

Integrating Asset Management and Planning

A White Paper Produced by the Federal Highway Administration Transportation Asset Management Expert Task Group

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Integrating Asset Management and Planning

Asset management, transportation performance management, and performance-based planning and programming are three related strategic approaches that work together to advance State and Federal transportation goals. This paper by the FHWA Transportation Asset Management Expert Task Group (TAMETG) examines how all three are likely to increase the emphasis on asset management in the transportation planning process.

Performance-based planning and programming (PBPP) applies performance management within the planning and programming processes (FHWA 2013) Performance management uses system information to make investment and policy decisions. (FHWA 2019a) Asset management takes a strategic approach to economically achieve and sustain a desired state of good repair over the life cycle of assets. (23 CFR 515.5) This paper examines some of ways in which these three related processes are likely to enhance the focus in the State and metropolitan planning processes of managing asset conditions.

Several sections of U.S. Code and Federal regulation direct an evolution of the planning process to be more performance-based and explicitly incorporate asset management goals, objectives, performance measures, and targets. (In this paper, the transportation planning process refers to the processes established under 23 U.S.C. 450 and its related statutes and regulations.) The statutes and regulations lead to closer linkages between the goals, objectives, performance measures, and targets for asset management with the products of planning processes such as the long-range statewide transportation plan (LRSTP), the metropolitan transportation plan (MTP), the statewide transportation improvement program (STIP), and the transportation improvement program (TIP). (Examples include 23 USC 450.206 (c) and 450.206 (c) (4) and (5) and 23 U.S.C. 134 (2) (A) for highways and for transit the provisions contained within 49 U.S.C. 5303, 5304, 5305 and related provisions.)

These linkages reflect the sentiment expressed by Congress when it drafted the performance sections of the Moving Ahead for Progress in the 21st Century Act (MAP-21.) “Performance management will transform the Federal-aid highway program and provide a means to the most efficient investment of Federal transportation funds by refocusing on national transportation goals, increasing the accountability and transparency of the Federal-aid highway program, and improving project decision making through performance-based planning and programming.” (23 U.S.C. 150 (a))

The DOT/MPO Focus is Likely to Evolve

MAP-21 increased the focus of the Statewide and metropolitan planning processes on managing the condition of assets. Many metropolitan planning organizations (MPOs) operate sophisticated travel demand models that allow analysis of scenarios regarding how highway and transit projects will affect mobility. MPOs also were highly engaged with public involvement, prioritizing projects funded with sub-allocated Federal-aid, running air-quality conformity analyses, and addressing issues such as social justice. To some extent, the experience of the TAMETG members was that MPOs were less engaged in planning for the condition of assets, particularly those on the National Highway System (NHS.) Although local agencies may be aware of the conditions of their city streets and bridges, that knowledge was not often consolidated into information about the overall condition of local bridges, pavements, and other transportation assets across the MPO region.

Citing just one example, while most MPOs have travel demand models, the TAMETG has only identified a few MPOs that have pavement management or bridge management systems.

Local government officials who are engaged with MPOs are likely to become more exposed to asset management through the collaboration spurred by MAP-21 and the Fixing America's Surface Transportation Act or (FAST Act.) Local officials such as mayors, service directors, county engineers, and city council members comprise MPO boards and technical committees. Through their MPO involvement, they will start engaging more with the State transportation agencies about key areas such as asset management data collection, target setting, and incorporating into long range plans the goals, objectives, performance measures, and targets relating to asset management. (Similar coordination is occurring in other performance areas such as with safety, freight, and congestion but this paper deals only with asset management.) As this collaboration grows, the TAMETG members suggest the role of asset management is likely to assume more prominence in the metropolitan planning processes.

The performance-based collaboration occurs also with development of the STIP, and through periodic performance reports that States and MPOs must produce. States must describe in the STIP how the program of projects contributes to achievement of the performance targets identified in the LRSTP or other State performance-based plans. Similarly, MPOs must describe in the TIP how the program of projects contributes to achieving the MPO's performance targets in the MTP, and how the TIP links investment priorities to those targets. The FHWA guidance states that this assessment should be a written narrative included in the documents. (FHWA 2019b)

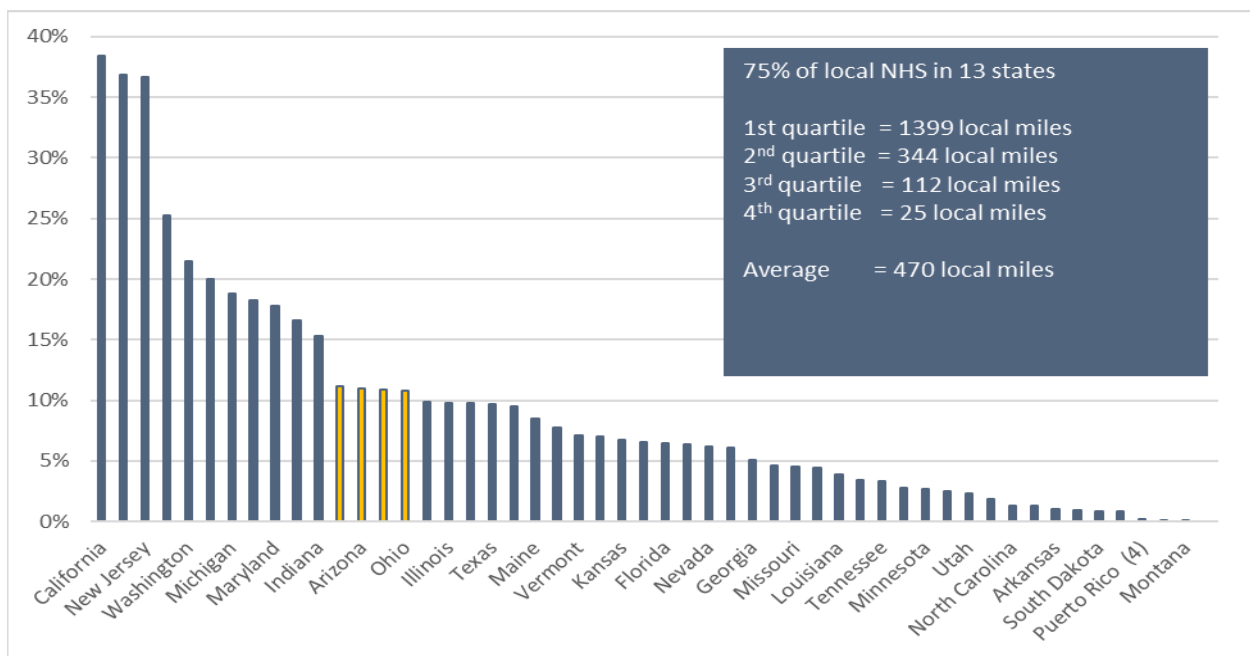
The FHWA also says the narrative descriptions in the STIPs and TIPs should include a description of how the other performance-based planning and programming documents are being implemented through the STIP and TIPs. (FHWA 2019c) For example, the narrative should describe how the objectives, investment strategies, performance measures and targets from the asset management plans, Strategic Highway Safety Plan (SHSP), Highway Safety Improvement Program (HSIP), freight plan, Congestion Mitigation and Air Quality (CMAQ) Performance Plan(s) (23 U.S.C. 149(l)), Congestion Management Process (CMP), and other performance based plans are being implemented through the program of projects in the STIP or TIP. The narrative should specifically describe these linkages and answer these questions: Are the projects in the STIP and TIPs directly linked to implementation of these other (performance based) plans? How was the program of projects in the STIP/TIP determined? Does the STIP/TIP support achievement of the performance targets? How does the STIP/TIP support achievement of the performance targets? Are the STIP/TIPs consistent with the other performance-based planning documents such as the asset management plans, safety plans, freight plan, CMAQ Performance Plan, and congestion management program? How was this assessment conducted? What does the assessment show?

For the owners of local assets, this engagement could expose them to the benefits of asset management that already are recognized by State transportation officials. These benefits include the ability to better cope with the constraints they face such as rising costs for managing assets, aging infrastructure, and limited financial resources. TAMETG members expect that as MPO officials review the results of investment-scenario analyses, it is likely they will see the long-term cost savings that asset management provides. When forecast over a 10-year or 20-year period, the “mix of fixes” included in a life cycle planning approach generally produces higher conditions for less cost compared to a worst-first strategy. The asset management engagement spurred by MAP-21 and FAST Act requirements is likely to create broader appreciation of the benefits of asset management.

The Degree of Asset Management Engagement May Vary

With 408 MPOs nationally (BTS 2019) and 52 transportation agencies implementing the performance-based program, the TAMETG members predict that there will be substantial variation between how State DOTs and MPOs interact regarding asset management. DOTs engage in the planning process with metropolitan areas as small as 50,000 to as large as the Southern California Association of Governments that encompasses 191 cities, 38,000 square miles (SCAG 2019) and manages 11,658 lane miles of the NHS and 13.8 million square feet of NHS bridge area. (Caltrans 2018) The TAMETG members predict that for many small planning organizations, the degree of asset management engagement with the State DOT could be relatively minimal. It could be limited to joint agreements on data collection, target setting, and STIP/TIP development. Because a very small planning area may have few locally owned NHS bridges and pavements, the engagement could be limited.

However, for the large MPOs, the engagement could evolve to become a significant component of the MPO planning process. Figure 1 shows the percentage of NHS centerline miles in each State that is locally managed. Nationally, 24,445 centerline miles of the total 223,155 centerline miles of the NHS are locally owned or managed. (FHWA 2015) As seen in Figure 1, these miles are not uniformly distributed nationally. Seventy-five percent of the centerline miles are in 13 States, or 25 percent of all States, Washington, D.C. and Puerto Rico. States in the lowest quartile of States with the smallest amounts of locally owned NHS average only 25 centerline miles of NHS that are locally controlled. For the States with the 13 largest amounts, the average is close to 1,400 centerline miles. The percentage of the NHS centerline miles locally managed for the States in the top quartile ranges from 10.8 percent to as high as 38.4 percent. For these States, engaging with the MPOs and locals could represent the critical path to fully deploying asset management strategies on the NHS and achieving State and regional performance targets.



Source: FHWA Highway Statistics Table HM-40 for 2015

Figure 1. Locally owned NHS centerline miles by state.

Early Examples of DOT/MPO Collaboration on Asset Management

Since its founding in 2012, the TAMETG members have noted an expansion of asset management focus into the planning process. The TAMETG held several sessions with State DOTs and MPOs over the past seven years in which the issue of MPO/DOT collaboration was discussed. The TAMETG also discussed the content of many transportation asset management plans. The trend over the seven years was to identify a seemingly increasing number of examples of DOTs and MPOs collaborating to enhance asset management in the planning process.

In 2019, the TAMETG heard presentations from several States and MPOs that were collaborating more closely on managing the conditions of assets on the NHS, both for assets managed by the State and those managed by local agencies. Representatives of the North Central Texas Council of Governments (NCTCOG) discussed how it is reviewing for the first time the condition of bridges in its region both on and off the NHS. It is taking into consideration those conditions as one of the factors that influences its project-prioritization process. The Texas Department of Transportation (TxDOT) created for the MPOs a web report that simplifies the MPOs' ability to access information on the condition of bridges within their region. Although bridge data always were available from the National Bridge Inventory (NBI) data sets, it was not always clear which structures were within the MPO boundary. NCTCOG reported that it used the data to develop an Infrastructure for Rebuilding America (INFRA) application to seek additional funds to improve the bridges on its NHS network. Furthermore, achieving and sustaining the asset-condition targets has become an additional important factor in the MPO's planning and programming processes.

A representative of the Washington State Department of Transportation (WSDOT) reported during an October 2018 ETG meeting on the agency's increased outreach effort to local owners of NHS assets. The WSDOT asset management plan reports the agency is providing \$75 million as a form of seed money available to local NHS owners willing to adopt asset management practices to preserve and improve the condition of locally owned NHS pavements and bridges. (WSDOT 2018) Washington state has one of the highest percentages of locally owned NHS facilities at about 25 percent.

The WSDOT TAMP states that it is imperative that both State and local agencies collaborate to manage the NHS and this type of program will encourage collaboration and asset management principles across the NHS. The objective of the NHS Asset Management Program is to highlight the importance of preserving the roadway system by incentivizing local agencies to use asset management strategies that provide cost-effective solutions to maximize the life expectancy of a roadway. To meet this objective, the program will evaluate an agency's use of pavement management strategies and its level of investment to preserve and maintain its roadway system, placing emphasis on cost-effectiveness and pavement rehabilitation over reconstruction.

In March 2018, the TAMETG heard presentations from the MPO in the greater Cleveland area and another from the Metropolitan Transportation Commission in greater San Francisco about how they are supporting asset management across the entire Federal-aid network by providing local agencies with pavement-condition data. Both MPOs operate pavement management systems. These systems support the MPOs' planning and programming processes by tracking conditions and estimating investment needs. Both MPOs said that their pavement management systems greatly enhance the metropolitan planning process by supporting data-driven pavement programming. In both cases, as well, the agencies say the management systems are supporting the embrace of asset management by local decision makers.

The MPO members who presented to the TAMETG noted that over the years the MPO process has evolved to embrace new requirements, such as air-quality conformity and social justice. Now, the MPO process is evolving again as it embraces asset management, and other performance-based initiatives.

Areas of Likely Further Collaboration

Based upon their collective experience and from their interaction with dozens of MPOs and state DOTs, the TAMETG members indicate that the following areas may be likely for further collaboration as the MPOs and DOTs fully institute the performance-based planning requirements.

Financial Plan Coordination: The asset management rule requires State DOTs to develop asset management financial plans which are long-term plans spanning 10 years or longer, presenting a State DOT's estimates of projected available financial resources and predicted expenditures in major asset categories that can be used to achieve State DOT targets for asset condition during the plan period, and highlighting how resources are expected to be allocated based on asset strategies, needs, shortfalls, and agency policies. (23 CFR 515.5) Although the financial plan is required for the asset management plan, financial plans are optional for the long-range statewide transportation plan while they are required for the metropolitan transportation plans.

The TAMP financial plan could be a valuable component of the optional financial plan that State DOTs can include in their statewide long-range plan and could be a valuable component of the financial plan required for metropolitan transportation plans. (23 CFR 450.324 (f) (11)) The statewide planning rule says that the optional statewide long-range plan financial plan could demonstrate how the adopted long-range statewide transportation plan can be implemented, indicate resources from public and private sources that are reasonably expected to be made available to carry out the plan, and recommend any additional financing strategies for needed projects and programs. (23 CFR 450.216 (m)) In many States, the amounts spent to maintain pavements and bridges represent the largest capital programs. While the LRSTP covers a 20-year period, the TAMP financial plan could provide a substantial portion of the financial need and revenue estimates for the first 10 years of the long-range plan.

Additionally, STIPs may include a financial plan and MPO TIPs must include one. Because of the detail required in a TAMP financial plan, substantial information could be gleaned from it to support the financial plans for the LRSTP, STIP, the MTP, and the TIPs. The TAMP financial plan must include per 23 CFR 515.7 (d):

- (1) The estimated cost of expected future work to implement investment strategies contained in the asset management plan, by State fiscal year and work type;
- (2) The estimated funding levels that are expected to be reasonably available, by fiscal year, to address the costs of future work types;
- (3) Identification of anticipated funding sources; and
- (4) An estimate of the value of the agency's NHS pavement and bridge assets and the needed investment on an annual basis to maintain the value of these assets.

The TAMETG sees the coordination of financial plans as an area of likely collaboration that could benefit both MPOs and the State DOTs.

The Asset Management Impact of Capacity Projects: TAMETG members and the MPO staff who participated in the meetings discussed that the asset management condition targets make the MPOs more aware of the contribution that capacity projects can make to asset conditions. The discussions noted that often major urban highway projects are expanding congested interchanges and adding lanes. Often, the sections that are being improved were from the early days of the Interstate Highway System construction era. Not only are these sections over capacity, they often have bridges and pavements nearing the end of their useful lives. A major rebuild of an urban systems interchange can involve a dozen different structures and dozens of pavement lane miles.

TAMETG members and their MPO counterparts discussed that viewing these projects from both a capacity perspective and an asset management perspective reveals that such projects contribute to both mobility and asset management objectives. This can influence how future projects get scoped and how they are prioritized. If there are two capacity projects being evaluated, the one that contributes both to mobility and the retirement of exhausted assets may be prioritized in the programming process.

Increasing Awareness of Investment Needs to Sustain Asset Conditions: Several required areas of collaboration and coordination are likely to lead to a greater understanding by MPO members of the investments necessary to sustain the NHS in a state of good repair. First, is the asset management plan itself which for the first time requires development of an estimate of the expenditures needed to sustain a state of good repair. Second, the asset management requirements in 23 CFR 515 and the statewide and metropolitan planning requirements in 23 CFR 450 repeatedly call for collaboration in the development of the financial plans, in the shared adoption of goals, objectives, measures, and targets, and a specific planning factor in both the statewide and metropolitan plans to emphasize the preservation of the existing system. Third, the MPOs and DOTs must collaborate on target setting and data collection to support the performance-based approach.

The TAMETG members suggest that all these collaborative interfaces are likely to lead to increased understanding by MPO members of the current and future costs necessary to sustain the NHS in a state of good repair. This awareness, in turn, could serve to mitigate requests for new capacity projects that come at the expense of sustaining condition targets. It also could lead to long-term support for preservation programs that reduce the long-term cost of sustaining a state of good repair. Additionally, TAMETG members suggest that this greater awareness of the need to sustain the NHS could lead to increased support for bridge and pavement management systems to support scenario analysis of optimized investment strategies.

A Greater Educational Role: TAMETG members and their MPO counterparts who participated in the 2018 and 2019 ETG meetings suggest that the State DOT/MPO collaboration on asset management can over time play an important educational role. Large MPOs contain dozens, if not hundreds, of members whose representatives rotate onto the board and the agencies' many technical committees. The Chicago Metropolitan Agency for Planning (CMAP) reports a membership of 284 communities, while NCTCOG has 230 members and the Ohio Kentucky Indiana Council of Government has 118 member communities. As the DOTs and MPOs collaborate on asset management targets, performance reporting, data collection, and programming, the MPO members will be more exposed to the benefits of asset management.

Understanding Progress to Sustaining a State of Good Repair: TAMETG members also suggest that the collaborative performance-based program is likely to lead to greater understanding by State and local officials of the progress they are making to achieving a state of good repair. The planning provisions of 23 CFR 450 repeatedly emphasize that the statewide and metropolitan planning processes are to be performance based. The FHWA notes that the LRSTP and the MTP must include a description of the individual performance measures and targets for those measures. (FHWA 2019d) Additionally, at the time of plan adoption, the States and MPOs must include a system performance report that evaluates system performance with respect to the performance targets.

Then with each STIP adoption, States must describe how the program of projects in the STIP contributes to achievement of the performance targets identified in the LRSTP or other State performance-based plan(s) and how they link investment priorities to those targets. Similarly, MPOs must describe in the TIP how the program of projects contributes to achieving the MPO's performance targets and link investment priorities to those targets. This assessment should be a written narrative included in the documents.

Additionally, the performance reporting requirements under 23 CFR 490 also require periodic reporting on the performance measures for pavements, bridges, safety, performance of the NHS, freight movement, congestion mitigation and air quality, and mobile source emissions. These combined with the plan and STIP/TIP reporting provide regular updates about the progress toward achieving and sustaining asset conditions.

Summary and Conclusion

The collaboration between State transportation agencies and MPOs has evolved continually since 1960 to include issues such as air quality, social justice, resilience, public involvement, and land use coordination. Over time, the collaboration on asset management is likely to increase as both entities incorporate asset management into their collaborative planning processes. The TAMETG suggests that U.S. State transportation agencies and regional planners are in the early stages of what will evolve to be an increased focus on maintaining and preserving transportation assets in a state of good repair. This they believe will over time also become a major focus of the transportation planning process. This collaboration is likely to also include the shared analysis of management system scenarios, condition trends, and investment options to more fully bring asset management into the planning process.

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