Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)

Project Title: **ENRTF ID: 258-FH**

Comprehensive Environmental Building Site Design Using GIS Mapping

Category: H. Proposals seeking $200,000 or less in funding

Sub-Category: F. Methods to Protect, Restore, and Enhance Land, Water, and Habitat

Total Project Budget: $ 195,000

Proposed Project Time Period for the Funding Requested: June 30, 2022 (2 yrs)

Summary:

This web-based tool would quickly provide in-depth site information, streamlining compliance with existing environmental regulations and allowing designers and owners to develop and operate sites which better support ecological networks.

Name: Patrick Smith

Sponsoring Organization: U of MN

Job Title: Senior Research Fellow

Department: Center for Sustainable Building Research, College of Design

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Location:

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

The image shows a mockup of the tool that this project would develop; specifically an aerial view of a project site with output site information and local ecological considerations displayed.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____%

PROJECT TITLE:
Comprehensive Environmental Building Site Design Using GIS Mapping

I. PROJECT STATEMENT

Detailed information exists which is useful for ecologically appropriate site development, but it is dispersed among many separate data sources. Because compiling this information is challenging and time-intensive most building projects fail to benefit from these resources. The goal of this project is to develop a web-based tool that would summarize this information and present it in a useful format for designers, owners and other relevant parties, allowing a rapid understanding of the context of a site in plant, animal, human, soil, and water networks while eliminating the need to manually navigate a challenging array of data sources. This improved understanding of a project site would enable better protection of Minnesota ecological resources by revealing site-specific opportunities. Additionally this tool would streamline compliance with existing environmental site design criteria, including the B3 Guidelines, and would provide information useful for completion of the Environmental Assessment Worksheet.

The criteria used to guide development will be derived from the updated B3 Site & Water Guidelines. These guidelines are required for General Obligation Bond funded projects in Minnesota and were developed at the University of Minnesota in coordination with design professionals and State Agency staff. Guideline categories include: Process Management, Site & Water, Energy & Atmosphere, Indoor Environmental Quality, and Materials & Waste. The B3 Guidelines were adopted in 2004, and are updated on a rotating basis. The Site & Water guidelines were recently revised in 2018. They include a set of performance-based requirements for projects site and water resources, including the avoidance of high-value sites, providing habitat for threatened and endangered species, the enhancement of pollinator habitat, and providing connection to native plant and animal communities. The current process of compliance with these guidelines requires designers to collect information from multiple data sources related to plant, animal, soil, and water networks in order to develop appropriate and impactful site design strategies.

While the tool will facilitate compliance with five guidelines and 21 sub-guidelines it will be designed for use for in-depth and rapid site evaluation for non-B3 projects as well, including reporting data useful for completion of the Minnesota Environmental Quality Board's Environmental Assessment Worksheet (EAW), which is required for a significant number of land development projects in Minnesota.

The final phase of the project includes the presentation of this application to relevant professionals in order to increase its visibility and use in the marketplace as it will be made available free-of-charge to the public.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Develop logic and specifications for the tool based on interpretation of B3 Guidelines and the State Environmental Assessment Worksheet

Description:
Minnesota B3 Site & Water guidelines and the EAW will be used as guides to develop algorithms and specifications to implement in the mapping program. This will lay out the steps necessary to convert a disparate array of existing data into specific, site-level steps that a project developer can take to support the environmental potential of the site. For example, under B3 Guidelines, projects are required to have 75% of plant species be native to the surrounding area. The proposed tool will evaluate and integrate multiple GIS layers that characterize ecological communities to supply the user with a representative plant list.

Outcome	Completion Date
Complete set of logic arguments that codify relevant B3 Site guidelines compiled in a	December 2020

pdf document	

ENRTF BUDGET: $ 50,000

Activity 2: Compile current geospatial data sets from disparate sources and unify the formatting for use in the application
Description: Based on the data requirements identified in Activity 1, sets of geospatial (GIS) data will be compiled and prepared for use in the application. Data required for this tool are housed in various agencies and formats, such as County Biological Surveys, DNR data sets, FEMA flood plain maps, and ESRI GIS layers. This task will gather these data and prepare them in a unified format for use in the tool.

Outcome	Completion Date
Complete set of geospatial data that meets the data requirements defined in Activity 1, including references allowing future updates	July 2021

ENRTF BUDGET: $ 40,000

Activity 3: Develop and deploy mapping application, publicize its release
Description: A web-based mapping application will be developed. This application will provide guidance for specific proposed building sites. Users will define a site by drawing its border outline on a map. This will trigger the application to test the site against all criteria identified in Activity 1. If the site meets the basic suitability criteria, then data about the surrounding plant, animal, and hydrological communities will be polled to give project-specific advice to the developer regarding appropriate site development. This activity will include presentations to the design community and members of the public to encourage its use.

Outcome	Completion Date
Complete, functional, and user-friendly web based mapping application deployed to users and publicized to all B3 users and other interested parties	December 2021

ENRTF BUDGET: $ 105,000

III. PROJECT PARTNERS AND COLLABORATORS:
Partners receiving ENRTF funding:

Patrick Smith, Senior Research Fellow, Center for Sustainable Building Research, Role: Project management coordination with U Spatial, and software development

Len Kne, Associate Director, U Spatial, University of Minnesota office of the Vice President for Research, Role: Supervising the development of GIS- based mapping software

Partners NOT receiving ENRTF funding

Gordon Christofferson, Project Operations Manager, Minnesota Department of Administration, Real Estate and Construction Services, Role: B3 program support

IV. LONG-TERM IMPLEMENTATION AND FUNDING:
Ongoing maintenance and hosting of the application will be funded by an annual allocation from the B3 Guidelines budget.

V. SEE ADDITIONAL PROPOSAL COMPONENTS: A. Proposal Budget Spreadsheet, B. Visual Component, F. Project Manager Qualifications and Organization Description, Additional: Letter of Support

Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Patrick Smith
Project Title: Comprehensive Environmental Building Site Design Using GIS Mapping
Organization: Regents of the University of Minnesota, Center for Sustainable Building Research
Project Budget: $195,000
Project Length and Completion Date: 1.5 years, December 2021
Today's Date: March 14, 2019

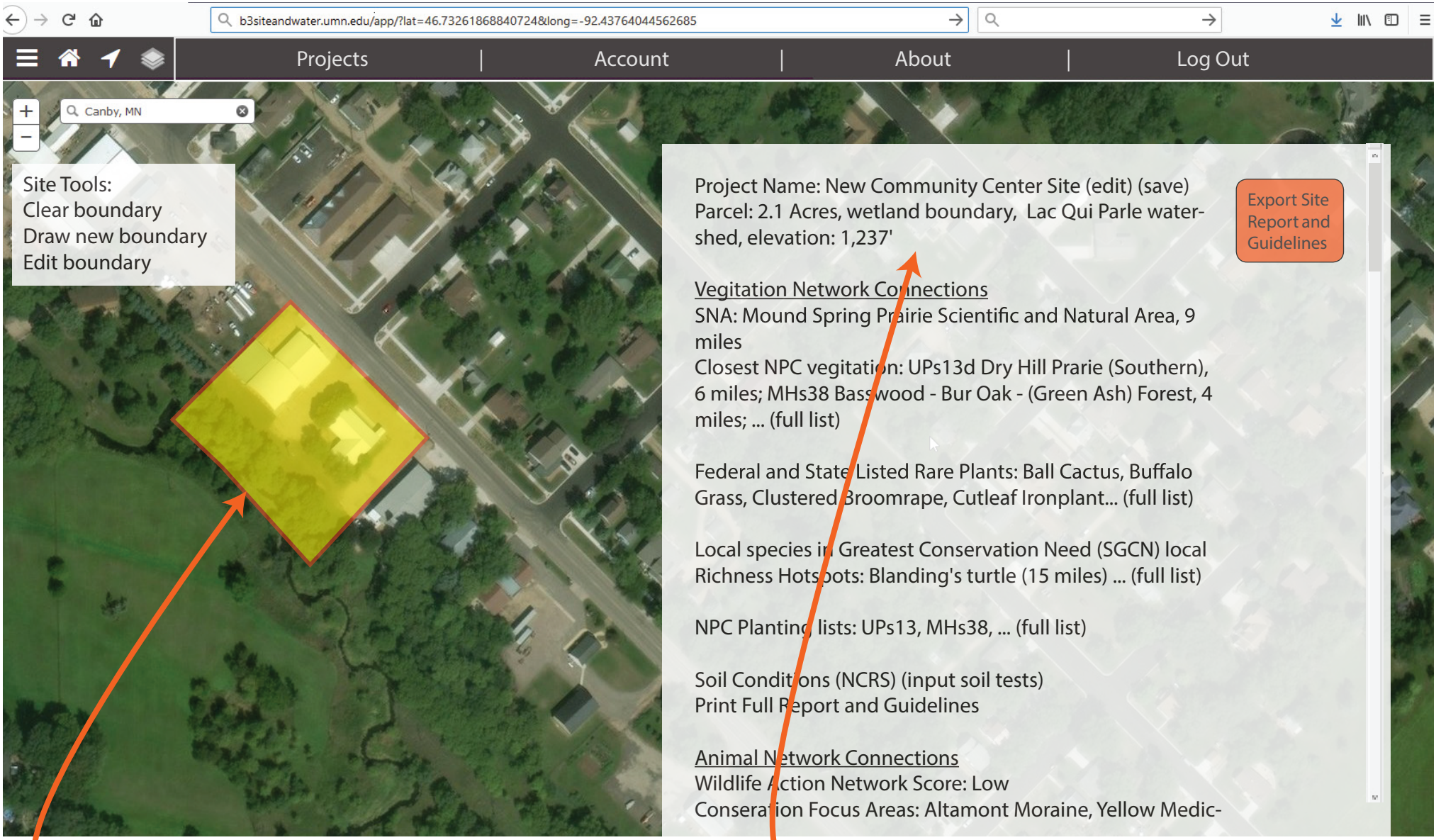
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)	$ 195,000	$ -	$ 195,000
Senior Research Fellow - 2 people, $75,000, 73.5% salary, 26.5% benefits, 22.5% FTE for 1.5 years			
Research Fellow, 1 person, 25,000, 73.5% salary, 26.5% benefits, % FTE TBD for 1.5 years			
Associate Director, 1 person, $10,000, 73.5% salary, 26.5% benefits, 4.1% FTE for 1.5 years			
Researcher 5, 1 person, 60,000, 73.5% salary, 26.5% benefits, 30.5% FTE for 1.5 years			
Undergraduate students - GIS, TBD # of people, 100% salary, 0% benefits, % FTE TBD for 1.5 years			
Professional/Technical/Service Contracts			
	$ -	$ -	$ -
Equipment/Tools/Supplies			
	$ -	$ -	$ -
Capital Expenditures Over $5,000			
	$ -	$ -	$ -
Fee Title Acquisition			
	$ -	$ -	$ -
Easement Acquisition			
	$ -	$ -	$ -
Professional Services for Acquisition			
	$ -	$ -	$ -
Printing			
	$ -	$ -	$ -
Travel expenses in Minnesota			
	$ -	$ -	$ -
Other			
	$ -	$ -	$ -
COLUMN TOTAL	$ 195,000	$ -	$ 195,000

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State: Richard Graves, CSBR Director (3% FTE for 1.5 years)	secured	$ 10,000	$ -	$ 10,000
State:		$ -	$ -	$ -
In kind: University of Minnesota unrecovered facilities and administration costs (54% of UMN costs; federal on-campus rate)	secured	$ 105,000	$ -	$ 105,000

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
		$ -	$ -	$ -

Comprehensive Environmental Building Site Design Using GIS Mapping

Mock-up of proposed tool



1. Tool user draws the site outline on a map.

2. Tool generates site-specific ecological information and design guidance based on multiple data sources.

F. Project Manager Qualifications and Organization Description

Project Manager: Patrick Smith, LEED-AP, Sr. Research Fellow

Experience and Expertise – Sustainable building guidelines program development and operation.

Patrick Smith holds a Bachelor of Arts degree with majors in Music, Mathematics and Physics from Carleton College and both a Masters in Architecture and a Masters in Science: Sustainable Design from the College of Design at the University of Minnesota. Previous to his current appointment Smith worked in precision tool manufacturing at several architecture firms in the Twin Cities area, as a graduate teaching assistant in the College of Design and as a graduate research assistant for the Center for Sustainable Building Research.

His research experience includes sustainable building policy development, utility auditing and performance evaluation, sustainable building guideline evaluation and development, sustainable building metrics, building performance benchmarking and evaluation, the implementation of life cycle analysis in green building guidelines, and writing for the Minnesota Sustainable Housing Initiative website.

He currently teaches in the undergraduate and graduate Architecture programs in the College of Design at the University of Minnesota. His current work is primarily program development and participant assistance in the B3 and Sustainable Buildings 2030 programs.

Organization Description:

The Center for Sustainable Building Research (CSBR) leads research, education, and design efforts to create a thriving future. We are a unit within the College of Design (CDES) at the University of Minnesota. Our work is founded on an ecological view of humanity and ecosystems as one unified community, and focused on living system design to discover solutions to enable designers, developers and makers of buildings and products to build the capacity, commitment and caring to regenerate the health of all living communities.

The Center for Sustainable Building Research was established in 1997 as the Building Research Group in what was then the College of Architecture and Landscape Architecture. Its founding project, The Minnesota Sustainable Design Guide preceded USGBC LEED and was the forerunner to the current Minnesota B3 Guidelines and Sustainable Buildings 2030 programs. The project set the standard and outlined the ambitious nature of the center's commitment to creating a sustainable future through innovative thinking and engagement with the building industry.