Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-293

Proposal Title: Building Soil Health with Compost Top-Dressing in Communities

Project Manager Information

Name: David Bauer

Organization: Minnesota Composting Council

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Project Basic Information

Project Summary: Eleven community partners will build soil health through compost top-dressing on four half-acre sites for three consecutive years and test the soil for
improvements in soil health and

Funds Requested: $699,000

Proposed Project Completion: December 31, 2027

LCCMR Funding Category: Air Quality, Climate Change, and Renewable Energy (E)

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Urban soils tend to be degraded by construction and use. They tend to have poor soil health. Poor soil health results in lack of soil biology, lack of fertility, decreased organic matter, and difficulty establishing and maintaining vegetation of both native plantings and turf. These factors lead to increased fertilizer and irrigation costs in neighborhoods that can afford it, and brown areas in areas that cannot.

Greenhouse gas emissions are well-documented in their contribution to climate change. Climate change brings Minnesota higher temperatures, more extreme storms, and flooding according to the Minnesota Pollution Control Agency (MPCA). This results in ecosystem shifts, increased crop and home insurance, and changes in recreation. In the past 50 years, Minnesota lakes have lost an average of 10-14 days of ice cover, affecting lake quality, fish health, and shortening the ice fishing season.

Finally, the MPCA states that nearly two-thirds of landfill waste and garbage incinerator waste in Minnesota could have been recycled, reused, or composted. These wasted resources contribute significantly to greenhouse gas emissions. Diverting organic waste back into the soil prevents the generation of powerful greenhouse gases and returns nutrients. As Minnesota runs out of landfill space, new landfills are created.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Compost top-dressing will be used to improve soil health, increase climate resilience, and sequester carbon. Compost helps jump-start the microbial community that cycles nutrients and builds organic matter which holds moisture in times of drought. The compost keeps soil microbes healthy, even in times of stress. Parks, boulevards, and open spaces will receive compost top-dressing in three annual half- inch applications – 36% of the project budget goes directly to compost top-dressing. Some communities will mix the compost with biochar for even more soil health benefits.

Soil testing will be used to document changes in soil health and increase understanding about where compost can create measurable differences. Two project sites per community will be monitored through soil testing, including comparisons to a control portion of each site not receiving compost. Soil fertility, organic matter, microbial respiration, and other properties will be documented.

Finally, case studies will be prepared on each project to increase awareness of the benefits of compost. This will increase demand for compost and awareness of organics collection programs. People will be inspired to direct their waste to compost instead of a landfill or incinerator. Top-dressing compost helps soil health, helps sequester carbon and is affordable to all classes.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

Soil Heath of degraded soils will be increased, and the following benefits realized:

-Sequestered Carbon
-Increased adaptation of turf to drought
-Visibly healthier plants
-Environmental equality promoted – easily including low-income neighborhoods
-Landfill/incinerated waste becomes a positive community resource
-Eighteen study sites will contribute valuable data about compost topdressing.

This will take place on 22 to 44 half-acre degraded soil sites throughout Minnesota. Most communities will use compost

top-dressing on four half-acre sites, but some will choose to use biochar and compost on just two sites. Biochar top-dressing will take place after aeration of the soil.

Activities and Milestones

Activity 1: Site Selection and Orientation

Activity Budget: $31,320

Activity Description:
Sites will be selected based on community needs, but all will be a public open space, boulevard, or park. The project is set up to accommodate four half-acre projects sites with compost, or two half-acre project sites with a compost & biochar mix. Each testing area will consist of two control plots and four compost-amended plots. The two control plots will mirror two of the compost- amended plots. The selection process has already started, with interested communities identifying their areas, as shown in the following examples:

-City of Plymouth will enhance soil health in a newly graded park.
-City of Roseville will enhance the soils along a new trail through a former industrial area.
-Washington County will enhance soils along recent road construction where the return to vegetation is sluggish.
-City of Rochester will enhance an area of open space for use as a community garden.
-Stearns Soil and Water Conservation District will enhance soils in parks of small cities.
-City of St. Louis Park will use compost to build drought resiliency on public lands.

For testing areas, six sample plots will be identified and their locations marked by GPS or landscape points.

Activity Milestones:

Description	Approximate Completion Date
Twenty two to forty two sites selected in eleven communities	August 31, 2024
Eighteen test sites selected.	September 30, 2024
Six sample plots per test site recorded by GPS and landscape points.	October 31, 2024

Activity 2: Compost or Compost-biochar Blend Top-dressing

Activity Budget: $366,612

Activity Description:
Compost derived from food and/or yard waste will be applied in a half-inch layer then lightly raked over the existing vegetation or erosion control blanket. Rainfall will push the compost into the blanket netting or existing turf, where it will breakdown and enter the soil. This will be followed with two more annual applications.

For biochar / compost applications, the turf will be aerated first, followed by raking in amendments. Rainfall will push amendments into the pores created by the aeration. The two following years will have a half-inch of compost raked in without aeration. Two truckloads of compost (about 20 cubic yards) will cover one half-acre with one half-inch of compost.

Minnesota Composting Council (MNCC) will purchase two compost spreaders to assist with applications, though this will still need touch-up by rakes. Past projects have shown that it takes one laborer about one hour to spread one cubic yard, this can be significantly improved with the proposed equipment.

Activity Milestones:

Description	Approximate Completion Date

Minnesota Compost Council Purchases Two Tow-behind Compost Spreaders	September 30, 2024
Compost or Compost-biochar Blend is top-dressed	October 31, 2024
Second application of compost is top-dressed.	October 31, 2025
Third application of compost is top-dressed	October 31, 2026

Activity 3: Soil Testing, Measurements, and Reports

Activity Budget: $301,068

Activity Description:
During site selection, six sampling plots (four receiving amendments and two as control) will be identified on each of the 18 test sites. The sample plots will be approximately 20 feet by 15 feet. Plots will be located on a mix of landscape positions, as well as a mix of vegetation management.

The week before compost is spread, soils at all six test plots will be tested to establish the initial condition. Testing will occur annually thereafter, preceding compost applications by a week. After three applications, one final data set will be collected.

Saturated hydraulic conductivity, a good indicator of water movement into soil, will be measured on site. Soil structure will be described initially and after three years. Soil samples will be sent to the University of Minnesota and Ward Labs in Keary Nebraska, where they be tested for soil fertility, organic matter, soil pH, salts, and microbial respiration.

Annual reports will summarize data. A final report of all 18 test sites will examine which sites and land uses responded best to compost top-dressing with regards to carbon sequestration and soil health. Results will be shared, and raw data will be available for use by scientists in future studies.

Activity Milestones:

Description	Approximate Completion Date
Initial Soil Tests on 18 Sites Before Compost Top-dressing	September 30, 2024
Soil Tests on 18 Sites 1 Year After 1st Application of Compost	September 30, 2025
Soil Tests on 18 Sites 1 Year After 2nd Application of Compost	September 30, 2026
Soi Tests on 18 Sites 1 Year After 3rd Application of Compost	September 30, 2027
Final Report & Raw Data Made Available	December 31, 2027

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Kevin Peterson	Washington County	Community Partner. Will enhance soils along recent road construction where the return of vegetation is sluggish.	Yes
Sonya Rippe	City of Plymouth	Community Partner. Will enhance soil health in a newly graded park.	Yes
Nathan Reinbold	Pope/Douglas Solid Waste Management	Community Partner. Will improve park and other public soils.	Yes
Ryan Johnson	City of Roseville	Community Partner. Will enhance the soils along a new trail through a former industrial area.	Yes
Lauren Jensen	City of Rochester	Community Partner. Will mix compost with biochar to enhance areas of open space for uses as community gardens and stormwater management.	Yes
Ben Knudson	Hennepin County	Community Partner. Looking at community gardens and public works projects.	Yes
Wayne Cymbaluk	Stearns SWCD	Community Partner. Will enhance soils in a City Park.	Yes
Michael Bahe	St. Louis Park	Community Partner. Will enhance drought resilience on public lands with composting.	Yes
Wade Yunker	City of Bloomington	Community Partner. Will improve soils of recent parkland construction.	Yes
Terry Jeffery	Riley Purgatory Bluff Creek Watershed District	Community Partner. Utilizing compost to enhance soil health on public lands.	Yes
John Exner	Dakota County	Community Partner. Will restore soils on city and county lands.	Yes

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

Building soil health results in a self-sustaining system that continues to renew fertility, build organic matter, and sustain life unless tilled up or otherwise disturbed. Nothing will need to be added to these soils. The raw data will be maintained by the Minnesota Composting Council and distributed to those wishing to use it for their own scientific research. Minnesota Composting Council will further utilize the data to promote the use of compost and improvement to the environment.

Project Manager and Organization Qualifications

Project Manager Name: David Bauer

Job Title: Senior Environmental Specialist

Provide description of the project manager's qualifications to manage the proposed project.

David Bauer is a senior environmental specialist at Alliant Engineering. As a Professional Soil Scientist, he assists with erosion and sediment control through education, design, and field compliance. He also assesses sites for stormwater management, focusing on water movement through the soil and identifying compacted soils, hydric soils, seasonally high water tables, and perched water tables.

The application of soil health to urban and construction environments is a passion of David's that has spanned his current job and past roles at MnDOT, Rice Creek Watershed District, and Ramsey Conservation District. He works with

others to build soil health, which increases climate resiliency of turf, carbon sequestration, and healthy plants.
David is on the executive board of the Minnesota Association of Professional Soil Scientists, has an M.S. Degree in Soil Science from the University of Minnesota, and his thesis project on stream bank erosion in the Blue Earth River has been cited in over 100 research papers. He has managed environmental commits for many projects, including the 35W expansion and reconstruction from Roseville to Blaine in the north metro, and most recently managing environmental commitments on Washington County Public Works projects.
David Bauer started a similar soil health project in Roseville, MN spreading compost with volunteers. Nicholas Vetsch soon joined him and together, the two of them created this project for LCCMR consideration.
Nick is a Professional Engineer at Stantec. He has worked extensively in stormwater engineering design, erosion control, and environmental compliance on major highway projects. Nick has further pursued a passion for soil waste management and found opportunity to combine his interests in soil science with organic waste diversion, processing, and byproduct end market development. He is currently Secretary of the Minnesota Composting Council where he contributes to grant pursuit and compost market development efforts.

Organization: Minnesota Composting Council

Organization Description:
Minnesota Composting Council (MNCC) was founded in 2013 and is a state chapter of United States Composting Council. MNCC is dedicated to the development, expansion, and promotion of the composting industry based upon sound science, principles of sustainability, and economic viability.

The organization achieves this mission by encouraging and guiding research, promoting best management practices, establishing standards, educating professionals and the public, and enhancing product quality and markets. Its members envision that composters, generators of organic residues, policy- makers, regulators, professionals, and consumers will pursue this mission.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Administrative Assistant		Manages financial distributions to community partners			0%	0.08		$5,000
							Sub Total	**$5,000**
Contracts and Services								
Washington County Field Staff	Sub award	Washington County Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
City of Plymouth Field Staff	Sub award	City of Plymouth Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
Pope/Douglas Solid Waste Management Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
City of Roseville Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
City of Rochester Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
Hennepin County Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
Stearns SWCD Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000

City of St. Louis Park Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
City of Bloomington Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
Riley Purgatory Bluff Creek Watershed District Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
Dakota County Field Staff	Sub award	Field Staff will visit sites for initial planning, three compost applications, and four soil testing sessions over four years to represent their organization's interests.				0.04		$8,000
Professional Soil Scientist or Professional Engineer	Professional or Technical Service Contract	Professional Soil Scientist or Professional Engineer will oversee Community Partner's implementation of the project, analyze soil test results, and write annual / final reports about soil health and carbon sequestration.				0.4		$138,210
Central Minnesota Soil Tech	Professional or Technical Service Contract	The soil tech will oversee compost amendments, collect and mail soil samples, conduct saturated hydraulic conductivity tests, describe soil color and structure, assess vegetation, and troubleshoot field problems in Pope, Dougles, and Stearns Counties.				0.4		$23,564
West Metro Soil Tech	Professional or Technical Service Contract	The soil tech will oversee compost amendments, collect and mail soil samples, conduct saturated hydraulic conductivity tests, describe soil color and structure, assess vegetation, and troubleshoot field problems in Hennepin County.				1		$58,910
East Metro Soil Tech	Professional or Technical Service Contract	The soil tech will oversee compost amendments, collect and mail soil samples, conduct saturated hydraulic conductivity tests, describe soil color and structure, assess vegetation, and troubleshoot field problems in Washington, Ramsey, and Dakota Counties.				0.6		$35,346
SE Minnesota Soil Tech	Professional or Technical	The soil tech will oversee compost amendments, collect and mail soil samples, conduct saturated hydraulic conductivity tests, describe soil color and				0.2		$11,782

	Service Contract	structure, assess vegetation, and troubleshoot field problems in Olmsted County						
Compost Spreading Contractors	Professional or Technical Service Contract	Provides labor and equipment to spread compost on the land to a depth of 1/4-inch in most projects. Contract will likely be spread between 11 communities.				0.08		$40,117
Ward Labs	Professional or Technical Service Contract	Ward Labs will run tests on soil samples, including microbial respiration, fertility, pH, salts, and organic matter.				0.4		$24,624
University of Minnesota Soil Testing Lab	Professional or Technical Service Contract	Soil testing lab will run tests on soil samples, including fertility, pH, salts, and organic matter.				0.2		$11,664
							Sub Total	**$432,217**
Equipment, Tools, and Supplies								
	Equipment	Two Tow-behind Compost Spreaders	For partners to use to make compost top-dressing easier and less expensive.					$40,000
	Tools and Supplies	2160 CY of MnDOT Type 2 compost, 1/4-inch screen	Screened compost for top-dressing to amend degraded soils. Includes transport costs. To be spread on up to 22 to 44 half-acre sites to a depth of 1/2-inch annually for three years.					$194,283
							Sub Total	**$234,283**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
							Sub Total	**-**

Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Printing	Signs, displays, and hand outs	Each of 11 partner communities will use $2500 to create their own signage, displays, or handouts to describe enhancing soil health with compost.					$27,500
							Sub Total	**$27,500**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$699,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**-**

Attachments

Required Attachments

Visual Component

File: 31bc08b4-e9a.pdf

Alternate Text for Visual Component

It is a map of Minnesota Counties with project partner general locations. These counties are shaded, listing them from west to east: Douglas, Pope, Stearns, Hennepin, Dakota, Washington, and Olmsted Counties. The map was created by Stantec....

Financial Capacity

File: a08608cc-eb5.pdf

Board Resolution or Letter

Title	File
LCCMR ENRTF Proposal Submission Authorization	cdf45291-ccb.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

No

Does your project include the design, construction, or renovation of a building, trail, campground, or other capital asset costing $10,000 or more?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services, as defined in Minnesota Statutes section 299C.61 Subd.7?

No