Appendix I
Noise Monitoring Memo

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Memorandum

To:	New York City Department of City Planning
From:	Daniel Abatemarco, AKRF, Inc.
Date:	March 20, 2019
Re:	Gowanus Neighborhood Rezoning EIS — Noise Monitoring Approach
cc:	Brianna Shaw, Patrick Blanchfield, Robert White, Henry Kearney (AKRF, Inc.)

The purpose of this memorandum is to describe the noise analysis approach for the proposed development sites for the Gowanus Rezoning Environmental Impact Statement (EIS). A total of 133 development sites (60 projected and 73 potential) have been identified in the proposed rezoning area (the "Project Area"). Under the reasonable worst case development scenario (RWCDS) for the Proposed Actions, the total development expected to occur on the 60 projected development sites under the With Action condition would consist of residential, commercial, industrial, and community facility uses, as well as parking. The analysis year is 2035.

This memorandum presents a summary of the selection of noise receptor locations and describes the noise monitoring approach to determine existing ambient noise levels in the rezoning area. The measured existing noise levels will be used as part of the noise analysis to examine: 1) whether there are any locations where there is the potential for the Proposed Actions to result in significant adverse noise impacts (i.e., doubling Noise Passenger Car Equivalents [PCEs]), and 2) what level of building attenuation is necessary to provide acceptable interior noise levels at each development site under guidelines contained in the 2014 *CEQR Technical Manual*.

SELECTION OF NOISE RECEPTOR LOCATIONS

As the first step in this process, a field visit was performed to develop a list of proposed receptor locations. According to AKRF's field observations, vehicular traffic is the dominant noise source throughout the study area, except along Smith Street, although stationary sources (e.g., building HVAC equipment) contribute some small amount to noise levels at some locations as well. Along Smith Street, elevated/at-grade NYCT F and G line trains are the dominant noise sources. In general, the levels of existing noise at each location are primarily influenced by the amount of vehicular traffic on the immediately adjacent roadway or nearby roadways or rail traffic along Smith Street. It is expected that measurements from one monitoring location could apply to multiple sites along the same road corridor as well as to sites along similar road corridors.

The proposed noise receptor locations were selected based on the following three criteria: 1) locations of the projected and potential development sites under the RWCDS; 2) providing comprehensive geographic coverage across the study area in order to get a characterization of the ambient noise environment; and 3) existing land use patterns (e.g., along major commercial road corridors, along bus routes, and near rail lines).

A total of 23 receptor sites will be selected for the noise analysis in the Project Area where a total of 134 development sites (61 projected and 73 potential) have been identified. In addition to these 23 sites, the results of existing noise measurements at two sites conducted for the Gowanus Canal Combined Sewer Overflow Facilities Final Environmental Impact Statement (CEQR# 17DCP040K) will be used to establish existing noise levels within the Project Area. These receptors, due to their proximity to the development sites, provide an effective and conservative representation of existing ambient noise levels at the projected and potential development sites.

NOISE MONITORING

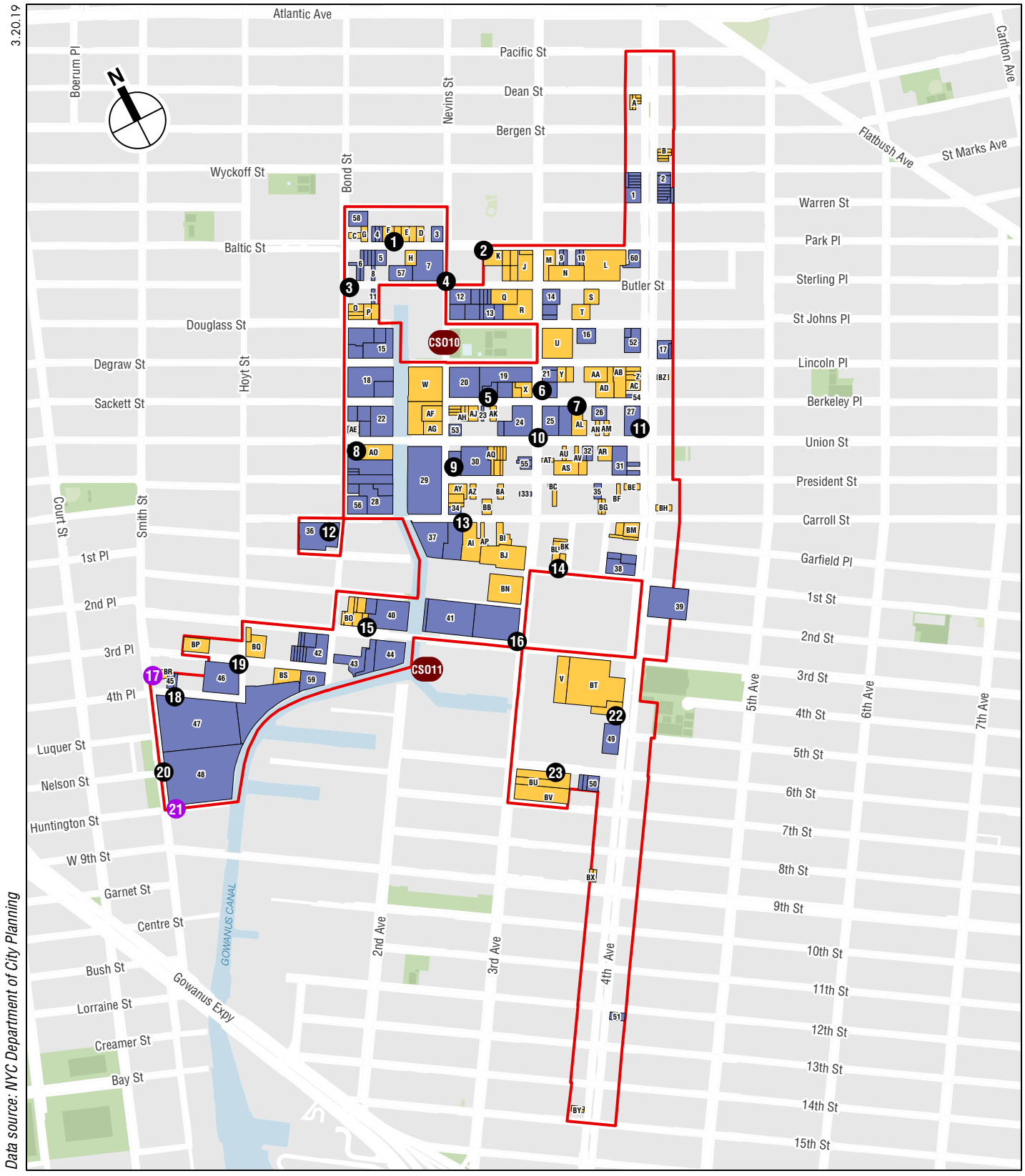
AKRF plans to conduct a noise survey with noise measurements at 23 locations in the rezoning area. Traffic and/or train counts will be included during all the measurements for the rail line and/or roadway immediately adjacent to each receptor site. **Figure 1** shows the locations of the 23 noise receptor sites, and **Table 1** lists the noise receptor sites, the duration of measurements, and receptor locations.

Table 1
Proposed Noise Measurement Locations

Site	Measurement Duration	Location
1	20 minutes	Baltic Street between Bond Street and Nevins Street
2	20 minutes	Baltic Street between Nevins Street and 3rd Avenue
3	20 minutes	Bond Street at Butler Street
4	20 minutes	Nevins Street at Butler Street
5	20 minutes	Sackett Street between Nevins Street and 3rd Avenue
6	20 minutes	3rd Avenue between Degraw Street and Sackett Street
7	20 minutes	Sackett Street between 3rd Avenue and 4th Avenue
8	20 minutes	Bond Street at Union Street
9	20 minutes	Nevins Street between Union Street and President Street
10	20 minutes	3rd Avenue at Union Street
11	20 minutes	4th Avenue between Sackett Street and Union Street
12	20 minutes	Bond Street between Carroll Street and 1st Street
13	20 minutes	Carroll Street between Nevins Street and 3rd Avenue
14	20 minutes	1st Street at Whitewell Place
15	20 minutes	3rd Street between Bond Street and Gowanus Canal
16	20 minutes	3rd Street at 3rd Avenue
17	60 minutes	Smith Street between 4th Street and 5th Street (elevated to level of adjacent rail line)
18	20 minutes	5th Street between Smith Street and Hoyt Street
19	20 minutes	4th Street at Hoyt Street
20	60 minutes	Smith Street at Nelson Street
21	60 minutes	Smith Street at Huntington Street (elevated approximately 12-15 feet above grade)
22	20 minutes	4th Avenue between 3rd Street and 5th Street
23	20 minutes	6th Street between 3rd Avenue and 4th Avenue

Notes:
[1] Noise measurements will be conducted during typical weekday AM, midday, PM and weekend (Saturday) midday peak periods.

At receptor sites 17, 20 and 21, which are adjacent to the elevated NYCT F and G rail lines, 1-hour spot noise measurements will be conducted during typical weekday AM (7:15 AM—9:15 AM), midday (12:00 PM—2:00 PM), PM (4:00 PM—6:00 PM), and weekend midday (12:00 PM—2:00 PM) peak periods. At all other receptor sites, 20-minute spot noise measurements will be conducted during the same peak periods. All noise measurement locations will be approximately 5 feet above grade, with the exception of receptor sites 17 and 21. Site 17 will be located approximately 12 feet above grade, which is approximately level with the NYCT F and G rail lines. Site 21 will be located approximately 12 to 15 feet above grade, which is the maximum available height from a hand-held extension pole. Although this height is lower than the



Noise Measurement Locations

GOWANUS NEIGHBORHOOD REZONING AND RELATED ACTIONS

Figure 1

height of the adjacent elevated F and G rail lines (approximately 35 feet at this location), it is expected to provide a maximum noise level incident at the nearby development sites because it is immediately adjacent to the stel support structure for the elevated subway, which is the primary element from which noise is radiated (i.e., the train wheels rolling over the tracks excite the structure, and the supports rattle and radiate noise with each subway pass-by). Traffic on adjacent roadways and trains on the elevated NYCT F and G rail lines will be counted concurrently with the noise measurements.

Measurements will be performed using Type 1 Sound Level Meter (SLM) instruments according to ANSI Standard S1.4-1983 (R2006). The SLMs will have laboratory calibration dates within one year of the date of the measurements. All measurement procedures will be based on the guidelines outlined in ANSI Standard S1.13-2005.

It is also proposed that the air traffic noise would not be removed from the noise measurements. This would ensure that recommended attenuation levels within the study area take the aircraft noise into account in order to determine acceptable interior noise levels.

GOWANUS CANAL COMBINED SEWAGE OVERFLOW FACILITIES FEIS NOISE MEASUREMENTS

As part of the construction noise analysis for the Gowanus Canal Combined Sewer Overflow Facilities Final Environmental Impact Statement, noise measurements were conducted at 11 sites. Continuous 24-hour noise measurements were performed at two sites (described here as CSO10 and CSO11) weekday on October 5, 2016 through October 6, 2016, and during the weekend on July 9 through 10 and 15 through 16, 2017. Weekday measurements were conducted between Tuesday and Thursday on weeks when New York City Public Schools were in session as recommended by the *CEQR Technical Manual*. Additional measurements were conducted on July 9, 10, 15 and 16, 2017 to document weekend noise levels. The measurements were performed using Type 1 Sound Level Meter (SLM) instruments according to ANSI Standard S1.4-1983 (R2006). The SLMs had laboratory calibration dates within one year of the date of the measurements. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

The existing $L_{eq(1)}$ and $L_{10(1)}$ noise levels measured during the weekday and weekend peak time periods at each measurement location from the Gowanus Canal Combined Sewer Overflow Facilities FEIS are summarized in **Table 2**.

Table 2
Noise Survey Results from Gowanus Canal CSO Facilities FEIS (in dBA)

Site	Location	Time	L_{eq}	L_{10}
CSO10	Nevins Street between Douglass Street and Degraw Street	AM	65.6	67.4
		MD	65.5	67.1
		PM	64.1	66.0
		WE	62.0	64.8
CSO11	Southwest corner of Whole Food Market Outdoor Space	AM	63.3	66.2
		MD	65.0	67.2
		PM	56.2	58.1
		WE	58.3	60.6

Notes:
[1] Continuous noise level measurements were conducted by AKRF, Inc. on October 5, 2016 (Wednesday) through October 6, 2016 (Thursday), July 8, 2017 (Saturday) through July 9, 2017 (Sunday) and July 15, 2017 (Saturday) through July 16, 2017 (Sunday), and are representative of weekday and weekend conditions.
Sources: Gowanus Canal Combined Sewer Overflow Facilities FEIS, 17DCP040K.

In addition to the peak hour noise levels shown in **Table 2**, the noise level evaluation at CSO10 and CSO11 will consider all hourly noise levels measured at these locations.

NOISE MEASUREMENT APPLICATION TO DEVELOPMENT SITES

Table 3 lists the Gowanus Canal development sites and the noise receptor sites (including those proposed for the Gowanus Neighborhood Rezoning noise analysis and those from the Gowanus Canal Combined Sewage Overflow Facilities FEIS) upon which existing noise levels at each development site would be based.

Table 3
Noise Measurement Locations associated with Projected/Potential Development Sites

Development Site	Block(s)	Lot(s)	Associated Noise Measurement Site(s)
Projected Development Sites			
1	395	30, 32-37	11
2	934	1-7,10,12,74	11
3	399	39, 41	1, 4
4	399	58,59, 60	1
5	405	13,14,15,16	1
6	405	12, 63, 64	1, 3
7	405	27	1, 4
8	405	60	1, 3
9	407	8,9	2
10	407	12,13	2
11	411	12	3
12	412	1,6,15,50,51	4,CSO10
13	412	18,19,20,45, 48	2, 4, CSO10
14	413	1,2,7	2, 6
15	417	1,10,14,21	3, 8
16	420	19	7
17	946	1,3-7, 84,85,101	11
18	424	1,20	3, 8
19	426	17, 44, 49	5, 6
20	426	1	5, CSO10

Table 3 (cont'd)
Noise Measurement Locations associated with Projected/Potential Development Sites

Development Site	Block(s)	Lot(s)	Associated Noise Measurement Site(s)
21	427	1,7,10	6, 7
22	431	12,17,7,43	8
23	433	18	5
24	433	28, 46	5, 10
25	434	1,12	6, 7, 10
26	434	24	7
27	434	35	11
28	438, 445	1,2,3,8,11, 20,50	8, 13
29	439	1	9, 13
30	440	1,12	9,10
31	441	24,33,35	7, 10, 11
32	441	16,18	10
33	447	32	10
34	447	1	9, 13
35	448	25	7
36	451	25	12
37	453	1,21	13
38	456	1,34,6	11
39	969	1	11

Table 3 (cont'd)

Noise Measurement Locations associated with Projected/Potential Development Sites

Development Site	Block(s)	Lot(s)	Associated Noise Measurement Site(s)
40	462	12,14	15
41	972	1,43,58	16
42	465	27-29,33,46-50	12
43	466	17,60	12,15
44	466	19	15, CSO11
45	468	60,60	18
46	468	25	18, 19
47	471	1,100	17, 18, 20
48	471	200	20, 21
49	980	77	22
50	992	24,26,29	23
51	1028	7	22
52	420	34,37	7, 11
53	433	1	9, 10
54	427	47	11
55	440	35,36,38	10
56	445	1	12
57	405	51	3, 4
58	399	6	3
59	471	125	19
60	407	26	11
Potential Development Sites			
A	198	34-38	11
B	932		11
C	399		3
D	399	47,49	1
E	399	51,53	1
F	399	55	1
G	399	62	1
H	405	24	1
J	406	25,27,50,52, 69,71	2, 6
K	406	18	2
L	407	41	2
M	407	1	6
N	407	52	2, 4
O	411	1,2,3	3
P	411	58,60	3
Q	412	21	2
R	412	29	2, 6
S	413	21	7
T	413	58	7
U	420	1	6
V	980	19	16
W	425,432	1,15	9
X	926	36,41	5, 6
Y	427	12,15	7
Z	427	37,38,40	11
AA	427	21	7
AB	427	31	7
AC	427	42	11
AD	427	52	7
AE	432	2	8, 9
AF	432	25	9
AG	432	7501	8, 9

Table 3 (cont'd)
Noise Measurement Locations associated with Projected/Potential Development Sites

Development Site	Block(s)	Lot(s)	Associated Noise Measurement Site(s)
AH	433	8,9,10,12,13	5
AI	453	26	13
AJ	433	14	5
AK	433	21	5
AL	434	16	7, 10
AM	434	52	10
AN	434	55	10
AO	438	7	8
AP	453	31	13
AQ	440	21,23-26,47,48	9, 10
AR	441	21	10
AS	441	50,53	7
AT	441	4	10
AU	441	11	10
AV	441	14	10
AY	447	3,4,7	9
AZ	447	13	5
BA	447	13	5
BB	447	22	13
BC	448	50	7
BE	448	12	11
BF	448	34	7
BG	448	31	13
BH	458	52,53	11
BI	453	2	13
BJ	453	36	14,16
BK	454	54	14
BL	454	24,25,27	14
BM	456	33,31	11, 13
BN	967	13,17,23	16
BO	462	24	15
BP		6,8,9,42, 44,50	19
BQ	465	1,10	19
BR	468	3	17
BS	471	116	19
BT	980	23,49	22
BU	992	5,7	23
BV	992	1	23
BX	1003	43, 44	23
BY	1040	46, 47	22
BZ	949	7, 8	11

PLAYGROUND NOISE

Table 4 shows measured maximum hourly playground boundary noise levels. These values are based upon measurements made at a series of New York City school playgrounds for the New York City School Construction Authority (SCA).[1]

[1] SCA Playground Noise Study, AKRF, Inc., October 23, 1992.

Table 4
Playground Boundary Noise $L_{eq(1)}$ Noise Levels (dBA)

Early Childhood	Elementary Schools	Intermediate Schools	High Schools
71.5	71.4	71.0	68.2
Source: SCA Playground Noise Study, AKRF, Inc., October 23, 1992.			

Geometric spreading and the consequent dissipation of sound energy with increasing distance from the playground decreases noise levels at varying distances from the playground boundary. Based upon measurements and acoustical principles, hourly noise levels are assumed to decrease by the following values at the specified distances from the playground boundary: 4.8 dBA at 20 feet, 6.8 dBA at 30 feet, and 9.1 dBA at 40 feet. For all distances between 40 and 300 feet, a 4.5-dBA drop-off per doubling of distances from the playground boundary is assumed.

At each of the noise receptor locations described above that has a direct line of sight to a playground, noise associated with any nearby playground will be estimated using the Early Childhood playground boundary noise level (to conservatively represent children of any age using the playground) and the noise level reductions with distances as described above.