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Technical Memorandum

To:	New York City Department of City Planning
From:	AKRF
Date:	September 16, 2022
Re:	Innovation QNS (CEQR #21DCP180Q) – Proposed Modified Application Alternative – Detailed Heating and Hot Water Systems Analysis

INTRODUCTION

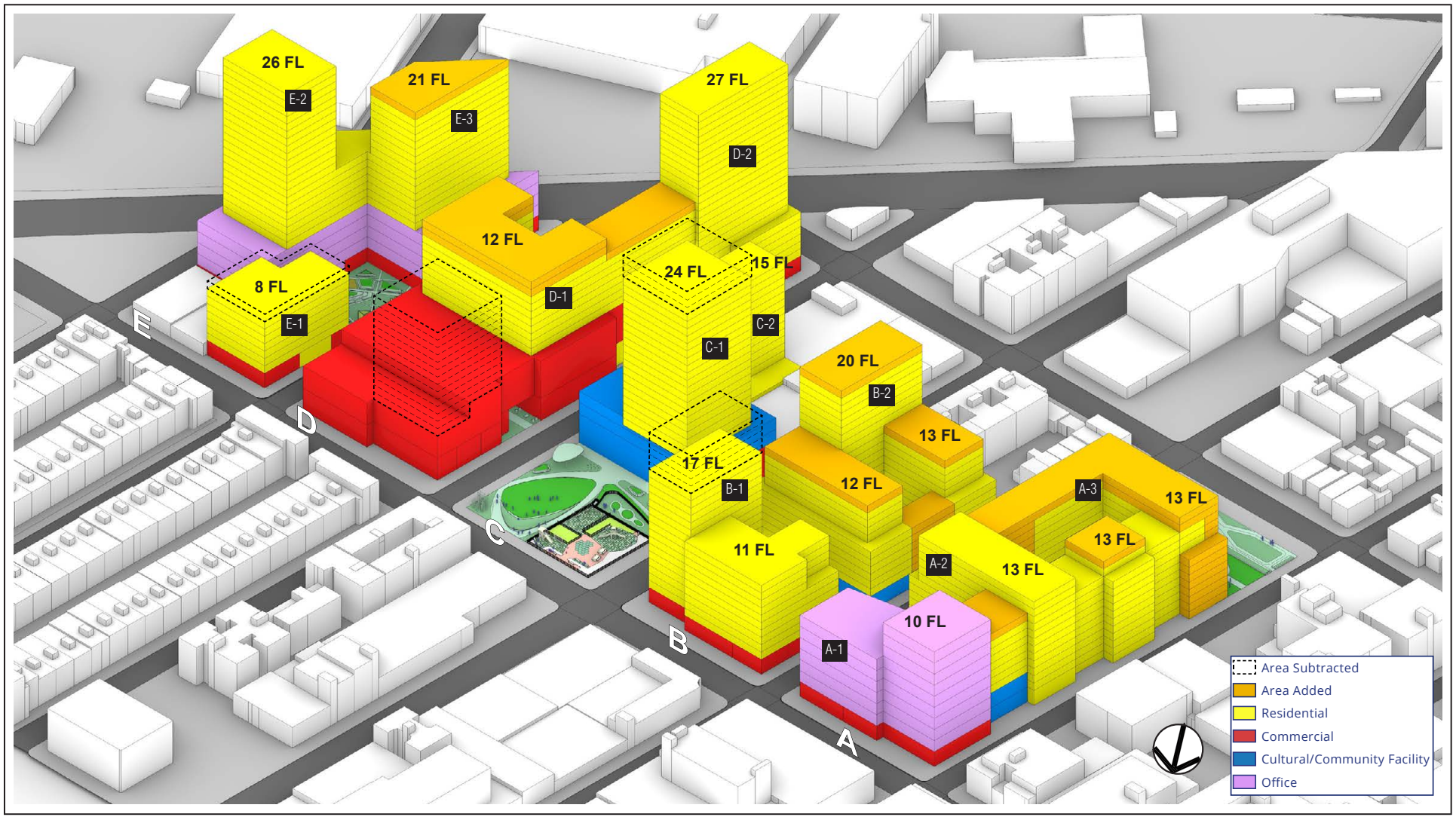
This post FEIS Technical Memorandum presents the stationary source analysis conducted for the Proposed Modified Application Alternative examined in Chapter 21, "Alternatives," of the Innovation QNS Rezoning and LSGD Final Environmental Impact Statement (FEIS), issued September 9, 2022. As discussed in the FEIS, the Proposed Modified Application Alternative was developed in response to comments received during the public review process. The proposed modifications include massing configuration and distribution of floor area across the Proposed Development's blocks, as well as a reduction of parking in the Proposed Development.

While the massing configuration would be different compared to the Proposed Development, the Proposed Modified Application Alternative would include an equivalent amount of floor area in the Proposed Development that would be generated as a result of the Proposed Actions, and would only affect the distribution of the floor area across the Proposed Development's blocks. Accordingly, the Proposed Modified Application Alternative would result in the same or similar significant adverse impacts as the Proposed Actions, requiring the same or similar mitigation measures, while still meeting the objectives of the Proposed Actions.

The configuration of the Proposed Development's buildings under the Proposed Modified Application Alternative would be modified compared to the Proposed Actions, including reducing the heights or elimination of some buildings and adding floors to buildings on other portions of the Development Site (see **Figures 1 and 2**). As described in Chapter 14 of the FEIS, "Air Quality," the projected development sites under the Proposed Actions would require certain restrictions from fossil fuel-fired heating and hot water systems through the placement of an (E) Designation (E-675) to avoid the potential for significant adverse air quality impacts. Similar to the Proposed Actions, the placement of an (E) Designation on the projected development sites would also be needed under the Proposed Modified Application Alternative in order to avoid the potential for significant adverse air quality impacts.

As with the Proposed Actions, the Proposed Modified Application Alternative would not result in significant adverse air quality impacts. The Proposed Modified Application Alternative would generate a

9.15.22



Source: ODA

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Massing of Proposed Modified Application Alternative
Figure 1

9.15.22



Source: ODA

Massing of Proposed Modified Application Alternative,
View from Northern Boulevard

Figure 2

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similar number of vehicular trips as the Proposed Actions. As such, the Proposed Modified Application Alternative would result in identical mobile source pollutant concentrations as the Proposed Actions. As such, like the Proposed Actions, no significant adverse mobile source air quality impacts would result. In addition, as the Proposed Modified Application Alternative would include a reduction of parking spaces in the Proposed Development, therefore, vehicle emissions within the parking garages would be reduced as well. Therefore, as with the Proposed Actions, no significant adverse air quality impacts would occur.

For stationary sources, the Proposed Modified Application Alternative would result in reducing the heights or elimination of some buildings and adding floors to buildings on other portions of the Development Site (see **Figures 1 and 2**). Therefore, the stationary source analysis prepared for the Proposed Development was revised to evaluate potential future pollutant concentrations from the proposed heating and hot water systems under the Proposed Modified Application Alternative.

METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

A stationary source analysis was conducted using the methodology described in the *CEQR Technical Manual* to assess air quality impacts associated with emissions from the Proposed Development's heat and hot water systems under the Proposed Modified Application Alternative. The same methodologies and assumptions outlined in the FEIS Air Quality Chapter were followed.

The emission rates and exhaust stack parameters used in the modeling analysis for the Proposed Modified Application Alternative for the Applicant-Controlled Lots are presented in **Table 1**. Note that there are no changes proposed for the non-Applicant-Controlled Lots; therefore, the same exhaust emission rates and exhaust stack parameters used in the FEIS for these buildings were used for purpose of this analysis.

Table 1
Exhaust Stack Parameters and Emission Rates – Applicant-Controlled Lots

Stack Parameter	A1	A2	A3	B1	B2	C1	C2	D1	D2	E1	E2/E3
Building Floor Area (gross square feet)	143,450	308,586	301,940	250,699	407,413	276,557	124,090	350,889	256,742	87,470	474,287
Building Height (feet)	155	140	130	180	210	265	150	180	280	90	290
Stack Height Above Building (feet)	3	25	20	3	25	3	35	23	3	3	3
Stack Height (feet)	158	165	150	183	235	268	185	203	283	93	293
Stack Diameter (feet) (1)	2	3.2	3.2	3.2	3.2	3.2	2	2	3.2	2	3.2
Exhaust Velocity (feet/minute)(1)	240	253	252	205	336	216	271	708	212	187	367
Exhaust Temperature (degrees Fahrenheit)(1)	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8
Emission Rate (grams/second)											
NO_2 (1-hour average)	0.034	0.035	0.035	0.028	0.046	0.080	0.014	0.037	0.029	0.010	0.14
NO_2 (Annual average)	0.0093	0.0095	0.0095	0.0078	0.013	0.022	0.0039	0.010	0.0080	0.0027	0.037
$PM_{2.5}$ (24-hour average)	0.0026	0.0072	0.0071	0.0058	0.0095	0.0061	0.0029	0.0077	0.0060	0.0020	0.010
$PM_{2.5}$ (Annual average)	0.00071	0.0020	0.0020	0.0016	0.0026	0.0017	0.00080	0.0021	0.0016	0.00055	0.0028

Note:
(1) Stack parameter assumptions were obtained from a survey of boiler exhaust data provided by DEP.
See **Figure 3** for the building distribution on the Applicant-controlled lots.

The same background concentrations were used as presented in Chapter 14 of the FEIS, "Air Quality" for the $PM_{2.5}$ as well as annual NO_2 stationary source analyses. An annual NO_2 background concentration of 32.8 $\mu g/m^3$ was used, while a $PM_{2.5}$ 24-hour average background concentration of 8.3 $\mu g/m^3$ (based on the 2017 to 2019 average of 98th percentile concentrations measured at the JHS 45 monitoring station) was used to establish the *de minimis* value for the 24-hour increment, consistent with the guidance provided in the *CEQR Technical Manual*. $PM_{2.5}$ annual average impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria, without considering the annual background. For the 1-hour NO_2 analysis, seasonal hourly background monitored concentrations were used, consistent with the methodology described for the detailed analysis of heating and hot water systems (see FEIS Chapter 14, "Air Quality").



Source: ODA

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Building Distribution Diagram

Figure 3

ANALYSIS RESULTS

Tables 2 and 3 present the maximum predicted concentration from the heating and hot water systems on the proposed buildings and existing buildings, respectively. As shown in the tables, all predicted pollutant concentrations are less than the applicable impact criteria. Therefore, there would be no potential for significant adverse air quality impacts from the Proposed Project's heating and hot water systems under the Proposed Modified Application Alternative.

Table 2
Maximum Modeled Pollutant Concentrations
On the Proposed Development and the Additional Affected Area (µg/m^3)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	Criterion
NO_2	1-hour	(1)	-	163	188(2)
	Annual	1.09	32.8	33.9	100
$PM_{2.5}$	24-hour	7.4	N/A	7.4	8.3 (3)
	Annual	0.29	N/A	0.29	0.3(4)

Notes:
N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO_2 concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS
(3) $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m^3
(4) $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor)

Table 3
Maximum Modeled Pollutant Concentrations
On Existing Buildings (µg/m^3)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	Criterion
NO_2	1-hour	(1)	-	114	188(2)
	Annual	0.80	32.8	33.6	100
$PM_{2.5}$	24-hour	1.6	N/A	1.6	8.3 (3)
	Annual	0.18	N/A	0.18	0.3(4)
	Annual – Neighborhood	0.021	N/A	0.021	0.1

Notes:
N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO2 concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS
(3) $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m^3
(4) $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor)

To ensure that there is no potential for significant adverse impacts of $PM_{2.5}$ or NO_2 from the Proposed Project's heating and hot water system emissions, certain restrictions would be required through an Air Quality (E) Designation (E-675) that would be placed on the projected development sites; no restrictions would be required on the Other Sites. These restrictions were assumed in the analysis results presented in **Tables 2 and 3**, and would avoid the potential for significant air quality impacts from stationary sources based on the conservative assumptions used in the analysis.

The restrictions would be as follows:

Projected Development Site A

Building A1 (Block 641, p/o Lot 9)

Any new development on Building A1 (Block 641, p/o Lot 9) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and locate heating and hot water exhaust stacks at least 158 feet above grade, to avoid potential significant air quality impacts.

Building A2 (Block 641, p/o Lots 9 and 4)

Any new development on Building A2 (Block 641, p/o Lots 9 and 4) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 165 feet above grade and located at least 112 feet away from the lot line facing 38th Street, to avoid any potential significant air quality impacts.

Building A3 (Block 641, p/o Lots 1, 4)

Any new development on Building A3 (Block 641, p/o Lots 1, 4) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 150 feet above grade and located at least 49 feet away from the lot line facing 35th Avenue on Lot 4 and at least 64 feet from the lot line facing 38th Street, to avoid any potential significant air quality impacts.

Projected Development Site B

Building B1 (Block 668, p/o Lot 5)

Any new development on Building B1 (Block 641, p/o Lot 5) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 183 feet above grade and located at least 45 feet away from the lot line facing Steinway Street and no more than 80 feet from the lot line facing 35th Avenue, to avoid any potential significant air quality impacts.

Building B2 (Block 668, p/o Lot 5)

Any new development on Building B2 (Block 668, p/o Lot 5) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 235 feet above grade and located at least 163 feet away from the tallest tiers of Building C1 on Lots 13 and p/o 16.

Projected Development Site C

Building C1 (Block 669, Lot 13, p/o Lot 16)

Any new development on Building C1 (Block 669, Lot 13, p/o Lot 16) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and locate heating and hot water exhaust stacks at least 268 feet above grade, to avoid potential significant air quality impacts.

Building C2 (Block 669, Lot 36)

Any new development on Building C2 (Block 669, Lot 36) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 185 feet above grade and located at least 125 feet away from the lot line facing 35th Avenue, to avoid potential significant air quality impacts.

Projected Development Site D

Building D1 (Block 670, Lots 4, 8, 20, 27, 30)

Any new development on Building D1 (Block 670, Lots 4, 8, 20, 27, 30) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30ppm) burners, and ensure that heating and hot water system stack(s) is located at least 203 feet above grade, to avoid potential significant air quality impacts.

Building D2 (Block 670, Lots 4, 47)

Any new development on Building D2 (Block 670, Lots 4, 47)) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30ppm) burners, and locate heating and hot water exhaust stacks at least 283 feet above grade, to avoid potential significant air quality impacts.

Projected Development Site E

Building E1 (Block 671, Lot 12, p/o Lot 8)

Any new development on Building E1 (Block 671, Lot 12, p/o Lot 8) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NOx (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 93 feet above grade and located no more than 75 feet away from the lot line facing 35th Avenue and no more than 18 feet from the lot line facing 42nd Street on Lot 12, to avoid any potential significant air quality impacts.

Building E2/E3 (Block 671, Lots 1,20, 23)

Any new development on Building E2 and E3 (Block 671, Lots 1, 20, 23) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and ensure that heating and hot water system stack(s) is located at least 293 feet above grade, to avoid potential significant air quality impacts.

Projected Development Site F (Block 668, Lots 1, 2)

Any new development on Building F (Block 668, Lots 1, 2) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and ensure that heating and hot water system stack(s) is located at least 223 feet above grade, to avoid potential significant air quality impacts.

Projected Development Site G (Block 669, Lots 7, 8)

Any new development on Building G (Block 669, Lots 7, 8) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 168 feet above grade and located at least 84 feet away from the lot line facing 35th Avenue and at least 56 feet from the lot line facing 41st Street, to avoid any potential significant air quality impacts.

Projected Development Site H (Block 669, Lots 1, 3, 41)

Any new development on Building H (Block 669, Lots 1, 3, 41) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NO_x (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 170 feet above grade and located at least 98 feet away from the lot line facing 35th Avenue and at least 137 feet from the lot line facing 41st Street, to avoid any potential significant air quality impacts.

Projected Development Site I (Block 670, Lots 33, 36)

Any new development on Building I (Block 670, Lots 33, 36) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NOx (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 170 feet above grade and located no more than 57 feet away from the lot line facing 42nd Street, to avoid any potential significant air quality impacts.

Projected Development Site J (Block 670, Lot 39)

Any new development on Building J (Block 670, Lot 39) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NOx (30 ppm) burners, and ensure that heating and hot water system stack(s) is located at least 170 feet above grade and located at least 57 feet away from the lot line facing 41st Street and at least 32 feet from the lot line facing 42nd Street, to avoid any potential significant air quality impacts.

Projected Development Site K (Block 671, Lots 16, 18)

Any new development on Building K (Block 671, Lots 16, 18) must utilize only natural gas for fossil fuel-fired heating and hot water equipment and be fitted with low NOx (30 ppm) burners, and ensure that

heating and hot water system stack(s) is located at least 110 feet above grade and located no more than 48 feet away from the lot line facing 35th Avenue and at least 38 feet from the lot line on Lot 16 facing 42nd Street, to avoid any potential significant air quality impacts.

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