

MPC-473

May 9, 2015

Project Title:

Bicycle and Pedestrian Design for Rural Communities

University:

University of Wyoming

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Research Needs:

Transportation facility design is undergoing major changes across the United States as agencies struggle with finding the balance between providing for mobility and livability in their roadway design. While the American Association of State Highway Transportation Officials (AASHTO) has long been the provider of guidance and standards for roadway design in this country (AASHTO, 2014; 2012; 2011; 2004a; 2004b), the National Association of City Transportation Officials (NACTO) has recently published design guides for urban roadways and bicycle facilities (NACTO, 2012; 2013). AASHTO has responded to the increasing needs for transportation facilities to address livability issues and provide for non-motorized and transit modes have published numerous guides on Context Sensitive Solutions (CSS) (AASHTO, 2004), non-motorized facility design (AASHTO, 2004; 2012) and the recent guide for design on on-street transit facilities (AASHTO, 2014). Still, many believe the emergence of the NACTO design guides as a direct response to perceived deficiencies in the design approach promoted by AASHTO. Regardless of the reasons behind the differences, it leads to a confusing picture of differing guidelines and, some feel, competing design ideologies.

Rarely do the AASHTO and NACTO design approaches directly conflict with each, but they can lead to confusion nonetheless. For example, consider lane width guidance. The AASHTO guides suggest 12-foot lanes in most cases but consider 10- or 11-foot lanes may be “acceptable” in low speed urban situations (AASHTO, 2011). NACTO guides, on the other hand, suggest 10 foot lanes and consider 11-foot lanes only acceptable when there are large number of heavy vehicles, and even in those cases the 11-foot lanes should only be provided in the outside lane (NACTO 2012). While these two guides do not directly contradict each other, they are confusing for transportation designers in determining what is “best”.

The confusion arising from the different design guides can be compounded in the rural communities where transportation design decisions are typically handled by staff from relatively small engineering and public works departments. These departments often require their engineers to engage in many areas of public infrastructure and may not have an engineer dedicated to transportation issues, let alone staff who are current in the rapidly evolving field of non-motorized transportation design.

The AASHTO committee representation is made up of transportation officials who are responsible for the design, operation, and maintenance of state highways. AASHTO maintains a balance between urbanized and rural representation from state officials with regional diversity. NACTO's 21 member cities area also regionally diverse but are mainly larger cities with populations over 500,000 up to 8 million (NACTO, 2015). The 17 affiliate member cities are smaller but are comprised cities with populations in the 50,000 to 100,000 range. When viewed from the representation angle, the choice between different design approaches is not straightforward for rural communities. On one hand, AASHTO is primarily focused on highway facilities and may not provide enough flexibility and design options for the livability they desire, while the NACTO guides are primarily focused on large, urban areas that have much different issues than rural communities. The questions for smaller, rural communities are which design guide is best suited for their particular community and, if no single guide meets all their needs, how should the differences between guides be reconciled?

Transportation "problems" are often associated with large, heavily populated urban areas in the form of excessive congestion and delay. Because of this, much of the emphasis of transportation design in the last several decades has been on creating capacity and increasing vehicle mobility. Viewed through this lens, it is easy to feel that the rural communities do not face very significant transportation issues. A more modern approach to transportation design, operation, and maintenance now realizes to a greater extent the link between transportation facilities and overall community livability. The concept of livability can be viewed through the six USDOT livability principles (USDOT, 2013):

1. **Provide more transportation choices** to decrease household transportation costs, reduce our dependence on oil, improve air quality and promote public health.
2. **Expand location- and energy-efficient housing choices** for people of all ages, incomes, races and ethnicities to increase mobility and lower the combined cost of housing and transportation.
3. **Improve economic competitiveness of neighborhoods** by giving people reliable access to employment centers, educational opportunities, services and other basic needs.
4. **Target federal funding toward existing communities** – through transit-oriented and land recycling – to revitalize communities, reduce public works costs, and safeguard rural landscapes.
5. **Align federal policies and funding** to remove barriers to collaboration, leverage funding and increase the effectiveness of programs to plan for future growth.
6. **Enhance the unique characteristics of all communities** by investing in healthy, safe and walkable neighborhoods, whether rural, urban or suburban.

As can be seen from the list above, livability is a broad concept affected by many aspects of a community. For this research, the focus is limited to principles 1 and 6 involving transportation choices and walkable neighborhoods and the inherent connection between transportation and livability.

Research Objectives:

The objective of this research is to utilize current design guides to develop a resource focused on rural communities to aid in making design decisions about transportation facilities that address livability and provision for non-motorized modes.

Research Methods:

The first step in developing a resource guide for rural communities is compiling the information from the applicable resources that are relevant to the types of decisions typically confronting rural communities. In order to be a useful resource the aim will be not be on a comprehensive blending of all available resources, but instead try to address some of the more common situations. This research identifies three main challenges for rural communities with the existing resources. The first is that there are many solutions presented in the materials that are simply not relevant to the types of issues confronted by rural communities making it difficult to sort through the extensive material to find what is needed. The second that many of the examples illustrated in the resources are shown in a heavily urban context. Even if the examples are applicable to less urbanized areas, this is can be difficult to recognize. Concern about the applicability and stated benefits of a design solution arise when the solution is presented in a context so different from the one faced. In order to maximize the usefulness of the guide to rural agencies it may be necessary to supplement the available examples found in the existing resources with ones developed to illustrate the applicability of certain tools in a rural setting. The last challenge is providing tools for transportation officials to develop support for their proposed solution, particularly if the solution proposed is viewed as innovative or untested. By obtaining the information from a rural focused resource the solution may be viewed more favorably. The first step of this research will keep these challenges in mind when compiling the information.

The second step of the project will be to vet the draft guide with rural transportation decision makers to ensure its usefulness to the intended audience. Presentations at gatherings of rural municipal and county officials will be made to present the draft guide. In addition, one-on-one interviews with targeted rural agencies will be made to refine the guide. The last step will focus on more wide spread dissemination of the guide to its intended audience through publication of articles, presentations at national conferences, and development of workshops through the Local Technical Assistance Programs (LTAP).

Expected Outcomes:

The outcome of the project will be a resource on the use of transportation design solutions to improve livability and provision for non-motorized roads in rural communities. Developed LTAP training workshops is another expected product. The expected outcome from the resource guide and training will be increased use of new design solutions that improve livability and provision for non-motorized transportation modes.

Relevance to Strategic Goals:

The primary focus areas for this research are Rural Transportation Operations, Multimodal Policy and Investment, and Traffic Operations and Maintenance.

Educational Benefits:

Training workshops for the LTAP programs will be developed through this workshop. The results of this research will be integrated into an existing university based, graduate level transportation course.

Work Plan:

The methodology for meeting the research objective stated above is broken down in to the following tasks:

1. Compile material relevant to rural communities from existing design guides into a single document.
2. Supplement existing material as necessary to present relevant design solutions in a rural context.
3. Perform literature search to present the available research on the benefits of the presented design solutions so that the results represent rural communities.
4. Develop draft resource guide.
5. Present draft guide at conferences for municipal and county agencies to gather feedback on draft guide.
6. Conduct interviews with agencies to gather feedback on draft guide.
7. Finalize resource guide.
8. Present final resource guide at national conferences addressing rural transportation.
9. Develop and implement LTAP training workshops based on resource guide.

Project Cost:

MPC Funds Requested: \$42,767

Matching Funds: \$42,816

Total Project Cost: \$85,583

Source of Matching Funds: University of Wyoming match of faculty salary and/or teaching assistantships

TRB Keywords:

Livability, rural transportation, bicycles, pedestrians

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