

Connected Network Designations for the Economic Stimulus Package

Downfalls of the Facility-Based Approach in Urban Areas

Currently, the vast majority of federally funded transportation projects are corridor- or facility-based—they focus exclusively on planning, prioritizing and building singular facilities. While such efforts may occur within the context of a system-wide approach, each individual facility must stand on its own merit, without regard to how such facilities might perform in combination with each other.

Facility-based metrics—typically volume to capacity ratios—are used to identify and prioritize ‘deficiencies’ in the system. The implication is that adding capacity in the form of additional lanes will ‘improve’ the system. This approach leads to proposals that mitigate the impacts of a new development or growth in general is to add vehicle lanes to an existing road or to widen an intersection—which in turn promotes auto-only travel and leads to more congestion.

Adding vehicle lanes or widening intersections can be damaging in urbanized areas. The facility-based approach means that many streets are left out of the analysis even though they could be providing tremendous transportation function. As a whole, the street network will end up with components that are underutilized, while other sections are concentrated with traffic. In addition, adding vehicle lanes can reduce opportunities for other modes of travel, such as walking and biking. These steps can be counter-productive to lasting local economic development as well as reaching greenhouse gas reduction targets by reducing vehicle miles traveled.

Federal transportation funding is currently used to improve and maintain state highways. In most states, some federal funding is available for roads under local jurisdiction that are within the functionally classified roadway system. The functional classification is limited to three types of roadways: expressways, arterials and collectors. However, most roads do not fall under the functional classification system—this is particularly true of networked streets. While state highways are often considered the backbone of the transportation system, local streets handle approximately 50% of vehicle miles traveled and the majority of all biking and walking trips. In most cities and towns, the capacity on local streets surpasses the capacity on roads that are eligible to receive federal funding.

Network Connectivity Proposal for Economic Recovery Bill

Since existing federal transportation funding focuses to such a great extent on the performance of individual roadways and therefore misses opportunities to capitalize on the benefits of highly-connected networks of streets, we propose the following measure be added to the Economic Recovery bill. This measure designates both existing and emerging areas of highly networked streets as areas that are eligible for project funding under the stimulus. It recognizes the significant benefits that areas of highly-connected streets arranged in small blocks have in promoting mobility for all users, whether they are walking, bicycling, riding transit or driving automobiles and other motor vehicles.

These benefits include improved traffic flow based on multiple route choice, shorter trip length, reduced vehicle miles traveled, lower per-capita greenhouse gas emissions and reduced dependence on fossil fuels, see network benefits section for more details on page 3. By contrast, standard high-volume freeways and arterials in areas of low-street connectivity promote auto-only travel, concentrate local traffic on regional roads, and increase greenhouse gas emissions.

The latest green design standards, LEED for Neighborhood Development, recognize highly connected network streets for their social and environmental benefits. This proposed measure mirrors the consensus built within the environmental and development community by adopting a similar standard for connectivity. Most of the conventional highways and large arterials regularly funded through the federal process do not meet these green development standards.

Funding eligible projects through this provision will have the same economic and job-generation benefits as other infrastructure spending but will also contribute to the long-term economic and environmental health of our communities.

Determining Eligibility for Well-Connected Network Designation

We propose a new system of designations that would apply a “network” label over an entire area, such as a Central Business District or even a small Main Street with its nearby and networked streets. All streets within the network areas would qualify for Federal funding. Street additions that bring an area up the threshold for networked areas would also be eligible for federal funding. The State, Metropolitan Planning Organization or City would set up a system of applying the designations to qualifying areas. Figure 1 depicts Minneapolis and St. Paul with potential designated network areas shaded in yellow. Figure 2 depicts how this same designation could work in a smaller scale town, Leesburg, Virginia.

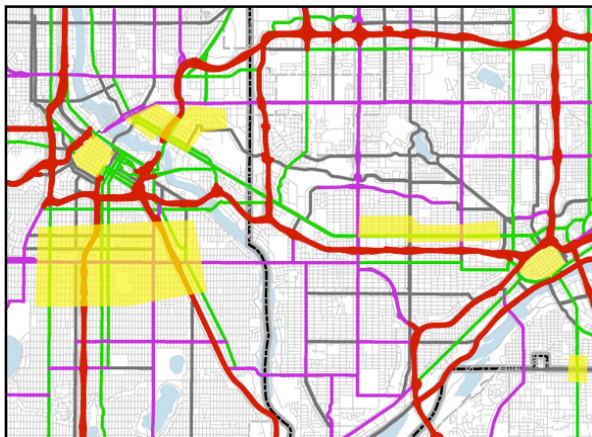


Figure 1: Minneapolis and St. Paul, MN with potential designated "Network" areas in yellow.

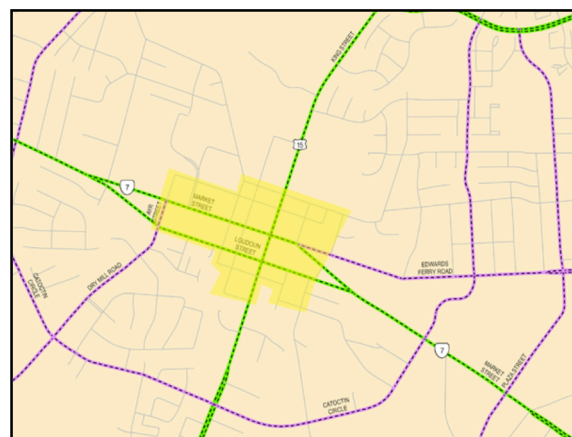


Figure 2: Leesburg, VA with potential designated "Network" areas in yellow.

This measure designates areas of cities and towns as having qualifying areas of street network connectivity based on the density of intersections within those areas. It also funds planned improvements that improve connectivity in a non-networked area so that it meets the threshold to become a qualifying network area. Portions of street systems in cities and towns qualify as either existing or emerging network areas based on the following criteria:

1. **Existing network areas.** Street system connectivity is determined by the number of intersections per square mile, minus the number of dead-end-serving intersections. Qualifying areas must have 150 intersections/square mile. Eligible intersections include:
 - Junctions of publicly accessible streets open to motor vehicle movement.
 - Junctions between publicly accessible streets and publicly dedicated alley – not alley-to-alley junctions.
 - Junctions between publicly-accessible streets and off-street bicycle and multi-use

- paths, up to 10% of total intersections.
- Multi-legged junctions, like roundabouts, traffic circles, and plazas count as a single intersection, unless the space is larger than 1/2 acre--in which case the components are counted individually.

Areas excluded from the calculation include: waterbodies, parks larger than 1/2 acre, recreational facilities, public campuses, airports, rail yards, areas preserved by codified law or ND prerequisites, and land with unique topographic or geologic conditions that prevents development.

These criteria match the street connectivity requirements in LEED for Neighborhood Development, the nation's first certification system for green development at the neighborhood scale. Projects must demonstrate a sufficient level of street connectivity in order to be certified as a green development. An extension of the nation's leading green building certification system, LEED-ND was developed through a partnership of the United States Green Building Council, the Natural Resources Defense Council and the Congress for the New Urbanism. The rating system is currently undergoing public comment and is predicted to launch mid-2009.

2. **Emerging network areas.** These areas do not currently meet the above standard of 150 intersections per square mile but would meet the standard through completion of qualified, fundable connectivity enhancement projects. The interventions would bring the intersection density above 150 intersections/square mile.

Connectivity Enhancement Projects

The measure funds improvements within the network areas in order to support and reinforce their high-performance characteristics. Within the Network areas, this measure gives priority to the following types of projects:

1. Connectivity Enhancements: These projects increase the number of intersections/square mile by removing gaps in the network.
2. Road Diets: These projects reduce the number of lanes or lane widths to accommodate more pedestrian capacity and/or improve vehicular speed on the roadway.
3. Intersection Diets: These projects add pedestrian bulb outs and remove right hand turn lanes so that the crossing distance for pedestrians is reduced.
4. Decrease Block Size: These projects add streets to large, underutilized projects, like greyfields and brownfields.
5. Sidewalk enhancements: These projects increase sidewalk width and/or improve pedestrian amenities.
6. Two-way conversions: Projects that replace one-way streets with two-way streets.
7. Context Sensitive Design Approach outlined in the Institute of Transportation Engineer's Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities.

Projects that decrease the multi-modal components do not meet the intent of this designation.

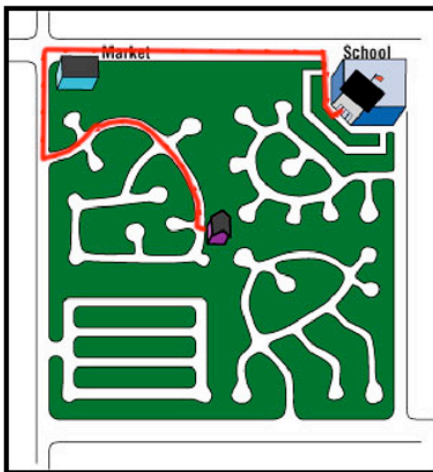
Benefits of Well-Connected Networks

A network is a structure of streets that serves and connects multiple places and people via multiple modes of travel. A network approach to transportation projects focuses on connecting people to places—ultimately allowing places to become more intense centers of economic development. A highly-networked system of streets, with at least 150 intersections/square mile, has redundant routes, compact block sizes, sidewalks, and narrower streets.

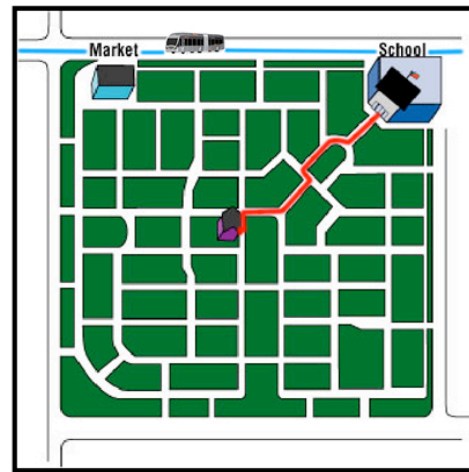
Brian Bochner, P.E. Senior Research Engineer for the Texas Transportation Institute, believes that “enhancing network roads has high potential to relieve the most congested areas.” Bochner and

Chester “Rick” Chellman, P.E., Principal of TND Engineering, developed the following list of benefits associated with a network approach.

Well-connected networked streets provide greater mobility and access. By their very nature, networked streets provide shorter, more direct routes between destinations. This increases the efficiency and reliability of the road network. During times of congestion or construction, drivers have more opportunities to switch to different routes and avoid delay. This is especially important for emergency responders as they need the fastest, most direct route to a fire or medical emergency. Networked streets also encourage intra-area trips to occur on local streets instead of arterials or highways. Poorly-networked streets typically concentrate local traffic on a few arterials because there is no other route available—but highly-networked streets can keep local traffic on local streets. This preserves capacity on arterials and highways for more regional trips.



Driving-only transportation pattern



Walkable, connected transportation network

Networked streets improve health and safety. In addition to improving emergency access and response times—by providing multiple, more direct routes—networked streets can reduce vehicular crash severity. Less traffic is concentrated on any one street, which allows each street in the system to be narrower in width. Narrower local streets lead to slower vehicle speeds. Slower speeds dramatically reduce the severity of pedestrian injuries. Narrower streets also allow for shorter pedestrian crossing-distances, which in turn, reduces the amount of time pedestrians are exposed to traffic directly and improves the intersection signaling times. Creating pedestrian-friendly streets increases the potential for walking and bicycling. Physical activity greatly improves public health and reduces the risk of many diseases.

Highly-connected networked streets can help the nation address climate change and reduce energy consumption. A system of compact blocks and streets increases the opportunities for and performance of other modes of travel, such as walking, bicycling, and taking transit. As more trips are done without an automobile, the number of vehicle miles traveled can decrease, in turn reducing the amount of energy consumed and greenhouse gas emissions.

Property values are heavily influenced by the quality and form of the streets surrounding them. Walkable streets and connected places can create environments where property values flourish *and continue to grow through time*. Walkable streets, by virtue of their street appearance and character, increase the desirability of locating on that street for commerce or residential purposes. As networked streets reduce the need for automobile trips, more households will be able to reduce the amount they spend on gas and related transportation costs. This money can then shift into the local economy, housing, and education.