A	62	72.7	73	11.1
5B	68	75.9	77	8.6	5B	62	75.9	76	14.1
6A	68	69.1	72	3.6	6A	62	69.1	70	7.9
6B	68	73.6	75	6.7	6B	62	73.6	74	11.9
7	68	58.7	68	0.5	7	62	58.7	64	1.7
8A	68	69	72	3.5	8A	62	69	70	7.8
8B	68	73.4	75	6.5	8B	62	73.4	74	11.7
9	65	64.4	68	2.7	9	60	64.4	66	5.7

Stage 2B (2 months) would include excavation of the distribution chamber. The rock drill is the primary noise contributors during this stage. During Stage 2B, the noise analysis indicates that at ground level Receptors, noise levels would increase over existing conditions at Receptors 1A, 4A, 5A, 6A, 8A, and 9 by between 3.2 and 6.7 dBA during Shift 1 and at Receptors 1A, 2A, 3A, 4A, 5A, 6A, 8A, and 9 by between 3.4 and 10.1 during Shift 2. These impacts would be marginally noticeable to intrusive. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 1B, 1C, 2B, 2C, 3B, 3C, 4B, 5B, 6B, 8B by between 5.0 and 15.0 dBA during Shift 1 and between 8.9 and 19.0 during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 66 and 86 dBA.

Stage 2C (6 months) would include slashing and lining of the shaft. The rock drill and derrick crane are the primary noise contributors during this stage. During Stage 2C, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 4A, 5A, 6A, 8A, and 9 by 3.2 to 4.8 dBA during Shift 2. These impacts would be marginally noticeable. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 1B, 1C, 4B, 5B, 6B, and 8B by between 3.0 and 6.8 dBA during Shift 1 and at Receptors 1B, 1C, 2B, 2C, 4B, 5B, 6B, and 8B by between 3.7 and 10.2 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 64 and 78 dBA.

Stage 3 (12 months) would include installation of riser piping and construction of the distribution chamber. The derrick crane, concrete trucks, flatbed truck, and front end loader are the primary noise contributors during this stage. During Stage 3, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 5A, 6A, 8A, and 9 by 3.0 to 4.8 dBA during Shift 2. These impacts would be marginally noticeable. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 5B, 6B, 8B by between 3.0 and 4.9 dBA during Shift 1 and at Receptors 4B, 5B, 6B, 8B by between 3.6 and 9.7 dBA during Shift 2. These impacts would be marginally noticeable to readily noticeable. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 64 and 73 dBA.

Stage 4A (12 months) would include installation of distribution pipes and valves, completion of riser/distribution chambers, and installation of other piping. The front end loader, dump truck, flatbed truck, excavator, and derrick crane are the primary noise contributors during this stage. During Stage 4A, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 5A, 6A, 8A, and 9 by 3.8 to 6.0 dBA during Shift 2. These impacts would be marginally noticeable to readily noticeable. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 5B, 6B, and 8B by between 3.6 and 5.6 dBA during Shift 1 and at Receptors 1B, 4B, 5B, 6B, and 8B by between 4.6 and 10.6 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 64 and 74 dBA.

Stage 4B (3 months) would include construction of the regulator and valve chambers adjacent to the shaft. The concrete trucks, telescoping crane, backhoe, and jackhammer are the primary noise contributors during this stage. During Stage 4B, the noise analysis indicates that at ground level Receptors, noise levels would increase over existing conditions at Receptors 1A, 2A, 4A, by between 3.4 and 7.8 dBA during Shift 1 and at Receptors 1A, 2A, 3A, 4A, 5A, 6A, 8A by between 3.4 and 11.3 during Shift 2. These impacts would be marginally noticeable to intrusive. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 1B, 1C, 2B, 2C, 3B, 3C, 4B, 5B, 6B, 8B by between 3.3 and 10.6 dBA during Shift 1 and between 6.6 and 14.4 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 65 and 82 dBA.

During this stage, shaft construction activities may occur concurrently with construction of the first stage of water mains with venturi chamber. As presented in Table 8-12.3 and Table 5.12-6, the noise analyses show that the noise produced by the water main construction activities would be dominant. Increases in noise levels at nearby receptors can be expected to be equal to the noise levels predicted for the first stage of the water main with venturi chamber. These noise levels would be expected to last for 20 weeks.

Stage 4C (2 months) would include site clean-up and restoration. The front end loader, dump truck, and flatbed truck are the primary noise contributors during this stage. During Stage 4C, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptor 5A by 4.9 dBA during shift 2. This impact would be marginally noticeable. At the elevated Receptors, noise levels would increase over existing conditions at Receptor 5B by 3.9 dBA during Shift 1 and Receptors 5B, 6B, and 8B by between 5.9 and 8.3 dBA during Shift 2. These impacts would be marginally noticeable to readily noticeable. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 67 and 72 dBA.

In addition to the potential noise impacts identified above, additional floors of the identified affected receptors could be impacted. Furthermore, impacts would extend to additional receptors locations beyond those modeled. During several stages of construction, it is estimated that potential noise impacts could extend to buildings located between First Avenue and the midblock of Third Avenue along E. 54th Street and between E. 53rd and E. 55th Streets along Second Avenue.

Potential Noise Impacts—Peak Period Analysis

The peak period analysis shows that incremental noise levels from construction would exceed 3 dBA for all stages of construction with the exception of Stage 2A. Impacts would occur at all receptors analyzed and either Receptor 4 or Receptor 5 would experience the greatest increases in noise levels depending on the stage of construction (see Figure 8.12-2 for a map of the receptor locations). In general, elevated receptors are more likely to exceed the 3 dBA CEQR threshold than ground level receptors, which would be protected by the site’s concrete wall. At locations further from the construction site (Receptor 7) the estimated construction noise levels would be less likely to exceed 3 dBA. The following discussion addresses only those receptors with impacts above the 3 dBA CEQR impact threshold. Note that no impacts are expected during Stage 2A, which consists of the raise bore operations. During a few days of this stage, additional equipment including a front end loader, dump truck, flatbed truck, derrick crane, welder, and saw would be used to support the raise bore operations such as pilot hole drilling activities. During these few days, noise levels would be somewhat higher than those presented, up to 8.8 dBA.

Stage 1 (4 months) would include site preparation, initial excavation, and installation of excavation supports and work slabs. The excavator and front end loader are the primary noise contributors during this stage. During Stage 1, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 1A and 4A by between 4.1 and 4.4 dBA during Shift 1 and at Receptors 1A, 2A, 3A, 4A, 5A, 6A and 8A by between 3.2 and 7.3 dBA during Shift 2. These increases range from marginally noticeable to readily noticeable. Noise levels at all elevated Receptors would increase over existing conditions. During Shift 1, noise levels would increase over existing conditions by between 3.0 and 9.8 dBA. During Shift 2 noise levels would increase over existing conditions by between 6.3 and 13.5 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 65 and 81 dBA.

Stage 2B (2 months) would include excavation of the distribution chamber. The rock drill is the primary noise contributor during this stage. During Stage 2B, the noise analysis indicates that noise levels would increase over existing conditions at all ground level Receptors by between 3.5 and 11.5 dBA during Shift 1 and by between 7.4 and 15.3 during Shift 2. These impacts would be marginally noticeable to intrusive. Noise levels would also increase over existing conditions at all elevated Receptors by between 9.5 and 20.5 dBA during Shift 1 and by between 14.2 and 24.5 during Shift 2. These impacts would be marginally noticeable to highly intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 68 and 92 dBA.

Stage 2C (6 months) would include slashing and lining of the shaft. The concrete truck and derrick crane are the primary noise contributors during this stage. During Stage 2C, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 5A, 6A, 8A and 9 by between 3.7 to 5.5 dBA during Shift 2. These impacts would be marginally noticeable to readily noticeable. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 5B, 6B, and 8B by between 3.9 and 6.3 dBA during Shift 1 and at Receptors 1B, 4B, 5B, 6B and 8B by between 3.7 and 11.5 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 65 and 74 dBA.

Stage 3 (12 months) would include installation of riser piping and construction of the distribution chamber. The concrete truck and derrick crane are the primary noise contributors during this stage. During Stage 3, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 5A, 6A, 8A and 9 by between 3.7 to 5.5 dBA during Shift 2. These impacts would be marginally noticeable to readily noticeable. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 5B, 6B, and 8B by between 3.9 and 6.3 dBA during Shift 1 and at Receptors 1B, 4B, 5B, 6B and 8B by between 3.7 and 11.5 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 65 and 74 dBA.

Stage 4A (12 months) would include installation of distribution pipes and valves, completion of riser/distribution chambers, and installation of other piping. The front end loader and dump truck are the primary noise contributors during this stage. During Stage 4A, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 5A, 6A, and 8A by between 3.5 to 6.0 dBA during shift 1 and at Receptors 1A, 4A, 5A, 6A, 8A and 9 by between 4.7 and 11.1 dBA during Shift 2. These increases range from marginally noticeable to intrusive. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 1B, 1C, 2B, 2C, 4B, 5B, 6B, and 8B by between 3.2 and 8.6 dBA during Shift 1 and at all elevated Receptors by between 4.2 and 14.1 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 66 and 78 dBA.

Stage 4B (3 months) would include construction of the regulator and valve chambers adjacent to the shaft. The concrete truck and backhoe are the primary noise contributors during this stage. During Stage 4B, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 1A, 2A, 3A, and 4A by between 4.5 and 11.7 dBA during Shift 1 and at all ground level Receptors except Receptor 9 by between 3.1 and 15.5 dBA during Shift 2. These increases range from marginally noticeable to readily intrusive. Noise levels would increase over existing conditions at all elevated receptors by between 5.0 and 13.4 dBA during Shift 1 and by between 9.3 and 17.3 dBA during Shift 2. These impacts would be readily noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 65 and 84 dBA.

Stage 4C (2 months) would include site clean-up and restoration. The front end loader and dump truck are the primary noise contributors during this stage. During Stage 4C, the noise analysis indicates that at the ground level Receptors, noise levels would increase over existing conditions at Receptors 5A, 6A, and 8A by between 3.5 to 6.0 dBA during Shift 1 and at Receptors 1A, 4A, 5A, 6A, 8A and 9 by between 4.7 and 11.1 dBA during Shift 2. These increases range from marginally noticeable to intrusive. At the elevated Receptors, noise levels would increase over existing conditions at Receptors 1B, 1C, 2B, 2C, 4B, 5B, 6B, and 8B by between 3.2 and 8.6 dBA during Shift 1 and at all elevated Receptors by between 4.2 and 14.1 dBA during Shift 2. These impacts would be marginally noticeable to intrusive. The total construction ambient noise levels (construction source plus baseline ambient) at these receptor locations would be between 66 and 78 dBA.

In addition to the potential noise impacts identified above, additional floors of the identified affected receptors could be impacted. Furthermore, impacts would extend to additional receptors locations beyond those modeled. During several stages of construction, it is estimated that potential noise impacts could extend to buildings located between First Avenue and the midblock of Third Avenue along 54th Street and between 53rd and 55th Streets along Second Avenue.

Potential Noise Impacts-Surface Excavation Method

Under the surface excavation method, the shaft would be constructed from the surface downward. In contrast to the raise bore method, where most of the work to excavate the shaft and distribution chamber would occur underground, under the surface excavation method, this work would occur at the surface of the Site. Only Stage 2 would be different between the two methods; Stages 1, 3, and 4 would be similar.

In addition to longer periods of blasting, as discussed above, the surface excavation method would require longer periods of controlled drilling and other excavation techniques to create the shaft from the surface level (30 months under the surface excavation method for Stage 2 as compared to 21 months under the raise bore method).

Heavier, and potentially louder, construction activities and equipment would be required during Stage 2 to excavate and move the heavy rock out of the shaft to the surface. The excavator, derrick crane and dump trucks would be used more extensively for longer hours as indicated in the average period equipment utilization tables in Appendix 12. In addition, a diesel compressor would likely be required on-site. During this Stage, the peak hour noise levels generated by construction equipment would be comparable to the raise bore method because similar types of equipment would be used, but the equipment would be used for a greater number of hours and the duration of noise impacts would be longer on a given day. In addition, noise levels would also be expected to be higher due to the higher level of construction activity associated with moving rock at the surface, rather than below ground.

The excavated soil and rock would be removed from the site by trucks for the entire shaft excavation during Stage 2. 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. However, the total number of trucks in Stage 2 would not result in a doubling of passenger car equivalents (PCEs) in the vicinity of the Site during the peak hour and a mobile source analysis is not warranted.

Conclusions

Blasting would result in high instantaneous noise levels. As described in Section 4.12, "Noise," of Chapter 4, "Preferred Shaft Site," NYCDEP would implement a number of protective measures during blasting to minimize noise impacts. Blasting would occur over a period of six months for the raise bore method and 15 months for the surface excavation method and it is highly unlikely that more than one or two blasts would occur on a given day.

During other construction activities at this Shaft Site, based on the range of analysis conducted, there is the potential for adverse noise impacts during all stages of construction. Potential adverse noise impacts during average conditions would range from 3.0 dBA to 15.0 dBA during Shift 1 and from 3.0 dBA to 19.0 dBA during Shift 2. Potential adverse noise impacts during peak conditions would range from 3.0 dBA to 20.5 dBA during Shift 1 and from 3.1 dBA to 24.5

dBA during shift 2. Receptors 1, 4, 5, 6, and 8 would experience the greatest increases in noise levels. Generally, ground floor receptors would be more protected by the site's concrete wall.

In addition to the potential noise impacts identified based on the modeling, additional floors of the identified affected receptors could be impacted. Furthermore, impacts would extend to additional receptors locations beyond those modeled. During several stages of construction, it is estimated that potential noise impacts could extend to buildings located between First Avenue and the midblock of Third Avenue along E. 54th Street and between E. 53rd and E. 55th Streets along Second Avenue.

If surface excavation were to be used, the peak hour noise levels during Stage 2 generated by construction equipment would be comparable to the raise bore method because similar types of equipment would be used, but the equipment would be used for a greater number of hours and the duration of noise impacts would be longer on a given day. In addition, noise levels would also be expected to be higher due to the higher level of construction activity associated with moving rock at the surface, rather than below ground.

Due to the extended duration that potential noise impacts could occur throughout the construction period, these impacts are considered to be significant. Section 5.12, "Noise," of Chapter 5, "Water Main Connections," discusses the temporary noise impacts generated by construction of the water main connections and venturi chambers. In the event of concurrent construction of the shaft, water main connections, and venturi chambers, no additional receptors would experience potential significant adverse impacts, but the receptors that are in the immediate vicinity of both construction projects would experience higher noise levels than they would experience if only the shaft would be constructed for the relatively short time (20 weeks) that both construction projects were under way at the same time.

These conclusions are based on the increases and duration of the noise levels due to the construction activities at the Shaft Site. The potential increases in noise levels are not permanent environmental changes and no changes in the noise levels will occur from this project after it has been constructed. As discussed in Section 8.16, "Mitigation Measures," NYCDEP is exploring potential mitigation measures that could attenuate noise levels at the affected receptors.

Activation and Operation

None of the activities associated with the activation or operation of the shaft would cause potential significant noise impacts, as there would be no loud machinery associated with these activities. Shaft activation would occur for a very short period of time (approximately one month), would not include the use of pumps or other noise-generating equipment, and would require a maximum of one truck delivery per day for a period of approximately three to five days. Due to these short-term and temporary effects, shaft activation would not have the potential to significantly impact noise within the Study Area. All equipment, including pumps and movable valves, associated with operation of the shaft would be located below ground and the facility would be unmanned. Maintenance activities would occur intermittently and generally for not more than a few hours per week. Therefore, no potential significant adverse noise impacts would be expected during activation and operation of the shaft. ◆