



Giving Resources New Life®

- Headquartered in Rutland, VT
- Provide resource management services to commercial and industrial customers in 39 states
- Annual revenue of nearly \$500 million
- 1,800 employees serving 200,000 customers
- In 2012 we recovered over 890,000 tons of recyclables and organic materials
- Using landfill gas to generate enough electricity for 15,000 homes annually
- Recent awards: Climate Leadership Award, Natural Gas Vehicles for America Achievement Award, Vermont Governor's Award for Environmental Excellence

“Organics” Recycling

Nutrients, Carbon, Minerals, & Energy



PAPER MILLS



**WWTPs &
Compost Facilities**



POWER PLANTS



Landscape, Horticultural & Specialty Soil Products

Casella Organics has been the northeast's premier supplier of soil amendments since 1983. Please call us at 800-933-6474 for product analyses, pricing or to arrange for delivery. Visit us on line at www.casellaorganics.com.

Compost & Soil Amendments

Compost An excellent source of organic matter, primary and secondary nutrients and microbial life. Available throughout the northeast, our customers choose Earthlife Compost for its unique ability to immediately fortify soil and ultimately to improve the soil's long term health.

Super-Peat A blend of Sphagnum Peat and Earthlife Compost. This combination forms a unique soil amendment ideal for turf topdressing, improving gardens and planting beds and creating tee, green and divot mix blends.

Gro-Max Horticultural grade ingredients of Sphagnum Peat, Premium Compost, & Superhumus are blended to produce an ideal growing media for both small and large containers. Our Gro-Max is specially designed to provide plant roots with a growing environment that is loose and well aerated.

Superhumus A screened (<7/8") natural blend of bark and leaf matter from the Maine woods. Approved by the Maine Organic Farmers and Gardeners Association for Organic growing.

Sphagnum Peat Native Maine Sphagnum Peat with excellent texture and water holding capacity.

Wood Ash An excellent soil additive and compost amendment that balances pH, provides secondary nutrients and valuable organic matter. Minimizes compost odor and improves topsoil screening productivity.

Fertilizer

Earthlife 4-2-0 Our pelletized 4-2-0 +Iron fertilizer is a favorite for vegetable and flower gardens, lawns, trees, shrubs, and planters. The easy to use granular formula is available in bulk and convenient 40lb bags.

Mulch

Nutri-Mulch A blend of Aged Dark Bark and Earthlife Compost, Nutri-Mulch improves both soil and plant health. It's dark color and rich texture are ideal for perennials, ornamentals and around trees and shrubs.

Aged Dark Bark All natural dark bark with no wood fillers or additives. Season-long color retention and authentic look.

Erosion Control Mix™ A practical, heavy duty slope stabilizer that includes coarse bark fragments (<6") and stone (<3"). ECM filters out soil particles and protects against excessive nutrient runoff.

Specialty Products & Applications

Biofilter Media We offer more than 20 years of experience custom blending biofilter and odor control media to meet your project specifications.

Bulking Agents Casella Organics is able to supply compost facilities and soil remediation projects with consistent, year round bulking agents including Wood Ash, Woodchips, Shavings, & Sawdust.

Wetland Soil We offer a range of products well suited to wetland soils applications. Casella Organics also provides the technical knowledge and project experience needed for successful wetland construction.

Engineered Soil Casella Organics specializes in supplying consistent soil amendments for use in bioretention & rain garden areas, bioremediation, green roofs, and USGA tee, green & divot Mixes.

Casella Organics, 135 Presumpscot Street, Unit #1, Portland, ME 04103
800-933-6474, 207-781-5011, Fax 207-781-5794
www.casellaorganics.com



Agricultural Products

Liming Agents

Wood Ash An excellent soil additive and compost amendment that balances pH, provides secondary nutrients and valuable organic matter. Minimizes compost odor and improves topsoil screening productivity.

Agrocarb High quality, fine textured natural lime used to condition and enrich soils. Agrocarb quickly reacts in soil to balance pH and serve as a valuable substitute for commercial agricultural lime.

Animal Bedding

Fiberbed Fiberbed is an excellent animal bedding alternative. Our patented blend stays in place better than sawdust, and agitates well in liquid manure pits. Fiberbed provides valuable potassium, magnesium, and calcium, and significantly outperforms average manure when land applied.

Agricultural Fertilizer

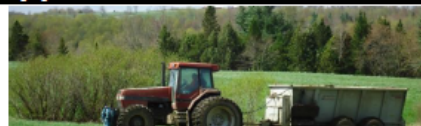
Fertilizer Our pelletized 4-2-0 +Iron fertilizer is a favorite for agriculture and sod growers. The easy to use granular formula is available in bulk and convenient 40lb bags.

Technical Services

Casella Organics provides on-site technical services including soil sampling, soil test evaluations, calculating application rates, and seed recommendations.

Spreading Equipment

To facilitate the farm spreading of our agricultural amendments, we provide spreading equipment specifically designed to efficiently and accurately apply our products. Please contact your Casella Organics representative for more information.



A Product Driven Company Since 1983

EARTHLIFE PRODUCTS

Improving Crop Yields Since 1983



Driven by the goal to create products to improve soil and plant health, we have sold over 2,500,000 cubic yards of compost under our earthlife brand; provided hundreds of thousands of tons of fertilizer and liming agents to farmers; and utilized soil products to improve thousands of acres of land. Headquartered in Portland, Maine, Casella Organics has operations located throughout New England and New York.

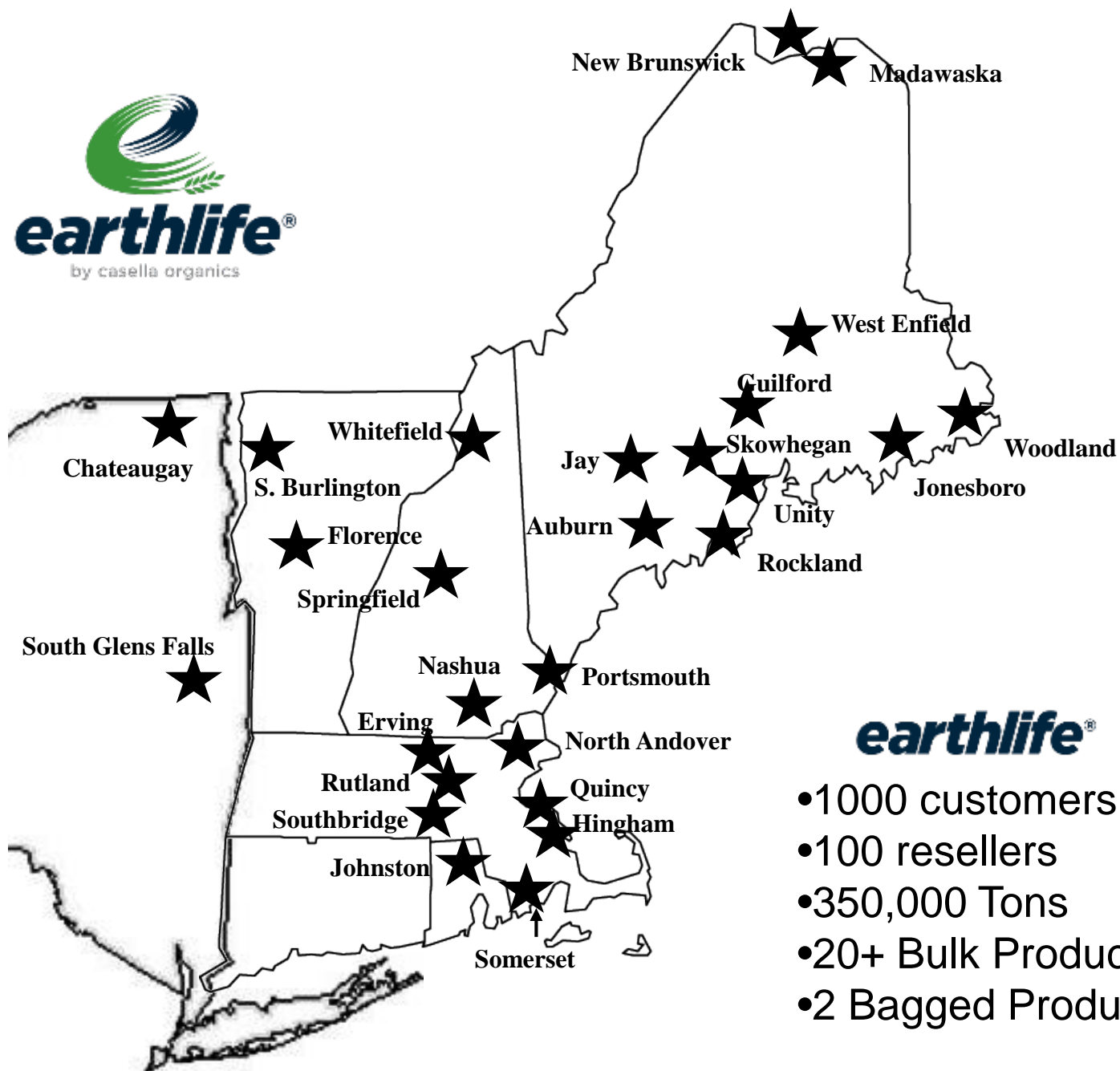
Casella Organics*
4 Chenell Drive, Suite 200
Concord, NH 03301
Tel: 603-228-6482
Fax: 603-228-2010

Casella Organics*
48 Liberty Drive, Suite A
Hermon, ME 04401
Tel: 207-948-5350
Fax: 207-862-7179

Casella Organics*
744 Main Street, Suite 16
Presque Isle, ME 04769
Tel: 207-540-1525
Fax: 207-540-1527

Casella Organics*
58 Clifton County Rd, Suite 200
Clifton Park, NY 12065
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Fax: 518-371-1590

Casella Organics, 135 Presumpscot Street, Unit #1, Portland, ME 04103
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www.casellaorganics.com



earthlife®

- 1000 customers
- 100 resellers
- 350,000 Tons
- 20+ Bulk Products
- 2 Bagged Products

Product Analyses & Use Guidelines

Updated: 4/15/15

Hawk Ridge Compost Unity, ME

"I use earthlife® compost for clients from Rockland to Kittery. My company prefers Casella Organics products for their excellent results on lawns and flowerbeds. My clients demand beautiful landscapes, earthlife® products provide the best results."

— Todd Marco
Gnome Landscaping
Falmouth, ME

National Recognitions for earthlife® Products:

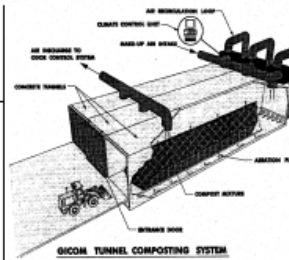
- **2009 Environmental Management System Certification
- **2004 U.S. Composter of Year
- **2001 EPA National Biosolids Exemplary Management Award
- **2000 Maine Governor's Award for Environmental Excellence
- **US Golf Association (USGA) specifications for greens & tees



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PRODUCT ANALYSES:

pH.....	7.6
Total Kjeldahl Nitrogen.....	2.2%
Organic N.....	1.4%
Total Phosphorus.....	0.7%
Total Potassium.....	0.3%
C:N ratio.....	20:1
Organic Matter.....	80.0%
Density.....	+/- 1000lbs/cy
Conductivity.....	4.5 mmhos/cm
Particle size.....	screened <3/8"

Data based on average or representative analyses.
This product is not a commercial fertilizer, and any nutrient claims are not a guaranteed analysis.

USE RECOMMENDATIONS:

- Topsoil Production:** Mix 10-30% Compost uniformly by volume.
- Sand Based Root Zone:** Mix 10-20% Compost with coarse sand by volume.
- Turf Topdressing:** Apply approximately 1/3". Brush/drag Compost into turf. Aerate turf prior to application if possible.
- Planting Beds/Gardens:** Add 10%-30% Compost to garden and shrub beds. Till compost into top 6" of soil.
- Landscape Mulch:** Apply an even layer approximately 2" deep.

PRODUCT INFORMATION

Hawk Ridge Compost is produced at the New England's largest compost facility in Unity, ME. The Hawk Ridge Compost Facility uses advanced composting technology (Gicom Tunnel) which produces compost with consistent quality, high organic content, microbial life and valuable slow-release nutrients. With over 1,000,000 cubic yards sold to garden centers, nursery owners, golf courses and athletic field managers, landscapers, and contractors, Hawk Ridge Compost is the leader in the field.

COMPOST INFORMATION:

- Compost Technology:** In-vessel Tunnel System using Gicom B.V. technology
- Compost Feed Stocks:** Sawdust, woodchips, compost & municipal biosolids.
- Classifications:** US EPA Class A, exceptional quality compost. Approved for use in ME, NH, MA, VT and CT.
- Services/Support:** On site technical assistance regarding blending ratios, application methods and seeding recommendations. Additional analyses & specifications available.

BEST PRACTICES:

Proper soil and subsoil drainage should be assured prior to determining compost, fertilizer and lime application rates. Compost application rates and soil amendment requirements are influenced by plant selection, soil/media quality, site characteristics, compost attributes and other factors. Have your soil and soil/compost blend tested by a reputable laboratory and review your test results with a trained agricultural/soil professional.

Visit us at www.casellaorganics.com.

Soil Amendment Trace Metal Comparison



Product: Hawk Ridge Compost

Updated: April 15, 2014

METAL (Part per million; dry weight basis, unless noted)	EPA STANDARD ¹	ME DEP STANDARD ²	HAWK RIDGE COMPOST ³	Average US Ag Soil ⁴
ARSENIC	41	34	4.2	6.3
CADMIUM	39	10	0.7	0.3
CHROMIUM	NS	1000	11	33.0
COPPER	1500	1000	144	19.4
LEAD	300	300	15	20.1
MERCURY	17	6	0.24	0.0
MOLYBDENUM	NS	75	2.2	0.9
NICKEL	420	200	9	15.5
SELENIUM	100	100	2.02	0.4
ZINC	2800	2000	257	58.9

NS = No Standard; NA = Not Available

1. USEPA 40 CFR Part 503 Regulations, promulgated 1992
2. ME DEP - Solid Waste Regulations, Chapter 419, Table 419.3, promulgated 1999, updated 2012
3. Hawk Ridge Compost, average metals values, 2014, analyses by Maine Environmental Laboratory
4. David B. Smith et al. "Geochemical and Mineralogical Data for Soils of the Conterminous United States", USGS, 2013



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PRODUCING
& PROMOTING



QUALITY SOIL AMENDMENTS



Composting

Services: Transportation, processing and product marketing

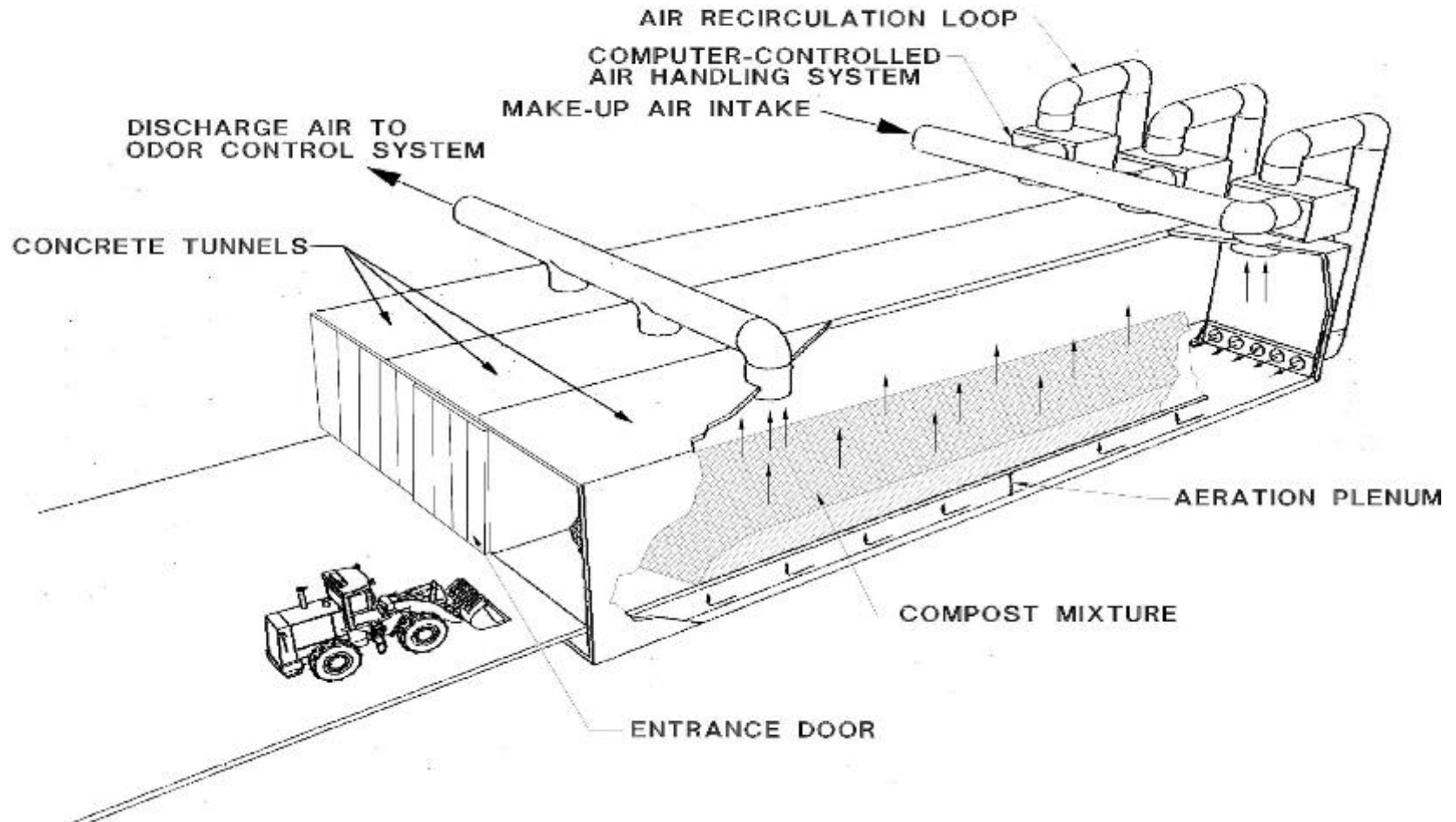
Feedstocks: Sawdust, woodchips, municipal biosolids, food waste

Technology: Gicom Tunnel

Product: Class A, EQ biosolids compost <3/8"



Hawk Ridge Compost Facility: Tunnel Technology



Alkaline Stabilization

- Services:** Transportation, processing and product marketing
- Feedstocks:** Municipal Biosolids, reactive liming agents
- Technology:** Schwing BioSet
- Product:** Fertilimer, Class A biosolids product



Markets:

Golf, Athletic Fields, Lawns, Greenhouse, Garden Center, Landscape, & Consumer

Products:

Compost

Mulch

Container Media

Topsoil Amendment

Wetlands

Roof Top Gardens

Bioretention Cells

Biofilter Media

Speciality Soils





GOLF COURSES GREEN UP WITH Earthlife™ PRODUCTS



- Tee & Green Root Zone Bleeds
- Divot Mixes
- Topdressing
- Hard to Grow Areas
- Planting Amendments
- Mulch



Course	Location	Course	Location
Atkinson Country Club	Atkinson, NH	Northeast Harbor GC	Northeast Harbor, ME
Ballyneade Country Club	North Falmouth, MA	Pleasant Valley CC	Sutton, MA
Bath Country Club	Bath, ME	Point Sebago Resort	Casco, ME
Biddeford-Saco Golf Club	Saco, ME	Pole Valley Players Club	Hartford, NY
Breakfast Hill Golf Club	Greenland, NH	Province Lake CC	East Wakefield, NH
Butterbrook Crossing	Westford, MA	Quail Ridge Golf Course	Acton, ME
Cape Ann Golf Club	Kennebunkport, ME	Quarry Hills Golf Course	Quincy, MA
Cedar Springs Golf Course	Albion, ME	Riverside Golf Course	Portland, ME
Cobbossee Colony	Monmouth, ME	Sable Oaks Golf Club	So. Portland, ME
Cold Spring Golf Course	Belchertown, MA	Samoset Resort	Rockport, ME
Deep Brook Golf Club	Saco, ME	Scottish Meadows	Warren, MA
Deeryfield Country Club	Manchester, NH	Sebasco Harbor Resort	Sebasco, ME
Eastman Golf Links	Granham, NH	Sugarloaf/USA Golf Club	Carrabassett, ME
Essex County Club	Manchester, MA	Sunday River Golf Course	Bethel, ME
Felt Brook Golf Course	Holden, ME	Tara Fennecott CC	Danvers, MA
Falmouth Country Club	Falmouth, ME	Tedesco Country Club	Marblehead, MA
Freeport Country Club	Freeport, ME	TPC of Boston	Norton, MA
Granham Country Club	Granham, NH	Turner Brook CC	Bloomfield, CT
Hidden Valley Golf Course	Deery, NH	Turner Highlands Course	North Turner, ME
Lake of Isles Golf Club	North Stonington, CT	Turner Hill Golf Club	Ipswich, MA
Lake Winnepesaukee Resort	Wolfboro, NH	Waukeeka Golf Course	Williamstown, MA
Lakewood Golf Course	Madison, ME	Waverly Oaks Golf Club	Plymouth, MA
Ledges Golf Course	York, ME	Wavenook Country Club	Dana'scotts, ME
Louden Country Club	Louden, NH	Webbhamet Golf Club	Kennebunk, ME
Mt Snow Golf Course	Mt Snow, VT	Westerly Winds	Westbrook, ME
Nattans Golf Course	Vassalboro, ME	York Golf & Tennis Club	York, ME

Earthlife Products Distributed by...

Casella Organics
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Builds and Maintains Athletic Fields



Location	Site	Location	Site
Acton/Boxborough, MA	Acton Athletic Fields	Lewiston, ME	Strawberry Fields
Arlington, MA	Reed's Brook Park	Medford, MA	Medford Athletic Field
Ashburnham, MA	Ashburnham Athletic Fields	Manchester, NH	Silver Family Park
Bath, ME	Bath Recreation Fields	Medway, MA	Medway High School
Belfast, ME	Robinson School	Naples, ME	Lake Region HS
Berwick, ME	Noble High School	Newcastle, ME	Lincoln Academy
Biddeford, ME	Biddeford Middle School	Newport, ME	Newport Athletic Fields
Bridgton, ME	Bridgton Elementary	New Sharon, ME	New Sharon Rec. Fields
Bristol, ME	Pemquid Park	North Berwick, ME	North Berwick Soccer field
Brunswick, ME	Bowdoin College	North Kingston, RI	Ryan Park
Brunswick, ME	Brunswick High School	North Yarmouth, ME	N. Yarmouth Academy
Buxton, ME	Miles Lane Fields	Pelham, NH	Pelham High School
Buxton, ME	Bonney Eagle MS	Pelham, ME	Pelham High School
Cumbehead, ME	Cumberland Athletic Fields	Portland, ME	Portland Community Fields
Camden, ME	Camden-Rockport HS	Quechee, VT	Ottumquee School
Casco, ME	Camp Laurel South	Riverston School	Riverston School
Dorchester, MA	Hemenway Park	Reidfield, ME	Kent's Hill School
Dorchester, MA	Pope John Paul Park	Rockport, ME	Recreation Complex
Durham, MA	Univ. of New Hampshire	Saco, ME	Little League
Dover-Foxcroft, ME	Foxcroft Academy	Salem, NH	Salem Elementary School
Farfield, ME	Farfield Field Complex	Shrewsbury, MA	Shrewsbury High School
Farmington, ME	Farmington High School	Standish, ME	Standish Elementary School
Farmington, ME	University of Farmington	Sanford, ME	Sanford Athletic Fields
Fayette, ME	Camp Winnebago	Stonington, ME	Deer Island School
Freeport, ME	Freeport Town Rec. Fields	South Paris, ME	Oxford Hills HS
St. George, ME	St. George Community fields	Sudbury, MA	Sudbury School Fields
Gorham, ME	Gorham Youth Soccer	Unity, ME	Unity Recreation Complex
Gorham, ME	Gorham Middle School	Walham, MA	Brandeis University
Gray, ME	Gray Athletic Field	Waterville, ME	Moosehead High School
Hanover, NH	Dartmouth College	Waterville, ME	Bates College
Harrison, ME	Harrison Elementary School	Waterville, ME	Waterville High School
Harpwell, ME	Harpwell Community Field	Waterville, ME	Waterville Youth Alliance
Hartford, ME	Camp Weekela	Westbrook, ME	Westbrook High School
Holderness, NH	Rockywood Deep Haven Camp	Weymouth, MA	Weymouth High School
Jonesport, ME	Jonesport Elementary School	White River Jct., VT	Dotban Brook School
Keene, NH	Keene High School	Westwood, MA	Westwood Athletic Fields
Kennebunk, ME	Kennebunk Athletic Fields	Windham, ME	Windham High School
Lewiston, ME	Bates College	Worcester, MA	Worcester Varsity School

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Large Scale Projects



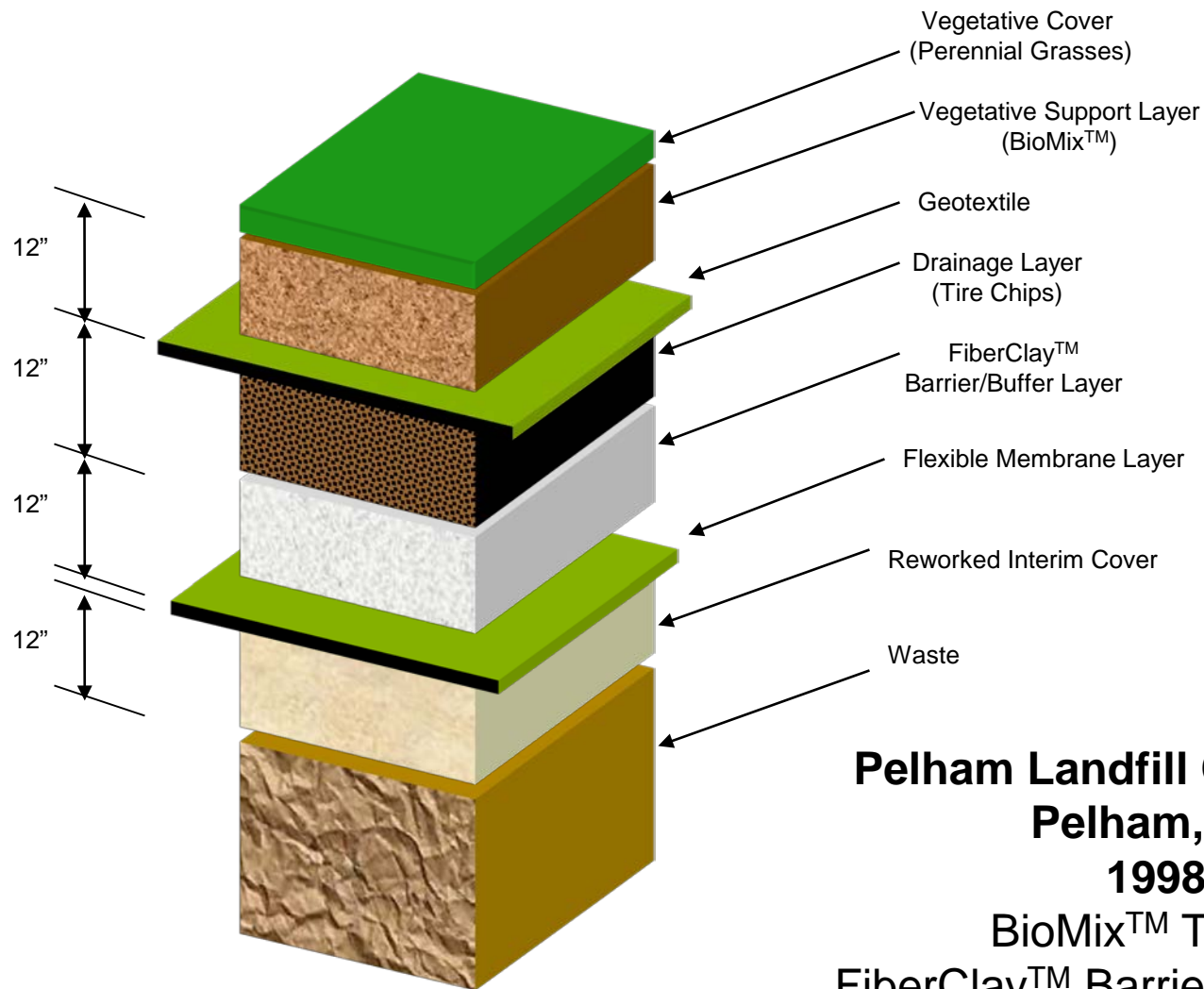
Site Restoration



Agriculture



Landfill and Site Closure Work



Pelham Landfill Cap System
Pelham, NH
1998
BioMix™ Topsoil
FiberClay™ Barrier/Buffer Layer

Vegetative Support Layer



Landfill Barrier Layer



- Engineers
- Agronomist
- Crop Advisors
- Marketing/Sales
- Project Managers
- Permitting/Compliance
- Business Development





Healthy Soils = Healthy Environment



Spectacle Island Facts

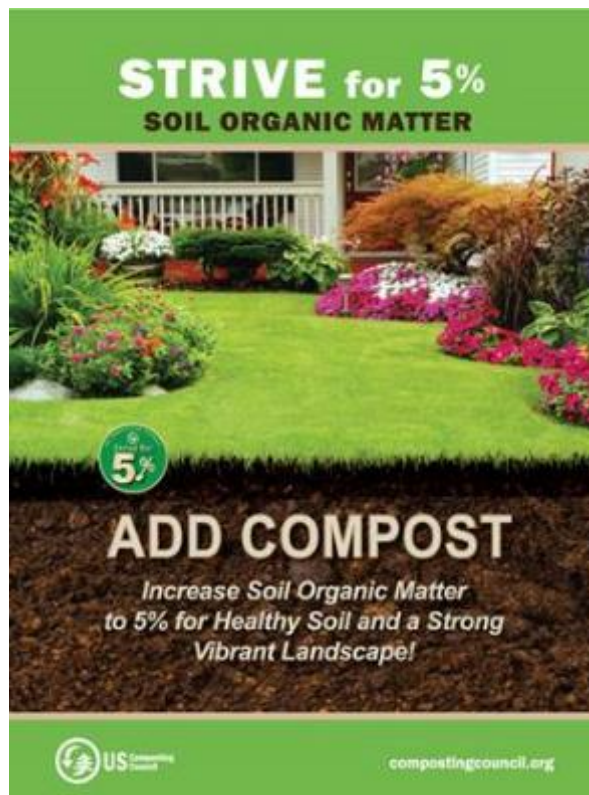
>6% OM

12" soil

50k+ cys compost

200k+ cys final soil

Organic Matter = Healthy Soils



1. Compost improves soil structure and porosity
2. Compost increases moisture infiltration and permeability
3. Compost supplies organic matter.
4. Compost allows plants to more effectively utilize nutrients.
5. Compost supplies beneficial microorganisms to soils

Acton, MA Water Department



Robbins Mill, Pulte Homes,
\$850k+

Water Ban = No Irrigation.

Jane Ceraso, Env.Manager,
Acton, MA required:


6" soil with 10% OM

Acton, MA Water Department

Possible water conservation techniques for new developments/upgraded services that fall under Water Impact Report regulation.

Outdoor Conservation Action	Est. water savings/yr for avg. 4 person household
Natural Lawn and landscape (no supplemental irrigation)	81,600 gallons*
Utilize captured rainwater for irrigation needs	Depends
Drip irrigation only	Depends
Maximum total turf area of 4,000 sq. ft. (approx. 1/10 acre)	48,960 gallons*
Minimum 6 inches 10% organic soil added to landscaped/turf areas	Depends
Fix all outdoor leaks (does not apply to new developments)	Depends
Use pool cover	400 gallons
Devices to increase efficiency of irrigation system	Depends
Indoor Conservation Action	
Replace all old toilets with ultra-low flow toilets (1.6 gpf) (does not apply to new developments)	Depends

Denver, Colorado Water Department

 **DENVER WATER**

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Conservation

- Use Only What You Need
- Tips & Tools
- Your Water Consumption History
- Water Use Rules & Regulations
- Rebates
- Single-Family Residential Audits
- Commercial and Multifamily Services
- Conservation Plan
- WaterSense
- Soil Amendment Program**
 - Compost Classifications
 - Approved Product List
- Remodel Your Yard
- Weather Reporting
- Resource Links

Home → Conservation → Soil Amendment Program

Soil Amendment Program

Before a newly constructed premise may be landscaped, property owners must amend their soil with [compost](#) so the soil more efficiently retains water. This rule applies to all new residential, commercial, government and industrial properties within Denver Water's service area.

> Importance of Soil Amendment

> To Pass a Soil Amendment Inspection

> Schedule a Soil Amendment Inspection

Provide documentation (invoice or load ticket) of soil amendment product, and a plot survey map with square footage of the amended area for inspection purposes. The load ticket must include the type of soil amendment product, and the address(es) it will be applied to.

Inspection/approval will be arranged once documentation has been received and product approved. Documentation may be:

- Emailed — customercare@denverwater.org
- Faxed — 303-628-6190 (indicate soil amendment)

You will be notified of inspection approval status by phone or email. All properties are subject to spot inspections.

If the property is served by a master meter distributor, the distributor's representative will be notified whether the property has passed or failed via email within the next business day.

> Winter Extension

> Phased Projects

For more information:

Soil amendment: 303-893-2444 or customercare@denverwater.org
Tap issues: 303-628-6100
Meter set/inspection: 303-628-6145

Improving Soil Biology



Compost Foodweb Analysis

Report prepared for:

Casella Organics
John Kelly
135 Presumpscot St.
Portland, ME 04103 USA
(207) 781-5794
john.kelly@casella.com

Report Sent:

Sample#: 03-009488 | Submission: 03-004231
Unique ID: Premium Compost N
Plant:
Invoice Number: 0
Sample Received: 11/27/2012

For interpretation of this report please contact:

Local Advisor: or regional lab
Soil Foodweb New York
soilfoodwebny@aol.co
631-750-1553

Consulting fees may apply

Organism Biomass Data	Dry Weight	Active Bacterial (µg/g)	Total Bacterial (µg/g)	Active Fungal (µg/g)	Total Fungal (µg/g)	Hyphal Diameter (µm)	Nematodes per Gram of Soil Identification to genus		
Results	0.40	62.5	1205	23.9	947	3	Bacterial Feeders Acroboloides Cuticularia Plectus Fungal Feeders Eudorytismus		0.38 0.72 0.27 0.15
Comments	Too Wet	Excellent	Good	Good	Excellent				
Expected Range	Low	0.45	15	100	15	100			
	High	0.85	25	3000	25	300			
	Protozoa			Total Nematodes #/g	Percent Mycorrhizal Colonization				
	Flagellates	Numbers/g Amoebae	Ciliates		ENDO	ECTO			
Results	14234	11394	143	3.76	Not Ordered	Not Ordered			
Comments	High	High	High	Low					
Expected Range	Low	10000	10000	50	20				
	High		100	30					
Organism Biomass Ratios	Total Fungal to Total Bacterial	Active to Total Fungal	Active to Total Bacterial	Active Fungal to Active Bacterial	Plant Available N Supply (lbs/acre)				
Results	0.79	0.03	0.05	0.38	100-150				
Comments	Good	Good	Good	Low					
Expected Range	Low	0.75	0.01	0.01	0.75				
	High	1.5	0.1	0.1	1.5				

1645 Washington Ave. Bohemia, NY 11716 USA
631-750-1553 | soilfoodwebny@aol.com
www.soilfoodweb.com

03-009488: Page 1 of 2

Creating Better Specifications

100 cubic yards of compost shall be applied, and uniformly incorporated into the top 6 inches of Planting Area A.

[Home](#)

Getting to the root of urban tree health

December 11, 2015

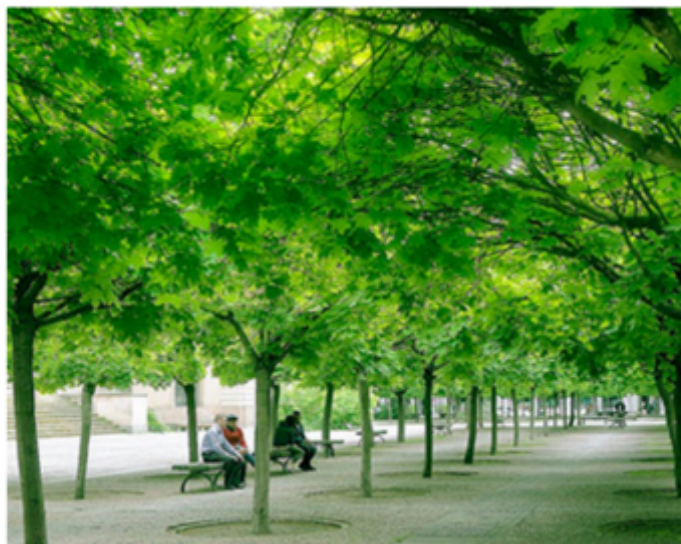
By Erik Ness

Politicians are always looking for babies to kiss. They love easy gestures like ribbon cuttings and hearty handshakes and, since at least 1872, tree planting.

In that year, the first Arbor Day in the United States was held in Nebraska City, NE. An estimated one million trees were planted that day across the state. There were grand parades.

Tree planting is also in vogue in American cities today. The U.S. Conference of Mayors has taken an activist stand on climate change, and tree planting is an easy and non-controversial way to further the green agenda. All 10 of the largest cities in the United States have some kind of effort to increase tree cover. Ambitious "million tree" initiatives have even launched in a few larger metro areas; Sacramento's goal is to plant five million.

Trees are popular and can provide extraordinary benefits to life in the city. They trap stormwater and provide cooling as they transpire. They generate oxygen, remove pollutants from the air, and provide habitat for birds and many other critters. They help save energy and even prolong the life of asphalt. A recent estimate puts the economic value of trees in the Chicago area alone at \$51.2 billion.



DL News

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Healthy soils, healthy trees

Trees fall because of accidents, vandalism, or disease. They can be improperly planted, poorly chosen and placed, and not adequately nurtured during establishment. They can be staked too long, or not long enough. Heat and drought stress take their toll. All of these things can matter, but Scharenbroch is on a mission to upgrade the soil.

The problem of urban soil is fairly simple: it's often barely soil at all. The first thing city builders do is to remove it or modify it. They need something with minimal organic matter, a substance that can support a building or a road: gravel, rock, sand, and mineral soil. Even if it's not taken away, the soil is often diluted, contaminated, or compacted to the point where it cannot function. In essence, it is dead—a ghost of the living system that constitutes healthy soil.

Scharenbroch's fascination with the health and growth of urban trees began when he was still an undergraduate. He recognized that tree health and growth might be strongly tied to urban soil condition. "It's really important that we get in and fix the soil properties early to maximize the value of these trees," he says. Yet he found little practical support in the literature.

After graduate training, he landed at The Morton Arboretum in Chicago. The city has been an incubator for the urban forestry movement, and the Arboretum has prioritized work in soils. Eventually, he met Lakhwinder Hundal, chief soil scientist at the Metropolitan Water Reclamation District of Greater Chicago, which operates the world's largest wastewater facility. Hundal is charged with finding new and improved uses for its annual output of approximately 180,000 dry tons of biosolids every year—the nutrient-laden organic materials produced at the far end of your toilet.

Biosolids are invaluable raw materials, but in decades past, it was not uncommon for them to have been landfilled or incinerated. In the last few decades, many large cities have developed a robust market in biosolids, treating them and then selling them for spreading on agricultural fields. Biosolids have an understandable image problem, and sometimes raise safety concerns: they can be contaminated by heavy metals, microorganisms, and, increasingly, trace pharmaceuticals.

Yet the business is now fairly mature, and farmers could probably use everything produced by America's sewage treatment infrastructure. But transporting biosolids is costly, and finding a use for them closer to home could save the city in both transportation and material costs.

In 2010, with funding from the Tree Research and Education Endowment Fund, Scharenbroch set up 180 plots with five different tree species and a half dozen different soil treatments, ranging from standard commercial fertilizers to compost tea, wood chips, and biosolids. All treatments proved better than nothing, but biosolids were the clear winner: those trees grew bigger and faster. Their soil was richer in carbon, nitrogen, and phosphorus. "We've established that biosolids do increase tree growth and do improve soil quality," Scharenbroch says. "We can help to get these trees established by getting them to grow faster."

Continue reading this [story](#) in the December 2015 issue of CSA News magazine.

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