



PETITION FOR CASE-SPECIFIC BENEFICIAL USE DETERMINATION

FOR

**SARATOGA BIOCHAR SOLUTIONS, LLC
CARBON FERTILIZER™ MANUFACTURING FACILITY
MOREAU, NY**

Prepared for:

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May 15, 2023

“Serving our clients and the environment since 1993”

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1.0 INTRODUCTION

1.1 Purpose & Objective

Saratoga Biochar Solutions, LLC (SBS) is proposing to construct and operate a solid waste management facility (SWMF) to manufacture Carbon Fertilizer™ from biosolids and wood waste feedstock (hereinafter the “Facility”) with an annual throughput up to 235,200 wet tons of biosolids and up to 35,280 tons of wood waste. The Facility is designed to be constructed in three phases with each phase consisting of a process line capable of processing up to 10 wet tons per hour of biosolids and up to 1.5 tons per hour of wood waste. Each process line is capable of manufacturing approximately 1 ton per hour of Exceptional Quality (EQ) Class A biosolids product (i.e., “Carbon Fertilizer™”) in accordance with 40 CFR Part 503 and 6 NYCRR 361.

The selected location is on 5.89 acres composed of Tax Parcels 50.-4-16 (3.07 acres) and 50.-4-22 (2.82 acres), on Farnan Road within the Moreau Industrial Park in the Town of Moreau, Saratoga County, New York, owned by Moreau Industrial Park, LLC. A Site Location Map on a United States Geological Survey quadrangle map is provided as Figure 1, and a Site Vicinity Map on an aerial image is provided as Figure 2.

As described in this narrative and supporting documents, the proposed beneficial use constitutes a use rather than disposal. The manufactured Carbon Fertilizer™ uses biosolids and wood waste as feedstock, which would otherwise be disposed of as a waste. The beneficial use is a marketable commodity that is an effective substitute for commercial chemical fertilizers that are routinely used in agriculture. The Facility is designed to process biosolids and wood waste feedstock through low-temperature drying and pyrolysis to produce a marketable Carbon Fertilizer™ that meets specific end-use requirements. The Facility is subject to a New York State Department of Environmental Conservation (NYSDEC) SWMF permit under 6 NYCRR 362-1 (Thermal Treatment Facilities). The manufactured Carbon Fertilizer™ is ready for beneficial use upon leaving the Facility and no decontamination or additional processing is required prior to its use. To achieve the product designation as an EQ Class A biosolids product in accordance with 40 CFR Part 503 and 6 NYCRR 361, the manufactured Carbon Fertilizer™ must meet specific standards based on sampling and analysis.

This document and attached supporting material provide a complete petition for a Case-Specific Beneficial Use Determination (BUD) pursuant to 6 NYCRR 360.12(d) for the marketable end use of the manufactured Carbon Fertilizer™. A completed Beneficial Use Determination Petition – General is included in Appendix A. Table 1 provides a checklist of the BUD Petition contents.

Table 1
6 NYCRR Part 360.12(d) BUD Petition Checklist

Regulatory Requirement	Description	Location
6 NYCRR 360.12(d)	Case-Specific Beneficial Use Determinations - General	
6 NYCRR 360.12(d)(1)	Written petition for beneficial use submitted to NYSDEC.	BUD Petition Narrative Appendix A – BUD Petition
6 NYCRR 360.12(d)(2)(i)	Description of the waste and proposed use	BUD Petition Narrative Appendix B – Biosolids Supplier Contract Appendix C – Wood Waste Source Letters of Interest

6 NYCRR 360.12(d)(2)(ii)	Description of the annual quantity, by weight and volume, of the waste	BUD Petition Narrative Appendix B – Biosolids Supplier Contract Appendix D – End-Use Marketing Plan
6 NYCRR 360.12(d)(2)(iii)	Description of the source, process, or treatment system from which the waste originated.	BUD Petition Narrative Appendix B – Biosolids Supplier Contract Appendix C – Wood Waste Source Letters of Interest
6 NYCRR 360.12(d)(2)(iv)	Analytical data concerning the chemical and physical characteristics of the waste and proposed product including characteristics of a product for which the BUD material is an effective substitute.	BUD Petition Narrative Appendix B – Biosolids Supplier Contract Appendix D – End-Use Marketing Plan Appendix G – Example Product Label
6 NYCRR 360.12(d)(2)(v)	Justification that the waste functions as an effective substitute for the commercial product and that the use meets or exceeds government or industry standards or specifications.	BUD Petition Narrative Appendix D – End-Use Marketing Plan
6 NYCRR 360.12(d)(2)(vi)	Demonstration that there is a known or reasonably probable market.	BUD Petition Narrative Appendix D – End-Use Marketing Plan Appendix E – End-Use Market Letters of Interest
6 NYCRR 360.12(d)(2)(vii)	Demonstration that the management of the waste when used in accordance with the beneficial use will not adversely affect public health and the environment.	BUD Petition Narrative Appendix D – End-Use Marketing Plan
6 NYCRR 360.12(d)(2)(vii)(a)	Waste Control Plan	BUD Petition Narrative
6 NYCRR 360.12(d)(2)(vii)(b)	Comparison of the chemical and physical characteristics of the waste to applicable or relevant and appropriate criteria for the proposed beneficial use.	BUD Petition Narrative Appendix D – End-Use Marketing Plan Appendix G – Example Product Label Appendix J – Carbon Fertilizer Analytical Report

2.0 CASE-SPECIFIC BENEFICIAL USE DETERMINATION

2.1 Description of Waste and Proposed Use [6 NYCRR 360.12(d)(2)(i)]

2.1.1 Description of Waste

The waste is limited to biosolids sourced from wastewater treatment plants and wood waste consisting of land clearing debris and/or unadulterated wood, wood chips, or bark from logging operations, pulp and paper production, and wood products manufacturing.

6 NYCRR Part 360 Regulations define “Biosolids” as: *the accumulated semi-solids or solids resulting from treatment of wastewaters from publicly or privately owned or operated sewage treatment plants. Biosolids does not include grit, screenings, or ash generated from the incineration of biosolids.*

Sourced biosolids for the Facility will have been treated and tested to meet strict Federal and State standards prior to leaving the wastewater treatment plant. Biosolids can provide plant nutrients and organic matter to soils when used for land application. They can also be used to produce renewable energy through digestion and production of methane (i.e., biogas) or by drying and thermal processing. A redacted copy of the Facility contract with the biosolids supplier is included in Appendix B.

6 NYCRR Part 360 Regulations define “Unadulterated Wood” as *wood products, that are not painted, chemically treated (e.g., pressure-treated wood or treated railroad ties), or manufactured with chemicals such as glues or adhesives (e.g., plywood or particle board).*

Wood waste is used as a supplemental minor feedstock component for moisture control. Sources of wood will include local and regional municipal and industrial sources. Letters of interest for wood sources are included in Appendix C.

2.1.2 Proposed Use

The New York State Solid Waste Management Plan encourages reduction, reuse, and recycling of waste over land disposal. The carbon manufacturing process enhances nutrient recovery from biosolids to produce a marketable EQ Class A biosolids product as a direct substitute to traditional chemical fertilizers. The Facility provides a local alternative to disposal that decreases consumption of fossil fuel associated with longer hauling distances for current landfill disposal practices. Currently, some biosolids are being hauled out of state to landfills as far as Colorado, Texas, and Georgia by truck and train. However, most significantly, processing biosolids quickly after generation avoids methane production associated with decomposition in landfills or from land application practices, greatly reducing greenhouse gas emissions and climate change contribution from biosolids. Methane is 84 times the carbon dioxide equivalent as a greenhouse gas over an integrated 20-year timeframe as reported in 6 NYCRR 496.

In addition to avoiding greenhouse gas emissions, the process itself generates and recovers renewable energy to reduce natural gas consumption by 85% compared to typical natural gas-fired biosolids dryers. Renewable energy is generated in the form of synthetic gas (syngas), a low-methane gas produced by the pyrolysis reaction in the carbon manufacturing process. The process uses natural gas as fuel for the pyrolysis reactor, which generates sufficient syngas from the feedstock to operate the dryer. The carbon manufacturing process maximizes use of the biosolids’ inherent renewable energy to further reduce the greenhouse gas and climate change contribution from biosolids and wood waste while producing a marketable end-product with a beneficial use as a Carbon Fertilizer™.

Carbon Fertilizer™, when applied to soil, sequesters carbon in soil while substituting for and reducing chemical fertilizer use and their associated greenhouse gas emissions. The use of traditional chemical fertilizers results in soil degradation that contributes to nutrient runoff into waterbodies with local, regional, and global impacts (e.g., aquatic dead zones). Traditional chemical fertilizers are, in essence, nutrients bound by salt, and the salts are corrosive to soils. Carbon Fertilizer™ represents a new class of fertilizer that binds nutrients with carbon, instead of salt. Carbon absorbs water quickly to reduce nutrient runoff and retain nutrients in the soil, which reduces ongoing fertilizer application that is necessary with traditional fertilizers. Replenishing soil carbon after more than 75 years of employing carbon-extractive agrarian techniques helps restore soil's capacity to act as an environmental filter to the benefit of streams, rivers, lakes, and other waterbodies. Carbon Fertilizer™ is needed now, more than ever, and farmers are aware of the need as they continuously try to improve soil carbon levels. This is evidenced through agricultural adoption of no-till, cover crops, and numerous attempts to preserve soil carbon. Carbon Fertilizer™ is the first commercially viable means of carbon sequestration in soils.

In summary, the Carbon Fertilizer™ manufacturing process beneficially uses waste materials and potentially achieves a negative carbon footprint based on 1) replacing chemical fertilizers, 2) decreasing biosolids hauling, 3) avoiding biosolids decomposition and incineration, 4) generating and using renewable energy in the manufacturing process, and 5) the carbon sequestration benefits associated with using Carbon Fertilizer™ in soil. An End-Use Marketing Plan is included in Appendix D.

2.2 Description of Annual Waste Quantity [6 NYCRR 360.12(d)(2)(ii)]

The Facility is designed to manufacture Carbon Fertilizer™ from biosolids and wood waste feedstock with an annual throughput up to 235,200 wet tons of biosolids and up to 35,280 tons of wood waste. The Facility is designed to be constructed in three phases with each phase consisting of a process line capable of processing up to 10 wet tons per hour of biosolids and up to 1.5 tons per hour of wood waste. Each process line is capable of manufacturing approximately 1 ton per hour of EQ Class A biosolids product.

Each process line will produce up to approximately 7,840 dry tons of Carbon Fertilizer™ annually as agglomerated pellets with a solids content of 95 to 98%. At full buildout, the Facility will produce up to approximately 23,520 tons of Carbon Fertilizer™ per year.

2.3 Description of Waste Source [6 NYCRR 360.12(d)(2)(iii)]

The Facility has contracted with an established regional hauling partner for an initial ten-year term with two five-year extensions to source and transport biosolids to the Facility. The Facility will be subject to an NYSDEC Solid Waste Management Facility Permit with strict criteria for acceptable waste.

The primary service area includes regional wastewater treatment plants, which may increase or decrease as negotiated arrangements change over time. The service area contemplated includes the Hudson Valley, western Massachusetts, western Connecticut, New York City, and Long Island. A redacted copy of the Facility contract with the biosolids supplier is included in Appendix B.

2.4 Chemical and Physical Properties [6 NYCRR 360.12(d)(2)(iv)]

Sourced biosolids will have been treated and tested by the source prior to receipt at the Facility, in accordance with 6 NYCRR 361-3.6. Based on the regional publicly owned treatment works (POTWs), sourced biosolids are anticipated to be approximately 25% anaerobically digested and 75% aerobically digested and otherwise destined for landfill disposal or incineration. Biosolids destined for landfill disposal in New York must meet criteria contained in 6 NYCRR 363-7.1(j); therefore, the composition of received

biosolids will be relatively consistent. The anticipated solids content is an average of 23% with a range of 19 to 32%. For each source of biosolids, the Facility will maintain the following information:

- Name of biosolids generator and quantity received at the Facility.
- Description of generator’s biosolids treatment method (e.g., aerobic digestion).
- Description of the biosolids quality including information required by 6 NYCRR 361-3.6 and analytical results of the biosolids for the analytes contained in Table 1 of 6 NYCRR 361-3.9.

The following table describes the minimum number of samples for each biosolids source that must be on file before accepting the biosolids at the Facility:

Biosolids Source Initial Testing Requirements

Biosolids Received (dry ton/year)	Minimum Number of Samples
>15,000	12
>2,500 to 15,000	6
200 to 2,500	3
25 to 199	2
<25	1

Note: each sample must be analyzed for parameters in Table 1 of 6 NYCRR 361-3.9

Continued sampling of each biosolids source must be performed during Facility operations in accordance with the following table:

Biosolids Source Continued Testing Requirements

Biosolids Received (dry ton/year)	Minimum Number of Samples
>15,000	24
>2,500 to 15,000	12
200 to 2,500	6
25 to 199	4
<25	2

Note: each sample must be analyzed for parameters in Table 1 of 6 NYCRR 361-3.9

Manufactured Carbon Fertilizer™ will be tested according to the following schedule. Each sample for analysis must be a composite of a least five discrete grab samples:

Manufactured Product Testing Requirements

Product Generated (Cubic Yard/Day)	Minimum Number of Samples
>50	52
5-50	12
<5	6

Note: each sample must be analyzed for parameters in Table 1 of 6 NYCRR 361-3.9

Sourced biosolids and manufactured Carbon Fertilizer™ must not exceed the following pollutant concentrations listed in Table 6 of 6 NYCRR 361-3.9:

Maximum Pollutant Concentration

Parameter	Maximum Concentration (mg/kg, dry wt)
Arsenic	41
Cadmium	10
Chromium (total)	1,000
Copper	1,500
Lead	300
Mercury	10
Molybdenum	40
Nickel	200
Selenium	100
Zinc	2,500

Wood waste feedstock is an optional minor feedstock component that is not required for processing biosolids. Wood waste is to be sourced from local municipalities, counties, and wood waste generators, and consists only of land clearing debris and/or unadulterated wood, wood chips, or bark from logging operations, pulp and paper production, and wood products manufacturing. No chemical testing is required for the acceptance of wood waste.

2.4.1 Pathogen and Vector Attraction Reduction Criteria (6 NYCRR 361-3.7)

The Facility will achieve pathogen and vector attraction reduction through Class A – Alternative 1 (6 NYCRR 361-3.7(a)(1)(i)(b)) by heat drying the feedstock of biosolids and wood waste at a temperature above 80°C to achieve a moisture content less than 10 percent. Product testing must verify that either the density of fecal coliform is less than 1,000 most probable number per gram total solids (dry weight basis) or the density of salmonella bacteria is less than 3 most probable number per 4 grams of total solids (dry weight basis).

2.5 Justification as Effective Substitute [6 NYCRR 360.12(d)(2)(v)]

Carbon Fertilizer™ is manufactured from biosolids and wood wastes following a specific process to produce a final marketable product that provides a nutrient composition required for a licensed fertilizer. An End-Use Marketing Plan is included in Appendix D and End-Use Market Letters of Interest are included in Appendix E. The Facility will be a licensed commercial fertilizer distributor in accordance with Article 10, Section 146 of the New York State Agriculture and Markets (AGM) Law.

2.5.1 Licensing (AGM Chapter 69, Article 10, Section 146)

The Facility will obtain a license to distribute commercial fertilizer through the AGM Division of Plant Industry. The license will be renewed every two years with each licensing period expiring on December 31 of each even-numbered year. A copy of the applicable AGM Commercial Fertilizer Distributor Application is included in Appendix F and includes:

- Name and address of the licensee
- Name and address of the manufacturing facility
- Identification of the product name of commercial fertilizer distributed in New York State.

2.5.2 Guaranteed Analysis (AGM Chapter 69, Article 10, Section 144)

The manufactured Carbon Fertilizer™ will achieve a guaranteed analysis that is a statement of the minimum percentage of the following claimed plant nutrients:

- Total Nitrogen (N)
- Available Phosphoric Acid or Available Phosphate (P₂O₅)
- Soluble Potash (K₂O)

Each guaranteed minimum plant nutrient will be reported as percent in whole numbers with decimal fractions.

2.5.3 Plant Nutrients in Addition to N, P, K (1 NYCRR 153.2)

In addition to the plant nutrient listed in Section 2.5.2, the following additional plant nutrients may be guaranteed if present at or above the identified minimum percentage on an elemental basis:

Element	Minimum Percentage
Calcium (Ca)	1.0
Magnesium (Mg)	0.50
Sulfur (S)	1.0
Boron (B)	0.02
Cobalt (Co)	0.0005
Copper (Cu)	0.05
Iron (Fe)	0.10
Manganese (Mn)	0.05
Nickel (Ni)	0.001
Sodium (Na)	0.10
Zinc (Zn)	0.05

Only elements listed in this table are allowed to be listed and claimed for a commercial fertilizer. Representative laboratory analytical data for Carbon Fertilizer™ from bench scale testing is included in Appendix J that supports the claimed nutrient content.

2.5.4 Labelling (AGM Chapter 69, Article 10, Section 145; 1 NYCRR 153.3)

The Facility will distribute manufactured Carbon Fertilizer™ in containers (e.g., super sacks) or in bulk truck loads. The following labelling requirements apply for all distributed fertilizer:

- Individual containers must have an affixed label with clear language certifying the following:
 - Net weight of the container.
 - The brand or other identifying name of the commercial fertilizer.
 - The name and address of the principal office of the licensee placing the commodity on the market.
 - The guaranteed analysis of plant nutrients and any additional nutrients being claimed.
- Bulk distribution (e.g., truckloads) must include a written statement that accompanies the delivery that includes all information required for individual containers.
- If the commercial fertilizer will be distributed for non-farm use as a specialty fertilizer, the labelling is subject to the additional requirements contained in 1 NYCRR 153.3.

An example product label is included in Appendix G.

2.6 Demonstration of Beneficial Use Market [6 NYCRR 360.12(d)(2)(vi)]

The manufactured Carbon Fertilizer™ is a multi-use product that will be registered as a commercial fertilizer with minimum nutrient content that is guaranteed. Carbon Fertilizer™ can be used as a standalone fertilizer or mixed in with other dry fertilizers by end users to target specific nutrient levels. In addition to use as a fertilizer, end users have expressed interest in the following compatible uses as a soil amendment:

- Greenhouse fertilizer/grow medium (better yields in less time).
- Seed treatment coating for germination (a natural alternative).
- Plant propagation for high-intensity agriculture (improves roots).
- Compost production (increases rate and quality).
- Sod production (increases shelf life and product quality).

The primary market for distribution is agricultural cooperatives and other fertilizer distributors. Such distributors are expected to blend the Facility's manufactured Carbon Fertilizer™ with other nutrients to meet the individual needs of each farmer.

An End-Use Marketing Plan is included in Appendix D and End-Use Market Letters of Interest are included in Appendix E.

Furthermore, the biosolids supplier contract included in Appendix B provides for the beneficial use of the Facility's manufactured Carbon Fertilizer™ by the biosolids supplier in the event the Facility cannot market the full quantity of manufactured product for any reason (e.g., seasonal demand fluctuations). In addition,

upon facility startup, manufactured Carbon Fertilizer™ will require testing to determine the actual minimum guaranteed analysis for the commercial fertilizer. During this startup period, the manufactured product will be provided to the biosolids supplier for beneficial use in their composting operations until the Carbon Fertilizer™ licensing is complete. The biosolids supplier operates a regional compost facility that can accept the full quantity of manufactured Carbon Fertilizer™.

Carbon Fertilizer™ benefits compost production materially as it:

- Enhances the nutrient content and water retention properties.
- Improves the microbial environment, which expedites production/decomposition.
- Helps to contain and control nuisance odors associated with composting.
- Sequesters carbon in soil when the compost is applied to soil.

2.7 Demonstration of Protection of Public Health and the Environment [6 NYCRR 360.12(d)(2)(vii)]

Management of the biosolids or wood waste when used for this beneficial use will not adversely affect public health and the environment. Considerations for environmental and health impacts are discussed below. The Facility is designed to minimize the potential offsite release of dust, biosolids tracking, leachate, odor, and noise emissions. The Facility will be subject to an NYSDEC Solid Waste Management Facility Permit, which requires that the Facility be operated in a manner that is protective of public health and the environment. This is achieved through the development and implementation of specific plans, including: a Waste Control Plan, Operations and Maintenance Plan, Training Plan, Emergency Response Plan, Residue Management Plan, Radioactive Waste Detection Plan, and Closure Plan.

2.7.1 Waste Control Plan [6 NYCRR 360.12(d)(2)(vii)(a)]

A Waste Control Plan is a component of the Facility Solid Waste Management Facility Permit and is documented in a site-specific Facility Manual. The Waste Control Plan lists unauthorized waste and includes procedures for unauthorized waste identification, handling, and reporting. The Facility will only operate with a valid Solid Waste Management Facility Permit.

Manufactured Carbon Fertilizer™ will be stored onsite for up to 7 days within the enclosed storage area prior to loading onto trucks for offsite distribution. Carbon Fertilizer™ will be loaded directly into delivery trucks or into 1 to 2 cubic yard super sacks.

The feedstock receiving and storage area is fully enclosed, not located within a floodplain, and is designed to prevent stormwater runoff from entering the area. No leachate is generated that requires collection and management.

2.7.2 Comparison of BUD to ARARs [6 NYCRR 360.12(d)(2)(vii)(b)]

Testing of the manufactured Carbon Fertilizer™ will be in accordance with 40 CFR Part 503, 6 NYCRR 361-3.9, and Article 10 of the New York State Agriculture and Markets Law.

3.0 RECORDKEEPING [6 NYCRR 360.12(d)(8)]

An annual report must be filed with the NYSDEC by March 1 of the following year that describes the quantity of waste beneficially used during the previous calendar year. The report must include any

analytical data or other information required by the approved case-specific BUD. A blank copy of the Case-Specific BUD Annual Report is included in Appendix H and will be submitted annually along with any additional required material described in the approved case-specific BUD.

3.1 AGM Reporting [AGM Chapter 69, Article 10, Section 146-C]

A written statement must be submitted to the AGM Division of Plant Industry reporting the tonnage of commercial fertilizer distributed in New York State. Annual reporting must be on the electronic Excel format provided by AGM and submitted by email to plant.tonnage@agriculture.ny.gov by February 1st of the following year. A copy of the annual report form and instruction is included in Appendix I.

4.0 CONCLUSION

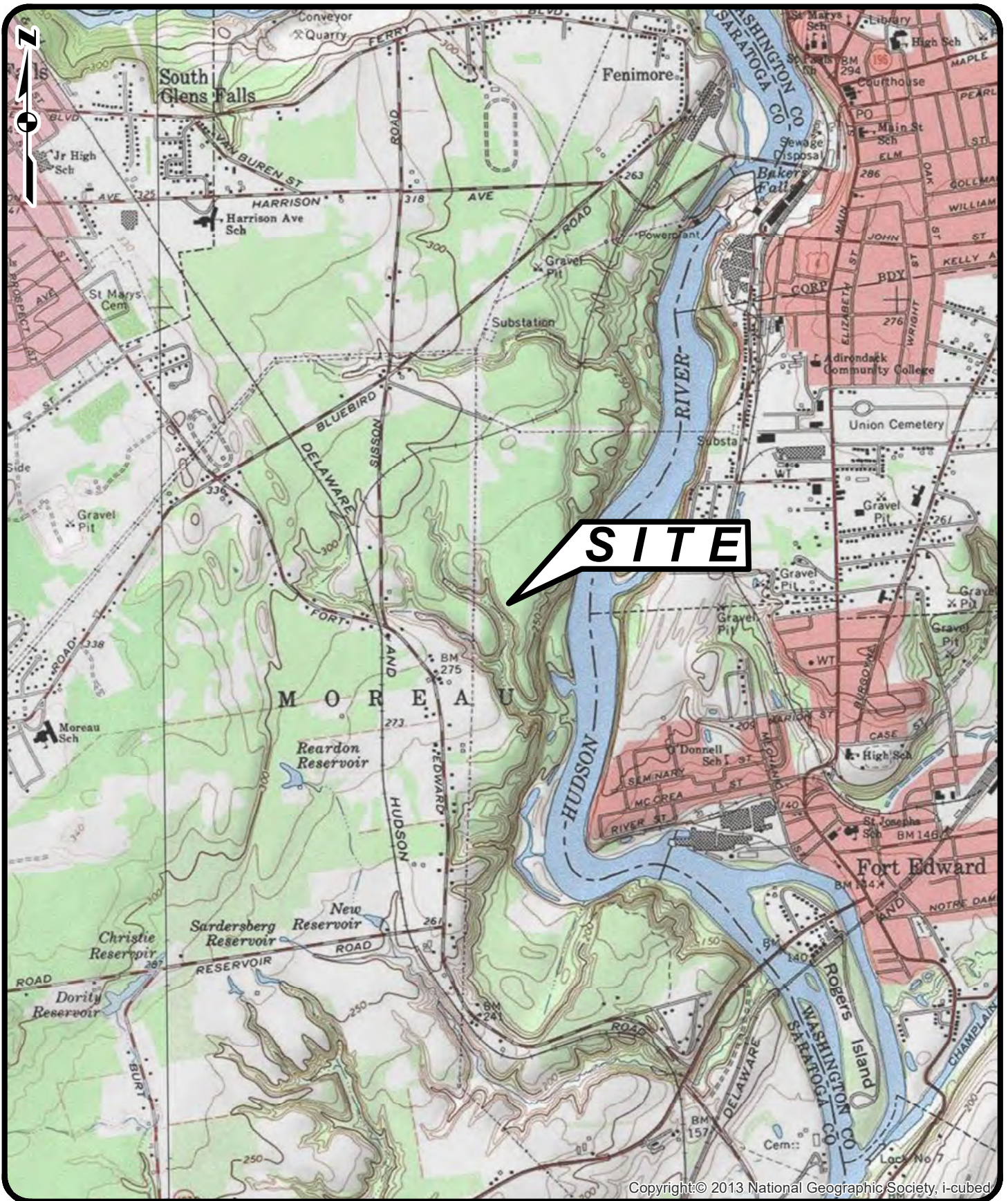
This Petition meets the requirements of 6 NYCRR Part 360.12(d) for a case-specific BUD. In consideration of the following, approval of this BUD Petition by the NYSDEC is recommended:

- The petition contains all necessary technical information as required under 6 NYCRR 360.12(d)(2).
- The essential nature of the proposed use of the waste constitutes use rather than disposal.
- The waste will be managed as a commodity and intended to function or serve as an effective substitute for an analogous commercial product or raw material.
- At the point of beneficial use, the waste will not require decontamination or other processing.
- A market exists for the proposed quantity and use of the product into which waste (i.e., biosolids and wood waste) is proposed to be incorporated (i.e., Carbon Fertilizer™).
- Heavy metals or other pollutants in the waste are present at acceptable concentrations for the proposed product and use based on achieving testing requirements for classification as EQ Class A biosolids product.
- The proposed use will not significantly adversely affect public health and the environment.

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FIGURES

S:\Sterling\Projects\2020 Projects\Saratoga Biochar Solutions - 2020-20\Drawings-Maps-Figures\GIS\2020-20001G- FIG 1 SITE LOC MAP.mxd



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STERLING

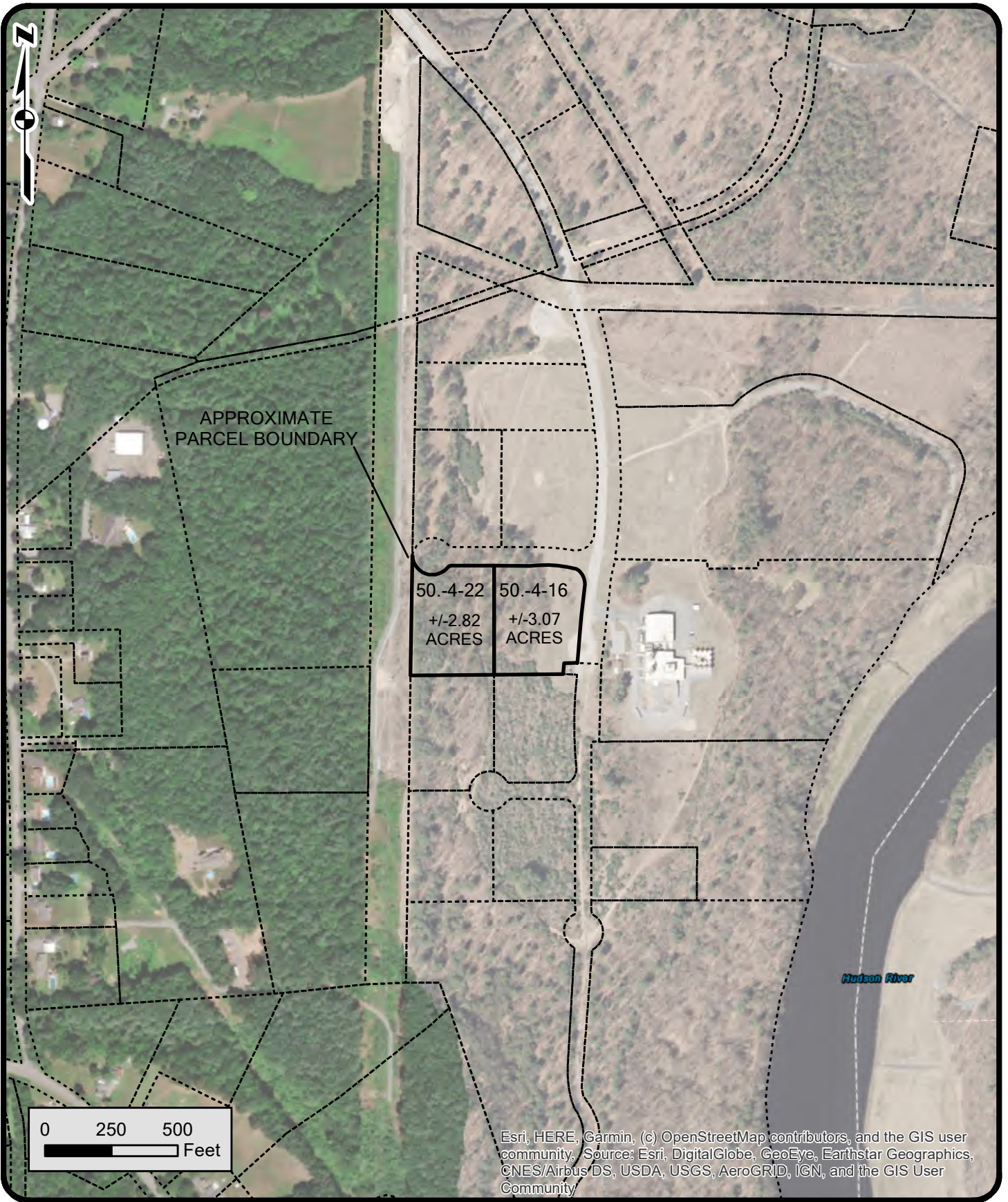
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

SITE LOCATION MAP
SARATOGA BIOCHAR SOLUTIONS, LLC
CARBON FERTILIZER MANUFACTURING FACILITY

TOWN OF MOREAU

SARATOGA CO., NY

PROJ.NO. 2020-20	DATE: 10/25/2021	SCALE: 1" = 2,000'	DWG.NO. 2020-20001G	FIGURE 1
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STERLING

Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

SITE VICINITY MAP
SARATOGA BIOCHAR SOLUTIONS, LLC
CARBON FERTILIZER MANUFACTURING FACILITY

TOWN OF MOREAU

SARATOGA CO., NY

APPENDIX A

BENEFICIAL USE DETERMINATION PETITION - GENERAL

Beneficial Use Determination Petition – General

OFFICIAL USE ONLY		
DATE RECEIVED		
PROJECT NUMBER		
STAFF INITIALS		
DATE		

6 NYCRR Part 360.12(c) addresses various pre-determined wastes, residual or by-product materials which, when used in the manner noted in that subdivision, are not considered solid wastes (for the purposes of Parts 360-369). In situations where a particular proposed reuse is not specifically identified in that subdivision, material generators and potential users may petition the Department for a case-specific beneficial use determination (BUD) under Subdivision 360.12(d). This form has been developed to assist applicants in obtaining a case-specific BUD. Before using this form, the petitioner should determine whether another of the BUD petition forms may be appropriate for their material. If no form appears applicable, this form should be used.

Note: This form is intended to address the requirements of 6 NYCRR Part 360.12(d) only and does not cover other federal, state, or local approvals that may be necessary for use of the waste, residual or by-product material.

Petitioner Information

Full Name:	<u>Apy</u>	<u>Raymond</u>	
	<i>Last</i>	<i>First</i>	<i>M.I.</i>
Affiliation:	<u>Saratoga Biochar Solutions, LLC</u>	<u>CEO</u>	
	<i>Company</i>	<i>Title</i>	
Primary Address:	<u>26F Congress Street #346</u>	<u>Saratoga Springs</u>	
	<i>Street Address</i>	<i>City/Town</i>	
	<u>Saratoga</u>	<u>12866</u>	
	<i>County</i>	<i>Zip Code</i>	
Primary Phone:	<u>(518) 391-0566</u>	Primary Email:	<u>rapy@northeasternbiochar.com</u>

Waste, Residual or By-Product Information

Waste Information:	<u>Biosolids & Wood</u>	<u>235,200 tons biosolids; 35,280 tons wood</u>
	<i>Type of Waste, Residual or By-Product</i>	<i>Estimated Annual Quantity (in tons or cubic yards)</i>
Source or Generation Facility:	<u>Saratoga Biochar Solutions, LLC</u>	<u>5-4144-00187/00001</u>
	<i>Facility Name</i>	<i>DEC Facility Authorization, if any (DEC registration; DEC permit; Out of State; Other)</i>
	<u>2-12 Electric Drive, Moreau, Saratoga County</u>	
	<i>Source Facility Location (Address, Town, County)</i>	
Details of Use:	<u>Soil Fertilizer</u>	<u>5 years</u>
	<i>Brief Description of How Material Will Be Used</i>	<i>Duration of project (up to 5 years- can be renewed)</i>
Location(s) of Use:	<u>Sold as product to end users</u>	<u>23,520</u>
	<i>Location of use, if applicable (Name and Address)</i>	<i>Quantity in tons or cubic yards at this location, annually</i>
	<u> </u>	<u> </u>
	<i>Location of use, if applicable (Name and Address)</i>	<i>Quantity in tons or cubic yards at this location, annually</i>

NOTE: Attach additional sheets to list other sources of materials and locations of use, if applicable.

Attachments Supporting a BUD

Note to Petitioners : The following is a list of attachments which are commonly found in approvable BUD petitions. This list is not intended to be all inclusive. Each BUD petition is unique and the type of information which may be used to support a determination of beneficial use will vary. Petitioners are encouraged to include all relevant documentation showing that the proposed use is truly beneficial (does not constitute disposal), will not pose a risk to the environment or to public health and safety and will not result in nuisance conditions.

- | Attached | N/A | |
|-------------------------------------|--------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Physical description of waste, residual or by-product material proposed for beneficial use, including weight and volume annually. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Details concerning how the waste will be used as a substitute for a commercial product or raw material. Figures may be helpful; for example, a diagram or flowchart for a manufacturing process, or a plan drawing for use of a material at a construction site. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Detailed description of source, process or treatment system from which the waste originates. Include any and all process chemicals added and their quantity. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Representative physical/geotechnical testing results for the waste with comparison to industry or government standard(s) applicable to the proposed use. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Analytical data concerning the chemical and physical characteristics of the waste. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Analytical data concerning the chemical and physical characteristics of each type of proposed product. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Analytical data concerning the chemical and physical characteristics of any analogous raw material or commercial product for which the waste is proposed to be an effective substitute. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Justification that the waste functions as an effective substitute for the commercial product or raw material and that the use meets or exceeds government or industry standards or specifications. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Demonstration of market (see 360.12(d)(2)(vi)). |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Comparison of chemical and physical characteristics of the waste to applicable or relevant and appropriate criteria for beneficial use. For materials placed on the land as fill or cover, note requirements of 360.12(d)(3)(vi). |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Describe any other potential adverse effects from use of the waste (including but not limited to odors, roots or seeds of invasive species). |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Waste Control Plan: <ol style="list-style-type: none"> 1. Procedure for periodic testing of the waste, and if necessary the product(s). 2. Type of storage of waste and maximum anticipated storage volume. Note: Storage cannot exceed 365 days without Department approval. 3. Procedures for run-on and run-off control in storage areas. 4. What best management practices will be followed to minimize uncontrolled dispersion of the waste prior to and during beneficial use? |

If Petition Request Attachments are not applicable state why. Attach additional sheets as necessary.

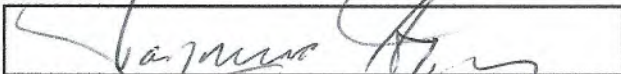
Solid Waste Facility Permit Requirements

Yes No

- Will the proposed material require decontamination or processing before beneficial use? (If yes, describe)
- Will a fee be charged for use by any receiving site for acceptance and use of the material?

Certification

I hereby affirm under penalty of perjury that information provided on this form (including attached statements and exhibits) was prepared by me or under my supervision and direction and is true to the best of my knowledge and belief, and that I have authority or am authorized to sign this application pursuant to 6 NYCRR Part 360. I am aware that any false statement made herein is punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law and ECL Section 3-0301(2)(Q).



Signature

Raymond Apy

Print Name

3-28-2022

Date

Before you submit this application, please verify:

- All fields of the application are complete (indicate N/A (not applicable) if appropriate).
- You have signed and dated above.
- You have enclosed all supporting information.

Send this completed form and any supporting attachments to the **Materials Management Supervisor** in your DEC Region (for help, see <http://www.dec.ny.gov/about/558.html>), with a copy to:

Kathleen Prather, P.E.
Bureau of Solid Waste Management
Division of Materials Management
NYSDEC
625 Broadway, 9th Floor
Albany, NY 12233-7260

Please contact Ms. Prather at (518) 402-8678 or benuse@dec.ny.gov if you have any questions about petitioning for a case-specific BUD.

APPENDIX B

BIOSOLIDS SUPPLIER CONTRACT

FEEDSTOCK SUPPLY AGREEMENT

THIS FEEDSTOCK SUPPLY AGREEMENT (“Agreement”) is made and entered into as of the 17th day of December, 2021 (the “Effective Date”), between Saratoga Biochar Solutions LLC, a New York limited liability company (the “Company”), and New England Waste Services of ME, Inc. d/b/a Casella Organics a Maine corporation (“Casella”). Company and Casella are each referred to as a “Party” and, together, as the “Parties”.

RECITALS:

WHEREAS, Company is in the business of building and operating waste conversion facilities using pyrolysis-based solutions;

WHEREAS, Company intends to construct and operate a Facility in the Town of Moreau, NY, at the Facility Location;

WHEREAS, Casella is in the business of providing Feedstock supply services within the Moreau, NY, region;

WHEREAS, Company and Casella desire to enter into this Agreement under which Casella shall supply and deliver, and Company shall accept, specified quantities of Feedstock to the Facility; and

WHEREAS, Casella may assist in the management of the Processed Materials produced at the Facility, all in accordance with the terms and conditions set forth in this Agreement.

NOW THEREFORE, in consideration of the mutual covenants and promises contained in this Agreement and other good and valuable consideration, the Parties agree as follows:

ARTICLE I DEFINITIONS AND INTERPRETATION

1.1 **Definitions.** Initially capitalized terms used herein shall have the meanings set forth below:

“Adjustment” has the meaning set forth in Section 3.1(f).

“Agreement” means this Feedstock Supply Agreement, including all Exhibits hereto, as amended from time to time.

“Applicable Law” means any law, statute, ordinance, rule or regulation, and any ruling, judgment, order, decree, permit or other requirement having the force of law, including any official interpretation of any of the foregoing, of or by any Governmental Authority, as in effect from time to time, which is applicable to any Party, its respective properties and businesses or the transactions contemplated by this Agreement.

“Beneficial Use” means a Beneficial Use Determination (BUD) made by the New York State Department of Environmental Conservation (NYSDEC) pursuant to 6 NYCRR Part 360.12.

“Business Day” means each day, from Monday through Friday, excluding holidays as recognized by the state of New York.

“Casella Indemnified Party” has the meaning set forth in Section 6.2.

“Casella Representative” has the meaning set forth in Section 2.4(g).

“Commercial Operation Date” or “COD” means the Day on which, following the Facility’s start-up, testing, commissioning and trial operating period (not to exceed six months), the Facility commences Commercial Operations, which shall be the date specified as such by Company in a notice provided by Company to Casella, such notice shall be provided to Casella no less than ninety (90) Days in advance of such date.

“Commercial Operations” shall mean acceptance of a minimum of 80% of Required Weekly Tonnage in the first twelve (12) months following the Commercial Operation Date, and acceptance of a minimum of 95% of the Required Weekly Tonnage thereafter.

“Company Indemnified Party” has the meaning set forth in Section 6.1.

“Company Representative” has the meaning set forth in Section 2.4(g).

“Confidants” shall have the meaning set forth in Section 10.1.

“Conforming Feedstock” shall have the meaning set forth in Exhibit A.

“Day” or “Days” means a calendar day.

“Delivery Day” means any day on which the Facility accepts Feedstock.

“Delivery Point” means the specific location where the delivered Feedstock is discharged from the vehicle delivering the Feedstock. The Delivery Point shall be located in an enclosed structure with overhead doors and odor control systems designed and operated to ensure that the unloading of Feedstock does not result in material adverse offsite impact.

“Effective Date” has the meaning set forth in the preamble.

“Event of Default” has the meaning set forth in Section 5.1 and Section 5.2.

“Extended Back-up Management” has the meaning set forth in Section 2.13.



“Facility” shall mean the Company owned sludge conversion facility located at the Facility Location.

“Facility Location” shall mean the physical Facility location of 2-6 Electric Drive, South Glens Falls, NY 12803.

“Feedstock” is either Conforming Feedstock or Non-Specification Feedstock as detailed in Exhibit A.

“Feedstock Delivery(ies)” shall mean up to thirty-seven (37) Tons of Feedstock in a single truck load that is tipped in one dump.

“Feedstock Source” means any wastewater treatment plant that is a producer or generator of Feedstock meeting the regulatory requirements in the NYSDEC Part 360 rules or other sources or third parties that are approved in writing (including via email) by the Company, such approval not to be unreasonably withheld. Each individual wastewater treatment plant meeting the foregoing regulatory requirements is a “Feedstock Source”.

“Governmental Approvals” means any authorization, consent, approval, license, permit, filing, registration or exemption by or with any Governmental Authority.

“Governmental Authority” means any federal, state or local government of the United States, any state of the United States or any political subdivision thereof, any agency or authority exercising executive, legislative, judicial, regulatory, taxing or administrative functions of any such government and any other governmental or quasi-governmental instrumentality, agency, authority, commission or other entity and any self-regulatory organization, in each case having jurisdiction or authority over the matter in question.

“Hazardous Material” means any chemical, material or substance which is a hazardous waste as determined by 6 CRR-NY Part 371.3.

“Month” means a calendar month.

“Non-Conforming Feedstock” is feedstock that fails to meet the requirements of both Conforming Feedstock and Non-Specification Feedstock.

“Non-Specification Feedstock” has the meaning set forth in Exhibit A and as further described in Section 2.8.

“NYSDEC” means the New York State Department of Environmental Conservation.

“Party” or “Parties” has the meaning set forth in the preamble.

“Person” means any individual, firm, corporation, partnership, limited liability company, trust, governmental authority or other organization or entity having legal capacity.

1.2 Rules of Interpretation. Unless the context otherwise requires, in this Agreement: (a) words of any gender include each other gender; (b) words using the singular or plural also include the plural or singular number, respectively; (c) the terms “hereof”, “herein”, “hereby”, “hereto” and similar words refer to the entire Agreement and not to any particular Article, Section, Clause, Exhibit, Appendix or Schedule or any other subdivision of or annex to this Agreement; (d) references to “Article”, “Section”, “Clause”, “Exhibit”, “Appendix” or “Schedule” are to the Articles, Sections, Clauses, Exhibits, Appendices and Schedules, respectively, of this Agreement; (e) the words “include” and “including” and words of similar import shall be deemed to be followed by “without limitation” or “but not limited to” or words of similar import whether or not they are followed by such phrases; (f) references to “this Agreement” or any other agreement or document shall be construed as a reference to such agreement or document as such agreement or document may from time to time be modified or supplemented in accordance with the terms thereof; and (g) references to any Applicable Law shall be construed as a reference to such Applicable Law as re-enacted, redesignated, amended, modified, supplemented, repealed or extended and in effect from time to time. Whenever this Agreement refers to a number of days, such number shall refer to calendar days unless Business Days are specified.

ARTICLE II DELIVERY AND ACCEPTANCE OF FEEDSTOCK

2.1 Deliveries Prior to COD. Prior to the Commercial Operation Date, Casella shall supply and deliver to Company, and Company shall accept, at the Delivery Point, such amounts of Feedstock as mutually agreed upon in a commissioning schedule to be developed prior to delivery of any Feedstock. The supply, delivery and acceptance of Feedstock prior to COD shall be in accordance with all the terms and conditions of this Agreement, except Section 2.2.

2.2 Deliveries Following COD.

(a) Schedule. From and after the Commercial Operation Date, the Schedule for delivery of Feedstock shall be prepared by Casella weekly and approved by the Company at least one week in advance. Casella will apply good faith efforts to accurately prepare the Schedule. Parties shall schedule deliveries of Feedstock using a mutually agreed upon standardized form (the “Schedule”), which deliveries will occur up to eleven (11) hours per Day between the hours of 6:30 a.m. and 5:30 p.m. and six (6) Days per Week excluding holidays as recognized by the state of New York (or more if the Parties mutually agree in writing).

(b) Deliveries of Feedstock. From and after the Commercial Operation Date, Casella shall supply and deliver to Company at the Delivery Point, and Company shall accept at the Delivery Point, the quantities of Feedstock specified in the Schedule, subject to the other terms of this Agreement. The Facility shall be able to receive thirty-seven (37) Tons of Feedstock in a single truck load that is tipped in one dump. The Facility shall be capable of receiving another 37 Ton load within twenty (20) minutes of the dumping of the preceding load during operating hours. Facility shall provide safe and clear access to receiving area for semi-truck and trailer combinations up to eighty (80) feet in total length

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and accommodate rear-dump, self-unloading trailers (in fully elevated position), roll-off containers (transported by rear-dump, self-unloading straight truck or trailer) with adequate clearance for top-hinged or side-hinged tailgates/doors. Facility shall have staging area sufficient to accommodate and provide safe parking and traffic access for up-to three delivery vehicles at any given time during regular operating hours as per Section 2.2(a).

(c) Interruptions. Company shall notify Casella of any planned Facility shutdowns, slowdowns, or business interruptions as early as possible. Additionally, each Party shall immediately notify the other Party's Representative (by telephone with written notification, including via email, as soon thereafter as is reasonably practicable) if such Party learns of any probable or actual interruption in the scheduled supply, delivery or acceptance of Feedstock in accordance with the then-applicable Schedule.

(d) Required Weekly Tonnage. Unless otherwise agreed to in writing by the Parties, from and after the Commercial Operation Date and during the Term, Casella shall supply and deliver to the Delivery Point at least the Required Weekly Tonnage and Company shall accept and manage such Feedstock.

(e) Demurrage. Provided that the Schedule for Feedstock Deliveries has been followed by Casella on all prior Feedstock Deliveries received on the same Delivery Day, delays in acceptance and unloading of the Feedstock at the Facility after arrival at the Facility when caused by Company or the Facility shall be billed by Casella and payable by Company [REDACTED]

[REDACTED] The demurrage set forth in this subsection will be adjusted on a biennial basis per the description for the Tip Fee in Section 3.1(f).

(f) Late Deliveries. If the Facility remains open past regular business hours or opens earlier than regular business hours, as per Section 2.2(a), to receive late Feedstock Deliveries as a result of delays in Feedstock Deliveries caused by Casella, [REDACTED]

[REDACTED] Acceptance of late Feedstock Deliveries shall be in the Company's sole discretion to accept on the scheduled Delivery Day or earlier than regular business hours on the following Delivery Day, which acceptance shall not be unreasonably withheld. The fee for late deliveries set forth in this subsection will be adjusted on a biennial basis per the description for the Tip Fee in Section 3.1(f).

2.3 Exclusivity, Future Expansion at Facility, Non-compete and Right of First Refusal on Future Facilities.

(a) Exclusivity. From and after the Commercial Operation Date, Company agrees that Casella will be the exclusive provider of all Feedstock to the Facility. [REDACTED]

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[REDACTED]

(b) Future Expansion at Facility. Casella shall have the option to supply additional Feedstock in excess of the Required Weekly Tonnage (“Additional Feedstock”) to the Facility in the event the Facility is capable of receiving Additional Feedstock through operational improvements and equipment additions. If the Company becomes capable of receiving up to twenty percent (20%) of Required Weekly Tonnage as Additional Feedstock (a “Minor Expansion”), Company shall give notice to Casella in writing thirty (30) Days prior to the date of such Minor Expansion. [REDACTED]

[REDACTED] If Company undertakes a material capital expansion and becomes capable of receiving more than twenty percent (20%) of Required Weekly Tonnage as Additional Feedstock (a “Major Expansion”), [REDACTED]

[REDACTED] Notwithstanding Casella’s election to not exercise its option described in this Section, Casella shall continue to supply Feedstock to the Facility pursuant to the terms of this Agreement,

(c) Non-Compete. [REDACTED]

[REDACTED] Notwithstanding the foregoing, nothing in this Section 2.3(c) shall be interpreted

to relieve Casella from its obligations to deliver Feedstock to the Facility or Company's obligations to receive Feedstock at the Facility as per the terms of this Agreement.

(d) Future Facilities.



2.4 Delivery Procedures.

(a) Transportation. Casella shall have the sole responsibility, at its sole expense, for transporting the Feedstock to the Delivery Point and unloading the Feedstock at the Delivery Point.

(b) Deliveries. Casella or its subcontractor shall deliver all Feedstock to the Delivery Point. All such deliveries shall be completed in accordance with this Agreement.

(c) Delivery Vehicle Washdown. Company shall provide operators of delivery vehicles with a pressurized water hose to facilitate the removal of residual Feedstock from tailgates, tires, and other areas of the delivery vehicle's exterior resulting from the unloading of the Feedstock at the Facility.

(d) Weighing Standards and Procedures. Company shall maintain and operate at the Facility Location, in accordance with Applicable Law, a motor vehicle scale certified by the State of New York and of sufficient operational capacity and suitable dimensions to accommodate delivery vehicles used by Casella for the purpose of determining the Tonnage of Feedstock delivered by Casella at the Delivery Point. Company shall weigh and record inbound weights of all of Casella's delivery vehicles when the vehicles arrive at the Facility Location and shall again weigh and record the weights of such vehicles after such vehicles have unloaded the Feedstock at the Delivery Point and prior to exiting the Facility Location. Company shall test and calibrate all scales in accordance with Applicable Law, but at least every twelve (12) Months. Company shall provide Casella with paper or electronic copies of weigh tickets or receipts for each Feedstock Delivery by Casella to the Delivery Point, including information specifying the Feedstock Source, the date and time of delivery, identification of the delivery vehicle, weight of the vehicle when loaded, weight of the vehicle after unloading, and resulting net weight of the delivery.

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Company shall provide Casella a summary report inclusive of the aforementioned information by twelve (12) o'clock pm (noon) within one (1) Business Day of each month following any month when Feedstock was delivered.

(e) Alternative Weighing Methods. If at any time the scales are unavailable, weight tickets from either a generator's certified scale(s) or third-party certified scale(s) may be substituted by Casella otherwise the Company shall estimate, using procedures agreed upon by Casella, the quantity of Feedstock delivered to the Facility on the basis of delivery vehicle volumes and historical density records.

(f) Facility Location Rules. Casella shall require all transporters of Feedstock to the Facility Location to comply with all Applicable Law. Company shall have the right to deny access to the Facility Location to any transporter that does not or cannot comply with Applicable Law or presents a hazard or a material disruption to the Facility. Casella shall require each of its transporters making Feedstock Deliveries to the Facility to carry and maintain insurance with coverages and amounts reasonably designated by Company from time to time as per Exhibit B of this Agreement, which is incorporated herein by this reference. Casella and Company shall also comply with the insurance requirements set forth in Exhibit B and with any requirements of their respective insurance companies for establishing and maintaining the coverage set forth in Exhibit B.

(g) Representatives.

(i) Company Representative. Company shall appoint an individual (the "Company Representative") who shall serve as the primary Company representative under this Agreement with respect to the scheduling and acceptance of Feedstock Deliveries. The Company Representative shall (i) have overall responsibility for managing and coordinating the performance of Company's obligations under this Agreement and (ii) be authorized to act for and on behalf of Company with respect to all scheduling and operational matters relating to this Agreement. The Company Representative may, upon notice to Casella, delegate such of his or her responsibilities hereunder to other Company employees as the Company Representative deems appropriate. Company may, upon notice to Casella given in accordance with Section 10.8, appoint a new individual to serve as the Company Representative.

(ii) Casella Representative. Casella shall appoint an individual (the "Casella Representative," and together with the Company Representative, individually, a "Representative") who shall serve as the primary Casella representative under this Agreement with respect to the scheduling of Feedstock Deliveries. The Casella Representative shall (i) have overall responsibility for managing and coordinating the performance of Casella's obligations under this Agreement and (ii) be authorized to act for and on behalf of Casella with respect to all scheduling and operational matters relating to this Agreement. The Casella Representative may, upon notice to Company, delegate such of his or her

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responsibilities hereunder to other Casella employees as the Casella Representative deems appropriate. Casella may, upon notice to Company given in accordance with Section 10.8, appoint a new individual to serve as the Casella Representative.

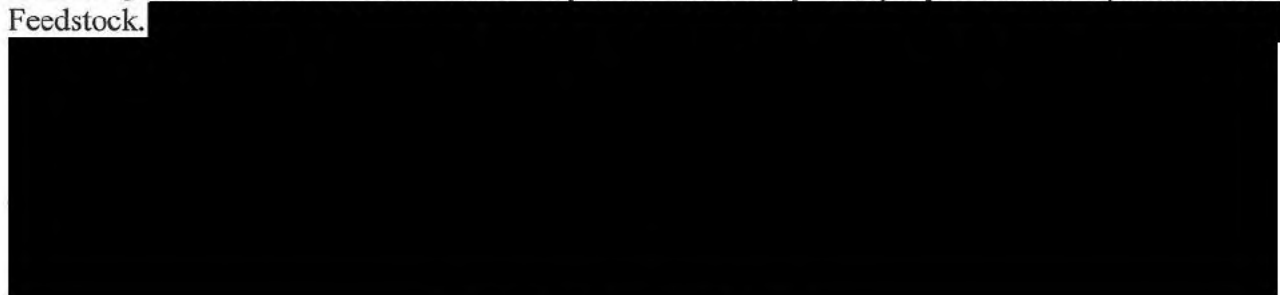
(iii) Notices to Representatives. Notwithstanding Section 10.8, notices, requests and other communications specifically relating to the scheduling, delivery and acceptance of Feedstock at the Facility shall be made to the Party's Representative. In the event of any emergency, or other unforeseen event that immediately affects, or is reasonably expected to immediately affect, the scheduling, delivery or acceptance of Feedstock as contemplated under this Agreement, a Party shall as soon as reasonably practicable notify the other Party's Representative in person or by telephone of the occurrence of such event, with written notice (including via email) to follow promptly thereafter. Notices shall be effective when received by the other Party. A Party may change its address for notification purposes by giving the other Party notice of the new address and the date upon which it shall become effective.

2.5 Compliance with Laws. Each Party shall comply with all Applicable Laws in carrying out its obligations under this Agreement.

2.6 Environmental Compliance. Each Party shall secure and hold all permits and other Governmental Approvals required by any Applicable Law to properly fulfill that Party's obligations under this Agreement and shall be solely responsible for maintaining such permits in full force and effect.

2.7 Testing and Monitoring of Feedstock. Company shall have the right (but not the obligation) to inspect or test any quantity of Feedstock delivered by Casella at the Delivery Point, but Company's exercise, or failure to exercise, such testing and inspection rights shall not relieve Casella of its responsibility to deliver Feedstock meeting the specifications of this Agreement as set forth in Exhibit A, which is incorporated herein by this reference. Any time required to perform testing procedures shall be subject to demurrage as per Section 2.2(e). Company shall provide Casella with all test results of Casella Feedstock within one Business Day of receipt of results.

2.8 Non-Specification Feedstock. In the event the Company receives a Feedstock Delivery of Non-Specification Feedstock, the Company shall send Casella written notice within twenty-four (24) hours of receiving the Feedstock Delivery of Non-Specification Feedstock, indicating the reason the Feedstock Delivery is determined by Company to be Non-Specification Feedstock.



[REDACTED] In the event that Company rejects any Feedstock Delivery as per the terms of this Section 2.8, such Feedstock Delivery shall be considered Rejected Materials as per Section 2.9 of this Agreement and shall not be included in Required Weekly Tonnage. Following the expiration of the Rejection Period for any Feedstock Source, Feedstock Deliveries from the Feedstock Source may resume the following Business Day [REDACTED]

2.9 Feedstock Rejection. If, within a reasonable time following a Feedstock Delivery, Company reasonably determines that any materials delivered by Casella are Non-Conforming Feedstock, or Non-Specification Feedstock that is received after [REDACTED] as set forth in Section 2.8 of this Agreement; Company shall inform Casella of its rejection (or revocation of acceptance) of such Non-Conforming Feedstock. Upon such identification of any such material, ("Rejected Materials"), Company will make commercially reasonable efforts to manage the removal, disposal, cleanup, and any other actions, including such actions as required by government, state or municipal agencies, resulting from Rejected Materials unloaded at the Facility. Casella shall have the right to remove and properly manage the Rejected Materials, shall be solely responsible for related costs, and shall reimburse Company for any out-of-pocket expenses that were incurred in the management of the Rejected Materials. The weight of any Rejected Materials shall not be counted towards the required amounts set forth in Section 1.1 for "Required Weekly Tonnage".

2.10 Title, Possession and Risk of Loss.

(a) Feedstock. Title, possession and risk of loss of any or all Feedstock accepted by Company for use at the Facility shall pass from Casella to Company, and delivery shall be completed, after such Feedstock is unloaded from the delivery vehicle at the Delivery Point, and after the Company has provided written acceptance of the Feedstock Delivery via the signing of a physical or electronic delivery ticket, subject to Section 2.8, Section 2.9, and this Section 2.10. Title and risk of loss to Rejected Materials shall not pass to Company at the Delivery Point, but shall at all times remain with Casella, and Casella shall be solely responsible for the costs incurred in managing Rejected Materials as per Section 2.9.

(b) Documentation. Each Party shall provide those completed documents, shipping papers or manifests as are required for lawful transfer of Feedstock.

2.11 Feedstock Shortfalls.

(a) After the Commercial Operation Date, Casella shall deliver the Required Weekly Tonnage of Feedstock to the Facility. [REDACTED]

(b) Casella shall have the right to substitute Feedstock from other Feedstock Sources and shall retain any positive spread between what Casella charges third parties and the Tip Fee.

(c) Company shall use reasonable commercial efforts to reschedule Feedstock Deliveries to assist Casella in meeting Required Weekly Tonnage. Feedstock Deliveries rescheduled outside of normal operating hours are subject to Section 2.2(f).

(d) Any Week in which Scheduled Back-up Management, Extended Back-up Management or Unscheduled Back-up Management occurs, the Required Weekly Tonnage shall be reduced by the number of Tons of Feedstock subject to Back-up Management Fees per Section 2.14.

2.12 Scheduled Back-up Management by Casella. In the event that Company provides Casella ten (10) Days written notice of a scheduled downtime period of up to seven (7) Days that Company will be unable to accept Feedstock as required by the terms of this Agreement (“Scheduled Back-up Management”), Casella will provide alternate transport and disposal of the Feedstock at alternate facilities. Commencing on the Delivery Day after such scheduled downtime period, if the Company is still unable to accept Feedstock as required hereunder,

Scheduled Back-up Management will be restricted to four (4) Weeks per contract year provided however, that if Company fails to utilize all four (4) Weeks of Scheduled Back-up Management time, the unused time, up to a maximum of seven (7) Days, may be deferred for use to the following contract year. Under no circumstances will there be more than four (4) Weeks of Scheduled Back-up Management utilized in any contract year. Scheduled Back-up Management will be limited to four (4) Weeks.

2.13 Unscheduled or Extended Back-up Management by Casella. In the event that Company is unable to accept all of the Feedstock pursuant to the Agreement, and has exceeded the limits in Section 2.12 (“Extended Back-up Management”), or Company is unable to provide Casella with seven (7) Days’ notice that it cannot receive the Feedstock at the Facility (“Unscheduled Back-up Management”), then Casella will transport and dispose of the Feedstock at alternate facilities,

Notwithstanding anything in this Agreement to the contrary, Unscheduled Back-up Management shall not include Company’s inability to receive Feedstock at the Facility which has been caused by Casella, its subcontractors or agents.

2.15 Beneficial Use. Provided the Processed Materials produced by the Facility is awarded a beneficial use determination (“BUD”) by the NYSDEC, the receipt of the Feedstock shall be considered a Beneficial Use of the Feedstock provided there is either (a) a market for the Processed Materials that qualifies as Beneficial Use, or (b) Casella receives the Processed Materials and utilizes them for Beneficial Use.

2.16 Processed Materials. Company shall use commercially reasonable efforts to market the Processed Materials. In the event that Company is awarded a BUD from the NYSDEC for the Processed Materials, then Company shall use commercially reasonable efforts to market the Processed Materials under the BUD. In the event Company provides two (2) Weeks’ advanced notice to Casella that Company cannot market the Processed Materials, then Casella may, at its discretion, receive the Processed Materials at no charge to Company provided that, Company shall be responsible for all handling and transportation costs to the delivery point designated by Casella. In the event Company is awarded a BUD for the Processed Materials by NYSDEC, Casella shall receive the Processed Materials for use in composting, or any other Beneficial Use as per Section 1.1 “Beneficial Use” to ensure the Beneficial Use of Processed Materials is maintained.

ARTICLE III PRICE AND PAYMENT

3.1 Price and Payment.

(a) Tip Fee. A per Ton fee for Feedstock in the amount set forth on Exhibit A hereto, excluding Rejected Materials, delivered to the Facility (the “Tip Fee”) shall be payable by Casella to the Company. During the Term, the Tip Fee per Ton of Feedstock delivered to the Delivery Point shall be determined in accordance with the pricing structure and other terms set forth in Exhibit A.

(b) Invoices. Upon delivery of the first Feedstock following commissioning of the Facility, the Company shall transmit electronically to Casella a weekly invoice of: (i) the number of Tons of Feedstock accepted by Company in such Week itemized by load and including the generator, ticket number, date, gross weight and tare weight, and (ii) the

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number of Tons of Rejected Materials in such Week; and (iii) the sum due from Casella to Company. After six (6) months following the Commercial Operation Date or nine (9) months following the delivery of the first Feedstock, whichever occurs first, the frequency of invoices shall change from Weekly to Monthly.

(c) Payments. When Company enrolls in Casella's single-use account (SUA) virtual card program, Casella shall pay to Company the sum shown to be due in the relevant weekly or monthly statement with any taxes which are properly payable by Casella within seven (7) Days. If Company declines to enroll in Casella's SUA, Casella shall pay to Company the sum shown to be due in the relevant weekly or monthly invoice with any taxes which are properly payable by Casella within sixty (60) Days

(d) Interest on Late Payments. Any amount payable under this Agreement by Casella that is not paid when due, including any disputed amount subsequently determined to have been due pursuant to this Agreement, shall accrue interest for each Day after such due date until the outstanding balance is paid at a per annum interest rate equal to the lesser of: (a) 12%; or (b) the maximum rate permitted by Applicable Law.

(e) Taxes and Other Costs. Casella shall be responsible for and shall pay all Taxes and other similar costs, fees, charges and expenses that may be imposed with respect to the Feedstock or the transactions hereunder arising prior to or at the Delivery Point. Company shall be responsible for and shall pay all Taxes and other similar costs, fees, charges and expenses that may be imposed with respect to the Feedstock after the Delivery Point.

(f) Inflation. The Parties agree that the all rates in this Agreement including Tip Fee, Scheduled Back-up Management Fee, Extended Back-up Management Fee, Unscheduled Back-up Management Fee, demurrage fee referred to in Section 2.2(e) and late delivery fees referred to in Section 2.2(f) will be adjusted biennially (i.e., every two years) to reflect increases or decreases in the Consumer Price Index published by the U.S. Department of Labor Statistics ("Department of Labor") for All Urban Consumers; Area New York, Northern New Jersey, Long Island, NY-NJ-PA, base: 1982-84=100, all items not seasonally adjusted. An adjustment to the Tip Fee will be effective on the first Day of the month after each two (2) year anniversary of the Commercial Operation Date. Adjustment shall equal 75% of any changes in the above specified price index (the "Adjustment").

ARTICLE IV TERM AND TERMINATION

4.1 Term and Termination. Unless terminated earlier pursuant to the provisions of this Agreement, the term of this Agreement (the "Initial Term") shall commence on the Effective Date and shall expire, without notice or any other action on the part of either Party hereto, at 11:59 p.m. on the date which is the tenth (10th) anniversary of the Commercial Operation Date with options to renew the Term of this Agreement for two (2) additional terms of five (5) years (each a "Renewal Term") by mutual agreement. Company and Casella agree to notify the other Party in writing of

Feedstock Supply Agreement between

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their respective election to exercise either of its options to renew at least twelve (12) months prior to the end of the Initial Term or Renewal Term (as applicable) of the Agreement. All references to “Term” within this Agreement include the Initial Term and Renewal Terms. Either Party may terminate this Agreement (a)

(b) if the Company has not obtained all permits necessary for the operation of the Facility by March 31, 2024 (and neither Party shall have any further liability hereunder); or (c) if the Company fails to issue, by December 31, 2023, a notice to Casella identifying the Commercial Operation Date or there is a failure of such required notice to identify a Commercial Operation Date that is on or before March 31, 2024 (and neither Party shall have any further liability hereunder).

4.2 Project Abandonment. If for any reason Company abandons development and construction of the Facility, Company must provide prompt written notice thereof to Casella, whereupon this Agreement shall immediately terminate, and no Party shall have any continuing obligations or liabilities to the other except as set forth in Section 10.9. If Casella determines that Company has abandoned development of the Facility, but has not provided the written notice thereof to Casella, then Casella may declare an Event of Default as described in Section 5.1(b) after the applicable cure period has expired if Company has not cured the alleged abandonment.

ARTICLE V DEFAULT AND REMEDIES

5.1 Default by Company. The occurrence of any of the following shall constitute an Event of Default by Company hereunder, unless due to Casella’s fault or negligent acts or omissions or a Force Majeure event.

(a) Any representation or warranty furnished by Company in or pursuant to this Agreement shall have been false or misleading in any material respect when made or deemed made, such breach has a material adverse effect on the ability of either Party to perform its obligations or exercise its rights under this Agreement and such material adverse effect continues uncured for a period of thirty (30) Days after written notice thereof is provided by Casella to Company;

(b) Company fails to perform any of its material duties or obligations (other than any material duties or obligations referred to in Section 5.1(a) above) contemplated by this Agreement and such failure continues and is not cured within thirty (30) Days after written notice thereof is received from Casella, unless such failure is not susceptible of a cure within said thirty (30) Day period, in which case an Event of Default shall not occur unless (i) Company fails to commence and continue with due diligence a cure for such failure within said thirty (30) Days, or (ii) the failure specified in such notice continues and is not cured within such time period as is reasonably required to cure such default;

(c) With respect to Company, (i) it shall file a voluntary petition in bankruptcy or shall be adjudicated as bankrupt or insolvent, or shall file any petition or answer or consent

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seeking any reorganization, arrangement, moratorium, composition, readjustment, liquidation, dissolution or similar relief for itself under any Federal, state or other Applicable Law relative to bankruptcy, insolvency or other relief for debtors, or shall seek or consent to the appointment of any trustee, receiver, conservator or liquidator of Company or of all or any substantial part of its properties; (ii) any Person shall file an involuntary petition in bankruptcy against Company, and such petition is not dismissed, discharged or otherwise terminated with prejudice within sixty (60) Days of the original filing thereof; (iii) a court of competent jurisdiction shall enter an order, judgment or decree approving a petition filed against Company seeking a reorganization, arrangement, moratorium, composition, readjustment, liquidation, dissolution or similar relief under any Federal, state or other Applicable Law relative to bankruptcy, insolvency or other relief for debtors, and Company shall acquiesce in such order, judgment or decree or such order, judgment or decree shall remain unvacated and unstayed for an aggregate of sixty (60) Days (whether or not consecutive) from the date of entry thereof, or a trustee, receiver, conservator or liquidator of Company or of all or any substantial part of its properties shall be appointed and Company shall acquiesce in such appointment or such appointment shall remain unvacated and unstayed for an aggregate of sixty (60) Days (whether or not consecutive); (iv) Company shall admit in writing its inability to pay its debts as they come due or its insolvency; (v) Company shall make a general assignment for the benefit of creditors or take any other similar action for the protection or benefit of creditors; or (vi) there occurs any event which under Applicable Laws has an effect similar to the events described in this Section 5.1(c).

(d) Failure of the Company to perform in a consistent and reliable manner as determined by the need for the provision of more than one hundred eighty (180) Days of Unscheduled Back-up Management in any continuous twelve (12) month period.

5.2 Default by Casella. The occurrence of any of the following shall constitute an Event of Default by Casella hereunder, unless due to Company's fault or negligent acts or omissions or a Force Majeure event (provided that the exception for a Force Majeure event does not apply to Section 5.2(a)).

(a) Any payment hereunder from Casella is undisputed (or is disputed without a good faith basis) and not made when due and remains unpaid for another thirty (30) Days after written notice from Company;

(b) Any representation or warranty furnished by Casella in or pursuant to this Agreement shall have been false or misleading in any material respect when made or deemed made, such breach has a material adverse effect on the ability of either Party to perform its obligations or exercise its rights under this Agreement and such material adverse effect continues uncured for a period of thirty (30) Days after written notice thereof is provided by Company to Casella;

(c) Casella fails to perform any of its material duties or obligations (other than any material duty or obligation referred to in Section 5.2(a) or 5.2(b) above) contemplated by

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this Agreement and such failure continues and is not cured within thirty (30) Days after written notice thereof is received from Company, unless such failure is not susceptible of a cure within said thirty (30) Day period, in which case an Event of Default shall not occur unless (i) Casella fails to commence and continue with due diligence a cure for such failure within said thirty (30) Days, or (ii) the failure specified in such notice continues and is not cured within such time period as is reasonably required to cure such default;

(d) With respect to Casella, (i) it shall file a voluntary petition in bankruptcy or shall be adjudicated as bankrupt or insolvent, or shall file any petition or answer or consent seeking any reorganization, arrangement, moratorium, composition, readjustment, liquidation, dissolution or similar relief for itself under any Federal, state or other Applicable Law relative to bankruptcy, insolvency or other relief for debtors, or shall seek or consent to the appointment of any trustee, receiver, conservator or liquidator of Casella or of all or any substantial part of its properties; (ii) an involuntary petition in bankruptcy shall be filed against Casella, and such petition is not dismissed, discharged or otherwise terminated with prejudice within sixty (60) Days of the original filing thereof; (iii) a court of competent jurisdiction shall enter an order, judgment or decree approving a petition filed against Casella seeking a reorganization, arrangement, moratorium, composition, readjustment, liquidation, dissolution or similar relief under any Federal, state or other Applicable Law relative to bankruptcy, insolvency or other relief for debtors, and Casella shall acquiesce in such order, judgment or decree or such order, judgment or decree shall remain unvacated and unstayed for an aggregate of sixty (60) Days (whether or not consecutive) from the date of entry thereof, or a trustee, receiver, conservator or liquidator of Casella or of all or any substantial part of its properties shall be appointed and Casella shall acquiesce in such appointment or such appointment shall remain unvacated and unstayed for an aggregate of sixty (60) Days (whether or not consecutive); (iv) Casella shall admit in writing its inability to pay its debts as they come due or its insolvency; (v) Casella shall make a general assignment for the benefit of creditors or take any other similar action for the protection or benefit of creditors; or (vi) there occurs any event which under Applicable Laws has an effect similar to the events described in this Section 5.2(d).

5.3 Remedies for Event of Default. Upon the occurrence and during the continuation of any Event of Default hereunder, the Party not in default shall have the right to (i) terminate this Agreement upon ten (10) Business Days' prior written notice to the other Party; and (ii) pursue any other remedy given under this Agreement or, unless expressly excluded or limited under this Agreement, any remedy now or hereafter existing at law or in equity or otherwise.

ARTICLE VI INDEMNITY

6.1 By Casella. Casella shall indemnify and hold harmless Company and its directors, officers, members, employees, agents, consultants, and other representatives (collectively, the "Company Indemnified Parties"), from and against any claims, demands, actions, causes of action, judgments, damages, losses (which shall include any diminution in value), liabilities, costs or expenses (including, without limitation, interest, penalties and reasonable out of pocket attorneys'

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and experts' fees and disbursements) which may be made against any of the Company Indemnified Parties or which any of them may suffer or incur as a result of, arising out of or relating to: (i) any violation, contravention or breach of any covenant, agreement or obligation of Casella under or pursuant to this Agreement; (ii) Casella's transportation and delivery of Feedstock to the Facility or (iii) any action, suit, trial, arbitration or other proceeding by a party containing allegations which, if proven true, would constitute an event described above.

6.2 By Company. Company shall indemnify and hold harmless Casella and its directors, officers, members, employees, agents, consultants, and other representatives (collectively, the "Casella Indemnified Parties"), from and against any claims, demands, actions, causes of action, judgments, damages, losses (which shall include any diminution in value), liabilities, costs or expenses (including, without limitation, interest, penalties and reasonable out of pocket attorneys' and experts' fees and disbursements) which may be made against any of the Casella Indemnified Parties or which any of them may suffer or incur as a result of, arising out of or relating to: (i) any violation, contravention or breach of any covenant, agreement or obligation of Company under or pursuant to this Agreement; or (ii) any action, suit, trial, arbitration or other proceeding by a party containing allegations which, if proven true, would constitute an event described above.

ARTICLE VII NO IMPLIED WARRANTIES

7.1 No Implied Warranties EXCEPT AS EXPRESSLY PROVIDED IN THIS AGREEMENT, NEITHER PARTY MAKES ANY WARRANTIES TO THE OTHER, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE PERFORMANCE UNDER AND SUBJECT MATTER OF THIS AGREEMENT, AND BOTH PARTIES DISCLAIM AND WAIVE ANY IMPLIED WARRANTIES OR WARRANTIES IMPOSED BY LAW.

ARTICLE VIII LIMITATION OF LIABILITY

8.1 Limitation on Liability. Neither Party shall be liable to the other for special, incidental, exemplary, punitive or consequential damages including without limitation loss of use, loss of profits or revenues, or cost of substitute or re-performed services, suffered, asserted or alleged by either Party or any third party arising from or relating to this Agreement, regardless of whether those damages are claimed under contract, warranty, indemnity, tort or any other theory at law or in equity. Notwithstanding anything to the contrary in this Agreement and for purposes of clarity, both Parties hereby agree that any payments to be made by Casella pursuant to Section 2.11(a) are actual damages.

ARTICLE IX REPRESENTATIONS AND WARRANTIES

9.1 Representation and Warranties of Company. Company hereby represents and warrants to Casella that as of the Effective Date and the Commercial Operation Date:

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(a) Company's execution and delivery of, and performance under, this Agreement have been duly authorized by Company and do not violate Company's organizational documents or any Applicable Law or contractual obligation applicable to or binding upon Company or any of Company's properties, other than any such violations that would not reasonably be expected to have a material adverse effect on Company's ability to perform its obligations under this Agreement.

(b) This Agreement has been duly executed and delivered by Company and constitutes the valid and binding obligation of Company, enforceable against Company in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, moratorium and other laws affecting the rights of creditors generally and by general principles of equity.

(c) Company is duly organized, validly existing and in good standing under the laws of the State of New York and is authorized to do business in each other jurisdiction where necessary for the performance of its obligations hereunder and has the right, power and authority to enter into this Agreement and to perform its obligations hereunder.

9.2 Representation and Warranties of Casella. Casella hereby represents and warrants to Company that as of the Effective Date and the Commercial Operation Date:

(a) Casella's execution and delivery of, and performance under, this Agreement have been duly authorized by Casella and do not violate Casella's organizational documents or any Applicable Law or contractual obligation applicable to or binding upon Casella or any of Casella's properties, other than any such violations that would not reasonably be expected to have a material adverse effect on Casella's ability to perform its obligations under this Agreement.

(b) This Agreement has been duly executed and delivered by Casella and constitutes the valid and binding obligation of Casella, enforceable against Casella in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, moratorium and other laws affecting the rights of creditors generally and by general principles of equity.

(c) Casella is duly organized, validly existing and in good standing under the laws of the State of Vermont and is authorized to do business in each other jurisdiction where necessary for the performance of its obligations hereunder and has the right, power and authority to enter into this Agreement and to perform its obligations hereunder.

ARTICLE X MISCELLANEOUS

10.1 Confidentiality. Each Party agrees that, except with the prior written consent of the other Party, it shall at all times keep confidential and not divulge, furnish or make accessible to anyone any confidential information, knowledge or data concerning or relating to the business or financial affairs of the other Party to which such Party has been or shall become privy by reason

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of this Agreement, discussions or negotiations relating to this Agreement, the terms of this Agreement, or the relationship of the Parties contemplated hereby; provided that confidential information may be disclosed to a Party's affiliates, directors, partners, officers, employees, members, managers, advisors, financing sources or representatives (collectively, the "Confidants") (provided that (a) such Confidants shall be informed by such Party of the confidential nature of such information and shall be directed by such Party to keep such information confidential in accordance with the contents of this Agreement and (b) each Party shall be liable for any breaches of this Section 10.1 by any of its Confidants). The confidentiality obligations of this Section 10.1 do not apply to any information, knowledge or data which is publicly available or becomes publicly available through no act or omission of the Party or its Confidants wishing to disclose the information, knowledge or data. In the event of any dispute between the Parties or others or in the event that confidential information shall be required to be disclosed by any Applicable Law, regulation or legal process or by the rules of any stock exchange, regulatory body or governmental authority, then prior to placing or seeking to place or consenting to the placement of any confidential information on public record in connection with such dispute or legal compulsion, the compelled Party agrees that (i) such Party will afford the other Party no less than two (2) Days prior written notice of its intention to place or to consent to the placement of confidential information on public record, (ii) the compelled Party will cooperate fully with the other Party in any protective orders that the other Party may seek so as to prevent confidential information from being made available to the public generally (e.g., by appropriate sealing of documents filed with the court or administrative agency), and (iii) any voluntary publication of confidential information by the compelled Party shall be limited to placing on public records with the court or agency of applicable jurisdiction only such confidential information as is necessary to resolve such dispute with the other Party or others or to satisfy such legal compulsion and only after the Company shall have been afforded its rights under clauses (i) and (ii) above. The provisions of this Section 10.1 shall survive termination of this Agreement.

10.2 Force Majeure.

a. "Force Majeure" shall mean any act, event or condition materially and adversely affecting the ability of a party to perform or comply with any material obligation, duty or agreement required under this Agreement, if such act, event, or condition is beyond the reasonable control of the nonperforming Party or its agents relying thereon, is not the result of the willful or negligent action, inaction or fault of the Party relying thereon, and the nonperforming Party has been unable to avoid or overcome the act, event or condition by the exercise of due diligence, including, without limitation: (i) an act of God, epidemic, pandemic, landslide, lightning, earthquake, fire, explosion, storm, flood or similar occurrence; (ii) an act of public enemy, war, blockage, insurrection, riot, general unrest or restraint of government and people, civil disturbance or disobedience, sabotage, act of terrorism or similar occurrence; or (iii) adoption or change (including a change in interpretation or enforcement) of any federal, state or local law after the date of this Agreement, preventing performance of or compliance with the obligations hereunder.

b. Except with respect to the performance of any obligations hereunder to make payments, neither Party shall be liable to the other for damages, including without limitation, liquidated damages if such Party's performance is delayed or prevented due to an event of Force

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Majeure. In such event, the affected Party shall promptly notify the other of the event of Force Majeure and its likely duration. During the continuation of the Force Majeure event, the nonperforming party shall (i) exercise commercially reasonable efforts to mitigate or limit damages to the performing Party; (ii) exercise commercially reasonable due diligence to overcome the Force Majeure event; (iii) to the extent it is able, continue to perform its obligations under this Agreement; and (iv) cause the suspension of performance to be of no greater scope and no longer duration than the Force Majeure event requires.

c. In the event of a delay in either Party's performance of its obligation hereunder for more than one hundred eighty (180) Days due to an event of Force Majeure, the other Party may, at any time thereafter, terminate this Agreement.

10.3 Modifications and Waiver. This Agreement may not be modified or amended except in writing signed by or on behalf of both Parties or by their duly authorized officers. No waiver of any of the provisions of this Agreement shall constitute a waiver of any other provision (whether or not similar), nor shall such waiver constitute a continuing waiver unless otherwise expressly provided in writing.

10.4 Independent Contractors; No Partnership. Each of Company and Casella is, and shall perform this Agreement as, an independent contractor, and, as such, shall have and maintain complete control over all of its employees, agents and operations. Neither Company nor Casella, nor any agent, employee or subcontractor of such Party shall be, represent, act, purport to act or be deemed to be the agent, representative, employee or servant of the other Party. Nothing contained in this Agreement shall be construed as constituting a joint venture or partnership between Company and Casella.

10.5 Assignments. Either Party may assign or subcontract its rights under this Agreement to an affiliated entity; provided that such affiliated entity has agreed to be bound by the terms of this Agreement, otherwise neither party may assign or subcontract its rights under this Agreement to a third-party without the prior written consent of the other party, such consent shall not be unreasonably withheld. Any assignment made in contravention of this Section 10.5 shall be void. This Agreement shall be binding upon, and inure to the benefit of, the Parties hereto and their successors and permitted assigns.

10.6 Entire Agreement. This Agreement, and any Exhibits attached hereto, constitute the entire agreement and understanding between the Parties with respect to the subject matter hereof and supersede all prior negotiations, agreements and understandings between the Parties.

10.7 Severability. In the event that any of the provisions, portions, or applications of this Agreement are held to be unenforceable or invalid by any court of competent jurisdiction, Company and Casella shall negotiate an equitable adjustment in the provisions of this Agreement with a view toward effecting the purpose of this Agreement, and the validity and enforceability of the remaining provisions, portions, or applications thereof shall not be affected thereby.

10.8 Notices. Any notice or other communication required to be given under this Agreement shall be made in writing and shall be validly given, if personally delivered to its

Feedstock Supply Agreement between

New England Waste Services of ME, Inc. d/b/a Casella Organics and Saratoga Biochar Solutions LLC

addressee, or sent by registered or certified mail, or sent by reputable overnight carrier that provides evidence of delivery, to the following addresses:

Company Representative:

Raymond Apy
Chief Executive Officer
Saratoga Biochar Solutions, LLC
26F Congress St.,
Saratoga Springs, NY 12866
rapy@northeasternbiochar.com

Casella Representative:

Clark James
Casella Resource Solutions
755 Banfield Road, Suite 201
Portsmouth, NH 03801
Clark.James@casella.com

With a copy via email to:

Alfred Jordan
Jordan Law, LLC
alfred@jordanlawkc.com

Shelley Sayward
Casella Waste Systems, General Counsel
Shelley.Sayward@casella.com

10.9 Survival. The provisions of Section 10.1, and any provision necessary to implement or enforce residual obligations of this Agreement, shall survive the expiration or other termination of this Agreement.

10.10 Governing Law; Venue; Jury Trial. This Agreement shall be governed by, and construed in accordance with, the laws of the State of New York, without regard to conflict of law principals. The Parties irrevocably submit to the exclusive jurisdiction of the state or federal courts sitting in or for Saratoga County, New York to resolve any dispute arising out of or relating to this Agreement and irrevocably waive any objection that they may now or hereafter have to the laying of venue in such court or any defense of inconvenient forum. ANY RIGHT TO TRIAL BY JURY WITH RESPECT TO ANY LAWSUIT, CLAIM OR OTHER PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT IS EXPRESSLY AND IRREVOCABLY WAIVED. The Parties hereby agree to be bound by the terms regarding dispute resolution set forth on Exhibit C hereto, the terms of which are incorporated herein by this reference.

10.11 Counterparts. This Agreement may be executed in any number of counterparts and by each Party hereto in separate counterparts (including by facsimile or other electronic transmission), each of which counterparts, when so executed and delivered, shall be deemed to be an original and all of which counterparts, taken together, shall constitute one and the same agreement.

[Signature Page Follows]

Feedstock Supply Agreement between

New England Waste Services of ME, Inc. d/b/a Casella Organics and Saratoga Biochar Solutions LLC

IN WITNESS WHEREOF, Company and Casella have caused this Agreement to be executed and delivered by their duly authorized representatives as of the Effective Date.

NEW ENGLAND WASTE SERVICES OF ME, INC.
D/B/A CASELLA ORGANICS

SARATOGA BIOCHAR
SOLUTIONS, LLC

By: Robert J. Cappadona
Robert Cappadona
Vice President

By: Raymond Apy
Raymond Apy
President

EXHIBIT A

FEEDSTOCK SUPPLY

Feedstock is inclusive of Conforming Feedstock and Non-Specification Feedstock which shall meet the following specifications:

Conforming Feedstock

1. The feedstock shall be sourced from a Feedstock Source.
2. The type of feedstock shall be solid or semi-solid waste generated by a process that separates the liquid and solid fractions of the waste from a wastewater treatment plant and shall be exclusive of screenings, grit, trash, non-hazardous contaminants, and hazardous contaminants.
3. Total Solids Percentage shall fall within 19% to 31.99% of total solids.

Non-Specification Feedstock.

1. The feedstock shall be sourced from a Feedstock Source.
2. The type of feedstock shall be solid or semi-solid waste generated by a process that separates the liquid and solid fractions of the waste from a wastewater treatment plant and shall be exclusive of screenings, grit, trash, non-hazardous contaminants, and hazardous contaminants.
3. Total Solids Percentage is between 17% to 18.99%, or 32% or greater of total solids.

Non-Conforming Feedstock

1. Feedstock which does not meet the definition of Conforming Feedstock, or Non-Specification Feedstock.
2. Feedstock which cannot lawfully be processed at the Facility.
3. Feedstock which produces a Processed Material which cannot be lawfully beneficially used.


Tip Fee: 

EXHIBIT B

INSURANCE COVERAGE REQUIREMENTS

The minimum insurance requirements for Company, Casella and Casella's subcontracted haulers are as follows (except that Company is excepted from the requirement for automobile liability insurance):

1. Worker's Compensation (this coverage is required if the subcontractor hauler employs individuals on either a full or part time basis to perform the subcontract activities)
 - Worker's Compensation – Statutory
 - Employer's Liability - \$500,000/500,000/500,000
2. Automobile Liability - \$1,000,000 combined single limit
3. General Liability
 - \$1,000,000 each occurrence
 - \$2,000,000 general aggregate
4. Umbrella Coverage - \$2,000,000

The insurance policies must list Casella or Company, as applicable as an additional insured. The insurance must be maintained continuously throughout the term of the Agreement or the subcontractor agreement and must provide for thirty (30) Days prior written notice to Company or Casella, as applicable, before termination, cancellation, or material change in coverage.

A Certificate of Insurance evidencing the above coverage must be submitted to Company or Casella, as applicable prior to the performance of this Agreement and any subcontract services and fifteen (15) Days prior to each anniversary date.

EXHIBIT C
DISPUTE RESOLUTION

If a claim or dispute arises out of this Agreement or its performance, the Parties agree to endeavor in good faith to resolve it equitably through negotiation, or if that fails, through non-binding mediation under the rules of the American Arbitration Association, before having recourse to the courts. However, prior to or during negotiation or mediation, either Party may initiate litigation that would otherwise become barred by a statute of limitations.

APPENDIX C

WOOD WASTE SOURCE LETTERS OF INTEREST



ESTABLISHED 1975

755 Banfield Road, Suite 201, Portsmouth, NH 03801 p. 800-933-6474 • f. 603-228-2010

March 7th, 2022

New York State Department of Environmental Conservation

Dear New York State Department of Environmental Conservation,

Casella would like to confirm our interest in delivering waste wood feedstock to the Saratoga Biochar Solutions, LLC, ("SBS") Facility in Moreau, NY. We currently manage various sources of wood waste in the region (through our Industrial Services group, as well as our Fort Edward, and Latham hauling divisions). The wood waste we are referring to is composed predominantly of chipped virgin wood, bark, sawdust from mills, pallets, and other sources of non-hazardous and non-C&D wood waste.

As per our understanding, the SBS Facility has a 400hp wood grinder that will have the ability to further process any of the wood waste delivered. In respects to tip fee pricing, this material is estimated to be subject to a minimum tip fee of \$15 per ton as received at the SBS Facility.

As a company, we have a vested interest in seeing the SBS Facility succeed as we have executed a 10-year biosolids supply agreement, with two 5-year extensions, with the SBS Facility already. Furthermore, the SBS Facility's waste wood receiving capacity, up to 7,840 tons per year per line, or 23,520 tons per year total, is a relatively small, and could easily be managed given the volumes that Casella Organics currently manages in the region. The phased approach to adding capacity will certainly ensure that we have the ability to manage the wood volumes as we have time to ramp up deliveries as the SBS facility expands.

We look forward to playing our part in commercializing this revolutionary technology that represents a material improvement in the environmental sustainability for the biosolids disposal industry.

Sincerely,

A handwritten signature in blue ink, appearing to read "Patrick Ellis", is written over a light blue horizontal line.

Patrick Ellis
Director of Strategic Alliances

APPENDIX D
END-USE MARKETING PLAN

Carbon Fertilizer™

Marketing & Distribution Plan

May 15, 2023

Casella Organics

Carbon Fertilizer™ is a byproduct produced by the Carbon Manufacturing Facility (the “Facility”) that Saratoga Biochar Solutions, LLC (“SBS”) is building in Moreau, NY. SBS derives 69% of its revenues on average (78% in 2024) from biosolids tip fees which is sufficient to operate and finance the Facility. Biosolids revenue is guaranteed by Casella Organics. A copy of the redacted Biosolids Supply Agreement (the “Agreement”) has been provided to the NYSDEC. As part of the Agreement, Casella is obligated to receive any unmarketable Carbon Fertilizer™ at no charge provided SBS provides transportation to their designated “beneficial use” facility. The Agreement with Casella Organics was negotiated specifically with the intent of providing a disposal pathway in the event Carbon Fertilizer™ cannot be marketed at any time of the year.

Casella Organics operates numerous composting facilities throughout the region. Using Carbon Fertilizer™ in compost production should qualify as a “beneficial use” of the material. “Beneficial use” is a requirement that Casella Organics is motivated to maintain as they typically receive a premium tip fee if a “beneficial use” of biosolids can be determined. “Beneficial use” is also a requirement that SBS is motivated to maintain as any “beneficial use” of Carbon Fertilizer™ ensures the carbon sequestration potential of the material is also achieved. In this respect, SBS is also submitting a BUD petition to the NYSDEC.

Carbon Fertilizer™ Revenues

Carbon Fertilizer™ net revenues are pure profit as operations and debt servicing are covered by guaranteed revenue from the Agreement with Casella Organics. Carbon Fertilizer™ generates revenue for SBS in two ways which ensure revenues even when “giving” the product away to Casella Organics.

- “Carbon Credit Sales” – SBS is marketing voluntary carbon credits that are conservatively estimated at \$59/ton based on carbon sequestration value only.
- “Fertilizer Sales” – SBS is conservatively marketing Carbon Fertilizer™ at \$92/ton (i.e., introductory pricing) based on its projected “guaranteed” or “minimum” nutrient content.

The disposal pathway provided by Casella Organics ensures that SBS generates net revenues (i.e., profits) from carbon credit sales even when the Carbon Fertilizer™ is “given” to Casella Organics for use in their compost operations, or other “beneficial uses”. In this respect, a beneficial use determination (a “BUD”) is highly desired, but not required as SBS does not rely on profit from Carbon Fertilizer™ sales for operating and financing the Facility.

“Carbon Credit Sales”

Voluntary carbon credit markets have developed significantly over the past decade. The market is driven by large corporations (i.e., Microsoft, Spotify, etc.) that purchase voluntary carbon credits based on verified GHG emission

reductions as a means for offsetting their GHG footprint. SBS is currently engaging a third-party engineering group, Eco Engineers, PLC, to develop our lifecycle GHG analysis to determine the net GHG reductions which can be monetized as voluntary carbon credits. In the lifecycle GHG analysis, the SBS Facility's GHG footprint will be based on GHG emissions from the Facility and the following credits for GHG emission reductions:

1. GHG emissions avoided by diverting biosolids from current biosolids disposal methods (i.e., landfilling, incineration, composting, etc.) that have a much higher GHG footprint than the SBS Facility.
2. GHG emissions avoided by substituting Carbon Fertilizer™ for chemical fertilizers which are produced with a much higher GHG footprint.
3. GHG emissions sequestered by using Carbon Fertilizer™ in crop production, compost, or other “beneficial use” applications.
4. GHG emissions avoided by reducing biosolids transportation to distant disposal facilities.

Carbon Fertilizer™ (i.e., #3 above) alone is projected to sequester its weight in GHG emissions based on its fixed carbon content. Fixed carbon is carbon that is not utilized by soils and therefore builds up in soils through repeated applications. Fixed carbon helps restore the soil's ability to retain moisture and nutrients and has a very long shelf-life in the soil which qualifies it for carbon sequestration credits.

SBS expects a minimum of \$59/ton carbon sequestration value from the Carbon Fertilizer™ based on its fixed carbon content. SBS forecasts a minimum of \$2MM in net carbon credit sales at a minimum (i.e., based on the carbon sequestration value alone) at full production.

SBS intends to complete the lifecycle GHG analysis prior to starting construction which may double or triple the amount of carbon credits that we expect to generate. We are also initiating marketing relations with voluntary carbon credit brokers to initiate pre-sale contracting.

“Fertilizer Sales”

Carbon Fertilizer™ is Made in USA from American organic matter, carbon, and nutrients. Farmers know what that means to soils damaged by decades of intense chemical fertilizer application. Furthermore, the current political environment is causing favorable price disruptions in fertilizer markets globally as almost 15% of nitrogen fertilizers used globally come from urea which is almost exclusively manufactured in Russia.

Selling Carbon Fertilizer™ as a commodity generates additional net revenue (i.e., profits) for SBS shareholders. SBS is estimating the initial price of Carbon Fertilizer™ at only \$92/ton bulk, loaded at the Facility. The estimate is based on macro-nutrient content including organic nitrogen (“N”), phosphorus (P₂O₅) (“P”), and potassium (K₂O) (“K”). The total claimed nutrients are based on our worst-case production scenario and further discounted. Carbon Fertilizer™ is expected to have a wholesale value of \$141.52/ton based on current wholesale NPK pricing. We have further discounted that value 35% to provide a margin for wholesalers and transport from the SBS Facility.

Furthermore, the introductory price for Carbon Fertilizer™ does not attribute any value to the organic matter, organic carbon, and micro-nutrient (calcium, sulfur, magnesium, copper, iron, manganese, nickel, and zinc) content which add value. The introductory price does not place any value on the further reduction in petrol-related fertilizer application related to reduced nutrient runoff qualities that Carbon Fertilizer™ uniquely

Providing Essential Services – Manufacturing Carbon Fertilizer – Benefiting Host Communities & Environment

possesses. SBS intends to capture additional premiums above and beyond the minimum claimed macro-nutrient value once we can guarantee a minimum value for each constituent.

The following table demonstrates the minimum net revenues provided all the Carbon Fertilizer is sold and a minimum carbon sequestration value is monetized. These are minimum expectations as similar forms of carbon-based fertilizers produced from biosolids in Europe are being imported at over \$1,000/ton delivered to greenhouses in NY. Furthermore, we expect to identify numerous specialty markets, such as treating chemical runoff from roadways, that may receive premiums for its adsorption properties. Lastly, it is worth noting that Calcium (Ca), Sodium (Na), Manganese (Mg), Copper (Cu), Zinc (Zn), Nickel (Ni), Iron (Fe), and Manganese (Mn) exceed minimum levels to be included in the guaranteed analysis on the product label but are not initially valued.

Guaranteed Analysis				
Carbon Fertilizer Value	Min. Scenario Values	Total Claimed Nutrients	Wholesale Nutrient Value	Net Nutrient Value
Macro-Nutrient Value, \$/ton	-	-	\$ 141.52	\$ 91.99
Nitrogen (N), %	4.07%	4.00%	\$ 66.52	\$ 43.24
Phosphorus (P ₂ O ₅), %	6.55%	6.50%	\$ 69.33	\$ 45.07
Potassium (K ₂ O), %	0.59%	0.50%	\$ 5.67	\$ 3.68
Sulfur (S), %	0.87%	0.00%	\$ -	\$ -
Organic Matter, %	39.24%	0.00%	\$ -	\$ -
Organic Carbon, %	35.35%	0.00%	\$ -	\$ -
Fixed Carbon, % (CO₂e value)	23.43%	23.40%	\$ 62.49	\$ 59.36
Calcium (Ca), %	3.71%	3.50%	\$ -	\$ -
Sodium (Na), %	0.25%	0.20%	\$ -	\$ -
Magnesium (Mg), %	0.86%	0.50%	\$ -	\$ -
Copper (Cu), mg/kg	0.05%	0.05%	\$ -	\$ -
Zinc (Zn), mg/kg	0.09%	0.05%	\$ -	\$ -
Nickel (Ni), mg/kg	0.0026%	0.0010%	\$ -	\$ -
Iron (Fe), mg/kg	1.98%	1.90%	\$ -	\$ -
Manganese (Mn), mg/kg	0.10%	0.05%	\$ -	\$ -
Moisture, %	10%			
Net Carbon Fertilizer Value, \$/ton				\$ 151.35

SBS recently reached out to Professor Johannes Lehmann, at the School of Integrative Plant Science Soil and Crop Sciences Section, to profile Carbon Fertilizer™ in research publications. We intend to work with Prof. Lehmann to develop research, and the Cornell Cooperative Extension to identify progressive “demonstration” farmers throughout the region. Professor Lehmann has been instrumental in our early-stage research, and we look forward to taking the next steps to verify Carbon Fertilizer’s value in soil.

While it may be several years until we realize the full value of Carbon Fertilizer™, which is expected to exceed \$400 per ton on average, we are in an advantageous situation whereby we can attribute some profit to Carbon Fertilizer™ even when the product is disposed of. Furthermore, biosolids tip fees account for 69% of revenues over the first 10 years (78% in 2024). In short, we are in an excellent position to introduce a new type of biological fertilizer to the market at a negligible, or negative, cost basis.

Specific End-Users

Specific end-users of the voluntary carbon credits are currently unknown. While it is possible to pre-contract some sales in advance, the voluntary carbon market has never been more liquid as the volumes of transactions grows rapidly. Microsoft is a likely target as they have purchased voluntary carbon credits from similar pyrolysis facilities and consider it the only option for filling their “medium-term” carbon sequestration goals. Voluntary carbon credits are currently valued at \$80 per metric ton of carbon dioxide equivalent (MTCO₂e) and are increasing in value due to a shortage of supply. In short, while it may not be advantageous to lock in a fixed price, we do anticipate conducting a life-cycle analysis (“LCA”) that would yield a comprehensive carbon intensity (“CI”) score for the SBS Facility. The CI score will then be used to line up interested buyers prior to completing the SBS Facility.

Specific end-users for the Carbon Fertilizer™ itself are currently unknown and may never be known in its entirety. SBS intends to develop a network of wholesale distributors in New York and neighboring states. As a

manufacturer, we intend to focus on business to business (“B2B”) transactions instead of business to consumer (“B2C”) transactions. In this respect, we may only know very large consumers of our products as others will be directly marketing Carbon Fertilizer™ to consumers. SBS does anticipate developing a retail product line of bagged products in 1 and 2 cubic foot bags. However, these sales will likely be developed in partnership with service providers that can receive, store, and bag bulk product off-site of the SBS Facility, and market directly to big box retail outlets that handle bagged products (i.e., Home Depot, Lowes, Walmart, etc.).

Distributor Relationships

SBS is developing several relationships with distributors already. However, we intend to focus more on distributor relationships once we have secured our permits and financing for the SBS Facility. SBS anticipates a 1-year construction period and 6-month ramp-up period after we secure the permits and financing. SBS anticipates starting construction in Summer 2022. This gives us nearly two years to focus on agricultural research and forming distributor relationships with existing fertilizer distributors. Given the concern for soil health in the current legislative environment in New York, we are anticipating a warm reception as our product blends well with chemical fertilizers and helps reduce nutrient runoff, and consequently reduces nutrient application requirements typically attributed to “nutrient loss”.

1. **Agro-Shield** <https://www.agro-shield.com/>

Agro-Shield is a distributor of crop protection products, fertilizers, and organic growth regulators. Agro-Shield has a representative based in Buffalo, NY, that has taken a keen interest in getting Carbon Fertilizer™ into roadway applications with the NYS Department of Transport as well as adding Carbon Fertilizer™ to their algae treatment service. Agro-Shield currently markets products that treat algae blossoms in ponds. Agro-Shield is interested in marketing Carbon Fertilizer™ for continual use to prevent algae blossoms from returning after the initial treatment. Agro-Shield is anxious to initiate business development with Carbon Fertilizer™ and intends to market bulk, super sacks, and retail bagged product by the pallet. At a minimum, Agro-Shield anticipates purchasing at least 1,000 tons per year and has executed a letter of intent. Deliveries will be unpredictable but are expected year-round as Agro-Shield sells products to wholesalers, including agriculture cooperatives, that have seasonal storage.

2. **BioEnergy Innovations Global, Inc.** <https://www.facebook.com/TerraCharInfo/>

BioEnergy Innovations Global, Inc (“BEIG”). owns the Terra-Char brand and currently distributes high fixed carbon biochar as a soil amendment in several states. BEIG is interested in mixing their high fixed carbon biochar, Terra Char, with Carbon Fertilizer™ to market to soil remediation companies for the upcoming NRCS program. The objective is to create a product with 60% fixed carbon and some nutrient value to improve adsorption heavy metals and other soil contaminants. At a minimum, BEIG anticipates purchasing at least 1,000 tons in the first year to develop and test its new product and has executed a letter of intent. Deliveries will depend on coordinating the development of the new product.

APPENDIX E

END-USE MARKET LETTERS OF INTEREST



AgroShield LLC 412 N. Main Street, Suite 100 Buffalo WY 82834 USA

www.agro-shield.com

info@agro-shield.com

Letter of Intent

Carbon Fertilizer Distribution

March 15, 2022

This Letter of Intent ("LOI") is issued from AgroShield, LLC ("AS"), a Wyoming limited liability company, to Saratoga Biochar Solutions, LLC ("SBS"), a New York limited liability company (collectively, the "Parties").

Whereas, AS is a distributor of crop protection products, fertilizers and natural soil and plant amendments in the United States with an office in Buffalo, NY, and with an annual turnover of \$21.8 Million USD. AS also distributes algae management products for treating algae blossoms in ponds and small lakes.

Whereas, SBS is building a Carbon Fertilizer manufacturing facility in Moreau, NY, that will generate manufacture Carbon Fertilizer, and distribute ex-works in bulk and super sacks.

Whereas, the Parties are mutually interested in developing a distribution agreement pertaining to the Carbon Fertilizer SBS produces. The Parties anticipate entering into a distribution agreement, or other legally binding agreement, prior to the SBS facility commencing operations, which is expected to occur in early 2024.

AS is interested in marketing Carbon Fertilizer, at a minimum, in the following markets:

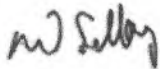
1. **New York State Department of Transportation** for use along roadways. AS anticipates blending Carbon Fertilizer with biochar to enhance chemical adsorption properties for the NYSDOT. Furthermore, AS is interested in marketing the blend under private label, or as a specialized high-carbon blend of Carbon Fertilizer jointly with SBS.
2. **Co-marketing with algae management products** to deter the reoccurrence of algae blossoms after initial treatment(s) with the objective of deterring further nutrient runoff into the water body which feeds the algae blossoms.

3. **Bio-fertilizer substitute for chemical fertilizers.** Biological fertilizers are scarce today despite growing demand particularly in New York State. AS intends to market Carbon Fertilizer directly to farms and agricultural cooperatives as part of our product offerings.

AS intends to purchase Carbon Fertilizer regularly, throughout the year, as many of its clients receive and store bulk fertilizers during off-peak seasons for better pricing. AS is interested in purchasing a minimum of 1,000 tons in the first year based on the forecasted nutrient content and SBS' introductory pricing of \$100 per ton received loaded in bulk at the SBS facility.

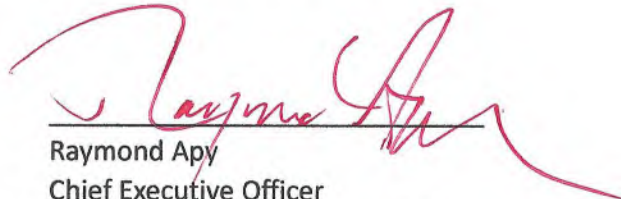
This LOI identifies current expectations and anticipated future commitments of the Parties. The Parties agree that it is not a legally binding agreement, but a precursor to a mutually agreeable legally binding agreement. This LOI shall expire on Dec. 31, 2022, or upon finalization of the intended legally binding agreement.

AgroShield, LLC



Richard Selby
Chief Executive Officer
AgroShield, LLC
412 N Main St Suite 100
Buffalo WY 82834
selby@agro-shield.com
515-419-9524

Saratoga Biochar Solutions, LLC



Raymond Apy
Chief Executive Officer
Saratoga Biochar Solutions, LLC
26F Congress Street #346,
Saratoga Springs, NY 12866
rapy@northeasternbiochar.com
(518) 391-0566

Letter of Intent
for
Carbon Fertilizer Distribution
March 18, 2022

This Letter of Intent ("LOI") is issued from BioEnergy Innovations Global, Inc. a company incorporated in Missouri, that owns Terra Char[®] as a registered brand ("Terra"), to Saratoga Biochar Solutions, LLC ("SBS"), a New York limited liability company (collectively, the "Parties").

Whereas, Terra is a distributor of Terra Char, a wood biochar that it custom manufactures at wood processing facilities in Georgia, and markets to a variety of industries and farmers.

Whereas, SBS is building a Carbon Fertilizer manufacturing facility in Moreau, NY, that will generate manufacture Carbon Fertilizer, and distribute ex-works in bulk and super sacks.

Whereas, the Parties are mutually interested in developing a distribution agreement and joint venture agreement pertaining to the Carbon Fertilizer SBS produces.

The Parties anticipate entering into a distribution agreement, or other legally binding agreement, prior to the SBS facility commencing operations, which is expected to occur in early 2024. The terms of this contemplated agreement include the following.

- Terra is interested in marketing Carbon Fertilizer along-side the wood biochar that Terra currently markets to farmers.
- *Terra is interested in blending Carbon Fertilizer with TerraChar to create a new marketable product targeting environmental remediation companies. Such product must have 60% fixed carbon to comply with the upcoming NRCS program.*
- Blending is anticipated to be accomplished under a joint venture with blending operations to be organized in New York and Georgia.
- *SBS is interested in distributing to Terra and engaging in a joint venture with Terra to blend Carbon Fertilizer with TerraChar.*

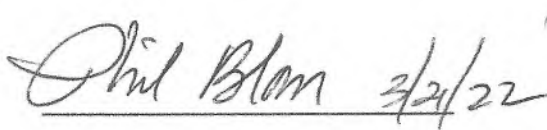
Terra intends to purchase Carbon Fertilizer irregularly throughout the year. Terra anticipates purchasing a minimum of 500 tons in the first year to service farm demonstrations in the Midwest, and a minimum of 500 tons in the first year to develop a new blend of carbon for environmental remediation applications. Pending the success of either, Terra anticipates increasing its purchases 1,000 tons per year, at a minimum, thereafter.

Terra appreciates the offered introductory pricing of \$100 per ton (based on macro-nutrient content only) received at the facility in bulk and would appreciate locking in future purchases at the same rate.

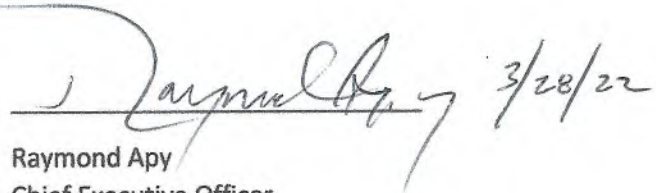
This LOI identifies current expectations and anticipated future commitments of the Parties. The Parties agree that it is not a legally binding agreement, but a precursor to a mutually agreeable legally binding agreement. This LOI shall expire on Dec. 31, 2022, or upon finalization of the intended legally binding agreement.

BioEnergy Innovations Global, Inc.

Saratoga Biochar Solutions, LLC

 3/24/22

Phil Blom
Chief Executive Officer
BioEnergy Innovations Global, Inc.
Columbia, Missouri, 65202
philblom@yahoo.com
(573) 489-8929

 3/28/22

Raymond Apy
Chief Executive Officer
Saratoga Biochar Solutions, LLC
26F Congress Street #346,
Saratoga Springs, NY 12866
rapy@northeasternbiochar.com
(518) 391-0566



ESTABLISHED 1975

58 Clifton Country Rd, Suite 200 • Clifton Park, NY 12065

May 15, 2023

Raymond Apy
26F Congress St. #346
Saratoga Springs, NY 12866

Related to BUD proposal in NYSDEC application 5-4144-00187/00001

The biosolids sources proposed by Casella for processing at the Saratoga BioChar Solutions (SBS) facility will all be biosolids sources that are already approved into Casella's Grasslands Facility in Chateaugay, NY. Casella is prepared to work cooperatively with SBS and act as an outlet for the Carbon Fertilizer produced by SBS.

As the biosolids sources are already approved into Grasslands. Additional permitting may not be required. However, if the NYSDEC requires a specific permit to accept the Carbon Fertilizer, Casella will work to obtain such an approved during the construction phase of the SBS Facility. Casella can utilize the Carbon Fertilizer product at the Grasslands facility as an amendment to the products currently produced at its Grasslands facility. The high carbon value of the Biochar can improve the handling, odor and overall fertility value of Casella's products distributed from its Grasslands facility.

Beyond that potential beneficial use, Casella would be prepared to utilize the Carbon Fertilizer as Alternate Daily Cover (ADC) at its Landfills. As ADC, Casella recognizes the potential for this high Carbon product to 1. Reduce odors and 2. Sequester carbon, making it an ideal ADC. If necessary (i.e. during review and approval as ADC), the Carbon Fertilizer product could also be disposed of at certain Casella Landfills.

Thank you,

Jeremy Tensen
Business Development Specialist
Casella Resource Solutions

APPENDIX F

AGM COMMERCIAL FERTILIZER DISTRIBUTOR APPLICATION



**APPLICATION FOR A LICENSE TO
DISTRIBUTE
COMMERCIAL FERTILIZER**

For the period ending

Pursuant to Article 10 of the Agriculture and
Markets Law

Division of Plant Industry
10B Airline Drive
Albany, New York, 12235
Phone No. (518) 453-8130
www.agriculture.ny.gov

FOR OFFICE USE ONLY

Estab No: _____
License No: _____
Date Received: _____
Received \$ _____
<input type="checkbox"/> Credit Card <input type="checkbox"/> Check <input type="checkbox"/> M.O
Receipt No. _____
Reviewed: _____ Approved: _____

LICENSE FEE

\$150.00

Make check or money order payable to the
Commissioner of NY Agriculture and Markets

1a. Business Name (If business type is individual, must be person's name)		1b. Phone No. () Fax No. ()	
		1c. Email: _____	
2. Business Location Address		City	State Zip Code
3. Business Mailing Address (if different from above)		City	State Zip Code
4. Contact person to receive mailings. Include mailing and or business address if different from above (add additional sheets if necessary)			
Contact Type (select one or more)	Name	Business Name	Address
<input type="checkbox"/> Applications <input type="checkbox"/> Licenses <input type="checkbox"/> Tonnage Reports			
<input type="checkbox"/> Applications <input type="checkbox"/> Licenses <input type="checkbox"/> Tonnage Reports			
5a. Check Business Type:		5b. State Incorporated and Date	
<input type="checkbox"/> INDIVIDUAL <input type="checkbox"/> LIMITED PARTNERSHIP <input type="checkbox"/> CORPORATION <input type="checkbox"/> GENERAL PARTNERSHIP <input type="checkbox"/> COOPERATIVE <input type="checkbox"/> LIMITED LIABILITY COMPANY (LLC)	5c. Federal ID # or SS # (if individual)*		
		5d. If no SSN or FEIN please indicate reason:	

6. Individual Owners, Members of Partnership, Officers of Corporation, Cooperative or Members of LLC must complete the following:
(Attach list if necessary):

INDIVIDUAL OWNERS, MEMBERS OF PARTNERSHIP OR OFFICERS OF A CORPORATION:	
<u>Name and Title -</u>	<u>Home Address</u>

THIS APPLICATION REQUIRES A SIGNATURE ON THE BACK TO BE PROCESSED



7. Are you a foreign or out of state individual, partnership or corporation? Yes No

By checking the box above, a foreign or out of state individual, partnership or corporation consents to personal jurisdiction in the courts of New York State in any action which may be brought by the New York State Department of Agriculture and Markets for matters relating to the requested license. The applicant also agrees to accept service of process in any such action by service of a summons and/or complaint by first class mail to the designated individual at the said address below which shall constitute good and proper service of process.

Designated individual _____ At Address _____

8. Have you or an officer, director or any stockholder exercising any position of management or control been convicted of a felony and/or misdemeanor in any court of the U.S. or any state or territory? Yes No if yes, please explain: _____

9. Do you have any facilities in New York State? Yes No

If yes, provide the Address and Type of Each Manufacturing, Blending, Bulk Storage and/or Distributing Facility in New York State. (Licensee is to inform the Director of Plant Industry of additional distribution points established during the period of the license.) If more space is needed, attach list.

Check Type - (Manf) Manufacturing, (Bld) Blending, (St) Bulk Storage, (Dist) Distributor

Manufacturing	Blending	Bulk Storage	Distributor	Facility Address

10. List the Brand and Product Name of all Commercial Fertilizer Distributed in the State of New York. **Note: A Label must be submitted with this Application for each Product.** If more space is needed, attach list.

Brand/Product	Contains Microorganisms(Yes or No)

I (We) agree to permit free entry and free access to licensed premises, buildings, and offices to the Commissioner and his agents in pursuance of the manufacture, storage, distribution, sale, and use of Commercial Fertilizer subject to the Commissioner's jurisdiction. Yes

"I understand that the statements made in this application will be accepted for all purposes as the equivalent of an Affidavit and that any false statements made herein, in addition to being the possible basis for a revocation of any license issued as a result of this application, may be punishable as a misdemeanor under the provisions of Section 210.45 of the Penal Law of the State of New York."

Individual, Firm or Corporate Name (See Note)	Date
Signature of Person Executing	Title

NOTE: (a) If applicant is individual doing business under his own name, he must sign on signature line; (b) if co-partnership is assumed name, firm name must be given and one member must sign individually on signature line; (c) if corporation, corporate name must be given in full, with an authorized officer's signature on signature line and title on title line.

*The authority to request the information contained in this document is found in Section 16 of the Agriculture and Markets Law and the specific section or sections of that Law which relate to the license, permit, certificate, approval, registration or permission which you seek. The principle purpose for which this information is collected is to enable the Department of Agriculture and Markets to determine whether or not to issue the requested license, permit, certificate, approval, registration or permission. This information will be used by the Department of Agriculture and Markets for the purpose of evaluating your application and enforcing and administering the Agriculture and Markets Law.

Disclosure of your federal social security and federal employer identification numbers by you is mandatory and is authorized by Section 5 of the Tax Law. The principle purpose for which this information is collected is to enable the Department of Taxation and Finance to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their tax liabilities and to generally identify persons affected by the Tax Law administered by the Commissioner of Taxation and Finance for administering the Tax Law and for any other purpose authorized by the Tax Law.

Should you fail to provide all the requested information and a signature, your application will not be processed.



RICHARD A. BALL
Commissioner

BUSINESS NAME: _____

BUSINESS ADDRESS: _____

CITY, STATE, ZIP: _____

EST NO: _____

**One Time Credit Card Payment Authorization Form
DO NOT FAX THIS FORM**

Sign and complete this form to authorize the NYS Department of Agriculture and Markets to make a one time debit to your credit card listed below. Please mail to the address below.

By signing this form you give us permission to debit your account for the amount indicated on or after the indicated date. This is permission for a single transaction only, and does not provide authorization for any additional unrelated debits or credits to your account.

Please complete the information below:

I, _____, authorize the NYS Department of Agriculture and Markets to charge my credit card account indicated below for \$ _____. This payment is for a:

COMMERCIAL FERTILIZER DISTRIBUTOR LICENSE

Business Name _____

Billing Address _____

Phone No _____

City _____

State _____ Zip _____

Email _____

Account Type: <input type="checkbox"/> Visa <input type="checkbox"/> Mastercard <input type="checkbox"/> AMEX <input type="checkbox"/> Discover Cardholder Name _____ Account Number _____ Expiration Date _____ CVV2 (3 digit number on back of Visa/MC/DS, 4 digits on front of AMEX) _____	FOR OFFICE USE ONLY Estab No. _____ License No. _____ Receipt No. _____ Validation No. _____
---	---

SIGNATURE _____ DATE _____

I authorize the NYS Department of Agriculture and Markets to charge the credit card indicated in this authorization form according to the terms outlined above. This payment authorization is for a Commercial Fertilizer Distributor license, for the amount indicated above only, and is valid for one time use only. I certify that I am an authorized user of this credit card.

APPENDIX G

EXAMPLE PRODUCT LABEL

6
C
Carbon

The Original

CARBON FERTILIZER™



Granular Slow-Release Bio-Fertilizer that builds Soil Carbon

CARBON FERTILIZER™

- **MADE IN USA** from recycled American organic matter, carbon, and nutrients.
- **Made from biosolids and wood wastes.** Biosolids are produced by publicly-owned treatment works. Pathogens, odors, and organic compounds are completely removed from the feedstock and utilized as renewable energy in the process.
- **Multi-use bio-fertilizer** that can be used as a stand-alone bio-fertilizer or custom mixed with other dry fertilizers to target specific nutrient levels.
- **Mixture of organic matter, carbon, and macro and micro-nutrients** designed to promote and enhance plant growth and soil health. Organic matter and carbon benefit the soil by increasing its ability to retain water and nutrients and host microbes that are essential for soil health.
- **Uses organic matter and carbon to bind nutrients (instead of corrosive salts)** to proliferate microbial life, prolong nutrient availability, and reduce nutrient and water runoff/losses; reducing application rates/requirements over time.
- **Sequesters carbon in soil where it is needed;** effectively offsetting its weight in greenhouse gas (GHG) emissions.
- **Low emission/pollution manufacturing** process that maximizes resource recovery and replaces biosolids disposal practices and chemical fertilizer production both of which are heavy GHG emitters/polluters.

4.0 – 6.5 – 0.5
Guaranteed Analysis

Total Nitrogen (N)	4.00%
Ammonia, mg/kg	<8
Nitrate, mg/kg	<3
Organic Nitrogen	4.00%
Available Phosphate (P₂O₅)	6.50%
Soluble Potash (K₂O)	0.50%
Calcium (Ca)	3.50%
Magnesium (Mg)	0.50%
Copper (Cu)	0.05%
Iron (Fe)	1.90%
Manganese (Mn)	0.05%
Nickel (Ni)	0.0010%
Sodium (Na)	0.20%
Zinc (Zn)	0.05%

From: biosolids, wood, and ammonium sulfate.

- Do not exceed 2.78lbs/1,000 sq. ft. in any single application.
- To avoid mower pickup: Apply, irrigate, let dry, and then mow.
- Use maximum setting on any granular dry fertilizer spreader.

CONDITIONS FOR SALE: The Manufacturer warrants only that product conforms to label description. Buyer and user agree to accept all liability associated with handling, use and disposal of this product.

Information regarding the contents and levels of metals in this product is available at: www.northeasternbiochar.com

Not for use in organic crop and organic food production in the State of California.

INSTRUCTIONS FOR USE

Established Turfgrass and Landscape:
Use as a bio-fertilizer for lawns and landscape biannually.

New Turfgrass, Planting and Seeding:
Incorporate into top 2-4 inches of soil prior to seeding, sodding or sprigging and landscape planting.

Commercial Agricultural Use:
Custom mix with other nutrients as desired to obtain desired nutrient loading. Apply after cutting prior crop with granular fertilizer spreader/drill.

Greenhouse Use:
Mix with other nutrients and grow media as desired to obtain desired nutrient loading and water retention.

Application Coverage Rates
For one pound of nitrogen, broadcast at a rate of 2.78lbs per 1,000sq feet (1.21kg per 93 sq. meters).

- 1cy bag (820lbs) covers 0.375 acre
- 2cy bag (1,640lbs) covers 0.75 acre
- 1ton covers 1.83 acres

Application Guidelines

- Apply when air temperatures are under 90°F
- Irrigate after application
- Do not apply when temperature plus humidity exceed 175°F

Storage and Use

- Store in a dry location.
- Keep bag closed and out of reach of children when not in use.



Manufactured by Saratoga Biochar Solutions, LLC

2-6 Electric Drive, Glens Falls, NY

Distributed by Northeastern Biochar Solutions, LLC

26F Congress St. #346, Saratoga Springs, NY 12866

www.northeasternbiochar.com

1 (800) 555-5555

Net Weight: 22.6 Kg (50lb)

Bulk Density: 30.4lbs/c.f.

6
C
Carbon

The Original

CARBON FERTILIZER™



Granular Slow-Release Bio-Fertilizer that builds Soil Carbon

CARBON FERTILIZER™

- **MADE IN USA** from recycled American organic matter, carbon, and nutrients.
- **Made from biosolids and wood wastes.** Biosolids are produced by publicly-owned treatment works. Pathogens, odors, and organic compounds are completely removed from the feedstock and utilized as renewable energy in the process.
- **Multi-use bio-fertilizer** that can be used as a stand-alone bio-fertilizer or custom mixed with other dry fertilizers to target specific nutrient levels.
- **Mixture of organic matter, carbon, and macro and micro-nutrients** designed to promote and enhance plant growth and soil health. Organic matter and carbon benefit the soil by increasing its ability to retain water and nutrients and host microbes that are essential for soil health.
- **Uses organic matter and carbon to bind nutrients (instead of corrosive salts)** to proliferate microbial life, prolong nutrient availability, and reduce nutrient and water runoff/losses; reducing application rates/requirements over time.
- **Sequesters carbon in soil where it is needed;** effectively offsetting its weight in greenhouse gas (GHG) emissions.
- **Low emission/pollution manufacturing** process that maximizes resource recovery and replaces biosolids disposal practices and chemical fertilizer production both of which are heavy GHG emitters/polluters.

4.0 – 6.5 – 0.5
Guaranteed Analysis

Total Nitrogen (N)	4.00%
Ammonia, mg/kg	<8
Nitrate, mg/kg	<3
Organic Nitrogen	4.00%
Available Phosphate (P₂O₅)	6.50%
Soluble Potash (K₂O)	0.50%
Calcium (Ca)	3.50%
Magnesium (Mg)	0.50%
Copper (Cu)	0.05%
Iron (Fe)	1.90%
Manganese (Mn)	0.05%
Nickel (Ni)	0.0010%
Sodium (Na)	0.20%
Zinc (Zn)	0.05%

From: biosolids, wood, and ammonium sulfate.

- Do not exceed 2.78lbs/1,000 sq. ft. in any single application.
- To avoid mower pickup: Apply, irrigate, let dry, and then mow.
- Use maximum setting on any granular dry fertilizer spreader.

CONDITIONS FOR SALE: The Manufacturer warrants only that product conforms to label description. Buyer and user agree to accept all liability associated with handling, use and disposal of this product.

Information regarding the contents and levels of metals in this product is available at: www.northeasternbiochar.com

Not for use in organic crop and organic food production in the State of California.

INSTRUCTIONS FOR USE

Established Turfgrass and Landscape:
Use as a bio-fertilizer for lawns and landscape biannually.

New Turfgrass, Planting and Seeding:
Incorporate into top 2-4 inches of soil prior to seeding, sodding or sprigging and landscape planting.

Commercial Agricultural Use:
Custom mix with other nutrients as desired to obtain desired nutrient loading. Apply after cutting prior crop with granular fertilizer spreader/drill.

Greenhouse Use:
Mix with other nutrients and grow media as desired to obtain desired nutrient loading and water retention.

Application Coverage Rates
For one pound of nitrogen, broadcast at a rate of 2.78lbs per 1,000sq feet (1.21kg per 93 sq. meters).

- 1 bag (50lbs) covers 2,000sf
- 21.75 bags (1,088lbs) covers 1 acre
- 40 bags (1ton) covers 1.83 acres

Application Guidelines

- Apply when air temperatures are under 90°F
- Irrigate after application
- Do not apply when temperature plus humidity exceed 175°F

Storage and Use

- Store in a dry location.
- Keep bag closed and out of reach of children when not in use.



Manufactured by Saratoga Biochar Solutions, LLC
2-6 Electric Drive, Glens Falls, NY

Distributed by Northeastern Biochar Solutions, LLC
26F Congress St. #346, Saratoga Springs, NY 12866

www.northeasternbiochar.com

1 (800) 555-5555

Net Weight: 22.6 Kg (50lb)

Bulk Density: 30.4lbs/c.f.

APPENDIX H

**CASE-SPECIFIC BENEFICIAL USE DETERMINATION ANNUAL
REPORT**



Case-Specific Beneficial Use Determination Annual Report

This form may be used to submit annual reports for case-specific BUDs granted pursuant to 6 NYCRR Part 360.12(d) and (e).

BUD Holder Information

BUD Holder Name

Name of Person or Organization

Contact Person

BUD Holder Address:

Contact Phone: _____ Contact Email: _____

Check if this is a change from previous information

Waste, Residual or By Product Information

BUD Information

BUD Number

Waste Information

Type of Waste, Residual or By-Product

Beneficial Use:

Brief Description of Approved Beneficial Use(s)

Annual Reporting for January 1, 2021 through December 31, 2021

Total Quantity of Material Used Pursuant to this BUD

Quantity

Units

Other Information Required for Annual Reporting Under This BUD (e.g., analytical results or locations of use – attach sheets as necessary)

Certification

(Must be completed by a responsible official)

I certify that the BUD Holder, _____, has been in compliance with the terms and conditions of BUD No. _____ during this reporting period.

NOTICE: Pursuant to ECL Section 3-0301(2)(Q): False statements made in this report are punishable pursuant to Section 210.45 of the New York State Penal Code.

Signature

Title

Date

Send completed form and any supporting attachments, **on or before March 1, 2022**, to: **Materials Management Supervisor in your DEC Region** (for help, see <http://www.dec.ny.gov/about/558.html>),

with a copy to:

Kathleen Prather, P.E.
Bureau of Solid Waste Management
Division of Materials Management
NYSDEC
625 Broadway, 9th Floor Albany, NY
12233-7260

Please contact Ms. Prather at (518) 402-8678 or benuse@dec.ny.gov if you have any questions concerning this form. Thank you for your continued cooperation in providing the above information.

APPENDIX I

AGM COMMERCIAL FERTILIZER ANNUAL REPORT

APPENDIX J

CARBON FERTILIZER™ LABORATORY REPORT

SOIL CONTROL LAB

42 HANGAR WAY
WATSONVILLE
CALIFORNIA
95076
USA

Group: Mar19B #29
Reporting Date: March 20, 2019

Date Received: 06 Mar. 19
Sample Identification: 950 F Sample
Sample ID #: 9030201 - 1/1

Nutrients				Stability Indicator:			
	Dry wt.	As Rcvd.	units	CO2 Evolution		Respirometry	
Total Nitrogen:	4.9	4.7	%	mg CO ₂ -C/g OM/day		0.73	
Ammonia (NH ₄ -N):	< 10	< 9.7	mg/kg	mg CO ₂ -C/g TS/day		0.38	
Nitrate (NO ₃ -N):	2.8	2.7	mg/kg	<i>Stability Rating</i>		<i>very stable</i>	
Org. Nitrogen (Org.-N):	4.9	4.7	%	Maturity Indicator: Cucumber Bioassay			
Phosphorus (as P ₂ O ₅):	9.7	9.4	%	Compost:Vermiculite (v:v)		1:2	
Phosphorus (P):	43000	41000	mg/kg	Emergence (%)		87	
Potassium (as K ₂ O):	0.77	0.74	%	Seedling Vigor (%)		99	
Potassium (K):	6400	6200	mg/kg	<i>Description of Plants</i>		<i>healthy</i>	
Calcium (Ca):	5.2	5.0	%	Pathogens			
Magnesium (Mg):	1.2	1.2	%	Fecal Coliform	< 7.5	MPN/g	pass
Sulfate (SO ₄ -S):	14	14	mg/kg	Salmonella	< 3	MPN/4g	pass
Boron (Total B):	17	16	mg/kg	Date Tested: 06 Mar. 19			
Moisture:	0	3.29	%	Physical Contaminants**			
Sodium (Na):	0.32	0.31	%	% by weight			
Chloride (Cl):	0.017	0.016	%	Total Plastic		< 0.1	
pH Value:	NA	7.57	unit	Film Plastic		< 0.1	
Bulk Density :	32	33	lb/cu ft	Glass		< 0.1	
Carbonates (CaCO ₃):	77	75	lb/ton	Metal		< 0.1	
Conductivity (EC5):	0.48	NA	mmhos/cm	Sharps		ND	
Organic Matter:	52.5	50.8	%	Total		< 0.5	
Organic Carbon:	36.0	35.0	%	Size Distribution			
Ash:	47.5	45.9	%	MM % by weight			
C/N Ratio	7.3	7.3	ratio	> 50		0.0	
AgIndex	> 10	> 10	ratio	25 to 50		0.0	
				16 to 25		0.0	
				9.5 to 16		0.0	
				6.3 to 9.5		0.0	
				4.0 to 6.3		0.4	
				2.0 to 4.0		11.9	
				< 2.0		87.7	
				**Greater than 4mm in size (Sharps greater than 2mm)			
Metals							
	Dry wt.	EPA Limit	units				
Aluminum (Al):	8400	-	mg/kg				
Arsenic (As):	22	41	mg/kg				
Cadmium (Cd):	1.2	39	mg/kg				
Chromium (Cr):	25	-	mg/kg				
Cobalt (Co)	6.6	-	mg/kg				
Copper (Cu):	690	1500	mg/kg				
Iron (Fe):	31000	-	mg/kg				
Lead (Pb):	38	300	mg/kg				
Manganese (Mn):	1400	-	mg/kg				
Mercury (Hg):	< 1.0	17	mg/kg				
Molybdenum (Mo):	15	75	mg/kg				
Nickel (Ni):	39	420	mg/kg				
Selenium (Se):	< 1.0	100	mg/kg				
Zinc (Zn):	1300	2800	mg/kg				

Analyst: Assaf Sadeh



*Sample was received and handled in accordance with TMECC procedures.

Account No.:
 9030201 - 1/1 - 10523
 Group: Mar19B No. 29

Date Received: 06 Mar. 19
 Sample i.d.: 950 F Sample
 Sample I.d. No.: 1/1 9030201

INTERPRETATION:

Is Your Compost Stable?

Respiration Rate 0.73 mg CO ₂ -C/ g OM/day	Biodegradation Rate of Your Pile
	++ < Stable > < Moderately Unstable > < Unstable > < High For Mulch

Is Your Compost Mature?

Ammonia/Nitrate N ratio NA Ratio	Ratio does not apply due to low concentrations of both Ammonia N and Nitrate N. VeryMature> < Mature > < Immature
Ammonia N ppm <10 mg/kg dry wt.	+ VeryMature> < Mature > < Immature
Nitrate N ppm 2.8 mg/kg dry wt.	++ < Immature > < Mature
pH value 7.57 units	+++++ < Immature > < Mature > < Immature
Cucumber Emergence 86.7 percent	+++++ < Immature > < Mature

Is Your Compost Safe Regarding Health?

Fecal Coliform < 1000 MPN/g dry wt.	+++++ < Safe > < High Fecal Coliform
Salmonella Less than 3 /4g dry wt.	+++++ <Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
Metals US EPA 503 Pass dry wt.	+++++ <All Metals Pass > < One or more Metals Fail

Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O) 15.4 Percent dry wt.	+++++ <Low > < Average > < High Nutrient Content
AgIndex (Nutrients / Sodium and Chloride Salts) 15 Ratio	((N+P2O5+K2O) / (Na + Cl)) Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
Plant Available Nitrogen (PAN) 9 lbs/ton wet wt.	Estimated release for first season +++++ Low Nitrogen Provider> < Average Nitrogen Provider > <High Nitrogen Provider
C/N Ratio 7.3 Ratio	+++++ < Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
Soluble Available Nutrients & Salts (EC5 w/w dw) 0.48 mmhos/cm dry wt.	++ SloRelease> < Average Nutrient Release Rate > <High Available Nutrients
Lime Content (CaCO3) 77 Lbs/ton dry wt.	+++++ < Low > < Average > < High Lime Content (as CaCO3)

What are the physical properties of your compost?

Percent Ash 47.5 Percent dry wt.	+++++ < High Organic Matter > < Average > < High Ash Content
Sieve Size % > 6.3 MM (0.25") 0.0 Percent dry wt.	+ All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

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Sample I.d. No. 1/1 9030201

INTERPRETATION:

Page two of three

Is Your Compost Stable?

Respiration Rate

0.73 Low: Good for all uses mg CO₂-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO₂ is released under optimized moisture and temperature conditions.

Is Your Compost Mature?

Ammonia:NitrateN ratio

NA NA

(Ratio does not apply due to low concentrations of both Ammonia N and Nitrate N.)

Ammonia N ppm

<10 NA

Nitrate N ppm

2.8 immature

pH value

7.57 mature

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

Cucumber Bioassay

86.7 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media.

Is Your Compost Safe Regarding Health?

Fecal Coliform

< 1000 / g dry wt.

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all other pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.

Salmonella Bacteria

Less than 3 / 4g dry wt.

Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

Metals

Pass

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem.

Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P₂O₅+K₂O)

15.4 High nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

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INTERPRETATION:

AgIndex (Nutrients/Na+Cl)

15 High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients from another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

Plant Available Nitrogen (lbs/ton)

9 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on the respiration rate, ammonia, and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during the growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied.

C/N Ratio

7.3 Indicates maturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate. If the respiration rate is too high the transfer of Nitrogen will not be controllable.

Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

0.48 Low salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of the sodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

Lime Content (lbs. per ton)

77 High lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

Physical Properties

Percent Ash

47.5 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess mineralization (old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

Particle Size % > 6.3 MM (0.25")

0.0 Suitable for all uses Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

Appendix:	
Plant Available Nitrogen (PAN) calculations:	Estimated available nutrients for use when calculating application rates
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))	lbs/ton (As Rcvd.)
X value =	
If RR < 2 then X = 0.1	Plant Available Nitrogen (PAN)
If RR =2.1 to 5 then X = 0.2	9.4
If RR =5.1 to 10 then X = 0.3	Ammonia (NH4-N)
If RR > 10 then X = 0.4	0.02
Note: If C/N ratio > 15 additional N should be applied.	Nitrate (NO3-N)
RR = Respiration rate	0.01
	Available Phosphorus (P2O5*0.64)
	119.3
	Available Potassium (K2O)
	14.9