2019 UDOT RESEARCH PROBLEM STATEMENT

**** Problem statement deadline is Feb. 6, 2019. Submit statements to UTRAC@utah.gov. ****

Title: Street Network Connectivity, Traffic Congestion, and Traffic Safety **No. (Office Use):** 19.05.01

Written By: Reid Ewing **Organization:** University of Utah **Email:** ewing@arch.utah.edu **Phone:** 954-895-5128

Submitted By UDOT Employee: Jordan Backman **Email:** jbackman@utah.gov **Phone:** 385-226-4255

UDOT Champion (if different): **Email:** **Phone:**

Select ONE Subject Area ☐ Materials/Pavements ☐ Maintenance ☐ Traffic Mgmt/Safety ☐ Structures/Geotech ☒ Planning ☐ Perf Mgmt/Data Analytics ☐ Public Transportation ☐ Other

1. Describe the problem to be addressed:

WFRC, UDOT, UTA, and MAG released the Utah Street Connectivity Guide in March 2017. The Guide is an excellent overview piece, but would be even more compelling if backed by local empirical research quantifying the benefits of interconnected streets. Compared to urban grids, suburban curvilinear street networks tend to increase trip distances, generate high speeds between intersections, concentrate traffic at the intersections of major roads rather than disperse traffic across the networks, and discourage walk, bike, and transit trips. Since 1990, planners and engineers have been touting the advantages of more connected and grid-like street networks. Planners in this region often point to the Avenues and Daybreak as examples of what can be achieved with more connected street networks. At least two jurisdictions in this region (Lehi and Saratoga Springs) have already adopted street connectivity standards for new developments. Yet the literature on street connectivity, to which the PI has contributed significantly, is largely theoretical and intuitive rather than empirical. The cause of street connectivity would be greatly enhanced by hard numbers on mobility and safety advantages of highly connected networks vs. curvilinear networks.

2. Write the project objective (25 words or less):

Relate congestion levels and crash rates to measures of street connectivity in the Wasatch Front neighborhoods and suggest appropriate land development code provisions to foster street connectivity.

3. Explain why this research is important:
(In response, consider addressing specific UDOT goals, applicability in Utah or other states, etc.)

Our extensive research has established that cities and states cannot pave their way out of congestion by building more freeways and arterials. This is due to highway-induced traffic and highway induced development. Cities and states also cannot *plan* their way out of congestion by either concentrating development in centers (though there are many other benefits of centering) or by dispersing development in sprawl patterns (which bring with them many other costs of sprawl). It appears that about the only effective strategy for moderating congestion (other than road user pricing) is to provide more complete and connected street networks, including a higher density of collectors and local streets (Ewing et al. 2017). Our research shows that short blocks and four-way intersections reduce VMT and increase walking, bicycling, and transit use. But do they do so at the expense of traffic safety and do they also measurably reduce congestion? These are questions that have not been answered empirically, and suggest the importance of this particular study.

4. List the major tasks:

1. Acquire congestion data from HERE and extract crash data from UDOT's database and, using GIS, develop various measures of street connectivity for neighborhoods in the Wasatch Front.
2. Use multivariate statistics to model congestion levels and crash rates for neighborhoods in the Wasatch Front.
3. Conduct parcel-level trip generation estimates using our MXD methodology (CMP) and traffic simulations using Vissim (Traffic Lab) for selected neighborhoods in the Wasatch Front. Selected neighborhoods will include the Avenues and Daybreak, plus matched pair neighborhoods with much less street connectivity from Salt Lake, Utah, Davis, and Weber counties.
4. Again using Vissim, test how the addition of links to the poorly connected street networks in the control neighborhoods affect traffic congestion.
5. Conduct a national survey through AMPO to determine state-of-practice and state-of-the-art in promoting street connectivity through local land development codes (updating Handy et al.'s 2003 survey) .

5. List the expected deliverables (reports, manual, specification, design method, training, etc.):

We will produce a final report, peer reviewed papers, and a companion empirical supplement to the Utah Street Design Guide.

6. Describe how the research results will be implemented:
(In response, consider addressing UDOT leader support, process or standard improvement, etc.)

The implementation will be primarily through local land development codes and site plan review. The implementation will be national, not just limited to Utah. This will be groundbreaking research that receives a lot of attention (like our study of trip and parking generation at TODs). The UU will host a one-day workshop to introduce local and state planners to our results, including the review of regulatory tools that can be used to guarantee a degree of street connectivity in newly developed and redeveloped areas.

7. Requested from UDOT: $30,000 **Other/Matching Funds:** $10,000 **Total Cost:** $40,000
(or UTA for Public Transportation)

8. Outline the proposed schedule, including start and major event dates:

- Project Start Date: May 1, 2019
- Data Collection: May 2019-August 2019
- Data Analysis: August 2019-October 2019
- National Survey: August 2019-October 2019
- National Case Studies: October 2019-January 2020
- Draft Report Complete: January 31 2020
- Peer Review: February 2020
- Report Revision: March-April 2020

Project End Date: April 31 2020