GREENHOUSE GAS EMISSIONS ANALYSIS

SHEFFIELD APARTMENTS
TOWN OF MONTGOMERY, NEW YORK

APRIL 2024

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1.0 PROJECT BACKGROUND

The project site consists of 53.08 acres on the site of MILR, LLC property in the Town of Montgomery, New York. The site has frontage/access on Route 17K and occurs to the west of Route 208 and north of I-84.

2.0 PROPOSED PROJECT

2.1 General

The 53.08-acre MILR, LLC property ("the Site") is a previously vacant property located in the south-central area of the Town of Montgomery, Orange County, New York. Referred to as the Scotts Corners area, the Site is located on Route 17K in the portion of Montgomery, just west of Scotts Corners itself. The Site includes 5 tax parcels: Section 29, Block 1, Lots 5.1, 5.2, 5.3, 5.4 & 5.5 with three different zoning designations.

The Proposed Action includes development of the former, vacant (agricultural) Site with multifamily residential units () to the south and, to the north, some commercial and retail fronting on Route 17K. This includes ACOE and NYSDEC wetlands and the NYSDEC's 100-foot, regulated adjacent areas. The 11,2 total acres of wetlands on Site will remain in their natural condition as will some of the adjacent areas.

Three multifamily residential buildings, with two unit types, are proposed Sheffield Apartments, including one and two bedroom apartments. Residential units are proposed to be market rate, rental apartments. There will be 36, one-bedroom apartments at 954 sq. ft. each and 225 two-bedroom apartments at 1,100 sq. ft. each.

Commercial retail will be constructed along the Route 17K frontage and will total approximately 31,000 square feet as one main building.

2.2 Project Sustainability

Project sustainability measures and building design components are discussed below and relate to advancements in energy conservation via equipment and materials. The project does not currently include any on-site "clean" energy-generating technologies (e.g., wind, solar or geothermal). These technologies will be further considered when the project reaches the building design phase.

The project will endeavor to meet the International Energy Conservation Code (or equivalent as suited to the New York State Building Code and the Town's Code) for residential buildings in Climate Zone 5 as follows:

Building Envelope: The building thermal envelope for all buildings will meet the requirements of the International Energy Conservation Code (or equivalent as suited to the New York State

Building Code and the Town's Code) for residential buildings in Climate Zone 5. (Note: specific values for building envelope components are as follows:

- Windows/fenestration U-Factor: 0.35 or less.
- Glazed fenestration SHGC: 0.25 or less
- Attic/Roof R-Value: 49 or greater
- Wood frame wall R-Value: 20 (cavity insulation) or 13+5 (continuous insulation: i.e., R-13 cavity insulation + R-5 continuous insulation).
- Mass wall R-Value: 8/13
- Floor R-Value: 38
- Basement wall R-Value: 7.5
- Slab R-Value & depth: 10 & 2 feet
- Crawl space wall R-Value: 10

All values can be substituted if building envelope passes a COMcheck.

Building Mechanical, Electrical & Plumbing Systems: Although detailed specifications of each of these systems has not been determined at this time, all systems will meet the requirements of the International Energy Conservation Code (or equivalent as suited to the New York State Building Code and the Town's Code). Examples of requirements are as follows:

- Controls: (1) thermostats shall be provided for each separate heating and cooling system (each apartment to have its own zone). Programmable thermostats are recommended.
- Hot water boilers: When supplying heat to each building through one or two-pipe heating systems, they shall have an outdoor setback control that lowers the boiler water temperature based on the outdoor temperature.
- Ducts and air handlers: Supply & return ducts with a size of 3" dia. or greater shall be insulated to a minimum of R-8, and those with a size of less than 3" dia. shall be insulated to a minimum of R-6. Ducts, air handlers and filter boxes shall be sealed.
- Mechanical system piping insulation: Mechanical system piping capable of carrying fluids above 105 degrees F or below 55 degrees F shall be insulated to a min. of R-3.
- Heated Water Circulation & Temperature Maintenance Systems*:* Heated water circulation systems shall be provided with a circulation pump. Controls shall start the pump based on demand, and shall automatically turn off the pump when the water reaches the desired temperature and when there is no longer demand for hot water.
- Demand recirculation systems: A water distribution system having one or more recirculation pumps that pump water from a heated water supply pipe back to the heated water source through a cold-water supply pipe. Pumps shall have controls that start on demand from a user/fixture or sense the flow of hot or tempered water to a fixture fitting or appliance.
- Hot water pipe insulation: Insulation for hot water pipe with a min. thermal resistance of R-3 shall apply to ¾" dia. or larger piping, piping serving more than (1) dwelling unit, piping located outside the conditioned space, piping from the water heater to a distribution manifold, piping located under a floor slab, or buried piping.
- Mechanical ventilation: The building shall be provided with ventilation that meets the requirements of the International Residential Code or the International Mechanical Code

(or equivalent as suited to the New York State Building Code and the Town's Code). Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

- HVAC equipment sizing & efficiency rating: Shall be sized in accordance with ACCA Manual S based on building loads. New or replaced HVAC equipment shall have an efficiency rating equal or greater than the minimum required by federal law for the geographic location where the equipment is installed. Systems serving multiple dwelling units shall comply with Sections C403 and C404 of the IECC (or equivalent as suited to the New York State Building Code and the Town's Code) – Commercial Provisions in lieu of Section R403.
- Lighting equipment: Lamps in permanently installed lighting fixtures shall be high-efficiency lamps (e.g., LEDs), with the exception of low-voltage lighting in certain locations.

Interior Finishes, Equipment:

- Finishes: Although the specific interior finishes have not been selected at this time, they will be designed to meet sustainability standards such as Greenguard Indoor Air Quality. Products with a high natural material content, as well as a high recycled content and a non-VOC content will be selected as available. In addition, every effort will be made to select products manufactured or assembled in the United States.

Construction Methods, Equipment:
The project will investigate and/or use several methods to reduce GHG emissions in building construction:

- Use AutoCAD (or equivalent) for estimating "Cut Sheets" in material design. This reduces wasted materials needing disposal.
- Abide by NY State idling laws which limit diesel engine idling to 5 minutes (NYS Environmental Conservation Law, 6 NYCRR, Subpart 217).
- Investigate the use of low-carbon cement for the foundations.
- Use newer (i.e., higher-efficiency/low-emission) equipment where possible.
- Ensure that all caps for petroleum storage and on equipment are fully tightened daily (this reduces evaporative loss of VOCs).

3.0 GREENHOUSE GAS MODELING

3.1 General

In the existing condition, the site is in a vacant, secondary growth condition. It does not currently contribute any significant, man-made greenhouse gasses or equivalents as a carbon footprint.

The Kyoto Protocol discusses emissions of the six main greenhouse gases, namely: • Carbon dioxide (**CO_2**); • Methane (**CH_4**); • Nitrous oxide (**N_2O**); • Hydrofluorocarbons (**HFCs**); • Perfluorocarbons (**PFCs**); and • Sulphur hexafluoride (**SF_6**).

Per the US EPA:

> **Carbon Dioxide (CO_2)** is a naturally occurring gas and is a by-product of burning fossil fuels and other industrial processes. It is the principal man-made greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured. ***CO_2*** *will be produced on site as the dominant end product (i.e., full combustion) of home and office heating fuels. Indirectly, it will be produced as the project (i) consumes electricity and (ii) results in vehicular trips (non-ev).*
>
> **Nitrous Oxide (N_2O)** is a powerful greenhouse gas with a global warming potential of 310 times that of carbon dioxide (CO_2). Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers and high temperature fossil fuel combustion. ***N_2O*** *will not be produced directly by the project; indirectly, it will be produced as the project (i) consumes electricity (ii) results in some landscaping*[1]*. No high temperature fossil fuel combustion (i.e., 2,000 to 3,000 degrees F) will occur on site.*
>
> **Methane (CH4)** is a hydrocarbon and a greenhouse gas with a global warming potential of 21. Methane is produced through anaerobic (without oxygen) decomposition of waste and incomplete fossil fuel combustion. *Therefore, the proposed action would produce methane dominantly as a by-product of the proposed waste water treatment facility. The project will not be supplied with natural gas (i.e., methane) fuel.*
>
> **Sulfur Hexafluoride (SF6)** is a man-made chemical composed of sulfur and fluorine with a global warming potential of 22,800. It is a colorless gas soluble in alcohol and ether and only slightly soluble in water. Sulfur hexafluoride is a very powerful greenhouse gas used primarily in electrical transmission and distribution

[1] It should be notes that when the site was in a prior agricultural use, the N_2O contribution to greenhouse gasses due to fertilizer use was undoubtedly much greater than the proposed action. The prior agricultural use also produced a considerable amount of CO_2 due to planting/harvesting and other farm equipment.

systems. *Therefore, the proposed action would "produce" (utilize) this compound only indirectly as a result of electrical consummation.*

Perfluorocarbons (PFCs) are a group of man-made chemicals composed of carbon and fluorine only. PFCs are emitted as by-products of industrial processes and are also used in manufacturing. *The project will not significantly "produce" PFCs but it may be included in some, synthetic building products.*

Hydrofluorocarbons (HFCs) are compounds that contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. *The project will not significantly "produce" HFCs but it may be included in some, synthetic building products and some personal products (mostly as propellants).*

The carbon footprint modeling begins with a measure of the total amount of carbon dioxide (CO_2), or in the case of vehicular emissions, CO_2 or CO_2 equivalents, which are emissions that are directly and indirectly caused by an activity or is accumulated over the life stages/operation of a product. The "operation" includes activities of individuals living in those residential units plus associated transportation. The CO_2 emissions or CO_2 equivalents may then be converted to/expressed as carbon content. Footprint calculations, usually in pounds or tons per year, follow from the CO_2 emission calculations. *The above factors are accounted for in the USEPA's modeling. For example, CH4 is assumed as a by-product of treating household sanitary waste water and bio-solid and the results are in CO_2 equivalents and direct and indirect vehicular trips are calculated.*

3.2 U. S. Environmental Protection Agency Tools (Operational GHG)

The New York State Department of Environmental Conservation's, Guide for Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements[2] was issued on September 9, 2008 (NYSDEC GHG). It states that it "will be applicable" to power plants and solid waste facilities and that other large-scale projects ("such as a very large-scale resort or residential" projects), "will also find this guide useful." In a further draft of March 11, 2009, "a very large scale project" was further refined to, "generate thousands of trips or use significant amounts of energy" could "possibly" have an EIS where the discussion of energy use or GHG emissions is "required." For this project and document, the applicant has requested a GHG

[2] NYSDEC's July 15, 2009

Assessing Energy Use and Greenhouse Gas missions in Environmental Impact Statements

States, "This policy should be used by DEC staff in their review of an EIS when:

- DEC is the SEQR lead agency in a project review and for project's with very large GHG emissions potential, such as "methane emissions from wastewater treatment plants; emissions of hydrofluorocarbons and perfluorocarbons from the manufacturing, servicing and disposal of refrigeration and air conditioning equipment; and other GHGs emitted through various chemical and manufacturing processes…" Further, The SEQR Handbook, 4th Edition Chapter 5: Environmental Impact Statements, Section 53 states that, "In contrast, the regulations exclude ordinary projects like large shopping malls, residential developments, or office complexes." Thus, this particular guidance does not apply to this project.

analysis. The above NYSDEC documents have been referred to and utilized in this effort as the useful guide they were intended to be.

The March 11, 2009 NYSDEC Greenhouse Gas Emission Guide states that, "accurate estimates of energy use and resulting GHG emissions will be complicated by the limitations of energy modeling tools," site and project-specific design features, and, "the **preliminary nature** [emphasis added] of a project design at the point when an EIS might be filed." Further, the March 11, 2009 Greenhouse Gas Emission Guide did not require any specific, overall methodology for calculating such virtual emissions. However, it does cite U.S. Environmental Protection Agency (EPA), U. S. Department of Energy and other sources which have been used in the current analysis. Specifically, it cites US EPA's Climate Leaders Inventory Guidance, US EPA's WARM program and the World Resources Institute and World Business Council for Sustainable Development (WRI/WBCSD) as providing "relevant information." These programs have been incorporated as methodologies, background data and calculations within the US EPA's carbon "tools."

The CO_2 "emission" modeling provided herein was based upon:

1. U.S. Environmental Protection Agency's (US EPA) most recent "Individual Household Calculation Tool" for the residential Proposed Action.
2. U.S. Environmental Protection Agency's (US EPA) most recent "Commercial Greenhouse Gas Emissions Tool" for the Proposed Action mixed uses on site.
3. World Resources Institute and World Business Council for Sustainable Development (WRI/WBCSD) inputs to the commercial use modeling tool.
4. U. S. Energy Information Administration, New York Energy Research and Development Authority and local utility data (as available).

The US EPA models are based upon detailed information which has been accumulated by the various Departments of the Federal government for several decades. These data include intensive information regarding energy consumption for a wide variety of human endeavors; they have been accumulated and compiled since the mid-1970s (as spurred on by the first energy crisis of 1973-1974). Data include home or commercial heating (oil, natural gas, etc.) in various regions of the country, the consumption of various goods, the transportation of both goods and people, etc. plus the energy required to accomplish these ends. These data were further augmented by information from the NY State Energy Research and Development Authority.

The modeling of virtual emissions[3] in the form of carbon dioxide requires the translation of various forms of energy (e.g., natural gas, gasoline, diesel fuel, etc.) to useful energy or "work" units and the carbon oxidized from the fuel in the process. Industry-wide energy equivalent conversions from gallons, kilowatts or cubic feet (therms) of energy consumed were/are applied in the calculations. For example, one kilowatt hour (kw-hr) of electricity translates to 3,412 British

[3] The CO_2 emission calculated in GHG efforts are largely "virtual" emissions. That is, with the exception of fossil fuel vehicles and non-electric home HVAC, the emissions are not produced directly by the user. For example, when a user "consumes" a staple item such as food, a bag of fertilizer or paper, they do not "emit" CO_2 at that location. Rather, the CO_2 emissions" occur in other places (where the consumer items are produced, transported and then the residual waste is disposed). Many, if not most, of these emissions are "virtual" since they do not- and will not- occur at the location of the proposed project.

Thermal Units (btu's), one horsepower (transportation) to 2,545 btu and one therm (natural gas) to 100,000 btu. Combustion was assumed to be 100 percent of the fuel at issue and carbon content was based on the type fuel "utilized". For example, one gallon of gasoline contains 18.9 kilograms (kg) of carbon per giga-joule (GJ equivalent to a little less than one million btus) and propane has 17.2 kg of carbon per GJ. Carbon dioxide (CO_2) emissions were/are determined in this analysis. The carbon equivalents can be derived from the data by using the appropriate molecular weights of carbon and oxygen.

Carbon dioxide (CO_2) and equivalent emissions were calculated as follows:

(A) Transportation: Pounds of carbon dioxide equivalent are calculated and based on US EPA's estimate of the greenhouse gas emissions (especially as CO_2) from a typical passenger vehicle. These data were based on average national fuel consumption for the vehicle types assumed to be used; the national sedan average is 26.5 miles per gallon (mpg).[4] The GHG NYSDEC draft guidance of March 11, 2009 recommends calculating trip generations for the project and then estimating vehicle miles traveled using, "reasonable assumptions about distance traveled…" The Project's traffic GHG generation assumed 2 vehicles per residential unit and a number of different vehicles, including panel trucks, for the commercial space. These unrestricted units were assumed to generate largely "localized" traffic. Some commuting to and from work in the Newburgh, Middletown and Beacon area was assumed or to the nearest Coach Bus route or Metro North stations in Middletown or Beacon.

(B) Electricity: Electricity emissions factors are categorized by geographic sub-region. Electrical uses for the home modeling have been compiled by use, square footage, and occupancy based on US EPA and U.S. Department of Energy (USDOE) statistics and New York State's Energy Research and Development Authority. For residential buildings, Department of Energy's, Energy Information Administration, Office of Energy Statistics consumption data was used to calculate an CO_2 equivalent per year based on carbon dioxide output of 907.16 pounds per megawatt-hour of electricity for New York power plants[5]. The energy consumption data were then calculated by proposed residential units types that is, 1-2 bedroom units as based on the Project plan by Engineering & Surveying Properties.

(C) Natural Gas[6]: Typical CO_2 emissions are usually calculated per household and are based on unit type. The consumption levels were further refined based upon Department of Energy's, Energy Information Administration, Office of Energy Statistics data, New York State Electric and Gas (NYSEG) and New York State's Energy Research and Development Authority pricing/consumption data, etc. However, no natural gas will be used for this project. The above electrical consumption numbers have been effectively doubled to reflect this condition.

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[4] As determined by Federal Highway Administration (FHWA), Bureau of Transportation Statistics, the average fuel consumption for passenger vehicles was 26.5 mpg. For projects with substantial future completion dates, CAFE standards which mandated a 40 percent fuel efficiency improvement by 2020 are included in MOVES. The current analysis is for the full build.

[5] This translates a little higher than the NYSDEC Draft guidance which provides a figure of 0.850 pounds of CO_2 per kw-hr. of power plant production in New York State. Based upon USEPA's eGrid Version 2.1.

[6] Fuel source was assumed to be electricity

(D) Waste Disposal: The residential calculations assume that households generated waste based upon 2.0 pounds per person per day in New York. Greenhouse gas emission benefits from recycling newspaper, glass, plastic, metal and magazines were developed using the US EPA data and all life-cycle greenhouse gas emissions factors for waste management. Carbon dioxide equivalent emissions associated with household waste management were based on material types. The emissions for each material type are based on the Waste Reduction Model (WARM)[7]. These emission factors take into account the full material life cycle: i.e., not only the emissions sequestered into landfills, but also the emissions and sequestration associated with production, manufacturing, remanufacturing, forest carbon storage due to reduced harvests.

In making the calculations about projected energy and resource use that are reflected in this report, the applicant has projected energy consumption based on transportation and residential unit types. The applicant has also gathered sufficient primary data in preparing the documentation to make reasonable calculations, of primary and secondary source CO_2 "emissions" data versus credible carbon measurement standards. As provided by NYSDEC GHG, however, any methodology is constrained by, "limitations of energy modeling tools," site-and project-specific design features, and, "the **preliminary nature** [emphasis added] of a project design at the point when an EIS might be filed." Within these limitations, these calculations represent reasonable estimates of carbon emissions and resource use for the project.

3.3 Building Construction GHG

For the GHG involved in the production and wooden building elements:

To allow for an equivalent comparison of each buildings type to the other, two construction materials, concrete and wood, were considered at present. Concrete was chosen because it has the largest, net carbon dioxide (CO_2) equivalent emissions (i.e., CO_2 equivalents for production minus CO_2 equivalents for sequestration) of all materials that could be used.

For example, concrete's CO_2 equivalent emissions are 0.51 tons per ton (which equates to approximately 1.03 tons per cubic yard). This CO_2 emission factor is approximately 230 times higher than a ton of wood[8] (before even counting the lower "tonnage" of wood generally required for construction of the same structure).

In this case, the majority of building construction will be wood frame on concrete foundations. The slab and foundations were estimated to use 814 cubic yards for the site. As such, the foundations would "generate" some 814 tons of CO_2 equivalent emissions but NOT on-site. These would be created at the Portland Cement production facility. One such plant occurs in New Baltimore, NY.

[7] The NYSDEC GHG draft recommendations of March 11, 2009, Section D, recommends calculating waste generation and CO_2 data from this source and WARM is the basis for calculations used in the USEPA's Household estimating tool.

[8] Per USEPA's 2009 Draft U.S. Greenhouse Gas Inventory and MIT 2019, Construction with Engineered Wood.

Each residential building would be some 3 stories tall and 39,759 square feet of footprint. The commercial buildings will add some 31,000 square feet of footprint. The wood framing include in each building is estimated at 92 tons per 1,000 square feet. At 0.002 tons of CO_2 equivalent emissions per ton of wood utilized, 14,670 tons of CO_2 equivalent emissions would "generated" but, to harvest, process, deliver and install the wood on-site. The fact that the building's framing and structural members will be dominantly constructed of wood actually creates a more environmentally "friendly" result because it results in carbon sequestration of some 0.8 tons per year per acre as it grows in the forest[9]. This result was not calculated herein.

[9] MIT 2018, Mass Timber Construction.

4.0 RESULTS

4.1 Greenhouse Gasses

Carbon dioxide (CO_2) emissions and footprint modeling results were calculated in several forms. First, the tools/models used produce results that are in pounds, kilograms or tons[10]. Tons can be English or metric units (see footnote 1). In Section 4.0 and its associated Table 1 at the end of the report text, the results are presented in English tons per year to make the results more understandable to the general public. The US EPA-based modeling from which these results are derived are presented in Appendices A and B. The results are reported as:

- Proposed Action – Residential Attached Units, 1-2 Bedrooms
- Proposed Action – Commercial (mixed use, non-industrial)
- 11.2 acres of wetlands and adjacent "buffer" areas (combined) are preserved acreage.

The Proposed Action has 261 attached residential units with no age restriction. The 1- and 2-bedroom units (36 and 225, respectively) would produce 4,014 tons per year of CO_2 or equivalent GHG emissions[11].

The potential, future commercial activity in the proposed mixed-use portions of the site will include some 31,000 square feet of space. Directly, this activity would produce approximately 107 tons of per year of CO_2 or equivalent GHG emissions. However, electricity used/purchased from outside sources (i.e., Orange and Rockland Utility in this case) would produce (off site) approximately 2,749 tons of per year of CO_2 or equivalent GHG emissions.

Since 11.2 acres of wetlands will be preserved on site, a sequestration credit of approximately 9 tons per year of CO_2 or equivalent GHG emissions was calculated for the Project.

It is important to note that the projected project population will occur regardless of the project's implementation. What this means is that the people which make up this population will occur most likely occur somewhere within the Hudson Valley and New York City metropolitan region as a result of "organic" demographic growth and they will create some type of carbon footprint as a result of their existence and in the course of living their lives; the only reasonable questions are – where will they occur and will that location foster a greater or smaller carbon load/footprint[12]?

Given the above results, it is likely that the proposed project could represent a net decline in CO_2 and GHG "equivalent" emissions. This will occur because the project will be contain only attached dwelling units. In the lower Hudson Valley, the vast majority of these "new" residents will

[10] Tons of carbon are a factor of about 4 times less than CO_2 based upon the appropriate molecular weights.

[11]

Metric tons of carbon dioxide equivalent ($MTCO_2$ Eq.)

A metric measure used to compare the emissions from different greenhouse gases based upon their global warming potential (GWP). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by its associated GWP. In ARCHIBUS, total emissions is expressed as $MTCO_2$ that is calculated by adding the metric tons of carbon dioxide emissions with the metric ton carbon dioxide equivalents for methane and nitrous oxide.

Total Emissions ($MTCO_2$) = Emissions $MTCO_2$+ CH_4 Emissions ($MTCO_2$ Eq.) + N_2O Emissions ($MTCO_2$ Eq.):

[12] This is B. Laing associates. Inc.'s professional opinion based upon prior project experience and alternatives analyses in the Hudson Valley.

purchase and move into single family homes[13]. Therefore, on a unit to unit and person to person comparison of emissions, apartments generally would show a 43% lower carbon utilization. However, a single family home development on this site would have fewer units.

TABLE 1 GHG Compilations

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CARBON FOOTPRINT ASSESSMENT TOTALS (Operational)

PROJECT:	SHEFFIELD APARTMENTS					
NUMBER:	EPPMTG01		12/13/2023			
Scenario: Multi-family Units (1-2 Bedrooms)						
	Uses		Pounds/Year	# Units	Pounds Per Year	
		Electric	4126	261	1,076,886	
		Gas	0	261	-	
		Waste	2075	261	541,575	
		Transport	25255	261	6,591,555	
		Uses Total: lbs	31456		8,210,016	
		Uses Total: tons	15.728			
	Credits					
		Electric	0	0	-	
		Gas	0	0	-	
		Recycle	700	261	182,700	
		Credits Total:				
					Pounds Per Year	Tons Per Year
	Unit Type Subtotal:				**8,027,316**	**4,014**
Scenario: Project Action - Commercial						
	Uses		Pounds/Year	# Units	Pounds Per Year	
		Electric	1773371	3.1	5497450	
		Gas	0	3.1	0	
		Waste	95	3.1	295	
		Transport	88382.8	3.1	273987	
		Uses Total: lbs	88477.8		5771731	
		Uses Total: tons	44.2			
	Credits					
		Electric	605	3.1	1876	
		Gas	0	3.1	0	
		Recycle	2992	3.1	9275	
		Sequestration/preserved acres	1600	11.2	17920	
		Credits Total:			29071	
					Pounds Per Year	Tons Per Year
			Unit Type Subtotal:		**5742660.58**	**2,871**
					PROJECT TOTAL:	**6,885**

[13] IBID.

ATTACHMENT A

CO_2 EMISSION ANALYSIS FOR RESIDENTIAL SCENARIO

The Basics

How many people live in your house?	3
What is your zip code?	12543
What is your household's primary heating source?	2

Enter 1 for natural gas, 2 for electric heat, 3 for oil, 4 for propane, 5 for wood, or 6 if you do not heat your house

Household Vehicles

How many vehicles does your household have?	Enter your data			Estimated pounds of carbon dioxide/year
	○1 ●2 ○3 ○4 ○5 ○None			
Vehicle 1	20,000 Miles driven	2	enter 1 if this represents miles per week or 2 if it's miles per year	30.0 Miles per Gallon
Vehicle 2	12,000 Miles driven	2	enter 1 if this represents miles per week or 2 if it's miles per year	21.6 Miles per Gallon
Vehicle 3	- Miles driven	2	enter 1 if this represents miles per week or 2 if it's miles per year	21.6 Miles per Gallon

21.9 miles/week is about average in the United States per vehicle. If you don't know your car's fuel economy, you can look it up at http://www.fueleconomy.gov. The national average is 21.6 miles per gallon.

25,255 Pounds of carbon dioxide/year
10,494 pounds is about average per vehicle over a year.

Do you perform regular maintenance on your vehicles?

2 — enter 1 for yes and 2 for no

971 pounds/yr

Regular maintenance includes: keeping your engine properly tuned and tires properly inflated

Home Energy

	Enter your data		Estimated pounds of carbon dioxide/year
How much natural gas does your household use per month? If you enter your monthly consumption in thousand cubic feet, you'll get a more accurate estimate. If you enter dollars, our calculations assume you pay $10.69/thousand cubic feet.	$25 is about average in the United States for a household of two persons.	Enter 1 for dollars, 2 for thousand cubic feet, 3 for therms: 1	0 Pounds of carbon dioxide/year 3,071 pounds is about average for a household of two persons over a year.
How much electricity does your household use per month? If you enter your average kilowatt-hours, you'll get a more accurate estimate. If you enter dollars, our calculations assume that you pay 11.9 cents/kWh.	629 — $74 is about average in the United States for a household of two persons.	Enter 1 for dollars, 2 for kilowatt-hours: 2	4,126 Pounds of carbon dioxide equivalent/year 5,455 pounds is about average in the U.S. for a household of two persons over a year.
Does your household currently purchase green power? Green power can often be bought through your local utility or through a green power marketer. For a description of green power visit (http://www.eere.energy.gov/greenpower/whatis/whatis.htm).	2	Enter 1 for yes, 2 for no	
If so, what portion of your household's total purchased electricity use is green power? Enter 100% if you buy all of your electricity as green power.	0%		
How much fuel oil does your household use per month? Divide your annual fuel oil consumption (in gallons or dollars) by 12 to obtain a monthly average. If you enter your monthly fuel oil use in gallons, you'll get a more accurate estimate. If you enter dollars, our calculations assume that you pay $4.03/gallon.	0 — $72 is about average in the United States for a household of two persons.	Enter 1 for dollars, 2 for gallons: 1	Pounds of carbon dioxide/year 4,845 pounds is about average for a household of two persons over a year.
How much propane does your household use per month? If you enter your monthly propane use in gallons, you'll get a more accurate estimate. If you enter dollars, our calculations assume that you pay $2.47/gallon.	$37 is about average in the United States for a household of two persons.	Enter 1 for dollars, 2 for gallons: 1	Pounds of carbon dioxide/year 2,363 pounds is about average for a household of two persons over a year.

Waste

	Enter your data	Estimated pounds of carbon dioxide/year
Based on the number of people in your household, the box at right shows your estimated greenhouse gas emissions from waste. However, if you currently recycle certain materials, your waste emissions may be lower.	Total Waste Emissions Before Recycling	2,075 Pounds of carbon dioxide equivalent/year 692 pounds is about average for a household of two persons over a year.
Which of the following products do you currently recycle in your household?		
Do you recycle aluminum and steel cans?	1 — enter 1 for yes and 2 for no	(268) Pounds of carbon dioxide equivalent/year
Do you recycle plastic?	1 — enter 1 for yes and 2 for no	(107) Pounds of carbon dioxide equivalent/year
Do you recycle glass?	1 — enter 1 for yes and 2 for no	(76) Pounds of carbon dioxide equivalent/year
Do you recycle newspaper?	1 — enter 1 for yes and 2 for no	(339) Pounds of carbon dioxide equivalent/year
Do you recycle magazines?	1 — enter 1 for yes and 2 for no	(82) Pounds of carbon dioxide equivalent/year
	Total Waste Emissions After Recycling	1,202 Pounds of carbon dioxide equivalent/year
Your Total Emissions		35,982 Pounds of carbon dioxide equivalent/year 19,702 pounds is about average in the United States for a household of two persons over a year

What You Can Do to Reduce Your Emissions

On the Road

Suggested actions			Cost* (Dollars)	Estimated Savings (Dollars)	Estimated Savings (CO2 Emissions)	
Reduce the number of miles you drive vehicle 1 by miles per week. Will you take this action?	0	2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	$0 annual savings	0 pounds/yr	0% percent of total emissions
Reduce the number of miles you drive vehicle 2 by miles per week. Will you take this action?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	$0 annual savings	0 pounds/yr	0% percent of total emissions
Reduce the number of miles you drive vehicle 3 by miles per week. Will you take this action?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	$0 annual savings	0 pounds/yr	0% percent of total emissions

The Fuel Economy Web site (www.fueleconomy.gov) can help you find efficient vehicles.

Will you perform regular maintenance on your vehicles?		1 (enter 1 for yes, 2 for no, and 3 if you are already taking this action.)	$	0 annual savings	0 pounds/yr	0% percent of total emissions

Regular maintenance includes: keeping your engine properly tuned and tires properly inflated

Replace vehicle 1 with one that gets more miles per gallon. Will you take this action? (see EPA's Green Vehicle Guide for additional information: http://www.epa.gov/greenvehicles/index.do)	0	2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$$$	$0 annual savings	0 pounds/yr	0% percent of total emissions
Replace vehicle 2 with one that gets more miles per gallon. Will you take this action?	1	1 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$$$	$90 annual savings	488 pounds/yr	2% percent of total emissions
Replace vehicle 3 with one that gets more miles per gallon. Will you take this action?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$$$	$0 annual savings	0 pounds/yr	0% percent of total emissions
				$90	1,460	percent of total emissions

Walking, biking, carpooling, telecommuting, and using mass transit are good options.

At Home

Suggested actions			Cost* (Dollars)	Estimated Savings (Dollars)	Estimated Savings (CO2 Emissions)	
Turn down your household's heating thermostat by ____ degree(s) Fahrenheit on winter nights. Will you take this action?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	$0 annual savings	0 pounds/yr	0% percent of total emissions
Turn up your household's air conditioner thermostat by ____ degree(s) Fahrenheit in summer. Will you take this action?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	0 annual savings	0 pounds/yr	0% percent of total emissions
Enable sleep feature on your computer and monitor. Will you take this action?		1 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	$13 annual savings	59 pounds/yr	0% percent of total emissions
Wash clothes in cold water instead of hot. Will you take this action? Enter the number of loads you do in a week ____		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	$0 annual savings	0 pounds/yr	0% percent of total emissions
Use a clothes line or drying rack for 50% of your laundry, instead of your dryer. Will you take this action?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$	0 annual savings	0 pounds/yr	0% percent of total emissions
Substitute 0% percent of your household's current electricity use with Green Power. Will you take this action?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$	The cost of green power [http://www.epa.gov/greenpower/locator/index.htm] varies depending on resource, geography and type of green power product.	0 pounds/yr	0% percent of total emissions

Your local utility or other electricity supplier may offer green power as an option. If you purchase some or all of your electricity as green power, enter the percentage here. For a definition of green power, visit http://www.epa.gov/greenpower/gpmarket/index.htm. On average, green power costs roughly 2 cents per kWh more than conventional power.

Replace 12 60-watt incandescent light bulbs with 13-watt ENERGY STAR lights. Will you take this action?		1 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$	$48 annual savings	217 pounds/yr	1% percent of total emissions
The ENERGY STAR *Change a Light, Change the World* website (www.energystar.gov) can help your household take this action						
Replace your household's old refrigerator with an ENERGY STAR model. Will you take this action?		1 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$$	$38 annual savings	177 pounds/yr	1% percent of total emissions
Replace old gas or oil furnace or boiler with an ENERGY STAR model. Will you take this action?		1 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$$$	$0 annual savings	0 pounds/yr	0% percent of total emissions
Replace single-pane windows with ENERGY STAR windows. Will you take this action?		1 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	$$$	$150 annual savings	4052 pounds/yr	13% percent of total emissions

Waste

Suggested actions			Cost* (Dollars)	Estimated Savings (Dollars)	Estimated Savings (CO2 Emissions)	
Are you willing to start recycling the material(s) you don't currently recycle (such as newspaper, glass, plastic, metal and magazines)?		2 (enter 1 for yes, 2 for no, and 3 if you're already taking this action.)	no cost	Potential cost savings from recycling vary by community. If your community charges a fee per bag for trash pickup, for example, you may save money by recycling.	0 pounds/yr	0% percent of total emissions

Also consider reducing and reusing materials whenever possible. For more information visit EPA's Reduce Reuse Recycle Web site (http://www.epa.gov/garbage/reduce.htm).

Current Emissions (as reported in the first section)		30,582	pounds	
If you took all the actions you selected above, you would reduce your annual emissions by		4,993	pounds	or 16%
If you took all the actions you selected above, your potential annual dollar savings would be*	$	339	dollars	
Your new total annual CO2 emissions would be		25,590	pounds	

ATTACHMENT B
CO_2 EMISSION ANALYSIS FOR COMMERCIAL SOURCE

Natural Gas

Natural Gas Type	Fuel Consumed (cubic feet)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Natural gas	0	=	0	=	0.00
		=	0	=	0.00
		=	0	=	0.00
		=	0	=	0.00

Company-Owned Vehicle Transportation (Scope 1)

Mobile Factors

Instructions: Enter the vehicle type and miles traveled in company-owned vehicles per year. For company-owned aircraft, select the type of jet and hours flown per year.

Road Transportation

CO_2 Emissions from Vehicles Used for Road Transportation

Vehicle Type	Miles Traveled		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Diesel Automobiles	15,720	=	6,653	=	7
Gasoline Light Truck	15,720	=	9,900	=	10
Gasoline Heavy Truck	15,720	=	23,621	=	24
		=	0	=	0
		=	0	=	0

Company-Owned Aircraft

CO_2 Emissions from company-owned aircraft

Type of Aircraft	Hours Flown		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
		=	0	=	0

Refrigerant and Air Conditioning Use (Scope 1)

Refrigerant Factors

Instructions: Enter the refrigeration/AC application, the number of units, and the type of refrigerant used in each application.

Application*	Number of Units	Type Of Refrigerant		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Residential & Commercial A/C	2	R-401A	=	101	=	0
Chillers	2	R-401A	=	3,109	=	3
			=	0	=	0
			=	0	=	0
			=	0	=	0

*The application type is a refrigerator unless explicitly stated as air conditioning (A/C).

Purchased Electricity, Heat, and Steam (Scope 2)

Electricity Factors | Average Office Electricity Consumption

Instructions: Enter the amount of purchased electricity consumed (kWh) for the year you are performing the inventory. The state default emission factor for this calculation matches the state selected on the Welcome worksheet for your office location.

CO_2 Emissions

State	Electricity Consumption (kWh)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
New York	1,953,000	=	806,078	=	806.08

Waste Disposal (Scope 3)

Waste Factors

Instructions: Select a material and enter the amount of that material that is disposed (e.g., landfilliing, combustion or landfilled, combusted) and the amount that is recycled.

Material	Amount Disposed (Not Recycled) (lbs)	Amount Recycled (lbs)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Aluminum Cans	0	143	=	-975	=	-0.97
Glass	0	143	=	-20	=	-0.02
Office Paper	0	143	=	-204	=	-0.20
Personal Computers	0	143	=	-162	=	-0.16
			=	0	=	0.00
			=	0	=	0.00
			=	0	=	0.00

Wastewater Treated (Gallons)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
26,200	=	42.99	=	0

Employee Business and Commuting Travel (Scope 3)

Mobile Factors

Instructions: Enter the type of vehicle and distance traveled in employee-owned vehicles. Vehicle types can be seen in the drop-down lists below. For rail and subway transportation, enter the type of rail transportation and the distance traveled. For employee business travel, enter the distance traveled, the type of flight, and the seat class.

Road Transportation

CO_2 Emissions from Vehicles Used for Road Transportation

Vehicle Type	Distance Traveled (Miles)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Medium Gasoline Automobiles	271,560	=	108,548	=	108.55
Gasoline Light Truck	213,792	=	134,639	=	134.64
		=	0	=	0.00
		=	0	=	0.00
		=	0	=	0.00

Rail and Subway Transportation

CO_2 Emissions from Rail Transportation

Type of Rail Transportation	Distance Traveled (Passenger Miles)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Diesel Locomotive	56,064	=	9,636	=	9.64
		=	0	=	0.00
		=	0	=	0.00
		=	0	=	0.00
		=	0	=	0.00

Air Transportation

CO_2 Emissions from Employee air travel

Type of Flight (Short, Medium, or Long Haul)	Seat Class (First, Business, Premium Economy, Economy)	Distance Traveled (land miles)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Medium Haul (300 to 700 miles)	Premium Economy	500	=	116	=	0
			=	0	=	0
			=	0	=	0
			=	0	=	0
			=	0	=	0

Production of Purchased Materials (Scope 3)

Waste Factors

Instructions: Select a material and enter the amount of material that is purchased and the average recycled content of each material.

Material	Amount Purchased (lbs)	Average Recycled Content(%)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Personal Computers	143		=	3,988	=	3.99
Glass	143		=	46	=	0.05
Office Paper	143		=	74	=	0.07
Aluminum Cans	143		=	1,124	=	1.12
			=	0	=	0.00
			=	0	=	0.00
			=	0	=	0.00

Contractor-Owned Vehicles (Scope 3)

Mobile Factors

Instructions: The following emissions use an estimate of vehicle type and distance traveled by contractors.

Road Transportation

CO_2 Emissions from Vehicles Used for Road Transportation

Vehicle Type	Distance Traveled (Miles)		Emissions ($kg CO_2 Eq.$)		Emissions ($MTCO_2 Eq.$)
Diesel Light Truck	10,480	=	7,096	=	7.10
Diesel Heavy Truck	10,480	=	15,213	=	15.21
		=	0	=	0.00
		=	0	=	0.00
		=	0	=	0.00

	Total Emissions ($MTCO_2$ Eq.)
Scope 1 Emissions	**CO_2**
On-Site Electricity Generation	**0.0**
Natural Gas	0.0
Company-Owned Vehicle Transportation	**40.2**
Road Transportation	40.2
Aircraft	0.0
Refrigerant and Air Conditioning Use	**3.2**
Scope 2 Emissions	
Purchased Electricity	**806.1**
Other Emissions	
Other	**0.0**
Total Emissions (excluding Scope 3)	**849.5**

***NE indicates emissions were not estimated for this source.**

***NA indicates this particular emission is not applicable for this source.**

Note: Calculations based on 10,000 square feet.

ATTACHMENT C
GHG "STANDARDS" IN NEW YORK STATE

NYSDEC has no "standard" per se for greenhouse gas emissions other than compliance with National/State Ambient Air Quality Standards - NAAQS/SAAQS which is provided in the Level 1 NYSDOT Manual analysis in Section III.5 and the Air Quality Appendix. The project will make "best practices" efforts as described to reduce its Greenhouse Gas – carbon equivalent footprint. Further, for larger projects (see above) a "best practices" standard for GHG reduction and mitigation applies. Handbook, 4th Edition Chapter 5: Environmental Impact Statements, Section 53 states/tests whether or not a project could have or trigger a:

> "reasonably foreseeable catastrophic impact…"Catastrophic impact" is not defined in the SEQR regulations. However, several examples of projects that could result in catastrophic impacts are provided in the regulation, including development and operation of oil supertanker ports, liquid propane or liquid natural gas storage facilities, and hazardous waste treatment facilities. In contrast, the [GHG] regulations exclude ordinary projects like large shopping malls, residential developments, or office complexes."

Thus, this impact definition does not apply to this project.