



Victoria F. Sheehan
Commissioner

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION



William Cass, P.E.
Assistant Commissioner

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Bureau of Materials & Research
September 7, 2016

Her Excellency, Governor Margaret Wood Hassan
and the Honorable Council
State House
Concord, New Hampshire 03301

REQUESTED ACTION

Authorize the Department of Transportation to execute a **sole-source** Cooperative Project Agreement with the Plymouth State University Sponsored Programs Administration (Vendor #177866), Plymouth, New Hampshire, for a total fee not to exceed \$55,000, for a cooperative investigation to assess patterns of current bicycle activity and identify potential barriers to access and participation (SPR 26962R) effective upon Governor and Council approval through June 30, 2018. 100% Federal Funds.

Funding is available as follows:

04-96-96-962015-3036	<u>FY 2017</u>
SPR Research Funds	
046-500464 General Consultants Non-Benefit	\$ 55,000.00

EXPLANATION

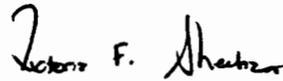
The Department is collaborating with Plymouth State University (PSU) to conduct a cooperative research study that will address several high-priority challenges and benefit the Department in preparing for a future that promotes environmental, social, and economic well-being in a growing New Hampshire. PSU is uniquely qualified to conduct this study because of their comprehensive knowledge in sustainable management of ecosystems using Geographic Information System (GIS) tools to assess the impact of land use and how human behavior creates barriers and opportunities to sustainability. As such, the proposed work does not lend itself to a selection process that includes private industry or out-of-state organizations, and it is in the Department's and the State's best interest to work directly with PSU.

This project will address several high-priority challenges including enhancing the performance and accessibility of roads for alternative modes of transportation, promoting sustainability, and increasing alternative modes of mobility by residents and tourists. The results of this study can be used to inform Road Diet strategies in which existing infrastructure can be reconfigured, at relatively low cost, to increase access to safe, alternative transportation, and alleviate traffic congestion. Moreover, the Origin to Key Destination analysis will provide information and data-driven products that may help inform Safe Routes to School project priorities.

This Agreement has been approved by the Attorney General as to form and execution. Copies of the fully executed Agreement are on file at the Secretary of State's Office and the Department of Administrative Services, and subsequent to Governor and Council approval will be on file at the Department of Transportation.

It is respectfully requested that authority be given to enter into this **sole-source** Agreement as outlined above.

Sincerely,



Victoria F. Sheehan
Commissioner

Attachments

COOPERATIVE PROJECT AGREEMENT

between the

STATE OF NEW HAMPSHIRE, Department of Transportation

and the

Plymouth State University of the UNIVERSITY SYSTEM OF NEW HAMPSHIRE

RECEIVED

SEP 7 2016

Bureau of Materials & Research
NH Department of Transportation

- A. This Cooperative Project Agreement (hereinafter "Project Agreement") is entered into by the State of New Hampshire, Department of Transportation, (hereinafter "State"), and the University System of New Hampshire, acting through Plymouth State University, (hereinafter "Campus"), for the purpose of undertaking a project of mutual interest. This Cooperative Project shall be carried out under the terms and conditions of the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002, except as may be modified herein.
- B. This Project Agreement and all obligations of the parties hereunder shall become effective on the date the Governor and Executive Council of the State of New Hampshire approve this Project Agreement ("Effective date") and shall end on 6/30/18. If the provision of services by Campus precedes the Effective date, all services performed by Campus shall be performed at the sole risk of Campus and in the event that this Project Agreement does not become effective, State shall be under no obligation to pay Campus for costs incurred or services performed; however, if this Project Agreement becomes effective, all costs incurred prior to the Effective date that would otherwise be allowable shall be paid under the terms of this Project Agreement.
- C. The work to be performed under the terms of this Project Agreement is described in the proposal identified below and attached to this document as Exhibit A, the content of which is incorporated herein as a part of this Project Agreement.

Project Title: Active Transportation Accounting: A three-pronged approach to developing metrics for project prioritization, monitoring, safety assessment, and evaluation (SPR #26962R)

- D. The Following Individuals are designated as Project Administrators. These Project Administrators shall be responsible for the business aspects of this Project Agreement and all invoices, payments, project amendments and related correspondence shall be directed to the individuals so designated.

State Project Administrator

Name: Ann Scholz
 Address: NHDOT,
 Bureau of Materials and Research
 5 Hazen Drive, P.O. Box 483
 Concord, NH 03302-0482
 Phone: 603-271-1659

Campus Project Administrator

Name: Andrew Ines
 Address: Office of Sponsored Programs
 Plymouth State University
 17 High Street, MSC 51
 Plymouth, NH 03245
 Phone: 603-535-3233

- E. The Following Individuals are designated as Project Directors. These Project Directors shall be responsible for the technical leadership and conduct of the project. All progress reports, completion reports and related correspondence shall be directed to the individuals so designated.

State Project Director

Name: Michelle Winters
 Address: NHDOT
 Bureau of Rail & Transit
 7 Hazen Drive, P.O. Box 483
 Concord, NH 03302-0483
 Phone: 603-271-2468

Campus Project Director

Name: Amy Villamagna, Ph.D.
 Address: Plymouth State University
 Center for the Environment
 17 High Street, MSC 63
 Plymouth, NH 03264
 Phone: 603-535-2177

Campus Authorized Official 
 Date 9/16

F. Total State funds in the amount of \$55,000.00 have been allotted and are available for payment of allowable costs incurred under this Project Agreement. State will not reimburse Campus for costs exceeding the amount specified in this paragraph.

Check if applicable

Campus will cost-share % of total costs during the term of this Project Agreement.

Federal funds paid to Campus under this Project Agreement are from Grant/Contract/Cooperative Agreement No. from **Federal Highway Administration** under CFDA# **20.205**. Federal regulations required to be passed through to Campus as part of this Project Agreement, and in accordance with the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002, are attached to this document as Exhibit B, the content of which is incorporated herein as a part of this Project Agreement.

G: Check if applicable

Article(s) of the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002 is/are hereby amended to read:

H. State has chosen **not to take** possession of equipment purchased under this Project Agreement.
 State has chosen **to take** possession of equipment purchased under this Project Agreement and will issue instructions for the disposition of such equipment within 90 days of the Project Agreement's end-date. Any expenses incurred by Campus in carrying out State's requested disposition will be fully reimbursed by State.

This Project Agreement and the Master Agreement constitute the entire agreement between State and Campus regarding this Cooperative Project, and supersede and replace any previously existing arrangements, oral or written; all changes herein must be made by written amendment and executed for the parties by their authorized officials.

IN WITNESS WHEREOF, the University System of New Hampshire, acting through the **Plymouth State University** and the State of New Hampshire, **Department of Transportation** have executed this Project Agreement.

By An Authorized Official of:
Plymouth State University
Name: Laurie R. Wilcox
Title: Associate Vice President for Finance & Administration
Signature and Date: *Laurie R. Wilcox* 9/1/16

By An Authorized Official of:
Department of Transportation
Name: Peter E. Starnas
Title: Director of Project Development
Signature and Date: *P. E. Starnas* 9/12/2016

By An Authorized Official of: the New Hampshire Office of the Attorney General
Name: *Dianne Martin*
Title: *AAG*
Signature and Date: *Dianne Martin* 10/6/16

By An Authorized Official of: the New Hampshire Governor & Executive Council
Name: _____
Title: _____
Signature and Date: _____

Campus Authorized Official *L.R.W.*
Date *9/1/16*

EXHIBIT A

- A. **Project Title:** Active Transportation Accounting: A three-pronged approach to developing metrics for project prioritization, monitoring, safety assessment, and evaluation (SPR Project#26962R)
- B. **Project Period:** Governor and Council Approval - March 31, 2018
- C. **Objectives:** Statement of Work

Background

New Hampshire is on a precipice of change given population growth and distribution shifts across the state; however, we have the opportunity to plan and foster increased connectivity resilience within and among communities. Significant attention should be paid to equitable investment in active transportation infrastructure to promote safety, sustainability, and protect socially vulnerable areas. Despite growing interest and momentum in enhancing active transportation, little weight is currently given to active transportation projects. NH DOT projects for infrastructure improvements are largely evaluated based on a suite of criteria that gives little recognition to the impacts of active transportation. This is largely due to the lack of sufficient data. In order to identify key areas for active transportation enhancement, to justify investment, and to measure success, it is necessary to understand where and when people are participating in active transportation (e.g. bicycling). There is an urgent need to change how bike-ped projects are evaluated. This project proposal is relevant and timely in that it has been developed with partners from the BPTAC, NH Healthy Eating Active Living program, Bike – Walk Alliance of NH, and representatives from prominent regional planning commissions (Central NH and Nashua) and leverages the momentum of a 1-year pilot project led by proposal PI, Dr. Villamagna, and research assistant housed at Plymouth State University. Likewise, it occurs during the development of NH's 10 year Transportation Improvement Plan. Moreover, this project reflects priorities at the federal level, including the Federal Highway Administration's Bicycle-Pedestrian Count Technology Pilot Project, Non-motorized Transportation Pilot Program, and the Every Day Counts Round 3 Innovations - Road Diet strategies.

Project Team: NH Dept of Transportation, Plymouth State University, Central New Hampshire Regional Planning Commission, Nashua Regional Planning Commission, New Hampshire Foundation for Healthy Communities (HEAL), and Bike Walk Alliance of New Hampshire

This project will leverage a) existing datasets (participatory mapping of facility activity through the Strava App), b) statewide on-the-ground bike-ped monitoring initiatives (conducted in partnership with the 9 regional planning commissions in NH) (Tufts et al. 2015), c) efforts to develop and apply a Level of Traffic Stress model for bicycling (CITE), and incorporate novel public participatory GIS approaches to assess patterns of current bicycle activity and identify potential barriers to access and participation. The project will consist of statewide summaries of biking activity as well as in-depth case study analyses of 4 primary NH townships, including: Plymouth, Nashua, Hanover, and Manchester. This project reflects a strong collaboration among community partners, including: NH Foundation for Healthy Living, Bike Walk Alliance of NH, Central New Hampshire & Nashua Planning Commissions, and the Bicycle-Pedestrian Technical Advisory Committee of NH DOT.

EXPECTED BENEFITS: If possible, include a statement on how the research addresses the FHWA's six high-priority highway challenges (e.g. advancing safety, enhancing performance, improving mobility, promoting sustainability, maintaining infrastructure integrity, and preparing for the future)

or is related to Every Day Counts (EDC) technologies and practices.

<http://www.fhwa.dot.gov/innovation/everydaycounts/>

This project will address several high-priority challenges including enhancing the performance and accessibility of roads for alternative modes of transportation, promoting sustainability, increasing alternative modes of mobility by residents and tourists, and preparing for a future that promotes environmental, social, and economic well-being in a growing New Hampshire. The products from this project can be used to inform Road Diet strategies in which existing infrastructure can be reconfigured, at relatively low cost, to increase access to safe, alternative transportation and alleviate traffic congestion. Moreover, the Origin to Key Destination analysis will provide information and data-driven products that may help inform Safe Routes to School project priorities.

D. Scope of Work:

Objective 1: Assess the reliability of Strava data to reflect biking activity in New Hampshire

- Summarize current patterns (2014-2015) of biking in New Hampshire over space and time using Strava.
- Develop GIS tools (ArcGIS) to calculate summary metrics for future Strava datasets.
- Compare Strava reported bike activity to manual and automated bike counts in focal areas
- Identify future manual count locations that can provide assessment of traffic flow.
- Develop a GIS tool specific to manual counts that evaluates spatial bike flows patterns at the community level for mass manual count events. This will provide a metric against which Strava and LTS analyses can be evaluated.

We will demonstrate the utility of the Strava dataset by analyzing biking patterns spatially and temporally (hourly, weekly, seasonally) by facility type (rail trail, rural road, city streets) and activity type (e.g. recreation, commuting, training). Site selection includes areas of priority to Regional Planning Commissions. Collectively, these focal areas provide a gradient of rural-urban and facility type (bike trail-rural byway) from which we will begin to identify and organize informative facility metrics to be evaluated in barrier assessments.

Objective 2: Evaluate the ability of Level of Traffic Stress to predict biking patterns and barriers to active transportation

- Apply the Level of Traffic Stress model adopted by NH DOT and Nashua RPC to Plymouth, Manchester, and Hanover-Lebanon, NH
- Compare biking patterns derived from Strava dataset to expected ridership according to LTS model.
- Utilize LTS data to confirm Strava-indicated choke points, or facility disruptions, which represent weak links in a community's chain of bicycle facilities between key origins and destinations (ie. residences to hubs of employment and services).
- Evaluate bike/ped accessibility to key community amenities and services within socially vulnerable communities using the NH Social Vulnerability Index. Identification of key service locations (hubs) will be mapped for each of the focal communities. Low stress routes identified using LTS model and compared to current Strava dataset.
- Evaluate increases in bicycling activity attributed to annual road paving. Road surface condition can influence bicycling activity, especially in New Hampshire where freeze-thaw cycles and plowing leaves roads broken and riddled with pot holes. Assess the utility of LTS model to predict increase in ridership (by means of greater use by less confident riders).

The LTS model requires road attribute data that is in part provided in NH DOT datasets as well as additional data that can be collected via satellite imagery and field collection. The LTS model will

enable us to evaluate biking connectivity on low stress streets within focal areas as well as barriers that may be affecting the flow of biking traffic and road use.

Objective 3: Evaluate perceived barriers to active transportation (e.g. safety concerns) against objective physical barriers as reflected in LTS model

- Conduct public participatory GIS surveys to map road conditions and locations of perceived barriers to biking in focal communities: Plymouth and Nashua, NH. Surveys will be administered both online through a shared web address and a call for responses as well as during community meetings (Town Hall Meetings, Planning meetings, town events, farmers markets, Parent Teacher meetings, etc). Surveys will seek to include those already engaged in active transportation as well as those not currently engaged, and various decision makers at the town, regional, and state levels. Surveys will be developed and administered through Maptionnaire, an online PPGIS research tool (<https://maptionnaire.com/>).
- Compare locations noted by respondents to LTS models and Strava data to validate physical barriers and identify barriers due to perceived threat.
- Develop a framework for assessing community-specific exposure to vehicular conflicts and hazardous conditions using NH DOT Safety Analyst assessment reports and PPGIS survey responses (Lowry et al. 2012, Callister and Lowry 2013)
- Conduct hotspot analysis of the reported barriers to prioritize community concerns and identify potential areas of reform.

To accomplish this objective we will use a combination of data derived from PPGIS efforts, Strava, LTS model, and NH DOT Safety Analyst reports. PPGIS provides an incredible opportunity to spatialize people's concerns and perceived barriers to active transportation. WE will utilize an online survey mapping tool called Maptionnaire to develop and administer a questionnaire to focal community members. Within this questionnaire environment we will ask respondents to comment on safety concerns to help develop a framework that can be used to identify hotspots of vehicular conflict. Understanding the perceived barriers to biking in New Hampshire is a critical step to identifying how and where investments in active transportation infrastructure is best allocated.

Anticipated Product(s), Change(s) or Improvements expected from the study:

The proposed project will yield a suite of products that include a conceptual framework to enhance NH DOT's capacity to accurately evaluate active transportation activity and project proposals, data-driven metrics for project prioritization and effective assessment, maps, and thematic case study assessments, and technical GIS tools to automate summary of current and future Strava datasets. These are listed more specifically below. When considered collectively we expect this project to improve active transportation accounting during project selection, monitoring, and evaluation which will ultimately lead to a more sustainable transportation network in NH.

- Framework for evaluating bike-ped activity and use of facilities
- Development of reliable and informative bikability metrics that can be integrated into NH DOT project evaluation to facility framework reform and more acknowledge of bike-ped impacts.
- Strava-based biking summaries across the state
- ArcGIS tools that will facilitate summary of biking using Strava data
- Level of Traffic Stress GIS layers for focal areas (as selected by RPCs)
- Summary of Origin-Destination analyses and LTS assessment for focal communities
- PPGIS maps of perceived barriers, conflict areas, and preferred routes

E. Deliverables Schedule:

Quarterly Reporting to submitted by the 5th of the month after the end of the quarter.

Months 1-3

- Conduct PPGIS/Surveys and synthesize results

- Identify future manual count locations (for 10/16 and 6/17)
- Apply Level of Traffic Stress to focal regions

Months 4-6

- Compare Strava to manual counts from May 2014/2015 and Sept 2014/2015
- Apply Level of Traffic Stress to focal regions
- Compare survey results of biking barriers (maps) to Strava patterns
- Evaluate biking accessibility to key community amenities using LTS model

Months 7-9

- Compare survey results of biking barriers (maps) to LTS patterns
- Evaluate increases in biking activity potentially attributed to road paving (Strava 2014 & 2015)
- Evaluate biking accessibility to key community amenities using LTS model (continued)
- Compare biking pattern observation in Strava to ridership expected by LTS

Months 10-12

- Utilize LTS data to validate Strava choke points (barriers) or faculty disruptions in focal regions
- Compare biking pattern observation in Strava to ridership expected by LTS (continued)
- Present results at Northern New England American Planning Association meeting

Months 13-16

- Finalize GIS tools for common Strava data analysis
- Finalize GIS tools for manual count - Strava comparisons
- Final summary of Strava 2015 & 2016 data
- Final report & presentation to NH TAG

F. Budget and Invoicing Instructions: Upon completion of tasks and submittal of quarterly report

Month 1-3: \$8112.50

Month 4-6: \$8112,50

Month 7-9: \$8,112.50

Month 10-12: \$8,112.50

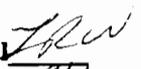
Month 13-15: \$17,050.00

Month 16: \$5,500.00 (final payment after acceptance of final report)

EXHIBIT B

This Project Agreement is funded under a Grant/Contract/Cooperative Agreement to State from the Federal sponsor specified in Project Agreement article F. All applicable requirements, regulations, provisions, terms and conditions of this Federal Grant/Contract/Cooperative Agreement are hereby adopted in full force and effect to the relationship between State and Campus, except that wherever such requirements, regulations, provisions and terms and conditions differ for INSTITUTIONS OF HIGHER EDUCATION, the appropriate requirements should be substituted (e.g., OMB Circulars A-21 and A-110, rather than OMB Circulars A-87 and A-102). References to Contractor or Recipient in the Federal language will be taken to mean Campus; references to the Government or Federal Awarding Agency will be taken to mean Government/Federal Awarding Agency or State or both, as appropriate.

Special Federal provisions are listed here: None or

Campus Authorized Official 
Date 