14 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

14.1 Introduction

Per the 2021 *City Environmental Quality Review (CEQR) Technical Manual*, increased concentrations of greenhouse gases (GHGs) are changing the global climate, resulting in wide-ranging effects on the environment, including rising sea levels, increases in temperature, and changes in precipitation levels. Although this change is occurring on a global scale, the environmental effects of climate change are also likely to be felt at the local level.

Through *PlaNYC*, New York City's long-term sustainability program – and enhanced by *OneNYC 2050* – the City advances sustainability initiatives and goals to both greatly reduce GHG emissions and increase the City's resilience to climate change. The goal to reduce citywide GHG emissions to 30 percent below 2005 levels by 2030 was codified by Local Law 22 of 2008, known as the New York City Climate Protection Act (the "GHG reduction goal"). This goal was developed for the purpose of planning for an increase in population of almost one million residents while also achieving significant greenhouse gas reductions. Subsequently, the City committed to an 80 percent reduction in greenhouse gases by the year 2050. On November 13, 2014, City Council passed a bill to reduce citywide greenhouse gas emissions by 80 percent by 2050 (INT. 378), which was codified as Local Law 66 of 2014 on December 14, 2014 ("80 x 50"). In April 2019, *OneNYC 2050* was published as an update to *OneNYC,* which included a commitment to citywide carbon neutrality by 2050.

In addition, in December of 2021, the New York City Council enacted Introduction 2317A-2021 (INT 2317-A), which prohibits the combustion of substances with certain emissions profiles in buildings within the City. The City's new law sets restrictions on fossil fuel usage by phasing in strict emissions limits beginning in 2023 for new residential and commercial developments. This law was codified as Local Law 154 of 2021 on December 22, 2021.

The contribution of a proposed project's GHG emissions to global GHG emissions is likely to be considered insignificant when measured against the scale and magnitude of global climate change. However, certain projects' contributions of GHG emissions are analyzed to determine their consistency with the City's GHG reduction goal, which is currently the most appropriate standard to analyze a project under CEQR. The GHG consistency assessment focuses on those projects that have the greatest potential to produce GHG emissions and evaluates their potential that may result in significant inconsistencies with the GHG reduction goal. The *CEQR Technical Manual* recommends that a GHG consistency assessment be conducted for any project resulting in 350,000 square feet (sf) or more of development where an environmental impact statement (EIS) is required, and for other energy-intensive projects.

The Proposed Actions require the preparation of a Draft EIS (DEIS) and would enable the construction of three new mixed-use buildings across the projected development sites with a total of 866,017 gross square feet (gsf). These buildings would comprise residential, commercial, and accessory parking uses.[1] Therefore, a GHG consistency assessment is warranted. Potential Development Site A is not under the control of the Applicant and there is no specific development proposal for this site; therefore, it is not considered in this assessment. A worst-case estimate of project-generated GHG emissions resulting from the three new mixed-use buildings in the With-Action Condition is presented in this chapter, along with an assessment of the Proposed Actions' consistency with the citywide GHG reduction goal.

14.2 Principal Conclusions

Greenhouse Gas Emissions

The Proposed Actions would not result in a significant adverse greenhouse gas emissions and climate change impact. The Proposed Actions would generate an estimated 7,472.50 metric tons of carbon dioxide equivalent (CO_2e) annually under worst-case conditions. Of these annual CO_2e emissions, an estimated 5,083.28 tons would be from building operations, and an estimated 2,389.22 metric tons would result from mobile sources. Under this worst-case scenario, the project-generated GHG emissions would be less than 0.015 percent of the City's overall 2020 GHG emissions of approximately 48.4 million metric tons (the latest available data). Based on the assumption that construction-generated GHG emissions would be equivalent to between five and ten years' worth of operational GHG emissions, the estimated construction-generated GHG emissions would be between 37,362.5 and 74,725 metric tons of CO_2e.

The Proposed Actions would advance New York City's GHG reduction goals because the Proposed Rezoning Area is in a highly urbanized area with access to subway stations, local buses, and essential retail. Project-generated development would be required to comply with local laws intended to reduce the GHG emissions such as Local Law 22 of 2008 (known as the New York City Climate Protection Act); the Greener, Greater Building Plan; Local Law 66 of 2014 ("80 x 50"); Local Law 133 of 2016; Local Law 97 of 2019; New York City Conservation Code; and INT 2317-A. The new buildings would be subject to the New York City Energy Conservation Code (NYCECC), which was updated in 2020 to be one of

[1] Pursuant to CEQR, the GHG assessment is based on total GHG emissions associated with a project, rather than the relative increment of a project's GHG emissions as compared to the No-Action scenario.

the highest energy efficient standards nationwide for sustainability and efficiency. The Proposed Project would therefore comply with the City's emissions reduction goals by enabling new construction near existing transit and by adhering to resource- and energy-efficiency standards in new mixed-use buildings.

Climate Change

As described in Policy 6.2 of the WRP Assessment (Appendix C), the Preliminary Flood Insurance Rate Maps (pFIRM) published by the Federal Emergency Management Agency (FEMA) identifies the Project Area at a Base Flood Elevation (BFE) of 13 feet, as measured in the North American Vertical Datum of 1988 (NAVD88). Therefore, the Project Area is susceptible to storm surge and coastal flooding. The Project Area is also within the future 100- and 500-year projected flood zones developed by the New York City Panel on Climate Change (NPCC) through the year 2100. Based on these findings, the Design Flood Elevation (DFE) for the Proposed Development will be 15 feet. At an elevation of 15 feet, the Proposed Development will be two feet above the current BFE, which is required in Appendix G of the New York City Building Code. Any mechanical equipment would also be dry floodproofed up to at least the DFE through waterproofed concrete walls or automatic floodgates to protect the Proposed Development against the effects of climate change and sea-level rise.

Project-generated development would not increase the potential for flooding or flooding severity. The Proposed Actions also would not preclude the implementation of adaptive solutions in the future, including any technological advancements not yet developed. Based on this information, the Proposed Actions would be consistent with the New York City policies regarding adaptation to climate change despite the Project Area's location in an area of flood risk.

14.3 Methodology

Greenhouse Gas Emissions

New York City determined that a CEQR GHG analysis is appropriate for certain projects because:

1. greenhouse gas emission levels may be directly affected by a project's effect on energy use;
2. the United States Supreme Court has upheld the determination that carbon dioxide, one of the main greenhouse gases, is an air pollutant, subject to regulation as defined by the Clean Air Act;
3. Local Law 22 of 2008 codified *PlaNYC's* citywide GHG emissions reduction goal of 30 percent below 2005 levels by 2030; and
4. Local Law 66 of 2014 codified the City's longer-term goal to reduce GHG emissions to 80 percent below 2005 levels by 2050 and has published a study evaluating the potential for achieving that goal.

Per the *CEQR Technical Manual*, the GHG consistency assessment focuses on Proposed Actions that would result in the development of 350,000 sf or greater and other energy-intense projects. The Proposed Actions are projected to result in approximately 866,017 sf of mixed-use residential and commercial development, as well as accessory parking, across the two projected development sites.

A project's GHG emissions can generally be assessed in two steps. For step one, a project's emissions are estimated using the main emissions sources: on-site operational emissions (direct and indirect); mobile source emissions (direct and indirect); and, when applicable, emissions from construction or solid waste management. After the emissions are estimated, the source of GHG emissions are examined and qualitatively compared to the City's GHG reduction goals. As defined in the *CEQR Technical Manual*, the qualitative goals that should be assessed, as relevant to the Proposed Actions are:

- constructing new resource- and energy-efficient buildings and/or improving the efficiency of existing buildings;
- providing clean, renewable power through the replacement of inefficient power plants with state-of-the-art technology and expanding the use of clean distributed power generation;
- encouraging transit-oriented development; and
- encouraging sustainable transportation by improving public transit, improving the efficiency of private vehicles, and decreasing the carbon intensity of fuels.

Recognized Greenhouse Gases

GHGs are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the general warming of the Earth's atmosphere, or the "greenhouse effect." Some GHGs, such as carbon dioxide, occur naturally and are emitted into the atmosphere through both natural processes and human activities. The principal GHG emissions of concern resulting from human activities are described below.

Carbon Dioxide (CO_2)

Carbon dioxide (CO_2) enters the atmosphere via the combustion of fossil fuels (oil, natural gas, and coal), solid waste, trees, and wood products, and by other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Although not the GHG with the strongest greenhouse effect per molecule, CO_2 is by far the most abundant and, therefore, the most influential GHG.

Methane (CH_4)

Methane (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, as well as by the decay of organic waste in municipal solid waste landfills. Methane, in addition to nitrous oxide (noted below), plays an important role because the removal processes for these compounds are limited and they have a relatively high impact on global climate change as compared to an equal quantity of CO_2.

Nitrous Oxide (N_2O)

Nitrous oxide (N_2O) is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste.

Fluorinated Gases

Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are powerful synthetic greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone depleting substances (e.g., chlorofluorocarbons [CFCs], hydrochlorofluorocarbons [HCFCs], and halons). These gases are typically emitted in smaller quantities. However, because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases (High GWP gases).

Global Warming Potential

The *CEQR Technical Manual* lists six GHGs that could potentially be included in the scope of an environmental review: CO_2, N_2O, Methane, Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). This analysis focused on CO_2, N_2O, and methane because no significant direct or indirect sources of HFCs, PFCs, or SF_6 would result from the adoption of the Proposed Actions.

GHGs differ in their ability to trap heat. To compare emissions of GHGs, compilers use a weighting factor called a Global Warming Potential (GWP). The heat-trapping ability of one metric ton (1,000 kilograms (kg)) of CO_2 is taken as the standard, and emissions are expressed in terms of CO_2e, but can also be expressed in terms of carbon equivalents. The GWPs for the main GHGs are presented in Table 14-1.

Table 14-1: Global Warming Potential for Primary Greenhouse Gases

Greenhouse Gas	Common Sources	Warming Potential
CO_2	Fossil fuel combustion, forest clearing, cement production	1
CH_4 - Methane	Landfills, production and distribution of natural gas and petroleum, anaerobic digestion, rice cultivation, fossil fuel combustion	21
N_2O - Nitrous Oxide	Fossil fuel combustion, fertilizers, nylon production, manure	310
HFC's – Hydro-fluorocarbons	Refrigeration gases, aluminum smelting, semiconductor manufacturing	140-11,700[1]
PFC's - Perfluorocarbons	Aluminum production, semiconductor manufacturing	6,500-9,200[2]
SF_6 - Sulfur Hexafluoride	Electrical transmissions and distribution systems, circuit breakers, magnesium production	23,900

[1, 2] The GWPs of HFCs and PFCs vary depending on the specific compound emitted. A full list of these GWPs is available at https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html.
Note**:** Since the Second Assessment Report (SAR) was published in 1995, the International Panel on Climate Change (IPCC) has published updated GWP values in its Fifth Assessment Report (AR5) that reflect new information on atmospheric lifetimes of greenhouse gases and an improved calculation of the radiative forcing of CO_2. However, GWP values from the SAR are still used by international convention to maintain consistency in GHG reporting, including by the United States when reporting under the United Nations Framework Convention on Climate Change.

Applicable Regulations

To reach its aggressive sustainability goals, the City has launched initiatives and implemented various local laws aimed at energy efficiency measures and reduction of

GHG emissions. The following regulations provide guidance for current buildings and future growth in New York City and are applicable to the Proposed Development.

Local Law 22 of 2008

In 2008, Local Law 22 – known as the New York City Climate Protection Act (the "GHG reduction goal") – codified the City's goal to reduce citywide GHG emissions to 30 percent below 2005 levels by 2030 ("30 x 30"). This goal was developed to plan for an increase in population of almost one million residents while achieving significant greenhouse gas reductions.

Greener, Greater Building Plan

The Greener, Greater Building Plan (GGBP) is a set of comprehensive energy efficiency laws which target larger buildings in New York City. The plan consists of four local laws that require: 1) large buildings (originally buildings greater than 50,000 sf) to annually benchmark their energy consumption (Local Law 84 of 2009); 2) a local energy code to be adopted (Local Law 85 of 2009); 3) an energy audit and retro-commissioning conducted every 10 years (Local Law 87 of 2009); and, 3) lighting upgrade in non-residential spaces to meet code, and provision of sub-meters to large commercial tenants (Local Law 88 of 2009).

Local Law 66 of 2014

In 2014, the City Council passed Local Law 66, a bill that committed the City to reduce citywide greenhouse gas emissions by 80 percent below 2005 levels by 2050. It is known as "80 x 50". The law also set forth an interim target to reduce GHG emissions 40 percent by 2030 (known as "40 x 30").

Local Law 133 of 2016

In 2016, City Council passed Local Law 133, which made the reporting requirements of Local Law 84 applicable to all buildings over 25,000 sf. This local law also requires the city to provide benchmarking assistance.

Local Law 97 of 2019

Local Law 97 reflects the city's aim to reduce overall emissions by 80 percent by 2050. Under Local Law 97, buildings over 25,000 gross square feet must meet annual whole-building carbon intensity limits based on building type beginning in 2024. To comply, building owners must submit an emissions intensity report stamped by a registered design professional every year starting in 2025. For buildings that do not comply with the emissions targets, building owners must pay fines of $268 per metric ton that the building's carbon footprint exceeds the limit. The law, which applies citywide, incentivizes reduction in GHG emissions.

New York City Energy Conservation Code (NYCECC)

The NYCECC is one of the Construction Codes that protects public health, safety, general welfare, and the environment by establishing minimum standards for the design, construction, and occupancy of buildings. The energy code regulates building systems that most impact energy use: the envelope, heating and cooling, hot water, lighting and power. The code specifies requirements for each system to ensure a baseline of efficiency is built

in. The NYCECC continues to ensure that the construction of new buildings, additions and alterations will contribute to the 80 percent greenhouse gas reduction by 2050.

INT 2317-A

In 2021, the City Council passed INT 2317-A, a bill that prohibits the combustion of substances with certain emissions profiles in buildings within the City. Specifically, the combustion of any substances that emits 25 kilograms or more of carbon dioxide per million British thermal units of energy is prohibited within new buildings. The City's new law sets restrictions on fossil fuel usage in newly constructed residential and commercial buildings by phasing in strict emissions limits beginning in 2023. INT 2317-A requires that, beginning in 2027, all new buildings approved for construction must be powered only by non-combustion mechanical systems. Certain new buildings are required to comply with the fossil fuel usage restrictions as early as 2024.

Greenhouse Gas Emissions Sources

Operational Building GHG Emissions

Per the *CEQR Technical Manual*, annual GHG emissions should be estimated based on a project's anticipated future floor area and energy usage. Energy usage was estimated based on the multipliers provided in Table 15-1 in Chapter 15 "Energy" of the *CEQR Technical Manual*. While the primary source of energy for the Proposed Actions would be electricity, natural gas was used as a worst-case condition. Table 18-3 of the *CEQR Technical Manual* provided the conversion factor for natural gas to identify the total GHG emissions of the Proposed Actions in metric tons.

Mobile Source Emissions

The number of With-Action annual weekday vehicle trips by mode (passenger vehicles, taxis, and trucks) was taken from the transportation planning assumptions developed for the traffic analysis presented in Chapter 12, "Transportation." The assumptions used to calculate annual GHG vehicular emissions include the average daily weekday and Saturday person-trips and delivery trips by use, the percentage of vehicle trips by mode, and the average vehicle occupancy. To conservatively estimate annual totals, the number of trips on Sunday was assumed to equal the number of Saturday trips. Average one-way trip distances as shown in Tables 18-5 and 18-6 of the *CEQR Technical Manual* were used to estimate annual vehicle miles traveled by cars and taxis. The average truck trip was assumed to be 38 miles, per the *CEQR Technical Manual*. Table 18-7 of the *CEQR Technical Manual* was used to determine the percentage of vehicle miles traveled by road type. The *CEQR Technical Manual*'s mobile GHG emissions calculator was used to obtain an estimate of car, taxi, and truck GHG emissions attributable to the Proposed Actions.

Construction Emissions

GHG emissions associated with project-generated construction have not been estimated explicitly for the Proposed Actions, but analyses prepared for other development projects in New York City have shown that construction emissions (both direct and emissions embedded in the production of materials, including on-site construction equipment, delivery trucks, and upstream emissions from the production of steel, rebar, aluminum, and cement used for construction) would be equivalent to the total emissions from the

operation of the buildings over approximately five to ten years. Construction-generated emissions were estimated using this assumption.

Emissions from Solid Waste Management

The Proposed Actions would not fundamentally change the City's solid waste management system; therefore, an estimate of emissions from solid waste management is not warranted.

Climate Change

Depending on a project's sensitivity, location, and useful life, it may be appropriate to provide a qualitative discussion of the potential effects of climate change on a proposed project in an environmental review. Rising sea levels, increases in storm surges, and coastal flooding are the most immediate threats in New York City for which site-specific conditions can be assessed, and an analysis of climate change may be deemed warranted for sites located within the existing 100- or 500-year flood zones.

Per the Federal Emergency Management Agency (FEMA) Preliminary Flood Insurance Rate Maps (FIRMs) issued in 2015, the Rezoning Area contains portions within the 100- and 500-year flood zones. The sea level rise projections published by NPCC are outlined in Table 18-2 of the *CEQR Technical Manual*. Table 18-2, the *NPCC Baseline Climate and Mean Annual Changes* data indicate that sea level rise could reach 31 inches by 2050. Because the Rezoning Area is within the projected future 100-and 500-year flood plains from the 2020s through 2100, the Proposed Rezoning Area is susceptible to storm surge and coastal flooding, and an assessment of climate change is warranted.

Climate Change Resilience

Because the Proposed Actions would facilitate new construction within a coastal floodplain, the potential effects of global climate change on the Proposed Actions have been considered. Standards for analysis of the effects of climate change on a proposed project are still being developed and have not yet been defined in CEQR. However, the Waterfront Revitalization Program (WRP)[2] Assessment addresses climate change and sea level rise (SLR). The WRP requires consideration of climate change and sea level rise in the planning and design of waterfront developments. As set forth in more detail in the *CEQR Technical Manual*, the provisions of the revised WRP are applied by the New York City Department of City Planning (DCP) and other city agencies when conducting an environmental review.

Because the Proposed Rezoning Area is along the Bronx River waterfront, the potential effects of global climate change were considered in the WRP Assessment in Appendix C of this Environmental Impact Statement. The WRP identified several project features of the Proposed Development that would be considered "vulnerable" and "critical." Of the features analyzed, the cellar within Project Development Site 2 would be the lowest-lying feature at approximately 9 feet, as measured in the North American Vertical Datum of 1988 (NAVD88). The cellar would be dry floodproofed.

[2] City of New York Department of City Planning. *The New York City Waterfront Revitalization Program*. October 30, 2013. Approved by NY State February 3, 2016.

The shore public walkway, at an elevation of 10 feet, would contain features such as bench seating, lampposts, and native vegetation. Fixtures such as lampposts and bench seating would be designed and constructed to withstand projected flood conditions.

Projected Development Site 1 would have a ground floor elevation of at least 14.5 feet and would not have a cellar. The ground floor would contain residential lobbies and commercial spaces. Residential units would be on floors 2 – 24. At an elevation of 9 feet, on Projected Development Site 2, the cellar would contain accessory parking, mechanical space, and commercial space. At an elevation of 19.5 feet, the ground floor would contain the residential lobby and commercial space. The second floor – the lowest floor containing residential units - would have an approximate elevation of 30.5 feet. For Building 3, the ground floor would be sited at an elevation of 27.5 feet, and residential units would be sited above the ground floor at an elevation of at least 38.5 feet.

Project-generated development would not increase the potential for flooding or flooding severity. All mechanical space would be dry floodproofed up to two feet above the Base Flood Elevation (BFE). The Proposed Actions would not preclude the ability to floodproof the building to a higher elevation as flood conditions change with SLR. The Proposed Actions also would not preclude the implementation of adaptive solutions in the future, including any technological advancements not yet developed. These measures would not be implemented absent the Proposed Actions.

Development of Policy to Improve Climate Change Resilience

Federal

In recognition of the important role that the federal government has to play to address adaptation to climate change, a federal executive order signed October 5, 2009 charged the Interagency Climate Change Adaptation Task Force – composed of representatives from more than 20 federal agencies – to recommend policies and practices that can reinforce a national climate change adaptation strategy. The 2011 progress report by the Task Force included recommendations to build resilience to climate change in communities by integrating adaptation considerations into national programs that affect communities, facilitating the incorporation of climate change risks into insurance mechanisms, and addressing additional crosscutting issues, such as strengthening resilience of coastal, ocean, and Great Lakes communities.[3]

In February 2013, federal agencies released a Climate Action Plan[4] for the first time, outlining a plan for resiliency that includes building stronger and safer infrastructure through agency support in investment, developing standards, and other measures. The plan was followed by an executive order[5] in November 2013 that directed agencies to prepare the nation for impending impacts on the environment brought by climate change and to implement risk management strategies to lessen the harm done by these impacts.

In January 2015, a Presidential executive order was issued[6] requiring that federal actions use natural systems and approaches where possible to develop adaptation alternatives,

[3] The White House Council on Environmental Quality. Progress Report of the Interagency Climate Change Adaption Task Force: Federal Actions for a Climate Resilient Nation. October, 2011.
[4] Executive Office of the President. *The President's Climate Action Plan*, June 2013.
[5] The White House. Executive Order [13653] – Preparing the United States for the Impacts of Climate Change, November 1, 2013.
[6] The White House. Executive Order [13690] – Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input. January 30, 2015.

and to redefine the floodplain elevation. This executive order was revoked by Executive Order 13807 of August 15, 2017, before being reinstated by Executive Order 14030 on May 20, 2021.

New York State

The New York State Sea Level Rise Task Force was created in 2007 to assess potential impacts on the State's coastlines from rising seas and increased storm surge. The Task Force prepared a report of its findings and recommendations including protective and adaptive measures.[7] The recommendations seek to: provide more protective standards for coastal development, wetlands protection, shoreline armoring, and post-storm recovery; implement adaptive measures for habitats; integrate climate change adaptation strategies into state environmental plans; and, amend local and state regulations or statutes to respond to climate change. The Task Force also recommended the formal adoption of projections of sea level rise.

The New York State Climate Action Plan Interim Report released by the task force in 2010 identified a number of policy options and actions that could increase the climate change resilience of natural systems, the built environment, and key economic sectors—focusing on agriculture, vulnerable coastal zones, ecosystems, water resources, energy infrastructure, public health, telecommunications and information infrastructure, and transportation.[8] New York State's Community Risk and Resiliency Act (CRRA)[9] requires that applicants to certain State programs demonstrate that they have taken into account future physical climate risks from storm surges, sea-level rise and flooding, and required the New York State Department of Environmental Conservation (DEC) to establish official State sea-level rise projections by January 1, 2016. These projections provide the basis for State adaptation decisions and are available for use by all decision makers. DEC published a draft on November 2, 2015, proposing to adopt existing projections for use (see discussion of NPCC below). CRRA applies to specific State permitting, funding and regulatory decisions, including smart growth assessments; funding for wastewater treatment plants; siting of hazardous waste facilities; design and construction of petroleum and chemical bulk storage facilities; oil and gas drilling, and State acquisition of open space.

New York City

In New York City, the Climate Change Adaptation Task Force is tasked with securing the City's critical infrastructure against rising seas, higher temperatures, and fluctuating water supplies projected to result from climate change. The Task Force is composed of over 35 New York City and State agencies, public authorities, and companies that operate, regulate, or maintain critical infrastructure in New York City. The approaches suggested for the City include ways to assess risks, prioritize strategies, and examine how standards and regulations may need to be adjusted in response to a changing climate.

To assist the task force, the New York City Panel on Climate Change (NPCC) – a panel that includes leading climatologists, sea-level rise specialists, adaptation experts, and engineers, as well as representatives from the insurance and legal sectors – has prepared

[7] New York State Sea Level Rise Task Force. *Report to the Legislature*. December, 2010.
[8] NYSERDA. New York State Climate Action Plan. Interim Report. November, 2010.
[9] Community Risk and Resiliency Act. Chapter 355, NY Laws of 2014. April 9, 2013. Signed September 22, 2014.

a set of climate change projections for the New York City region[10] and recommended approaches to create an effective adaptation program for critical infrastructure. The recommendations were last updated in 2013.[11]

The climate change projections put forth by the NPCC included a summary of previously published baseline and projected climate conditions throughout the 21st century including heat waves and cold events, intense precipitation and droughts, sea level rise, and coastal storm levels and frequency. The NPCC projected that sea levels are likely to increase in the range of 11 to 21 inches, with a higher end estimate of up to 30 inches by the 2050s; and in the range of 22 to 50 inches, with a higher end estimate of up to 75 inches by the end of the century (2100). In general, the probability of higher sea levels is characterized as "extremely likely," but there is uncertainty regarding the various levels projected over time. Intense hurricanes are characterized as "more likely than not" to increase in intensity and/or frequency, and the likelihood of changes in other large storms ("Nor'easters") are characterized as unknown. Therefore, the projections for future 1-in-100 coastal storm surge levels for New York City include only sea level rise at this time, and do not account for changes in storm frequency.

The New York City Green Code Task Force has also recommended strategies to address climate change resilience in buildings and to improve storm water management.[12] Some of the recommendations called for further study, while others could serve as the basis for revisions to building code requirements. Notably, one recommendation was to require new developments within the projected future 100-year floodplain to meet the same standards as buildings in the current 100-year flood zone.

The City is currently working with the Federal Emergency Management Agency (FEMA) to revise the Flood Insurance Rate Maps (FIRMs) using the recently acquired detailed Light Detection and Ranging (LiDAR) data. In 2015, FEMA published Preliminary Flood Insurance Rate Maps as part of a citywide flood map update.

The New York City Department of Environmental Protection (DEP) is evaluating adaptive strategies for City water and wastewater infrastructure. The City has already developed a *New York City Green Infrastructure Plan,*[13] and a *Sustainable Stormwater Management Plan.*[14] Many of the strategies discussed in these plans would improve the City's resilience to climate change.

While strategies and guidelines to address the effects of climate change are being developed across levels of government, there are currently no specific requirements or accepted recommendations for development projects in New York City. However, the WRP Assessment requires consideration of climate change and sea level rise in planning and design of waterfront development. As set forth in more detail in the City's *CEQR Technical Manual*, the provisions of the WRP are applied by city agencies when conducting environmental review, and are described in detail in Chapter 2, "Land Use, Zoning, and Public Policy."

[10] New York City Panel on Climate Change. Climate Change Adaptation in New York City: Building a Risk Management Response. Annals of the New York Academy of Sciences, May 2010.
[11] New York City Panel on Climate Change. Climate Risk Information 2013: Observations, Climate Change Predictions, and Maps, June 2013.
[12] New York City Green Codes Task Force. *Recommendations to New York City Building Code*. February 2010.
[13] New York City. New York City Green Infrastructure Plan. September 2010.
[14] New York City. Sustainable Stormwater Management Plan. December 2008.

The WRP Policies 6.1 and 6.2 require waterfront developments reviewed under CEQR to consider potential risks to the project related to coastal flooding, including critical electrical and mechanical systems, residential living areas, and public access areas. The policies further require that the developments incorporate design techniques to address these risks. Projects with new structures directly in the water or on the water line should be designed to protect the structures from flooding and storm surge. The shoreline waterfront and habitat should be protected with vegetation and other measures.

Climate change considerations and measures to increase climate resilience that would be implemented as part of the Proposed Actions are considered in this assessment and the WRP Assessment provided in Appendix C. If additional climate change considerations are incorporated into state and/or local laws prior to project-generated construction, the development would be constructed to meet or exceed the minimum requirements in effect at the time of construction.

New development within a floodplain must also follow the 2014 New York City Building Code Appendix G "Flood-Resistant Construction." The objectives of the Building Code are similar to the climate change policies described above, including:

- Protecting human life;
- Minimizing damage to structures located in areas of special flood hazard; and
- Minimizing damage to public facilities and utilities.

14.4 Assessment

Operational Building GHG Emissions

Per the *CEQR Technical Manual*, for projects such as a proposed rezoning action, where the action would result in construction on sites that are not under the control of an applicant and where details such as the specific fuel type to be used are unknown, annual GHG emissions should be estimated based on a project's anticipated future floor area. The Proposed Actions would result in development on two sites, both of which are controlled by the applicant (Projected Development Sites 1 and 2).

The primary energy source for each proposed building would be electricity due to the requirements of Local Law 97 of 2019 and the emissions restrictions of INT 2317-A. However, assuming natural gas as a worst-case condition, the estimated GHG emissions associated with the emissions based on the Proposed Actions during the operational period are shown in Table 14-2.

Table 14-2: Project-Generated Annual Operational Emissions

With-Action Energy Use (MMBTUs/Year)	Conversion Factor for Natural Gas (kg CO_2e/MMBtu)	Projected Worst-Case GHG Emissions (kg)	GHG Emissions (metric tons)
109,092.47	53.196	5,803,283	**5,803.28**

Mobile Source GHG Emissions

The projected daily With-Action trips by passenger vehicles, taxis, and trucks are summarized in Table 14-3.

Table 14-3: Daily One-Way Trips (Including Off-Peak) by Mode

	Passenger Vehicles	Taxi	Truck
Residential Use			
Weekday Daily Trips	1,308	77	58
Saturday Daily Trips	1,452	85	19
Residential Total	2,760	162	77
Retail Use			
Weekday Daily Trips	366	0	7
Saturday Daily Trips	398	0	1
Retail Total	764	0	8

As presented in Table 14-4, the vehicle trips generated by the Projected Actions would travel an estimated 4.82 million miles annually. Of these 4.82 million vehicle miles traveled annually, passenger vehicles would account for 3.87 million miles, taxis would account for 227,417 miles, and trucks would account for 721,240 miles.

Table 14-4: With-Action Condition – Annual Miles Traveled for Weekdays and Weekends (miles per year)

Use	Passenger Vehicles	Taxis	Trucks	Total
Residential	3,324,672	227,416.80	648,128.00	4,110,216.8
Retail	546,208.00	0	73,112.00	619,320
Total	**3,870,880**	**227,416.80**	**721,240**	**4,819,536.80**

The mobile GHG emissions calculator provided in the *CEQR Technical Manual* was used to obtain an estimate of car, taxi, and truck GHG emissions attributable to the Proposed Actions. Table 14-5 shows annual mobile source emissions related to the Proposed Actions would result in an estimated 2,389 metric tons of CO_2e.

Table 14-5: Annual Mobile Source Emissions (CO_2e – metric tons/year)

Road Type	Passenger Vehicles	Taxis	Trucks	Total CO_2e
Local	298.29	15.74	270.82	584.85
Arterial	581.25	30.56	474.32	1,086.13
Interstate/Expressway	390.48	20.18	307.58	718.23
Total	**1,270.01**	**66.48**	**1,052.72**	**2,389.22**

Cumulative Operational (Building and Mobile) GHG Emissions

The estimated With-Action GHG emissions are shown in Table 14-6. The estimated total of 7,472.50 metric tons of GHG emissions is comprised of 5,083.28 metric tons of CO_2e from operational emissions and 2,389.22 metric tons of CO_2e from mobile source emissions, which is approximately 0.015 percent of New York City's 2020 annual total of 48.4 million metric tons.

Table 14-6: Summary of Projected Worst-Case Annual Operational GHG Emissions

Emissions Source	CO_2e Emissions (metric tons)
Operations	5,083.28
Mobile Sources	2,389.22
Total	**7,472.50**

Construction GHG Emissions

Construction-generated GHG emissions were not modeled explicitly for this project, but are estimated to be equivalent to approximately five to ten years of operational emissions, including both direct energy and emissions embedded in materials (extraction, production, and transport). For this project – which would generate a CO_2e of 7,472.5 metric tons annually during its operational period – the estimated construction-generated GHG emissions would equate to between 37,362.5 and 74,725 metric tons of CO_2e over the course of construction.

Overall, the estimated total of 7,472.50 metric tons of GHG emissions based on the Proposed Actions is comprised of 5,083.28 metric tons of CO_2e from operational emissions and 2,389.22 metric tons of CO_2e from mobile source emissions. This is approximately 0.015 percent of New York City's 2020 annual total of 48.4 million metric tons. Based on the assumption that construction-generated GHG emissions would be equivalent to between five and ten years' worth of operational GHG emissions, the estimated construction-generated GHG emissions would be between 37,362.5 and 74,725 metric tons of CO_2e.

Consistency with the GHG Reduction Goal

Per the *CEQR Technical Manual*, the assessment of consistency with the City GHG reduction goal should answer the following question: *"Is the project consistent with the goal of reducing GHG emissions, specifically the attainment of the City's established GHG reduction goal of reducing citywide GHG emissions by 30 percent below 2005 levels by 2030?"* To determine consistency with the City's overall GHG reduction goal, the four major goals as cited in the *CEQR Technical Manual* are used to assess a project:

- Pursue transit-oriented development;
- Generate clean renewable power through the replacement of inefficient power plants with state-of-the-art technology and expanding the use of clean distributed generation (not applicable in the case of the Proposed Actions);
- Construct new resource- and energy-efficient buildings (including the use of sustainable construction materials and practices) and improve the efficiency of existing buildings; and
- Encourage sustainable transportation through improving public transit, improving the efficiency of private vehicles, and decreasing the carbon intensity of fuels.

The Proposed Actions show consistency with these goals in that:

- The Rezoning Area is well served by public transportation being within 0.5-miles of three MTA Subway stations served by the 2, 5, and 6 lines. Additionally, there are four New York City Transit (NYCT)/MTA bus routes with stops near the Proposed Rezoning Area. The surrounding area is a mixed-use urban neighborhood, and the Proposed Actions would facilitate targeted infill development in an area with access to a variety

of transit options to destinations throughout the Bronx, with onward transit connections available to more distant destinations such as Manhattan and Westchester;

- The Proposed Actions would increase density along Sheridan Boulevard with mixed-use development, while also improving the pedestrian realm with an active streetscape and waterfront open space. New retail development would support the proposed and existing nearby residential population while also providing new local employment opportunities accessible by transit. By collocating retail and residential uses, trips could also be linked, thereby reducing localized dependence on vehicle travel for retail needs;
- Project-generated development would connect to existing urban infrastructure and would redevelop vacant sites in a waterfront urban area. The buildings would be constructed with modern construction materials typical of other recent construction projects in New York City;
- Stormwater discharges directly into the Bronx River would be improved over existing conditions. Currently, stormwater generated on the development sites is discharged directly to the Bronx River. In the With-Action Condition, some of the sites' stormwater would continue to be directly discharged to the river, but in accordance with current NYSDEC standards;
- The bulkhead on Projected Development Site 2 would be replaced with a new bulkhead that prevents material from being discharged into the Bronx River, in accordance with current NYSDEC standards;
- The new buildings facilitated by the Proposed Actions would be subject to the NYCECC, which are among the nation's highest standards of sustainability and efficiency, in addition to a series of local laws. The NYCECC governs performance requirements of heating, ventilation, and air conditioning systems, as well as the exterior building envelope of new buildings. In compliance with this code, new development resulting from the Proposed Actions must meet standards for energy efficiency;
- The new buildings facilitated by the Proposed Actions would also be required to comply with GHG-reduction measures required by local laws, such as Local Law 22 of 2008, Local Law 66 of 2014, Local Law 97 of 2019, and INT 2317-A;
- Portions of the development sites would be improved with native and non-invasive plantings, which would capture and sequester CO_2 through photosynthesis; and
- The Proposed Actions would not involve energy-intensive uses such as data centers or web hosting facilities, nor would they remove a source of energy generation. For these reasons, the Proposed Actions would not result in a significant adverse impact on energy systems. The Proposed Actions also do not have the potential to affect the city's waste management system.

Resilience of the Proposed Development to Climate Change

New development in the Proposed Rezoning Area's flood zones will be designed and constructed to New York City Building Code.

To determine absolute elevations of floodwaters that could affect the Proposed Actions, the 2015 Preliminary Flood Insurance Rate Maps (pFIRM) published by FEMA were

consulted to identify the area's flood zones.[15] The Proposed Rezoning Area contains AE and X flood zones. The AE zone has a one percent annual (100-year flood zone) flood hazard chance, and the X Zone has a 0.2 percent annual (500-year flood zone) flood hazard chance. Within the Proposed Rezoning Area's AE zones, the base flood elevation is 13 feet above sea level; FEMA pFIRM do not provide a flood elevation in Zone X. Both AE and X zones are mapped across the three development sites. The flood plains identified in the FEMA pFIRM do not directly account for sea level increases from climate change. For climate change effects, the NPCC directs that these flood levels should be increased by 30 inches (NPCC 2050) for commercial uses and 75 inches (NPCC 2100) for critical infrastructure and residential uses.

Based on the BFE of the Projected Development Sites, Projected Development Site 1 (Building 1) would have a ground floor elevation of approximately 14.5 feet for its commercial uses, and approximately 16.5 feet for its other uses. Building 1 would not have a cellar. The ground floor would contain residential lobbies and commercial spaces. Residential units would be on floors 2 – 24. The shore public walkway on Projected Development Site 1 would be at an elevation of approximately 15 feet.

At an elevation of 19.5 feet, Building 2's ground floor would contain the residential lobby and commercial space. The second floor – the lowest floor containing residential units - would have an approximate elevation of at least 30.5 feet. For Building 3, the ground floor would be sited at an elevation of 27.5 feet, and residential units would be sited above the ground floor at an elevation of at least 38.5 feet.

The design flood elevation (DFE) for the Proposed Development is 15 feet. At 15 feet, the DFE would be two feet above the current base flood elevation (BFE), as required by Appendix G of the New York City Building Code. Any mechanical space would be dry floodproofed up to at least the DFE. The proposed floodproofing to the DFE would be achieved by a combination of waterproofed concrete walls and, where applicable, automatic flood gates at the building entrances. This is further discussed in Policy 6.2 of the WRP Assessment (See Appendix C).

The projected and potential development sites front along tidal portions of the Bronx River. While the Applicant does not control Potential Development Site A, the resiliency measures to be deployed on the Projected Development Sites include:

- The waterfront structure on Projected Development Site 1 would be repaired, and the waterfront structure on Projected Development Site 2 would be replaced by a high-level pile supported platform and an anchored bulkhead;
- Native and non-invasive vegetation would be planted along the shore public walkway, which would be located between the Bronx River and the proposed buildings;
- New development would comply with DEP's Unified Stormwater Rule, which would limit the amount of water that would be directed to the Bronx River;
- The development sites would be improved with permeable pavers, native bioswales plantings and vegetation along the proposed shore public walkway, upland connections, and in other landscaped areas. The Proposed Actions would enable a decrease in the stormwater runoff coefficient; and

[15] FEMA, Region II Coastal Analysis and Mapping Flood Hazard Mapping Tool http://www.region2coastal.com/view-flood-maps-data/what-is-my-bfe-address-lookup-tool/

- All mechanical space on Projected Development Site 2 would be dry floodproofed up to at least the Design Flood Elevation (DFE), as previously discussed.

Based on the above review and design commitments, the Proposed Actions would be consistent with New York City policies regarding adaptation to climate change, and no significant adverse climate change impacts would occur as part of the Proposed Actions.