Strategy 6 – Project Prioritization

A well-defined project prioritization program can help rank system needs in a manner that is consistent with County preservation goals and objectives. This preservation strategy can help avoid the typical “worst first” approach to programming projects, that tends to invest limited resources in the most expensive “fixes” (reconstruction) instead of directing maintenance funds to roadways in the rehabilitation condition, a lower cost solution. In that respect, this strategy is intended to help county staff establish a project prioritization program.

A formal project prioritization program will give county staff the ability to communicate project needs to elected leaders, residents and stakeholders. The end goal in developing a project prioritization program is not to directly close the financial gap, but to influence the allocation of limited preservation resources for better investments. More importantly, a project prioritization program will help inform better decisions and help schedule the most appropriate preservation projects in a timely fashion to maximize project impact and minimize long-term preservation costs.

Project Prioritization Methodology and Tools

The main objective in developing a project prioritization program is to identify an understandable concise way to evaluate project priorities. To achieve this objective, a county can evaluate project priorities by using scoring criteria. In essence, the scoring criteria use performance measures and a data-driven process. This approach is further integrated with Geographical Information Systems (GIS) or databases, such as Microsoft Excel and Access. The end result is a project prioritization tool that ranks and scores preservation projects - the higher the score, the higher the priority amongst the entire system. The prioritization tool will rank county roadway systems for the county’s Capital Improvement Programs (CIP), while linking these project priorities to documented preservation needs and performance measures. This linkage allows for ranking of system improvements and performance.

Some counties have invested in Pavement Management Systems (PMS) software, and these technologies include project prioritization components, often with a GIS interface. Four of the five pilot counties did have such software, and received vendor assistance in preserving pavement priorities.

Otter Tail and Freeborn Counties’ future system improvements needs were primarily preservation oriented, they used their PMS software to develop preliminary preservation improvements and funding scenarios. After public input, a prioritized list of preservation projects for the near term and mid-term was proposed. Since both counties sought to adopt a local sales tax to increase funding for preservation work, and since legislation requires counties to have a capital improvement list to justify the use of new sales tax funds, the preservation priorities were very useful.

However, in the two metropolitan pilot counties (Anoka and Dakota), the pavement/bridge preservation project priorities needed to be further integrated into their overall multimodal
system improvement plans. Other critical projects competing with preservation needs included capacity expansion, new projects, various major transit enhancements (e.g., bus rapid transit, light rail transit, and express bus), and bicycle and pedestrian improvements. In this case, the metro counties used their PMS priorities and the prioritization tool described below to help them evaluate and rank their wide range of multimodal improvements needs.

Another pilot county, Stearns County did not have a pavement management system. Therefore, it used the proposed prioritization system, documented on the following pages, to rank its preservation projects and compare this ranking to their current CIP priorities. Of Minnesota’s 87 counties, most do not have a PMS; thus Stearns County is probably very representative of most counties statewide. Therefore, the case study for this “prioritization strategy” used Stearns County (please refer to Appendix G).

**Step-by-Step Process**

As evident by some of the pilot counties, developing a project prioritization tool does not need to be a costly endeavor. County staff can utilize existing data sets and their expertise to create a tool using “out-of-the-box” software (e.g., ArcView and Microsoft Excel). Figure 4.9 demonstrates a framework the can be followed to create an in-house tool. Each step listed in the framework is highlighted throughout this section and offers guidance on how to move forward. However, the framework does not provide the technical step-by-step directions required to create the customized project prioritization tool. This strategy will require additional coordination and collaborate with technical experts efficient in GIS or database development, in addition to county staff familiar with known data sets.

**Figure 4.9 – Project Prioritization Framework**

- Step 1: Establish Project Goals
- Step 2: Identify and Organize Data Sets
- Step 3: Develop Performance Measures
- Step 4: Establish Scoring Criteria and Weighting
- Step 5: Apply Scoring Criteria and Identify System Priorities
- Step 6: Evaluate System Needs and Project Priorities

The prioritization framework is based on regional best practices, and generally incorporates tool developed by Carver County. Furthermore, the framework’s foundation is built around a performance-based approach. It is recommended one reviews *Strategy 5: Performance Measures and Standards*, prior to initiating Strategy 6: Project Prioritization.
Step 1: Establish Project Goals

The prioritization process begins by setting the objectives the county wants to achieve, and defines how the tool will be used to evaluate projects. For example, does the county want to increase the operational efficiency of the existing systems and facilities, or preserve transportation infrastructure to achieve the lowest life cycle cost and prevent failure? Or, does the county want to use the tool to identify projects for a CIP from its long range transportation plan or preservation needs list? Understanding projects goals will help set the stage for next steps in the framework.

If a County has a transportation plan (see Strategy 4), its goals and objectives may address system preservation needs, which can offer guidance on establishing a project prioritization program. Examples of system preservation goals and objectives that were developed for Otter Tail County’s Transportation Plan are listed in Table 14.12.

<table>
<thead>
<tr>
<th>System Preservation Goal</th>
<th>System Preservation Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop a transportation system that maintains a state of good repair to satisfy public transportation priorities.</td>
<td>Prevent “fair condition” roads from falling into “poor condition” by utilizing methods to extend the life of pavements and lower maintenance costs. Prioritize preservation strategies to maximize project impact and minimize long-term costs.</td>
</tr>
</tbody>
</table>

Step 2 – Identify and Organize Data Sets

A key component in developing a county’s project prioritization tool is the use of good data. Thus, a critical step throughout this process is understanding data availability and data limitations. Understanding known data sets will add value in establishing meaningful performance measures, as needed later in the prioritization process. Step 2, however focuses on data compilations by creating one comprehensive roadway file that contains a range of roadway attribute information. This file will be linked to performance measures (Step 3), scoring criteria (Step 4), and the actual project ranking process (Step 5).

The more information provided in the roadway file, the more options will be available to the system preservation needs, using performance measures and scoring criteria. For example, adding information about a roadway’s past and present pavement quality will provide opportunities to assess historic trends and the deterioration rate of a roadway. Potential roadway attributes to explore include:

- Pavement Data (e.g., Ride Quality Index, Pavement Quality Index, Detrition Rates)
- Past and Programmed Improvements
Functional Classification
Location and Severity of Crashes
Roadway Age
Average Daily Traffic Volumes
Heavy Commercial Average Daily Traffic Volumes
Volume to Capacity Ratio

Often much of this data is already included in a County’s State Aid Highway (CSAH) needs data base, and many counties supplement this with a similar data base for County Roads (CR). Collecting and merging data sets together can be done in GIS or databases, such as Microsoft Excel or Access. However, merging files typically require a unique identifier to link attribute information to a roadway segment. This exercise will require knowledgeable staff in GIS or database development.

As part of this process, it is important to involve other departments (e.g., planning, maintenance, revenue, and engineering) responsible for managing data sets. Collaborating will help establish a better understanding of what data is available and its limitations in building a comprehensive roadway file. Understanding these limitations will also provide guidance in developing performance measures (Step 3) and scoring criteria (Step 4).

**Step 3 – Develop Performance Measures**

In general, performance measures are used to improve system conditions, serve as a benchmark to evaluate and track progress, and to document the value of local transportation investments. Additional information regarding performance measures can be found in Strategy 5.

As part of this step, county-defined performance measures are used to shape an evaluation process. The evaluation process should link performance measures to scoring criteria (Step 4) to rank system priorities. For example, Carver County’s Project Prioritization Tool embraces and provides specific weighting to over twenty performance-based measures including:

- Community Support
- Congestion
- Economic & Employment Factors
- Environmental Constraints
- Existing and Future Traffic Volumes
- Freight Connections
- Functional Classification
- Multimodal Elements
- Pavement Condition
- Project Readiness
- Roadway Age
- Safety (vehicles, pedestrians and bicyclists)
- System Connectivity
Each measure provides the flexibility to score and rank the county’s roadway network from various perspectives. For example, the Carver County tool is used to prioritize safety needs, multimodal projects, and system preservation needs. The Carver County Project Prioritization Tool is robust in nature; however, it has evolved overtime by slowly integrating new performance measures, as the County became more familiar with data sets and their limitations.

Therefore, it is important to start by selecting a manageable list of performance-based measures. This list will depend on the data sets discovered throughout Step 2. Examples of performance measures related to system preservation may include:

- Limit of X% pavement in poor condition (PQI rating of 0.0 – 2.4)
- Maintain X% in fair condition (PQI rating of 2.5 – 3.0)
- Maintain X% in good to excellent condition (PQI rating of 3.1 or higher)

**Step 4: Establish Scoring Criteria & Weighting**

Step 4 aligns the performance measures with scoring criteria. In essence, the scoring criteria are used to rank and prioritize the system. The end result is a project prioritization tool that provides a cumulative score for each roadway segment, which helps inform project prioritization needs - the higher the score, the higher the priority it ranks amongst the entire system. Examples of this type of scoring is provided below:

- Safety
  - Exceeds the critical crash rate = 15 points
  - Exceeds the average crash rate = 25 points
  - Does not exceed the crash rate = 0 points

- Pavement Conditions
  - Below Pavement Quality Index rating of 60 (poor) = 5 points
  - Between Pavement Quality Index rating of 60 and 70 (fair) = 20 points
  - Above Pavement Quality Index rating of 70 (good) = 0 points

Special attention should also be given to the scoring criteria’s weighing (i.e., the total amount of points for a criterion). The scoring criteria can be adjusted to provide a heavier weight on measures that address system preservation needs. Further, the points can be weighed in a manner to avoid “worst-first” preservation investments (as noted above), with highways in “fair” condition receiving more points than those in “poor” condition.

**Step 5: Apply Scoring Criteria, Evaluate Scenarios, and Identify System Priorities**

Once the scoring criteria has been established (Step 4), it can be applied to the comprehensive roadway file discussed in Step 2. This is best done in GIS or using database software. These tools provide the flexibility to change assumptions (e.g., scoring criteria) “on-the-fly” and the ability to run various scenarios. More importantly, these tools provide better data management while retaining the integrity of your data sets.
The Carver County Project Prioritization Tool was primarily built in Microsoft Excel and linked to the county’s comprehensive roadway file in GIS. In essence, the performance measures used the GIS roadway file’s attributes to score the performance measures in Microsoft Excel. The spreadsheets in Microsoft Excel also allow the County to adjust the scoring criteria and the performance targets “on-the-fly” to see “on-demand” results.

The prioritization tool, the scoring method and GIS mapping also readily provide transparency for the prioritization process. This ability to present scenarios, the priority rationale and geographic distribution gives County staff the ability to better communicate preservation needs and solutions to elected leaders, key stakeholders, and the public.

Once the scoring criteria is applied, a cumulative score is assigned to each roadway segment. Figure 4.10 is a screenshot of the Carver County’s Project Prioritization Tool’s interface.

**Figure 4.10 – Carver County Project Prioritization Tool (Screenshot)**

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**Step 6: Evaluate System Needs & Project Priorities**

The final outputs of the project prioritization tool is a prioritized list of projects, by roadway segment. The tool links these project priorities back to the County’s preservation needs and performance measures, and the outputs are useful when preparing CIPs.

The project prioritization outputs are very useful in informing programming decisions. However, it is importation to evaluate the draft outputs with a careful lens. Legitimate policy questions that can be used to adjust the project priorities include:

- What are the county’s priorities from a system preservation perspective?
• What are the county’s most immediate and pressing priorities (i.e., CSAH before CR)?
• What projects are necessary to avoid a “worst-first” approach (i.e., do projects in “fair” condition before those in “poor”)?
• What actions will benefit the largest number of customers of the system?
• What are some low-cost/high-benefit solutions or new technologies (see Strategy #8) that can be utilized to address priority preservation needs?

Case Study
All five pilot counties selected project prioritization as a preservation strategy. In addition to the study results noted above, please refer to Appendix E for an example of the prioritization tool, methodology and results from Stearns County.