northeastern BIOCHAR SOLUTIONS

SARATOGA biochar solutions

Town of Moreau, New York
Town Planning Board Meeting
July 19, 2021
-
Carbon Fertilizer Manufacturing Facility
at
Moreau Industrial Park
-
Request for Town of Moreau Planning Board to be Lead Agency under NY SEQR

Company Introduction

Welcome to the dawn of the bioeconomy.
Rooted in responsibility and driven by innovation.
Ensuring our future by sustainably using resources.
Avoiding GHG emissions and sequestering carbon.
Transforming dirty industries into green industries.
Harmonizing science with our environment.

- Northeastern Biochar Solutions, LLC ("NBS") is a privately held company developing green infrastructure that is environmentally, socially and economically beneficial.
- NBS recently acquired Element Carbon Hudson Ventures, LLC ("ECHV") and its proprietary process for manufacturing carbon fertilizer from biosolids and biomass.
- NBS is currently developing two (2) carbon fertilizer manufacturing facilities in New York.
  - Saratoga Biochar Solutions - Upper Hudson Facility - Town of Moreau, NY.
  - Element Carbon Hudson Ventures - Lower Hudson Facility - Town of Wallkill, NY.
- NBS intends to build carbon fertilizer manufacturing facilities in constrained biosolids markets throughout the U.S. and provide the technology to utilities globally.

Team Introduction

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- **Raymond Apy – NBS CEO, SBS President, ECHV VP**
  - Experienced CEO, entrepreneur, strategist, leader, talent and business developer.
  - 30+ years of business experience (engineering, sales, and management).
  - 15+ years in business management roles (President, CEO, Managing Partner).
  - Masters of Science - Environmental Science, Solid & Hazardous waste engineering, GIS, law and policy - Syracuse University/State University of NY.
- **Bryce Meeker – NBS President, ECHV VP**
  - 15+ years experience in renewable energy development and management.
  - 5+ years experience in carbon manufacturing.
  - Private equity, investment banking, and strategic consulting background.
  - Masters of International Business – Tufts University, Fletcher School.
- **Lee Wulfekuhle – NBS COO, ECHV President**
  - Recently sold Wulfekuhle Injection & Pumping, Inc. to pursue ECHV.
  - 25+ years operating experience with liming and spreading bio-waste in Midwest.
  - 20+ years experience contracting with wastewater treatment plants (WWTPs).
  - 1-1/133 RD Infantry in Dubuque, IA (10-years).

Carbon Fertilizer

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- **An economical means for soil restoration and nutrient pollution cleanup.**
  - Farmers are conscientious about soil carbon, yet they continually apply chemical fertilizers that are bound by salt which corrodes soil over time.
  - Over 75 years of chemical fertilizer application has eroded soil carbon nationally yet the demand for chemical fertilizers continues to grow along with the devastation that excess nutrient pollution has caused in waterways nationally.
  - Dead-zones are overtaking lakes, streams, rivers, bays and, most notoriously, the Gulf of Mexico where the dead-zone is currently the size of New Jersey.
  - Dead-zones are caused by excess nutrient pollution that feeds algae blossoms which are detrimental to human, animal, and fish health and related industries.
  - Carbon fertilizer application reverses the trend by increasing soil carbon which improves nutrient and water retention and reduces nutrient runoff downstream.

Biosolids Feedstock

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- **Biosolids are dewatered solids from publicly-owned treatment works (POTW).**
  - Densely-populated coastal areas have difficulty disposing of biosolids.
  - Landfilling and combustion methods emit material amounts of GHG emissions.
  - Recycling methods, such as land application, composting, heat drying, and mine reclamation, spread contaminants (such as PFAS) commonly found in biosolids.
- **Biosolids is an ideal feedstock for producing Carbon Fertilizer.**
  - Facilities can be scaled to service numerous POTWs.
  - Thermal treatment generates minimal GHG emissions which makes it carbon-negative relative to the industry.
  - Thermal treatment remediates PFAS, drugs, hormones, chemicals, and other contaminants from biosolids that other recycling methods leave behind.
  - Using biosolids as feedstock provides tip fee revenue and free energy to ensure our long-term sustainability.
  - Carbon fertilizer, being a byproduct of our biosolids management services, has a unique cost advantage over chemical fertilizers that pollute the environment.

Beneficial Use of Biosolids

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- **Finding a local, climate-friendly solution for biosolids disposal is a top priority in NY.**
  - NYS Climate Leadership and Community Protection Act's (CLPCA) highest goals are related to the reduction of landfilling biosolids and nutrient recovery from biosolids.
  - NYS exports nearly 25% of biosolids generated to out-of-state landfills by truck and train; having gone as far as Texas and Colorado to dispose of the material at a ridiculous cost.

End Use Method	Dry Tons per year	Wet Tons per year[1]	% of Total	POTWs using Method
Landfill	**257,480**	**1,119,478**	**68.2%**	**310**
In-State	164,297	714,335	43.5%	
Out-of-State	93,183	405,143	24.7%	
Combustion	**58,031**	**252,309**	**15.4%**	**87**
Reclycing[2]	**60,999**	**265,213**	**16.2%**	**90**
Other[3]	**1,170**	**5,087**	**0.3%**	**93**
Total	**377,680**	**1,642,087**		**580**

[1] Based on 23% average solids content

[2] Land application, compost, heat drying, mine reclamation - some out of state

[3] Some managed outside of NYS

https://climate.ny.gov/

- **Beneficial uses of biosolids are highly sought after by NY POTWs.**
  - SBS is applying for a Beneficial Use Determination (BUD) from the NYS DEC.
  - Thermal treatment qualifies as a "beneficial use" as it recycles the carbon and nutrients into a solid, odorless, dry fertilizer product while extracting and utilizing its renewable energy in the manufacturing process.
  - Many NY POTWs offer a premium tip fee for having a BUD.
  - It is almost certain that SBS will receive a BUD as heat drying, a form of thermal treatment, already qualifies for a BUD.

Environmental Opportunity

- **<u>Negative carbon footprint</u> in-line with NY Senate Bill 6599 goals (zero GHG emissions).**
  - Reduces transportation and associated GHG emissions.
  - Eliminates methane, pathogens, and odors from biosolids decomposition.
  - Reduces natural gas use in manufacturing process and associated GHG emissions.
  - Substitutes for chemical fertilizer use and associated GHG emissions.
  - Carbon Fertilizer sequesters carbon in soil when used.
- **<u>Nutrient pollution reduction</u> in-line with NYS Nutrient Runoff Law objectives.**
  - Carbon adsorbs rainfall quickly and slowly release nutrients to reduce fertilizer losses.
  - Harmful algae blossoms are a growing problem in NY ponds, lakes, streams and waterways.
  - Reducing nutrient runoff helps eliminate algae growth that creates "dead zones" in ponds, lakes, rivers and bays in NY.
  - NY contributes to Chesapeake Bay watershed and the severe dead zone in the bay.

https://www.dec.ny.gov/chemical/67239.html
"Excess phosphorus in waterbodies can cause algae overgrowth, including harmful algal blooms, with serious impacts to the environment and public health." ~NYS DEC Website.

Proposed Facility Locations

- **NBS strategically locates its facilities near the New York State Thruway.**
  - Numerous trucks use the artery to deliver biosolids to landfills, farms, composting facilities, and other disposal points throughout the entire state and beyond.
  - NYS Thruway has high weight limits that permit up to 37 tons per load.
  - Hundreds of trucks transporting biosolids pass by both facility locations weekly.

New York State Thruway Map

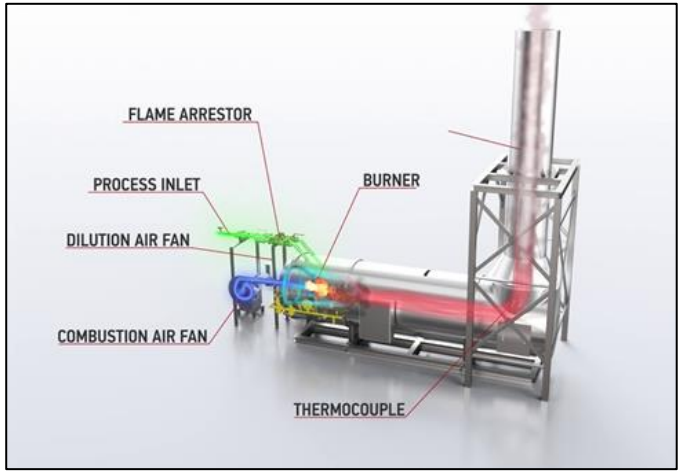
Upper Hudson Facility – Moreau, NY

Lower Hudson Facility – Wallkill, NY

Our Manufacturing Method

- **A thermal treatment method rooted in over 125 years of manufacturing experience.**
  - Thermal treatment is nothing new.
  - All equipment is commercially available from many manufacturers globally.
  - NBS's exclusive manufacture has over 125 years of experience supplying thermal treatment equipment to a wide variety of custom industrial applications.
- **NBS's proprietary method represents a new configuration of existing equipment components.**
  - Each component is used in a wide variety of permitted applications in the U.S.
  - Components are commonly customized for specific industrial applications.
  - Performance guarantees for throughput, safety, and environmental compliance are provided by our experienced manufacturer.

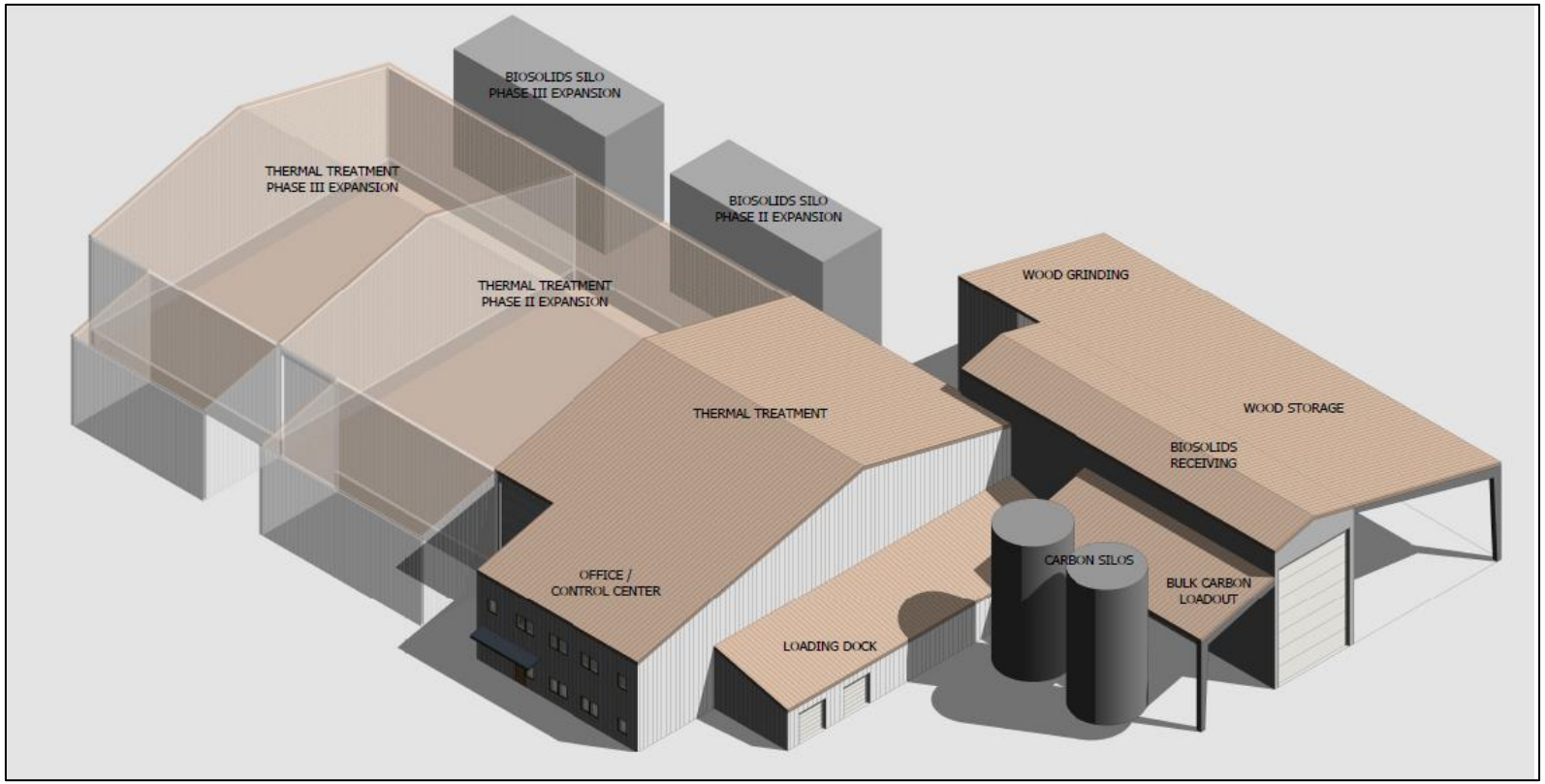
Rotary Kiln Dryer



Thermal Oxidizer

Moreau Facility

- Saratoga Biochar Solutions, LLC, ("SBS") is a subsidiary of NBS.
- To be constructed in 3 Phases and employ up to 20 full-time positions.
- Biosolids deliveries contracted by Casella Organics for up to 20 years.
- Performance and emission guarantees by manufacturer.



Facility Summary

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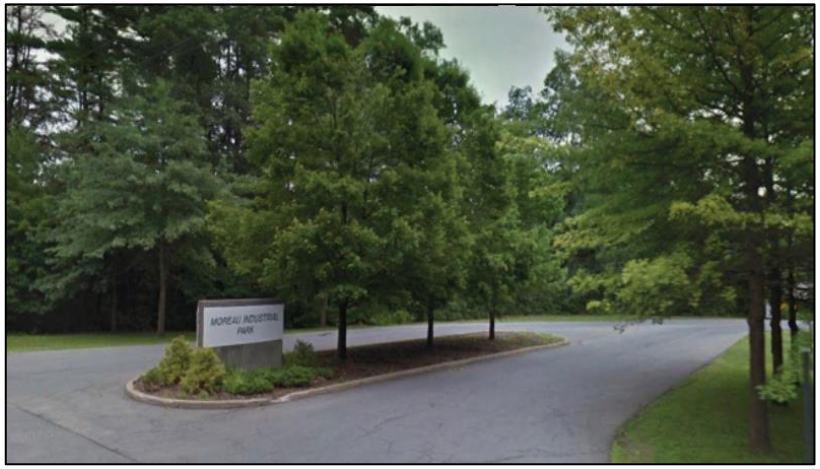
- **Moreau Facility is designed for three (3) construction phases.**
  - Biosolids are sourced regionally and transported to facility by Casella Organics.
  - Waste wood (optional) can be sourced from local municipalities or industries.
  - Carbon fertilizer sold to farms, greenhouses, composting, sod farms, retail, etc.
  - Chemicals (sulfuric acid) to be supplied locally.
  - Existing utilities are run to property and sufficient for our operations.

Inputs	Units	Total	Per Phase
Biosolids	Tons/day	720	240
Waste Wood	Tons/day	<72	<24
Natural Gas	MMBtu/h	6,450	2,150
Electricity	kWh	1,500	500
H2SO4 (50%)	GPD	216	72
Water	GPD	10,584	3,528

Outputs	Units	Total	Per Phase
Carbon Fertilizer	Tons/day	72	24
Discharge	GPD	1,512	504

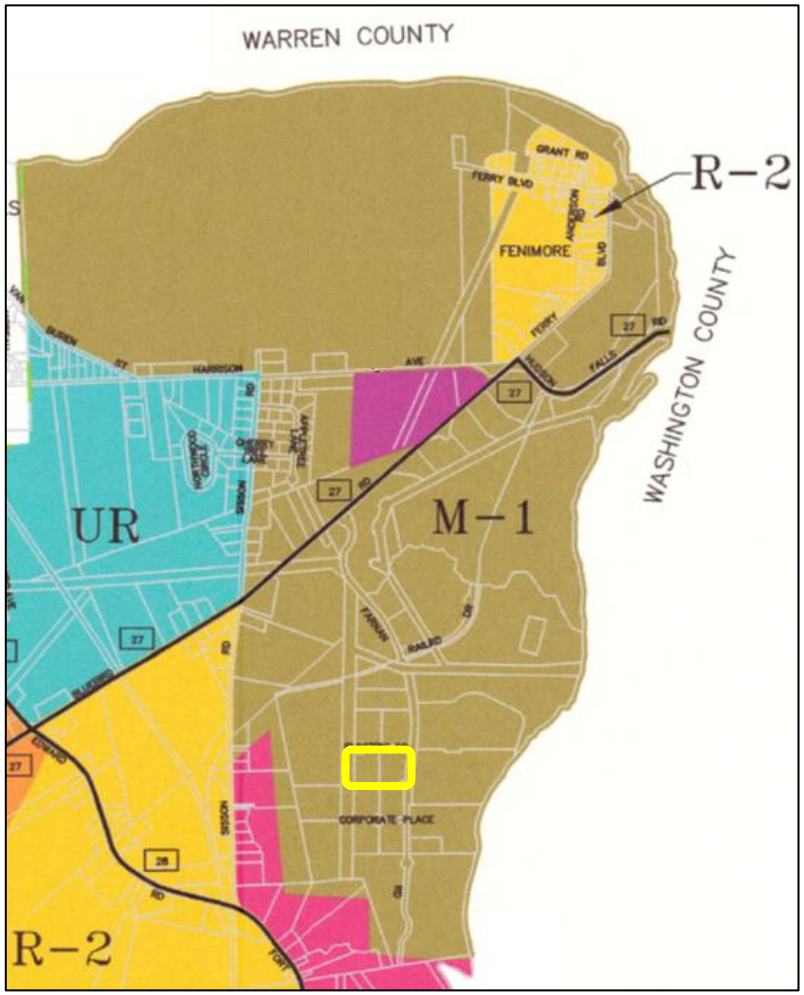
Site Overview

- **Executed purchase option, pending approvals, on 2 parcels in Moreau Industrial Park.**
  - Address: Farnan Road (desired address, instead of Electric Drive).
  - Parcels: 50.-4-22 and 50.-4-16 (merging parcels).
  - Acres: 5.89
  - Utilities: Gas, Water, Electric, Sewer
    Existing utilities are run to property and sufficient for our full-expanded operations.



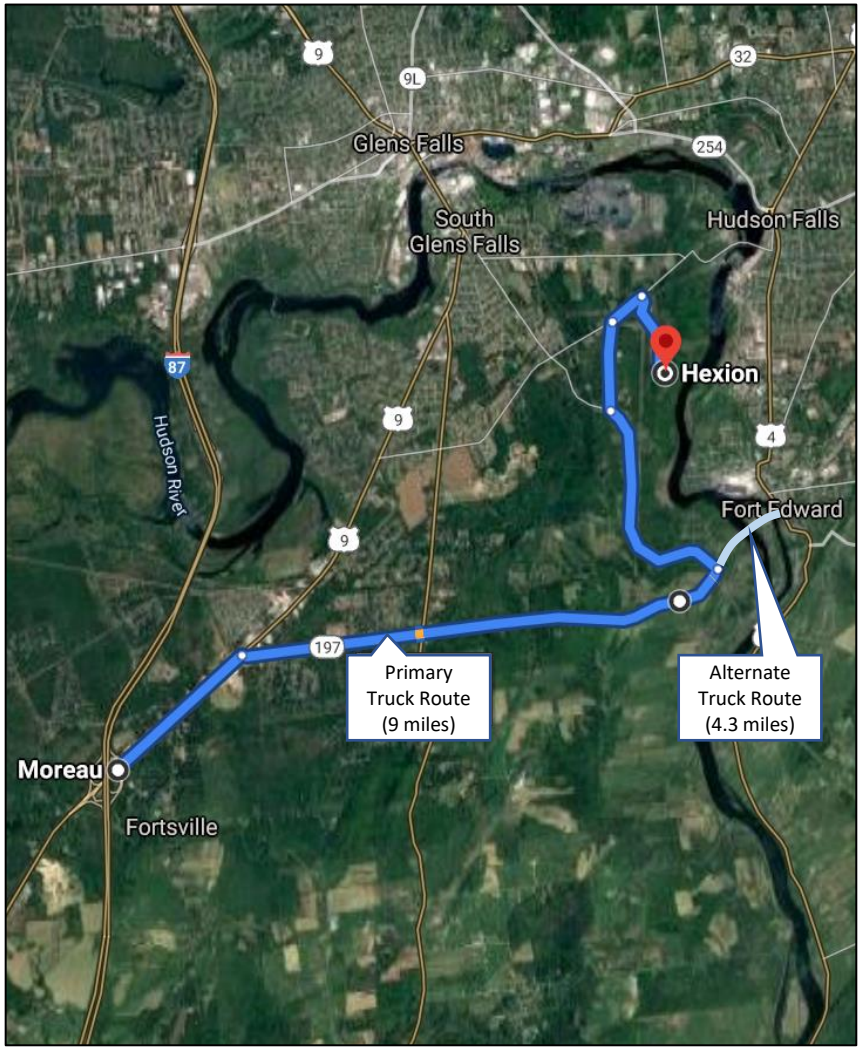
Site Zoning

- **Town of Moreau zoning is appropriate for our intended use.**
  - Zoning: M-1
    General Manufacturing
    & Industrial
- **Moreau Industrial Park was built over 20 years ago and SBS intends to be the second tenant.**
- **One (1) neighbor within 500 feet.**
  - Hexion, Inc.
  - 64 Farnan Rd, South Glen Falls, NY
  - (518) 792-8040
  - Rene.Champagne@hexion.com
  - Manufactures specialty chemicals such as binders, adhesives, coatings and ink resins.



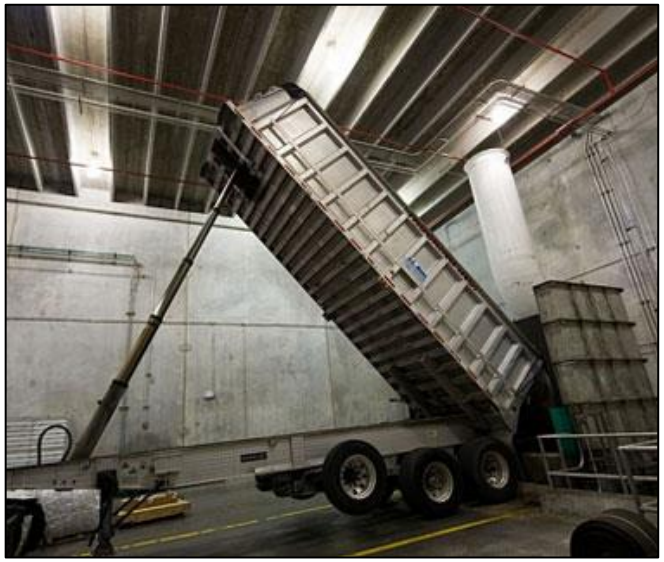
Truck Routes to Site

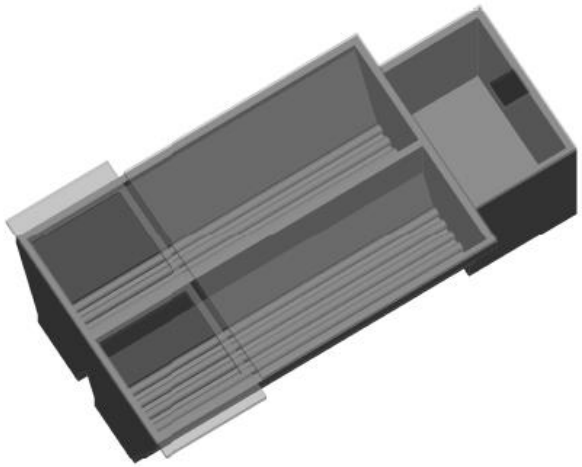
- **50 Trucks per day total once the facility is fully expanded (2026).**
  - Phase 1 – 20 trucks per day
  - Phase 2 – 35 trucks per day
  - Phase 3 – 50 trucks per day
- **Primary truck route from I-87:**
  - Exit 17 to Rt 9 north
  - Rt 9 north to 197 East
  - 197 East to Ft Edward Road North
  - Fort Edward Road North to Bluebird Road East
  - Bluebird Road East to Industrial Park Entrance.
- **Alternate truck route from Hwy 4:**
  - 197 West to Ft Edward Road North
  - Fort Edward Road North to Bluebird Road East
  - Bluebird Road East to Industrial Park Entrance.



Specialized Building Design

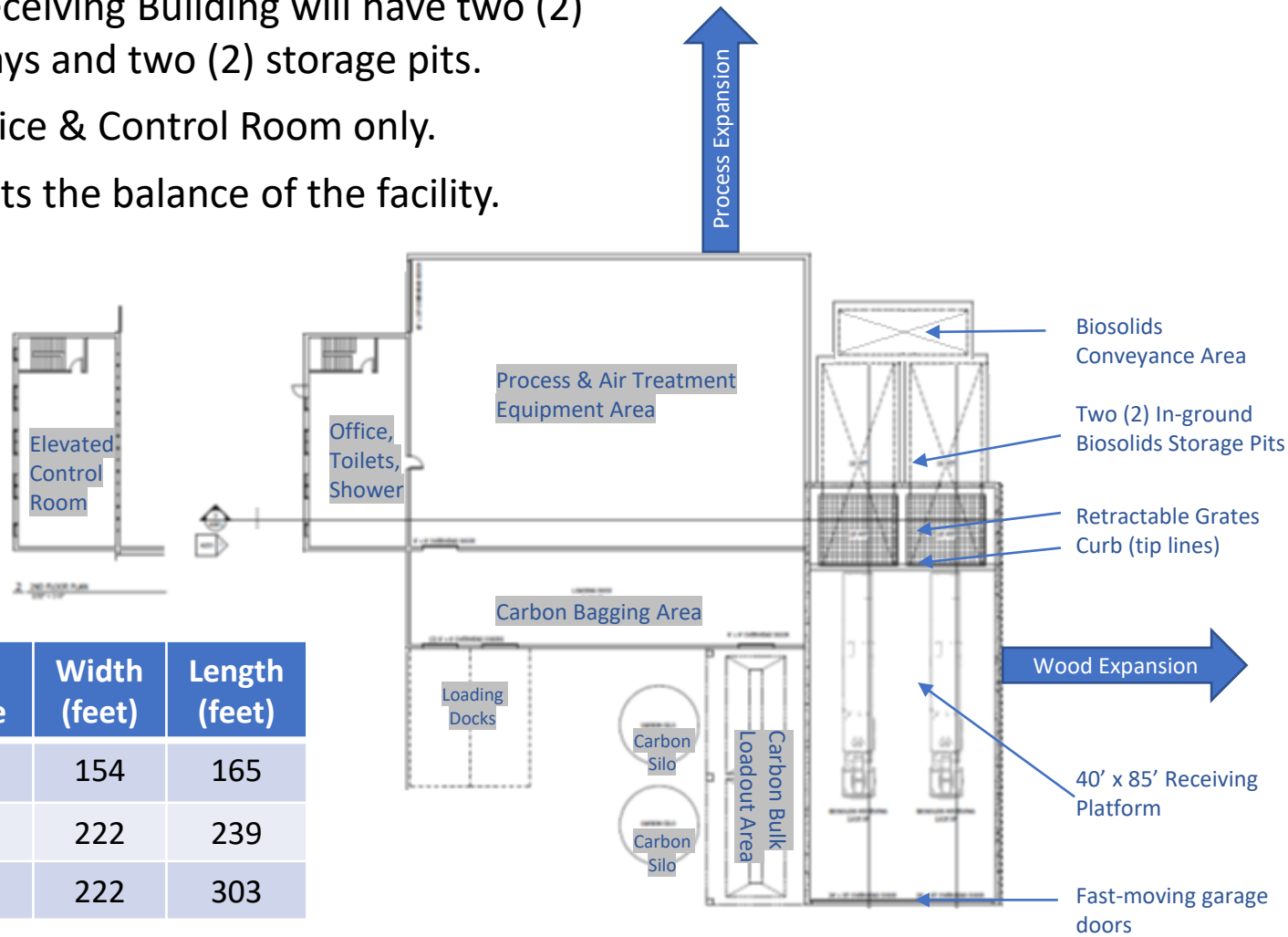
- **SBS is building a specialized manufacturing facility that is custom-designed for receiving, storing, and thermally treating biosolids.**
  - Many biosolids drying facilities are in downtown cities in the U.S.
  - Like any biosolids drying facility, the building is sculpted around odor management.
- **Biosolids receiving is handled indoors, under negative air pressure, to manage odors.**
  - Trucks back into one of two (2) 85’ long receiving bays until they bump the curb.
  - Hydraulic trailers then tip the biosolids into the receiving pits through a grate.
  - Screw conveyors on the bottom of the pit move the biosolids to the far end, through the wall, and into the conveyance area.
  - Biosolids receiving building and pits are under purview of air management system.





Building Layout

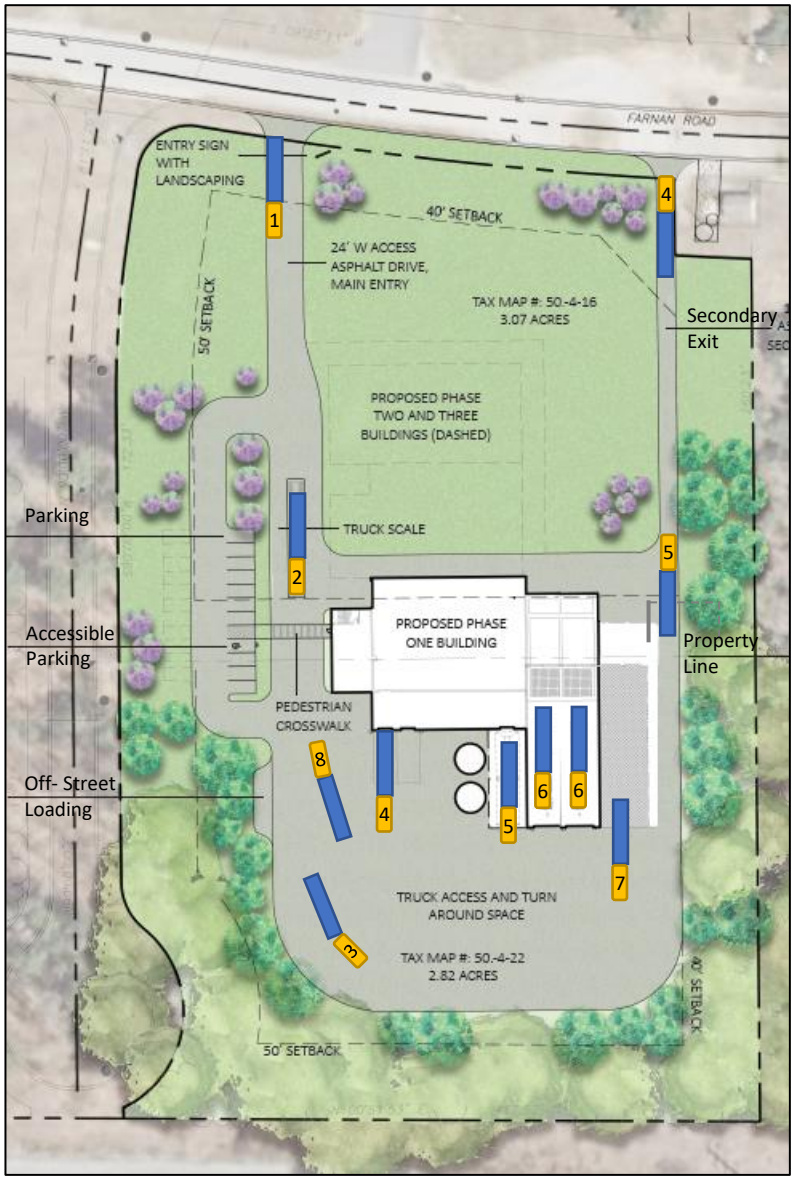
- **Phase 1 Building Layout**
  - Biosolids Receiving Building will have two (2) receiving bays and two (2) storage pits.
  - HVAC in Office & Control Room only.
  - Process heats the balance of the facility.



Phase	Square Footage	Width (feet)	Length (feet)
1	14,900	154	165
2	25,300	222	239
3	34,100	222	303

Site Layout & Logistics

1. All trucks enter from main entrance on Farnan Road (preferred).
2. Trucks are weighed in front of office, prior to crosswalk.
3. Trucks then proceed behind the building for loading/unloading.
4. Bagged carbon fertilizer is loaded into trucks at loading docks (alt. exit).
5. Bulk carbon fertilizer is loaded into tarped trailers under roof (alt. exit).
6. Biosolids trucks back into a receiving building designed to contain odors.
   - Two (2) biosolids receiving bays.
   - Truck tarps are managed inside.
   - Indoor truck wash in each bay.
7. Wood receiving and storage is to be added in Phase 2 (optional).
8. Biosolids & wood trucks weigh out on the same scale when exiting.



Air Treatment System (1)

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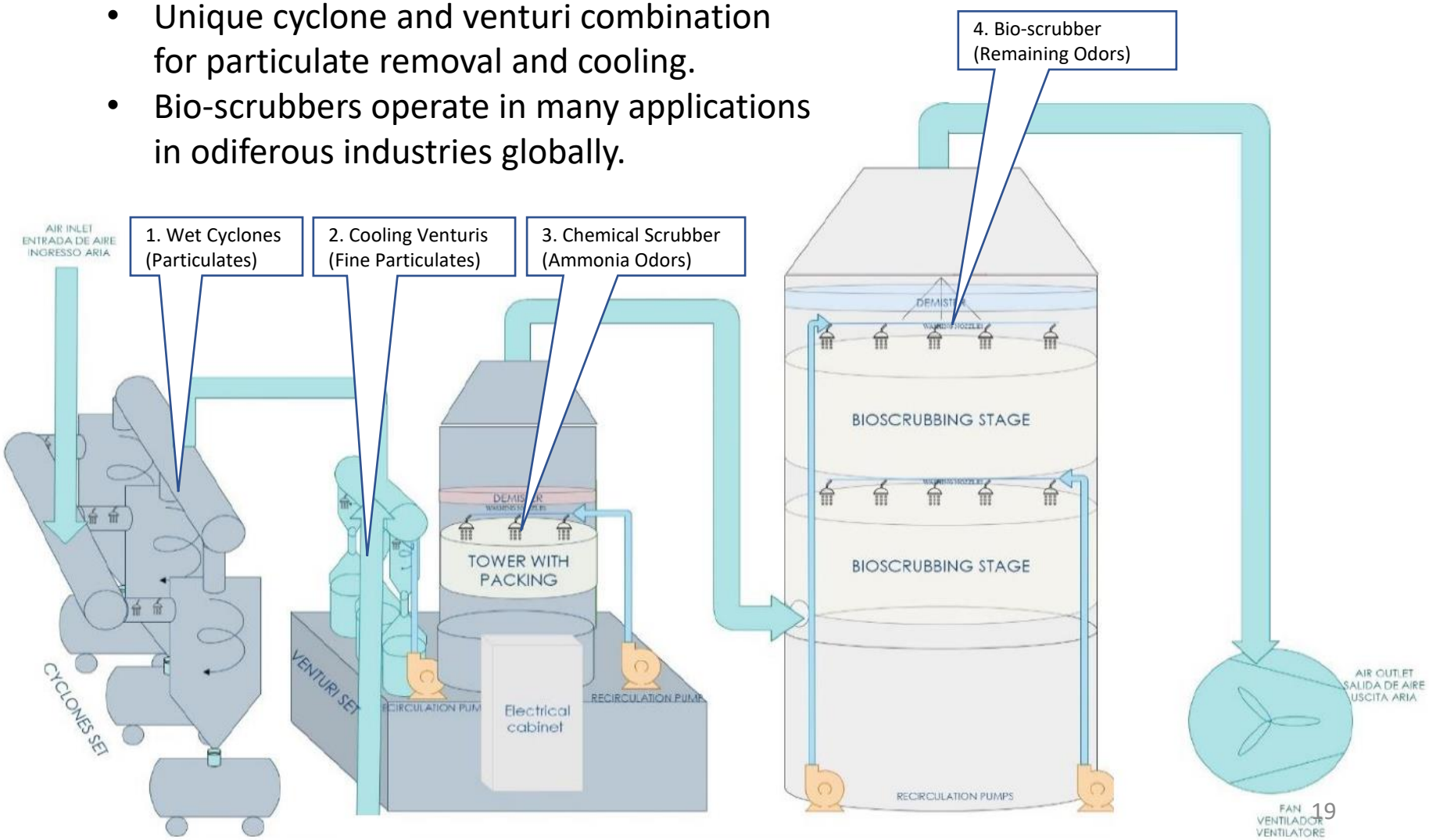
1. **Air flow management brings odors into the process and air treatment system.**
   - Air ducting throughout the facility manages air and odors into the process.
   - Process air requirements generate negative air pressure in the building.
   - Advanced European air treatment system eliminates odors from process exhaust.
2. **Exhaust from thermal treatment process is combusted to generate dryer heat.**
   - Syngas generated in process is thoroughly burned in a direct-fired thermal oxidizer (waste heat burner) to remediate odors and generate heat.
   - Heat is blended with odiferous auxiliary air from building and ducted to dryer.
3. **Exhaust from the dryer is managed in an advanced 4-stage air treatment system.**
   1. Most particulates are removed via wet cyclones.
   2. Fine particulates are removed as the air is cooled in multiple venturis.
   3. Ammonia odors are removed in a wet chemical scrubber (sulfuric acid use).
   4. Bio-scrubber (dual-bed) utilizes microbes to remove remaining odors.

Air Treatment System (2)

- **Diagram supplied by CondorChem Envitech** https://condorchem.com/en/
  - Similar systems operating in Europe.
  - Unique cyclone and venturi combination for particulate removal and cooling.
  - Bio-scrubbers operate in many applications in odiferous industries globally.



Air Treatment System (3)

- **SBS has elected to import an industry-benchmark air treatment system to ensure our facility is not a nuisance.**
- **Air Treatment System is to be provided by CondorChem Envitech; a leading global supplier of air treatment systems for biosolids, composting, rendering, and other odiferous facilities.**
  - Biosolids drying generates over 5,000 odor units per cubic meter (O.U./m³).
  - 4-stage air treatment system is guaranteed to emit less than 500 O.U./m³ at the stack, and prior to dispersion.
  - Uniquely environmental due to a low energy requirement.

Host Community Benefits

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- **SBS provides the following standard benefits.**
  - Directly adds up to 20 full-time positions in perpetuity.
  - Incentivizes local trucking firms to service our new capacity.
  - Increases the tax base.
  - Adds a second tenant in Moreau Industrial Park.

- **SBS helps avoid public wastewater expenditures.**
  - SBS operations add much needed wastewater volume to the sanitary sewer system which improves the flow and reduces the sediment buildup issue.
  - SBS provides an economical biosolids solution that reduces the need for public investments in POTWs.
- **SBS offers additional host community benefits.**
  - Opportunity to reduce biosolids disposal costs by using our services.
  - Opportunity to reduce municipal fertilizer expenditures by using our product.

NYSDEC Permitting

Department of Environmental Conservation

- **Solids Waste Handling Permit, Air Permit & Stormwater permit required.**
  - 3 days' biosolids storage required by permit.
  - 7 days' carbon fertilizer storage limited by permit.
  - Permitted biosolids receiving from 6am to 6pm, 6 days per week.
  - 50 trucks per day total; 16.5 trucks per day per phase/line.

- **Beneficial Use Determination (BUD)**
  - Seeking beneficial use determination for biosolids when received at facility.

✓ **<u>Requesting Town of Moreau Planning Board to be Lead Agency under NY SEQR</u>**

Contact Information

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