REDEFINING “TRANSPORTATION IMPACT”: A COMPARISON OF EMERGING METHODOLOGIES

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ABSTRACT
Since the enactment of the National Environmental Policy Act (NEPA) in 1970, environmental legislation has played an increasingly important role in the development process. While NEPA regulates only federal actions and federally funded projects, several states have passed their own environmental legislation, extending this oversight to state actors, and, in some cases, to private actors as well. This research focuses on one category of impacts—those related to transportation—and compares emerging alternatives to motor vehicle level of service in defining a transportation impact. Massachusetts and New York City have broadened the traditional level of service concept to include multiple modes of travel, while King County, Washington has added a greenhouse gas component to the environmental checklist. In contrast, California is moving away from level of service, replacing it with vehicle miles traveled. These new methodologies reflect subtle differences in the definition of a transportation impact, with some emphasizing the local impact on the transportation system, while others focus on the impact on global greenhouse gas emissions.
INTRODUCTION
Following the passage of the National Environmental Policy Act (NEPA) at the national level, fifteen states enacted their own State Environmental Policy Acts (SEPAs), which require review of all actions that may have significant environmental impacts (1, 2). In most of these states, the SEPA process applies only to actions undertaken by a state agency. However, a few states, including California, New York, Hawaii, Massachusetts, Minnesota, and Washington, extended the review process to actions at the municipal level as well. Because land use development often requires approval by the local government, and because this approval is an “action” subject to review, private development in these states is therefore also regulated by the environmental review process (3).

Environmental reviews often include a transportation impact analysis (TIA), which is an assessment of the action’s impact on the transportation system. In practice, most states narrowly define “transportation” to include only the effect on motor vehicle capacity and level of service (4), where it is not uncommon for the TIA to instead refer to a “traffic impact analysis” rather than a transportation impact analysis. Viewed through these metrics, rarely do federal or state agency actions, which often include adding capacity for motor vehicles, trigger thresholds related to transportation impacts. Although environmental review documents for such projects serve to compare multiple alternatives, the TIA is often of less importance compared to other elements in the review.

In contrast, for the six states that extend the review process to the local level (California, New York, Massachusetts, Washington, Hawaii, and Minnesota), the TIA is often a lengthy and contentious part of the environmental review. The inclusion of private development within environmental regulation is particularly important for the evaluation of transportation impacts, as scholars have long noted the inextricable link between transportation and the built environment (5). Given this relationship, a change in either will invariably “impact” the other. It is therefore unsurprising that the scope and importance of the TIA generally increases when environmental regulation is extended to the local level, and states with local application of SEPA (California, New York, Hawaii, Massachusetts, Minnesota, and Washington) generally have the most comprehensive guidelines with regard to transportation impact analyses. The guidelines in these states...
are applied far more frequently compared to those in states that do not regulate private
development.

In these states, and throughout the entire United States, motor vehicle level of
service has generally been the dominant transportation impact metric. However, there is a
growing perception that motor vehicle level of service alone is either inappropriate or too
limited for the measurement of transportation impacts (4, 6). The movement to replace
level of service is particularly strong in urban areas, where initiatives to improve
bicycling and walking have, perhaps ironically, been stalled during the environmental
review process when motor vehicle level of service is degraded (7). In response, a few
states have either expanded or supplanted level of service with different metrics. This
review examines these alternative metrics.

ALTERNATIVES TO MOTOR VEHICLE LEVEL OF SERVICE

Of the local application states, California, Massachusetts, Washington and New York
provide examples of possible alternatives to motor vehicle level of service in
transportation impact analysis required by environmental law. The State of Massachusetts
is expanding level of service to require multi-modal level of service (MMLOS) principles
in all TIAs. In contrast, California is moving away from level of service, replacing it with
vehicle miles traveled. At the county level, King County, Washington has added GHG
analysis, including GHGs from transportation generated by the project, to the
environmental analysis checklist. At the municipal level, New York City requires the
traditional motor vehicle level of service to be augmented with additional level of service
metrics in the environmental review.

The table below summarizes alternative metrics in states that extend SEPA to the
local level. Where explicit guidelines were not provided, the table reflects metrics used in
environmental review documents.

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<th>Area</th>
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<td>California</td>
<td>Vehicle Miles Traveled</td>
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TABLE 1. Alternative Metrics to Motor Vehicle Level of Service

New York City

One notable exception to the traditionally exclusive focus on automobiles includes New
York City, which has also historically reviewed impacts on bus service, rail service, and
pedestrian movements.
The New York State Environmental Quality Review Act (SEQRA) mandates the preparation of an environmental analysis for any state or local action that may impact the environment. With regard to transportation, SEQRA mandates the preparation of an EIS when the action may have a “substantial adverse change to ambient air or ground or surface water quality…traffic or noise levels,” leaving it to local jurisdictions to determine the metrics and thresholds of significance (SEQR 617.11(a)(1)). The Act also allows local agencies to adopt “any additional procedures which may be necessary for them to implement” requirements in the law, with the requirement that local review be no less protective of the environment than SEQRA. Under this authority, New York City established the City Environmental Quality Review (CEQR) process in 1977. Projects must include analysis of impacts to vehicular traffic, rail transit, bus transit, pedestrian movement, and parking.

Thresholds for Significance

Autos: The methodology used in the analysis is the motor vehicle LOS. A project is considered to have a significant impact if motor vehicle LOS is degraded.

Rail: A project must not only look at the impact to line haul capacity, but also the impact on stairways, passageways/corridors, turnstiles, and platform conditions.

Bus: If the projected bus load is above the maximum capacity at any time, the project is determined to have a significant impact.

Pedestrian Movement: NYCDOT evaluates pedestrian space at corners/crosswalks and pedestrian flow along sidewalks using LOS calculations. The determination of significance depends heavily on the area (CBD or non-CBD). This is because, according to NYCDOT, pedestrian in the CBD have “become acclimated to, and tolerant of, restricted level of service conditions that might not be considered acceptable elsewhere.”

Parking: If the project generates the need for more parking than the amount that is available nearby, it may be considered a significant impact.

Mitigation

The CEQR Technical Manual emphasizes the importance of looking at each travel mode as an element within the comprehensive transportation system. The Manual lists appropriate mitigation measures for impacts to each mode but acknowledges that the relationship between traffic, transit, and pedestrian needs should be carefully considered when mitigation measures are determined. For example, projects should not undertake mitigation measures that would create new significant impacts or aggravate already projected significant impacts elsewhere. One example provided is the tradeoff involved with re-timing signals. Lengthening the green time for motor vehicles—thus increasing capacity—may reduce the time for pedestrians to cross the street.

Massachusetts

As with CEQA, Massachusetts Environmental Policy Act (MEPA) Guidelines are currently being amended to incorporate state greenhouse gas reduction goals and
implement Complete Streets policies. The Draft Transportation Impact Assessment Guidelines for Transportation Impact Assessments prepared under the MEPA were submitted for public review in November 2013 (8). The updated TIA Guidelines are designed to encourage efficient transportation and support the continued development of a multimodal network. These principles are functionally incorporated into MEPA through the addition of the Multimodal Level of Service (MMLOS) metric in transportation impact analyses. The MMLOS method, adopted by the Highway Capacity Manual in 2010, estimates perceived level of comfort for bicyclists and pedestrians along urban streets (9).

According to MEPA, a TIA is required if the project generates 3,000 or more average daily automobile trips (ADT) or includes the construction of 1,000 or more new motor vehicle parking spaces at a single location. The TIA should include a level of service analysis of signalized intersections, freeways, and urban streets using the procedures in the most recent Highway Capacity Manual. Multimodal Level of Service analyses using the HCM 2010 method should also be calculated for bicyclists and pedestrians at nearby intersections and streets (8).

**Thresholds for Significance**

A project is determined to have a significant environmental impact that warrants mitigation if it adds enough vehicle trips to degrade motor vehicle level of service on facilities that already score a level of service of D or worse. A project may also have a significant environmental impact if it attracts trips to a site that does not currently provide adequate pedestrian, bicycle, or public transit access (8). Although the Guidelines support MMLOS principles, the thresholds for significance are not tied to impact of the development on bicycle, pedestrian, and transit level of service. Instead, MMLOS analyses should be used for “informational purposes.” Aware of continued development in the MMLOS methodology, the Massachusetts Department of Transportation acknowledges that “the MMLOS procedures highlighted in this document are relatively new and are expected to improve over time, allowing for more detailed analysis” (8).

**Mitigation**

The mitigation measures outlined in the updated TIA Guidelines are primarily focused on reducing the number of generated vehicle trips instead of increasing roadway capacity. Suggested mitigation measures include improving bicycle, pedestrian, and transit facilities, reducing the amount of parking provided, and other TDM measures. Roadway widening may be an acceptable mitigation measure if bicycle and pedestrian facilities are not negatively affected as a result of the mitigation measure.

**King County, Washington**

The Washington SEPA lists “transportation,” as an element of the built environment that is subject to environmental review (WAC 197-11-444). At the beginning of any project, the lead agency must complete a preliminary analysis using the SEPA checklist to determine whether a full Environmental Impact Statement (EIS) is required. The transportation element of this checklist requests information about auto access, nearby public transit routes, parking, and auto trips generated (WAC 197-11-960). However, it
does not require an assessment using the multimodal level of service metric. After completing the checklist, the agency must determine whether additional environmental review with an EIS is warranted. SEPA does not specify specific thresholds for determining whether a transportation impact is significant.

In addition to calculating auto trips generated (ATG), King County, Washington supplements the SEPA Checklist with a projection of GHG emissions as a result of the action. This comprehensive inventory includes emissions from the construction, energy demands from use of the project after it is completed, and emissions from transportation demands created by the development. 10.

California
Rather than augmenting motor vehicle level of service, California is moving to replace it entirely with vehicle miles traveled (VMT). In an effort to better align the California Environmental Quality Act (CEQA) with the state’s environmental goal of reducing greenhouse gas emissions, Governor Jerry Brown signed SB 743 on September 27, 2013. The legislation amends CEQA guidelines related to traffic and transportation impacts by removing motor vehicle level of service an appropriate metric for development.

Vehicle miles traveled retains the focus on motor vehicle traffic However, according to proponents, it offers a number of subtle yet important differences, especially with regard to infill development. According to the California Office of Planning and Research, an increase in traffic, by itself, is much more of a behavioral impact than it is an environmental impact, and that the focus of motor vehicle level of service is more aligned with facility performance than the environment. By penalizing location-efficient projects, the prioritization of level of service actively contradicts many of the state’s efforts to improve air quality and reduce greenhouse gas emissions.

CONCLUSION: REDEFINING “TRANSPORTATION IMPACT”
Although there is an emerging consensus in these local application states that motor vehicle level of service alone is inappropriate as a transportation impact metric, there is no similar level of agreement on its replacement. The differences in newer methodologies reveal diverging opinion on the very definition of a “transportation impact.”

New York and Massachusetts interpret a transportation impact to be an effect of development or government action on the transportation system. In this sense, the issue with motor vehicle level of service is that it is incomplete in the consideration of only one mode of travel, and the natural remedy to this problem is to broaden the level of service concept to include all modes of travel—bicycling, walking, transit, in addition to motor vehicles. In the case of King County, Washington, a transportation impact includes not only the effect on the transportation system, but also the secondary effects that the resulting transportation system will have on the natural environment. Not only does this move beyond the built environment to include impacts on the natural environment, this much more expansive definition adds a global component, greenhouse gas emissions, to a process that is generally focused on local effects. In California, the adoption of VMT is not entirely different from level of service—it is still chiefly concerned with the built environment and retains the focus on motor vehicle traffic. Yet VMT does not ignore the transportation system’s effect on the natural environment—it is much more tightly correlated to greenhouse gas emissions compared to motor vehicle level of service.
The advantages offered by the methodology should therefore be considered by states looking to streamline the transportation impact process whilst not deviating too far from level of service.

As states, counties, and cities continue to refine the environmental review process, it is important that they consider the underlying definition of a transportation impact. Should the environmental process highlight the impacts of development on the multimodal system? Should the transportation impact be concerned with the nexus between transportation and effects on climate change? Finally, is the definition more flexible, where the methodology can indirectly address both concerns?

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