



INVEST

ECONOMIC • SOCIAL • ENVIRONMENTAL

Version 1.1

Sustainable Highways Self-Evaluation Tool



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INVEST Version 1.1

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Primary Authors and Core Team Members

CH2M HILL

Lisa Reid, Project Manager

Tim Bevan, Principal-in-Charge

Anneke Davis

Tim Neuman

Kathleen Penney

Samuel Seskin

Mariah VanZerr

University of Washington

Jeraloe Anderson

Stephen Muench

Craig Weiland

Texas Transportation Institute

Tara Ramani

Joe Zietsman

High Street Consulting Group

Joe Crossett

Webkey LLC

Cory Crocker

Jordan Schulz

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Introduction to the Compendium

INVEST (Infrastructure Voluntary Evaluation Sustainability Tool) was developed by FHWA as a practical, web-based, collection of voluntary best practices, called criteria, designed to help transportation agencies integrate sustainability into their programs (policies, processes, procedures and practices) and projects. This compendium includes all of the criteria in INVEST 1.0 as of October 2012. It includes System Planning (SP), Project Development (PD), and Operations and Maintenance (OM) criteria. It is not intended to be an instructional manual or guidebook; the website, located at www.sustainablehighways.org, provides thorough information and instruction on how to use INVEST.

Short excerpts from the website are featured in this compendium. For more information, visit the INVEST website.

INVEST Version 1.0

INVEST Version 1.0 (v1.0) was the first full release of the INVEST tool and criteria in October 2012. It was developed through research and analysis of sustainability best practices in the transportation field. The original Beta Version criteria, released in the fall of 2010, were written by subject matter experts, and then were reviewed, modified, and vetted through valuable stakeholder feedback. After revising based on this feedback, the Pilot Test Version was released in the spring of 2011 for testing and evaluation across a broad spectrum of agencies, projects, programs and geographies. INVEST 1.0 reflects substantial revisions made to the criteria and web-based tool based on the pilot testing.

INVEST Versions 1.1 and 1.2

Development of Versions 1.1 and 1.2

After the release of INVEST v1.0, the Federal Highway Administration (FHWA) launched an implementation program that provided grants to teams from DOTs, MPOs, and a Tollway desiring to implement INVEST v1.0. These teams used INVEST to evaluate a project or program, and in some cases, their entire portfolio of projects. Each provided a final report to FHWA that included comments and suggestions for the online tool and the criteria. These comments were combined with comments received during the development of version 1.0 that were deferred for consideration in future versions of INVEST.

After reviewing the comments, it was decided to make two updates to INVEST, Version 1.1 and 1.2. Version 1.1 makes most of the editorial, formatting and errata changes, as well as enhancements to the online tool. **Version 1.1 does not affect the scoring of projects or programs.** Version 1.2, which is expected in the Spring of 2015, will make substantial changes to INVEST and will include modifications to criteria that affect scoring.

Modifications Included in Version 1.1

The edits to the criteria (within the SP, PD, and OM modules) include minor formatting, editorial, and content changes that **do not affect scoring**.

The formatting changes include inserting scoring requirement numbers and associated table numbers for better alignment between requirements and the web tool scoring questions. The editorial changes include grammatical corrections; modifications to word choice and consistency throughout the three modules; and correction of typos. The content changes include clarifications, definitions, and added or updated links and references. Figure 1, The website includes a *Matrix of INVEST Version 1.1 Criteria Changes*, that references each of the criteria and identifies the type of edits made. It can be downloaded at <https://www.sustainablehighways.org/1264/invest-11-summary-of-revisions.html>. If a content change was made, a brief description of that change is included.

Two versions of the Compendium are available for download, including an INVEST 1.1 version and an INVEST 1.1 Errata Version that shows the changes made to the criteria.

More significant changes were made in the web tool itself. These structural and functional changes were in response to user feedback to make INVEST Version 1.1 easier to use and more intuitive. They can be reviewed at <https://www.sustainablehighways.org/1264/invest-11-summary-of-revisions.html>.

INVEST Background

Transportation and Sustainability

Transportation projects and programs serve many different, and sometimes competing, objectives. “Sustainability” is a concept that enables decision-makers to make balanced choices around these objectives. The three principles of the “triple bottom line” upon which sustainability is based—social, economic, and environmental—capture the broad range of transportation goals and objectives. Highway project development (including project planning, design, and construction) should seek to apply these principles. These principles are useful because they begin to define specific results that can be achieved by improving highway sustainability. They begin to provide distinct reasons for highway project development to incorporate such diverse concepts as climate change, environmental protection, judicious use of funds, regional air quality improvement, construction quality incentives, recycling promotion, social equity, and environmental management system use. If done effectively, the result should be more sustainable highways. Using sustainable approaches in transportation infrastructure will help us to continue to enhance quality of life and serve the transportation needs of the present without compromising the ability of future generations to meet their needs.

What is the Purpose and Intent of this Tool?

FHWA's INVEST is designed to provide information and techniques to help agencies integrate sustainability best practices into their projects and programs. INVEST is intended to provide guidance for practitioners to evaluate the sustainability of their transportation projects and programs and to encourage sustainability progress within the field of transportation. **It is not required and it is not intended to encourage comparisons** between transportation agencies. INVEST was developed with input from state and local transportation agency officials and staff and professional organizations such as AASHTO and ASCE. FHWA will continue to update INVEST as the transportation sustainability field continues to advance. While the use of INVEST is voluntary, it can be used by transportation agencies, such as DOTs, MPOs, Council of Governments, public works departments, and their consultants and partners, to evaluate and aid the integration of sustainability into their programs and projects.

Modules and Scorecards

INVEST considers the full lifecycle of projects and has three modules to self-evaluate the entire lifecycle of transportation services, including System Planning (SP), Project Development (PD), and Operations and Maintenance (OM). Each of these modules is based on a separate collection of criteria and can be evaluated separately. INVEST 1.0 includes a total of sixty criteria organized into these three modules.

1. **System Planning (SP)** is the first step in the lifecycle of a transportation project. This is where an agency's system-wide network is analyzed and assessed to identify projects that will improve the safety, capacity, access, operations or other key features of the system. The SP module includes sixteen criteria and one bonus criteria (SP-4) that agencies are eligible for based on their scores on the first three criteria. There is one scorecard for the SP module that includes all of the criteria.
2. **Project Development (PD)** is the second step in the lifecycle of a transportation project. This is where specific projects conceptualized and programmed in the System Planning processes are planned, designed and

constructed. The PD module includes a total of twenty-nine criteria that are generally organized from planning to design to construction. The criteria are further organized into six scorecards for the evaluation of projects. The scorecards are designed to identify applicable criteria based on the project type and location. Five of these scorecards pre-identify criteria that are most likely to be applicable for the project type and location. The sixth scorecard is a custom scorecard option, which is a dynamic scorecard:

- Paving – for projects that are devoted exclusively to pavement preservation; restoration projects that extend the service life of existing facilities and enhance safety; or pavement restoration projects that restore pavement structure, ride quality, and spot safety. Use this scorecard for paving projects in both rural and urban locations.
- Basic Rural – for small, rural reconstruction or rural bridge replacement projects that do not expand capacity of the roadway.
- Basic Urban – for small urban reconstruction or urban bridge replacement projects that do not expand capacity of the roadway.
- Extended Rural – for rural projects for a new roadway facility; structure projects where nothing of its type currently exists; and major reconstruction projects that add travel lanes to an existing roadway or bridge.
- Extended Urban – for urban projects for a new roadway facility; structure projects where nothing of its type currently exists; and major reconstruction projects that add travel lanes to an existing roadway or bridge.
- Custom - for projects that do not fit any of the pre-defined scorecard options, the Custom Scorecard will allow the user to develop a unique set of criteria that is most appropriate for the project being evaluated. The Custom Scorecard starts with a core set of 19 that must be included as part of the score. There are not achievement levels associated with the custom scorecard.

Table 1 on the next page shows the criteria included in each of the PD scorecards. Each PD scorecard includes a different combination of the twenty-nine PD criteria based on the type project. The custom scorecard includes nineteen core criteria plus user-selected criteria to make a custom self-evaluation for projects that don't fit well into the five defined scorecards.

Table 1 - Project Development Criteria by Scorecard

Project Development by Criteria Scorecard						
	Paving	Urban Basic	Urban Extended	Rural Basic	Rural Extended	Custom Core Criteria ¹
PD-1 Economic Analyses			✓		✓	
PD-2 Life-Cycle Cost Analyses	✓	✓	✓	✓	✓	✓
PD-3 Context Sensitive Project Development		✓	✓	✓	✓	✓
PD-4 Highway and Traffic Safety	✓	✓	✓	✓	✓	✓
PD-5 Educational Outreach	✓	✓	✓	✓	✓	✓
PD-6 Tracking Environmental Commitments	✓	✓	✓	✓	✓	✓
PD-7 Habitat Restoration		✓	✓	✓	✓	✓
PD-8 Stormwater		✓	✓	✓	✓	✓
PD-9 Ecological Connectivity			✓	✓	✓	
PD-10 Pedestrian Access		✓	✓			
PD-11 Bicycle Access		✓	✓			
PD-12 Transit & HOV Access		✓	✓			
PD-13 Freight Mobility			✓		✓	
PD-14 ITS for System Operations		✓	✓		✓	
PD-15 Historical, Archaeological, and Cultural Preservation		✓	✓	✓	✓	✓
PD-16 Scenic, Natural, or Recreational Qualities			✓	✓	✓	
PD-17 Energy Efficiency		✓	✓	✓	✓	✓
PD-18 Site Vegetation		✓	✓	✓	✓	✓
PD-19 Reduce and Reuse Materials	✓	✓	✓	✓	✓	✓
PD-20 Recycle Materials	✓	✓	✓	✓	✓	✓
PD-21 Earthwork Balance			✓		✓	
PD-22 Long Life Pavement Design	✓	✓	✓	✓	✓	✓
PD-23 Reduced Energy and Emissions in Pavement Materials	✓	✓	✓	✓	✓	✓
PD-24 Contractor Warranty	✓	✓	✓	✓	✓	✓
PD-25 Construction Environmental Training		✓	✓	✓	✓	✓
PD-26 Construction Equipment Emission Reduction	✓	✓	✓	✓	✓	✓
PD-27 Construction Noise Mitigation		✓	✓			
PD-28 Construction Quality Control Plan	✓	✓	✓	✓	✓	✓
PD-29 Construction Waste Management	✓	✓	✓	✓	✓	✓
Total Number of Criteria in Scorecard	12	24	29	21	25	19

1 – Indicates the core criteria that must be included in the custom scorecard.
The user may choose as many additional criteria as desired.

3. **Operations & Maintenance (OM)** is the third step in the lifecycle of a transportation project. This is where infrastructure planned, designed and constructed in prior steps is operated and maintained and data collected and new project needs identified are passed back to the System Planning step to complete the lifecycle of projects. The OM module includes fourteen criteria including four aimed at internal operations and ten focused on maintenance and operations of the highway system. There is one scorecard for the OM module that includes all of the criteria.

Website and Tool

Website Organization

The INVEST website, at www.sustainablehighways.org is the primary source of INVEST information and contains the scoring tool. The site is organized into the following three primary sections, which are described in more detail below:

- **LEARN** – Provides a guided tour through the INVEST website to learn about sustainable highways and integrating sustainability best practices into projects and programs.
- **BROWSE** – Provides an interface to browse the complete set of criteria that can be used to evaluate the sustainability of projects and programs.
- **SCORE** – Is the self-evaluation tool that allows users to evaluate the sustainability of projects and programs. One of the key pages under

In addition to these primary sections, the website also contains a Glossary, FAQ, and Case Studies as well as links to the FHWA Sustainable Highways Initiative, site Registration, and a tool to Provide Comments

Learn

The **LEARN** section contains more information on multiple sustainability topics as well as more information about INVEST and using it to evaluate projects and programs. The following topics are covered:

- About Sustainability and Highways
 - What is Sustainability?
 - What is a Sustainable Highway?
 - Why Measure Sustainability?
 - How is Sustainability Measured?
- About INVEST
 - What is INVEST?
 - When Does INVEST Measure Sustainability?
 - How Does INVEST Measure Sustainability?
 - How are the Criteria Organized?
 - How are the Criteria Presented?
 - Are the Criteria Weighted?
- Using INVEST to Score an Agency's System Planning Program
 - About the System Planning Module
 - Why and When would I Score a System Planning Program?
 - Who Can Use the System Planning Module?
 - How Do I Use INVEST to Score a System Planning Program?
 - What Does the System Planning Score Mean?
- Using INVEST to Score a Project
 - About the Project Development Module
 - Why and When would I Score a Project?

- Who Can Use the Project Development Module?
- Which Scorecard Should I Use?
- Understanding the Context of a Project
- How Do I Use INVEST to Score a Project?
- What Does the Project Development Score Mean?
- Using INVEST to Score an Agency's Operations and Maintenance Program
 - About the Operations and Maintenance Module
 - Why and When Would I Score an Operations and Maintenance Program?
 - Who Can Use the Operations and Maintenance Module?
 - How Do I Use INVEST to Score an Operations and Maintenance Program?
 - What Does the Operations and Maintenance Score Mean?

Browse

The **BROWSE** section is essentially an online compendium. Users start by selecting a module to explore and can then select individual criteria to review and/or download. The Project Development criteria can be filtered to show only the criteria included in each scorecard.

The **BROWSE** section also contains a link to download a web (single-sided) or print (double-sided) version of the Version 1.1 Compendium as well as the Version 1.0 Compendium.

Score

There are 3 key functions on the **SCORE** page of the scoring tool, including an illustrated tutorial, new project/program registration, and **My Workspace**, a tool that allows you to see your current projects and programs and perform multiple scoring functions. My Workspace can be found on the right side of the website header or can be accessed by choosing to *Continue an Existing Project or Program* on the **SCORE** page.

Users can view basic project/program information including name, project IDs, Year Reviewed, Phase, Score, Status, and Rating. In addition, users can perform the following functions on individual projects/programs from **My Workspace**:

- Browse the Scoring Tutorial,
- Add a new Project or Program, and
- Modify Existing Projects or Programs by:
 - Editing Project/Program Information,
 - Duplicating a Project/Program,
 - Printing a Current Score,
 - Scoring a Project/Program,
 - Deleting a Project/Program, and
 - Collaborating with Others.

Criteria

The remainder of this document contains the criteria write-ups for all sixty (60) criteria contained in the System Planning, Project Development, and Operations & Maintenance modules of INVEST v1.1.

System Planning

SP-01: Integrated Planning: Land Use and Economic Development	SP-01
SP-02: Integrated Planning: Natural Environment.....	SP-02
SP-03: Integrated Planning: Social	SP-03
SP-04: Integrated Planning: Bonus.....	SP-04
SP-05: Access & Affordability	SP-05
SP-06: Safety Planning.....	SP-06
SP-07: Multimodal Transportation and Public Health	SP-07
SP-08: Freight and Goods Movement	SP-08
SP-09: Travel Demand Management	SP-09
SP-10: Air Quality	SP-10
SP-11: Energy and Fuels	SP-11
SP-12: Financial Sustainability.....	SP-12
SP-13: Analysis Methods	SP-13
SP-14: Transportation Systems Management & Operations.....	SP-04
SP-15: Linking Asset Management and Planning	SP-15
SP-16: Infrastructure Resiliency	SP-16
SP-17: Linking Planning and NEPA	SP-17

SP-01: Integrated Planning: Economic Development and Land Use

1-15 points

Goal: Integrate statewide and metropolitan Long Range Transportation Plans (LRTP) with statewide, regional, and/or local land use plans and economic development forecasts and goals. Proactively encourage and facilitate sustainability through the coordination of transportation, land use, and economic development planning.



Sustainability Linkage

Integrating transportation planning with economic development and land use supports the economic principle by creating opportunities to improve access and mobility, and increase the social, environmental, and economic returns on both public and private investments in transportation projects and programs..

Background and Scoring Requirements

Background

This criterion recognizes that each state and MPO has different land use and economic development regulatory, policy, and institutional frameworks, plans, and goals, and allows for flexibility in the activities and types of plans agencies use to measure integration. The intent of this criterion is to encourage agencies to integrate sustainability into transportation, land use, and economic development planning.

For the purpose of this criterion, it is important to define and further explain the following terms:

- **“Integration”** - In this case, “integration” means developing transportation, land use, and economic development plans consistently and collaboratively.
- **“Sustainable”** - Actions are sustainable when they maintain or enhance our capacity to endure. The goal of sustainability is the satisfaction of basic social and economic needs, both present and future, and the responsible use of natural resources, all while maintaining or improving the well-being of the environment on which life depends.
- **“Sustainability Principles”** - For the purposes of the INVEST tool, “sustainability principles” refers to the economic, environmental, and social principles of the triple bottom line.
- **“Economic development and land use plans”** - These include policies, plans, maps, regulations, or programs that focus on the use, design, location, density, or related features of land. These include growth strategies, comprehensive plans, zoning plans, downtown revitalization plans, visioning plans, and urban renewal plans, among others.

Agencies are encouraged to work with their stakeholders and the broader community to define what sustainability means for their jurisdiction in the context of land use and economic development. Examples of actions that typically promote sustainability principles include those that result in the efficient use of land near existing transportation infrastructure and/or those that enhance accessibility within and to existing communities. Other examples include policies that enhance the efficiency of goods movement (e.g., dedicated freight corridors or lanes), and policies that encourage economic development near planned transportation improvements.

In addition to many other widely used references and information sources, the following may be useful:

1. FHWA's Planning Tools for Linking Land Use and Transportation at www.fhwa.dot.gov/planning/ppasg.htm, and FHWA's Tool Kit for Integrating Land Use and Transportation Decision-Making at <http://www.fhwa.dot.gov/planning/landuse/index.htm>
2. The Transportation Planning Process: A Briefing Book for Transportation Decision-makers, Officials, and Staff, FHWA, Sept 2007 at <http://www.planning.dot.gov/documents/BriefingBook/BBook.htm>
3. Transportation Impacts of Smart Growth and Comprehensive Planning Initiatives, NCHRP Report 25-25 Task 02, May 2004 at [http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25\(2\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(2)_FR.pdf)
4. Travel Model Improvement Program Clearinghouse: Land Use at <http://tmiponline.org/Clearinghouse/Subject-Category/Land-use.aspx>
5. AASHTO Center for Environmental Excellence: Land Use at http://environment.transportation.org/environmental_issues/land_use_sg/recent_dev.aspx
6. NCHRP Report 582: Best Practices to Enhance the Transportation- Land Use Connection in the Rural United States at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_582.pdf

Scoring Requirements

Requirement SP-01.1

1-2 points. Develop and Adopt Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-01.1a**

1 point. Develop Goals and Objectives

The agency has developed goals and objectives for the integration of metropolitan and/or statewide transportation planning with economic development and land use planning above and beyond current requirements. The goals and objectives further the prospects for transportation investments that support sustainability.

- **Requirement SP-01.1b**

1 additional point. Goals and Objectives Consistent with Economic Development and Land Use Plans

The goals and objectives are consistent with applicable economic development and land use plans above and beyond current requirements. If existing local, metropolitan, and/or statewide economic development and land use plans cannot be said to further sustainability principles, the agency may earn the point by working with its partner jurisdictions to establish a joint vision for land use and economic development within the planning area that supports sustainability principles.

Requirement SP-01.2

2-3 points. Engage Partner Agencies

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-01.2a**

2 points. Engage Land Use and Economic Development Agencies

The agency regularly engages land use and economic development agencies in its jurisdiction throughout the transportation planning process, to reduce barriers and further the prospects for implementation of its goals and objectives as identified above.

- **Requirement SP-01.2b**

1 additional point. Utilize Institutional Mechanisms

The agency utilizes institutional mechanisms (such as ad hoc or standing technical advisory committees) to facilitate the engagement.

Requirement SP-01.3

2 points. Use Best Practice Quantitative Methods

The agency uses best practice quantitative methods (e.g. integrated land use and transportation models) to analyze and evaluate the performance of alternative land use/transportation scenarios. The agency incorporates the results into the LRTP. Technical assistance and resources are available through FHWA's Travel Model Improvement Program at <http://tmip.fhwa.dot.gov/>, FHWA's Toolkit for Integrating Land Use and Transportation Decision-Making at <http://www.fhwa.dot.gov/planning/landuse/tools.cfm>, and FHWA's Toolbox for Regional Policy Analysis at <http://www.fhwa.dot.gov/planning/toolbox/bibliography.htm>.

Requirement SP-01.4

2 points. Provide Leadership

The agency provides institutional leadership in encouraging transportation planning that is consistent with land use and economic development plans and that supports sustainability principles. Examples include the provision of incentives for partner jurisdictions (such as leveraging funds to provide planning grants, capital grants, model/tool development and/or technical assistance).

Requirement SP-01.5

1-6 points. Demonstrate Sustainable Outcomes

Scoring for this requirement is based on the following, cumulative elements. The first two elements must be accomplished to earn the third.

- **Requirement SP-01.5a**

1 point. LRTP Integrated with Land Use and Economic Development Plans

The LRTP is integrated with land use and economic development plans, and the agency is implementing transportation investments that support sustainability principles.

- **Requirement SP-01.5b**

2 points. LRTP Includes Sustainability Performance Measures

The LRTP includes sustainability-related performance measures for the integration of transportation planning with economic development and land use planning. Examples of sustainability-related performance measures can be found in NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf.

- **Requirement SP-01.5c**

3 additional points. Monitor Progress and Demonstrate Sustainable Outcomes

The agency monitors progress against the performance measures and can demonstrate the achievement of its goals and objectives.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation plans and supporting documentation that demonstrate how economic development and land use goals and objectives, stakeholder input, quantitative methods, and/or sustainability-related performance measures were integrated into the LRTP.
2. Documentation of regular land use and economic development agency engagement, and the incorporation of their feedback into transportation plans and programs. Documentation may include technical advisory committee membership rosters, meeting agendas and minutes, and interview summaries, among others.
3. Documentation of the use of best practice quantitative tools and analysis methods that enable the evaluation of integrated transportation, land use, and economic development scenarios.
4. The presence of statewide or metropolitan leadership and incentive programs for integrated transportation, land use, and economic development planning (e.g., state legislation, grant programs, and/or technical assistance, etc).
7. Documentation of the agency's monitoring process and progress to date at meeting the agency's goals and objectives for integrating transportation planning with economic development and land use planning and for implementing transportation investments that support sustainability principles.

SP-02: Integrated Planning: Natural Environment

1-15 points

Goal: Integrate ecological considerations into the transportation planning process, including the development of long range transportation plans (LRTP), corridor plans, and the TIP/STIP. Proactively support and enhance long-term ecological function through the coordination of transportation and natural resource planning.



Sustainability Linkage

Integrating transportation planning with natural resource planning supports the environmental principle by ensuring the transportation system supports and enhances sustainable ecological function.

Background and Scoring Requirements

Background

The agency conducts transportation planning activities in a comprehensive and integrated manner, and incorporates ecological considerations into the transportation planning process. The agency's LRTP is consistent with, and supports, applicable environmental plans, policies, and goals.

For the purpose of this criterion it is important to define and explain several terms:

- **“Integrated”** - For the purposes of this criterion, plans and planning are considered “integrated” when their means and ends are consistent, internally and with each other, and when they are developed in a collaborative manner.
- **“Sustainable”** - Actions are sustainable when they maintain or enhance our capacity to endure. The goal of sustainability is the satisfaction of basic social and economic needs, both present and future, and the responsible use of natural resources, all while maintaining or improving the well-being of the environment on which life depends.
- **“Ecological”** - In this case, it refers to the natural environment—specifically the ecosystems and natural resources on which life depends.
- **“Environmental plans, policies, and goals”** - These include air quality management plans, watershed and/or stormwater management plans, integrated natural resource management plans, climate change and energy plans, and/or habitat conservation or connectivity plans, among others.

Scoring Requirements

An agency can achieve points under this criterion through developing goals and objectives, engaging natural resource agency stakeholders, applying system or landscape-scale evaluation techniques, and demonstrating sustainable outcomes. Both the content of LRTP and the transportation planning process may be considered for points. An agency can achieve points under this criterion according to the following scoring requirements.

Requirement SP-02.1

1-2 points. Develop and Adopt Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-02.1a**

1 point. Develop Goals and Objectives

The agency has developed goals and objectives for the integration of metropolitan and/or statewide transportation planning with applicable environmental plans, policies, and goals. The goals and objectives are incorporated into the LRTP and encourage transportation investments that support and enhance long-term ecological function. Examples of transportation investments that support and enhance ecological function include those that improve surface water quality, maintain or enhance groundwater recharge (e.g., through innovative stormwater design features), or improve habitat connectivity (e.g., by increasing wildlife crossings, etc), among others.

- **Requirement SP-02.1b**

1 additional point. Goals and Objectives Consistent with Environmental Plans, Policies, and Goals

The goals and objectives are consistent with or surpass local, metropolitan, and/or statewide environmental plans, policies, and goals, as applicable.

Requirement SP-02.2

2-3 points. Engage Natural Resource and Regulatory Agencies

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-02.2a**

2 points. Engage Natural Resource and Regulatory Agencies

The agency goes above and beyond current consultation requirements by regularly engaging natural resource and regulatory agencies throughout the transportation planning process and incorporates their feedback into the creation of transportation plans and programs.

- **Requirement SP-02.21b**

1 additional point. Utilize Institutional Mechanisms

The agency utilizes institutional mechanisms (such as ad hoc or standing technical advisory committees) to facilitate the engagement.

Requirement SP-02.3

2 or 4 points. Apply System or Landscape-Scale Evaluation Techniques

The agency has applied system or landscape-scale evaluation techniques using natural resource data to (1) assess ecological conditions throughout the system, (2) identify opportunities to avoid and/or minimize potential impacts of planned transportation projects to the natural environment, and (3) identify opportunities to support and enhance long-term ecological function through planned transportation investments. Note that landscape-level natural resource data is collected at a higher resolution than project-level data and may be available through natural resource and regulatory agencies and/or non-profit organizations, such as the Nature Conservancy. An example of a landscape-level evaluation technique includes, but is not limited to, the regional ecosystem framework methodology as described in the Eco-Logical Ecosystem Approach at http://www.environment.fhwa.dot.gov/ecological/eco_index.asp.

Conducting system or landscape-level evaluations during the planning process has many benefits, including potentially identifying major environmental issues before project-level TIP/STIP decisions are made. Additionally, a system or landscape-level analysis can help lay the groundwork for satisfying future project-level federal environmental review requirements (see SP-17 Linking Planning and NEPA). Note that doing project-level NEPA analyses on transportation projects does not meet the intent of this requirement.

One of the following scores applies:

- **0 points.** The agency does not apply system or landscape-scale evaluation techniques using natural resource data during the transportation planning process.
- **2 points.** The agency applies system or landscape-scale evaluation techniques using natural resource data during the transportation planning process and has completed the first two items cited in the paragraph above.
- **4 points.** The agency applies system or landscape-scale evaluation techniques using natural resource data during the transportation planning process and has completed all three of the items cited in the paragraph above.

Requirement SP-02.4

1-6 points. Demonstrate Sustainable Outcomes

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-02.4a**
1 point. Integrate LRTP with Environmental Plans, Policies, and Goals
The LRTP is integrated with applicable environmental plans, policies, and goals, and the agency implements transportation investments that support and enhance long-term ecological function.
- **Requirement SP-02.4b**
2 points. LRTP Includes Sustainability Measures for Long-Term Ecological Function
The LRTP includes performance measures for long-term ecological function. Examples of sustainability-related ecological performance measures include, but are not limited to, “the number of projects programmed consistent with regional ecosystem framework(s)” and the “the number of projects programmed to maintain or improve water quantity or quality,” among others. Additional examples of sustainability-related performance measures can be found in NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf.
- **Requirement SP-02.4c**
3 points. Monitor Progress and Demonstrate Sustainable Outcomes
The agency monitors progress against the performance measures and can demonstrate sustainable outcomes.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation plans and supporting documentation that demonstrate how ecological considerations were integrated into the transportation planning process, including the development of the LRTP, corridor plans, and the TIP/STIP.

2. Documentation of regular natural resource and regulatory agency engagement and the incorporation of their feedback into transportation plans and programs. Documentation may include technical advisory committee membership rosters, meeting agendas and minutes, and interview summaries, among others.
3. Evaluation results that document the use of system or landscape-scale natural resource data, and system or landscape-scale evaluation techniques, and how the results of the assessment influenced project-level TIP/STIP decisions.
4. Documentation of the use of ecological criteria for the prioritization and selection of transportation projects included in the LRTP and/or TIP/STIP.
5. Documentation of the agency's monitoring process and progress to date at meeting the agency's goals and objectives for long-term ecological function.

SP-03: Integrated Planning: Social

1-15 points

Goal: The agency's Long Range Transportation Plan (LRTP) is consistent with and supportive of the community's vision and goals. When considered in an integrated fashion, these plans, goals and visions support sustainability principles. The agency applies context-sensitive principles to the planning process to achieve solutions that balance multiple objectives to meet stakeholder needs.



Sustainability Linkage

Integrating transportation planning with the community's vision and goals for sustainability supports the social principle by ensuring transportation investments reflect the unique vision, goals, and values of the community.

Background and Scoring Requirements

Background

The agency conducts transportation planning activities in a comprehensive and integrated manner, and incorporates the community's vision and goals for sustainability and stakeholder input into the transportation planning process. If community visions and goals for sustainability do not already exist, the agency works with stakeholders and the broader community to create visions and goals as they apply to the role of transportation in achieving sustainability outcomes. The agency successfully identifies a diverse range of stakeholders and public participants, engages them regularly throughout the transportation planning process, and demonstrates how their input informed and affected transportation planning decisions. The end result is a context-sensitive transportation system plan that is consistent with and supports the community's vision and goals for sustainability.

For the purpose of this credit, it is important to define and explain several terms:

- **"Community"** - In this case, the term "community" refers to persons, public agencies, and private or non-profit organizations within the agency's jurisdiction that are affected by changes to the transportation system.
- **"Vision and Goals"** - In this case, "visions and goals" refers to desired outcomes for the future that are determined by the community through an inclusive, comprehensive, and collaborative process.
- **"Sustainability"** - Actions are sustainable when they maintain or enhance our capacity to endure. The goal of sustainability is the satisfaction of basic social and economic needs, both present and future, and the responsible use of natural resources, all while maintaining or improving the well-being of the environment on which life depends.

In addition to many other widely used references, the following may be useful:

1. FHWA's Transportation Planning Process Resource Guide at http://www.fhwa.dot.gov/planning/public_involvement/resource_guide
2. FHWA's Context Sensitive Solutions Website at <http://contextsensitivesolutions.org>
3. Transportation Planning Capacity Building: Public Involvement Techniques at http://www.planning.dot.gov/PublicInvolvement/pi_documents/toc-foreword.asp

4. HUD-EPA-DOT Partnership for Sustainable Communities at <http://www.sustainablecommunities.gov/index.html>
5. NCHRP Synthesis 407: Effective Public Involvement Using Limited Resources at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_407.pdf
6. How to Engage Low-Literacy and Limited-English-Proficiency Populations in Transportation Decision-making at <http://www.fhwa.dot.gov/hep/lowlim/webbook.pdf>
7. International Association for Public Participation at <http://iap2usa.org>

Scoring Requirements

Requirement SP-03.1

2 points. Work toward a Shared Vision

Metropolitan and/or statewide transportation planning agencies share the community's vision for overall sustainability efforts, and transportation-related goals and objectives are consistent with that vision (as articulated in adopted community vision plans, sustainability plans, and/or community development plans, among others). The agency may also earn the points by working with its stakeholders and the broader community to create visions and goals (if they do not already exist) and to determine the role of transportation in helping to achieve sustainability outcomes.

Requirement SP-03.2

1-4 points. Engage a Diverse Range of Stakeholders and Public Participants

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-03.2a**

1 point. Identify Diverse Range of Stakeholders

The agency successfully identifies a diverse range of stakeholders and public participants, which include, at a minimum, all [interested parties](#) (as defined by current regulations), in addition to all other parties potentially affected by changes to the transportation system. The agency regularly engages the identified stakeholders and public participants throughout the transportation planning process.

- **Requirement SP-03.2b**

2 points. Give Special Consideration to Engagement of Diverse Populations

The agency gives special consideration and attention to the engagement of low-income, minority, disabled, and linguistically isolated populations, and uses a diverse and innovative range of public involvement techniques to ensure the engagement process is inclusive. Examples include, but are not limited to, conducting outreach in multiple languages, ensuring public meetings are coordinated with transit schedules, and using web-based surveys and/or social media to collect input, among others.

- **Requirement SP-03.2c**

1 point. Include Educational Component

The agency includes an education component so that stakeholders understand the transportation planning process and are able to better provide informed and meaningful input.

Requirement SP-03.3

1-3 points. Use a Transparent Process and Demonstrate the Incorporation of Stakeholder Input

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-03.3a**

1 point. Use Transparent Process

The agency uses a transparent process to inform stakeholders how their input will be used and then follows through accordingly. An example of a transparent process includes the use of an established hierarchy of public participation (such as the IAP2 Public Participation Spectrum at <http://www.cbe.ab.ca/schools/ceop/pdfs/spectrum.pdf> or [Arnstein's Ladder of Citizen Participation at http://www.cbe.ab.ca/schools/ceop/pdfs/spectrum.pdf](http://www.cbe.ab.ca/schools/ceop/pdfs/spectrum.pdf)).

- **Requirement SP-03.3b**

2 points. Demonstrate How Input was Used

The agency demonstrates to stakeholders how their input was used to inform and affect transportation planning decisions.

Requirement SP-03.4

1-6 points. Demonstrate Sustainable Outcomes

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-03.4a**

1 point. Implement Investments that Support Community Vision and Goals

The agency is implementing transportation investments that support the community's vision and goals and help achieve sustainability outcomes.

- **Requirement SP-03.4b**

2 point. Include Sustainability Performance Measures in Plan

The LRTP includes sustainability-related performance measures to assess the effectiveness of its public involvement process. Examples of sustainability-related performance measures can be found in NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf.

- **Requirement SP-03.4c**

3 points. Monitor Progress and Demonstrate Sustainable Outcomes

The agency monitors the effectiveness of its public involvement process against the performance measures, makes changes to improve the process as needed, and demonstrates sustainable outcomes.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation plans and supporting documentation that demonstrate how community vision and goals for sustainability and public input were integrated into the LRTP.
2. Documentation of the regular engagement of a diverse array of stakeholders, including low-income, minority, disabled, and linguistically isolated populations, throughout the transportation planning process. Example documentation sources include committee membership rosters, survey summaries, stakeholder interview summaries, and the times, locations, languages, and attendance of public meetings, among others.

3. Documentation of the use of a transparent public involvement process and the use of public input to inform and affect transportation planning decisions. Example documentation sources include a public involvement plan, project evaluation criteria, project prioritization processes, and comment response summaries that demonstrate how stakeholder input informed and affected the decisions made.
4. Documentation of the agency's monitoring process and the results of its evaluation of the effectiveness of its public involvement process.
5. A commendation for public participation planning in an FHWA/FTA TMA Planning Certification Review.

SP-04: Integrated Planning: Bonus

0-10 points

Goal: The agency has a continuing, cooperative, and comprehensive (3-C) transportation planning process. Planners and professionals from multiple disciplines and agencies (e.g., land use, transportation, economic development, energy, natural resources, community development, equity, housing, and public health) work together to incorporate and apply all three sustainability principles when preparing and evaluating plans.



Sustainability Linkage

Long-range, integrated planning at the state and metropolitan levels provides the most robust framework for responding to sustainability goals. This integration supports all of the triple bottom line principles.

Background and Scoring Requirements

Scoring Requirements

Prerequisite SP-04.1P

0 Points. Achieve 10 points on SP-01, SP-02, and SP-03

To gain points under this criterion, an agency must have achieved a score of 10 or higher on each of the first three INVEST System Planning criteria (SP-01 through SP-03).

High-performing states and MPOs must move beyond linking each sustainability criterion (economy, environment, and society) separately to transportation. In addition, MPOs and states must incorporate and evaluate the linkages and tradeoffs *between* the sustainability principles. States and MPOs that qualify for points will be able to show how their transportation planning process and its tangible products (LRTP, S/TIP, UPWP) support this broader understanding of sustainability.

Requirement SP-04.1

5 or 10 points. Transportation Planning Occurs within an Integrated and Collaborative Planning Process

As noted by FHWA at <http://www.fhwa.dot.gov/planning/metro/index.htm>, “since the 1962 Federal-aid Highway Act, federal authorizing legislation for expenditure of surface transportation funds has required metropolitan area transportation plans and programs to be developed through a continuing, cooperative, and comprehensive (3-C) planning process.” While Federal legislation and regulations have required this at the metropolitan level, the 3-C principles support the intent of the INVEST system well. Both state and metropolitan planning for sustainable transportation outcomes are well served by following the 3-C process.

Thus, to achieve points under this criterion, the agency’s transportation planning should occur within a 3-C planning process that is interdisciplinary, and that considers all three sustainability principles at the same time. Agencies will have brought interdisciplinary stakeholders from outside the agency to evaluate its planning process through a sustainability lens and will have developed approaches that integrate the three sustainability principles into the plan(s) for their state or region. Such work is not easily reduced to a formula. Examples include, but are not limited to:

- Sacramento's Blueprint (at <http://www.fhwa.dot.gov/planning/landuse/sacramentocs.htm>): Integrating community participation, urban planning and design, and quantitative analysis in the public involvement process.
- Florida DOT's ETDM Process (at http://environment.fhwa.dot.gov/integ/case_florida.asp): The development of a process for early and continuous resource agency input, and GIS analysis, into the agency's planning and decision making process.
- Comprehensive Plan Development: The LRTP is part of a "Comprehensive Plan", as described by the American Planning Association. The American Planning Association describes a comprehensive plan as "establish[ing] a 20-30 year blueprint for the long-range future of the entire community and guides local policy decisions. [The Comprehensive Plan] makes explicit the dependencies and interrelationships that exist between topics such as housing, transportation, land use, economic development and environmental protection. [It may also be] referred to as the general plan or master plan, the comprehensive plan is typically updated every 10-15 years and consists of mandatory elements (as required by state enabling legislation) and voluntary elements (not required by state legislation but important to addressing emerging needs and issues of a community)."
- The active involvement of representatives of multiple agencies, stakeholders, and disciplines in the Agency's INVEST self-evaluation scoring process.

One of the following scores apply:

- **0 points.** The agency assembles separate plans produced from different disciplines without interacting or collaborating with each other.
- **5 points.** The agency is making progress toward conducting its transportation planning within an interdisciplinary planning process; however, the three sustainability principles have not yet been fully integrated into the plan(s) for its jurisdiction.
- **10 points.** The agency's transportation planning occurs within an interdisciplinary planning process. Interdisciplinary stakeholders from outside the agency have evaluated the agency's planning process through a sustainability lens and the agency has developed approaches that integrate the three sustainability principles into the plan(s) for its jurisdiction.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following sources (or equivalent), as appropriate:

1. Documentation that transportation planning occurs within an interdisciplinary, 3-C planning process (e.g., a Comprehensive Plan, Sustainability Plan, or General Plan, among others).
2. Documentation of interdisciplinary collaboration and the evaluation of the agency's planning process through a sustainability lens (e.g., documentation of input, meeting minutes, or a summary report).

SP-05: Access and Affordability

1-15 points

Goal: Enhance accessibility and affordability of the transportation system to all users and by multiple modes.

Sustainability Linkage

Improved access and affordability benefit the social and economic sustainability principles by improving employment opportunities and enhancing opportunities to interact with the community. Increasing the modal choices available to the public supports the environmental principle by offering alternatives to motorized travel.



Background and Scoring Requirements

This criterion is related to SP-08: Freight and Goods Movement. This criterion focuses on access for people, while SP-08 focuses on access for freight and goods movement.

Background

As explained below, in the context of this self-evaluation tool, accessibility refers to three distinct and complementary issues—physical access, equitable access, and affordable access. To support and inform decision-making, agencies should conduct evaluations and analyses with regard to accessibility and affordability, and should use the results in the programming of transportation improvements.

The following are examples of accessibility issues that might be considered in a transportation planning context.

Reverse commutes: A community has high unemployment due in part to an inability to access service and retail jobs which are on the periphery of the metropolitan area. An accessibility analysis is performed to determine what highway or transit investments or improvements are needed to enhance the accessibility of these workers to job sites. The analysis considers the mismatches between the skills of the unemployed and locally available jobs, as well as auto ownership rates.

Economically depressed/isolated rural communities: A specific region of a state is economically depressed and isolated and wants additional highway investment to spur economic growth and enhance access to services (e.g., hospitals, airports, grocery stores). The political leadership requests that the State transportation agency evaluate whether a lack of accessibility is contributing to the area's economic woes and isolation. The agency conducts an accessibility analysis to determine the extent to which the area needs additional access and scopes specific projects/programs. These programs address both time and cost barriers to access.

Access for people with limited mobility or disabilities: An older metropolitan area has many transportation facilities that are not accessible to users with limited mobility or disabilities. This issue has been raised by the MPO's constituency as a primary concern that should be addressed in the transportation plan. In cooperation with the appropriate implementing agencies, the MPO conducts a study of areas where accessible facilities are lacking and needed, and creates a plan for strategically implementing projects/programs to enhance access to the transportation system for these populations. The results of the study are incorporated into its LRTP.

As these examples show, the terms access and accessibility have a number of dimensions. In developing plans, agencies should consider the following (the associated details are illustrative only):

Physical Access

- Compliance with the *Americans with Disabilities Act* (ADA), and more broadly to the principles of universal design, which go above and beyond ADA requirements.
- The ability to reach desired goods, services, activities, and destinations (collectively called opportunities). Providing a broad range of transportation choices increases accessibility.
- Trip connectivity which allows convenient, seamless, and intuitive connections between modes.

Access and Equity

- The availability of road, rail, bus, bike, and pedestrian facilities and transit service for all members of the public and specifically for minority and low-income communities.
- The impacts of transportation on all members of the public and specifically on minority communities and low-income communities.
- The cumulative opportunities afforded by access to jobs, education, food, recreation, health care, social services, places of worship, libraries, retail centers, etc. Good access is especially important for:
 - Rural isolated and/or poor communities
 - Transit-dependent households
 - Other zero-car households
 - Low-income households
 - Persons with disabilities
 - Older adults
 - Children

Affordability

Increase the affordability of the transportation system as a whole through the following transportation planning projects and programs:

- Planning and programming that specifically addresses the minimization of transportation costs, particularly for those that are poor or disadvantaged.
- Conduct planning activities that are focused on minimizing the cost of transportation:
 - Encourage non-motorized access
 - Encourage higher density and mixed-use developments in close proximity to existing transportation services or in conjunction with the development of new services
 - Allow flexibility for non-traditional transportation modes of transportation structures (e.g., jitneys, personal car-sharing, etc.)
- Specific outreach and communication strategies focused on the transportation needs of the disadvantaged.

Scoring Requirements

To achieve points, the agency must demonstrate that it effectively evaluates and monitors the distribution of user benefits and relative accessibility through planned transportation improvements to communities and areas/populations of concern. Points can be earned for increasing levels of activity in the planning process as follows:

Requirement SP-05.1

2 or 4 points. Discussion/Consideration in Planning Documents

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-05.1a**

2 points. Analyze Three Dimensions of Accessibility and Identify Populations where Access is an Issue

System planning documents analyze the three dimensions of accessibility and identify specific population groups or areas where this is an issue. The analysis includes a discussion of time and cost barriers, as well as their consequences. The document includes specific, planned programs or improvements that address access issues.

- **Requirement SP-05.1b**

2 additional points. Include Documentation of Outreach Communications

The planning document includes documentation of targeted, enhanced outreach or communications that have been used to engage these population groups or areas in the planning process. The agency goes above and beyond requirements to ensure public meetings are accessible by using innovative methods to involve these groups. Examples of innovative methods include, but are not limited to, taking the meeting to them (so they do not have to make a special trip), and providing materials in multiple languages and formats (e.g., ensuring compatibility with “readers” used by the visually impaired, etc), among others.

Requirement SP-05.2

2-5 points. Use Quantitative Analysis in Plans and Programs

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-05.2a**

2 points. Quantitatively Evaluate Accessibility and Affordability Concerns

The agency uses travel model, census, geospatial, and other data to quantitatively evaluate the nature and distribution of accessibility and affordability concerns in its jurisdiction.

- **Requirement SP-05.2b**

3 points. Quantitatively Analyze How System Addresses Concerns

The agency quantitatively analyzes how its system plan or program addresses or improves concerns/issues such as:

- Access to commercial centers, jobs, hospitals, schools, and other civic institutions and social and emergency services,
- The affordability of travel choices, and
- The affordability of housing through its relationship to transportation investments.

Requirement SP-05.3

3 or 6 points. Regular Monitoring of Plans and Programs

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-05.3a**

3 points. Include Sustainability Performance Measures

The system plan or program includes sustainability-related performance measures that can be used to monitor the effects of plan implementation on transportation accessibility and affordability.

- **Requirement SP-05.3b**

3 additional points. Monitor Progress and Demonstrate Sustainable Outcomes

The agency is monitoring progress against the performance measures and adjusts its program efforts as necessary to meet its goals.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following sources (or equivalent), as appropriate:

1. LRTP and TIP/STIP include accessibility and affordability content.
2. Supplemental documentation of accessibility and affordability analyses and evaluations.
3. Documentation of targeted and enhanced communication and outreach to “traditionally underserved” populations.
4. Documentation of implemented projects or activities to improve access and affordability in response to discussion/analysis.
5. Documentation of the agency’s performance measures, monitoring process, and progress to date.

SP-06: Safety Planning

1-15 points

Goal: Agency integrates quantitative measures of safety into regional planning policies, ordinances, activities, projects, and programs, and across all modes and jurisdictions.

Sustainability Linkage

Reducing fatal and serious injuries contributes to the social and economic principles by reducing the impacts associated with personal and public property damage, injury, and loss of life.



Background and Scoring Requirements

Background

The purpose of this criterion is to recognize the efforts of agencies to reduce fatalities and serious injuries by integrating quantitative measures of safety into the transportation planning process, thereby assuring that consideration of meaningful measures of safety influences program development and implementation.

Scoring Requirements

Requirement SP-06.1

1-2 points. Collaborate and Participate in the Development and Implementation of the State Strategic Highway Safety Plan

One of the following scores applies:

- **0 points.** Is not involved in the development of the State Strategic Highway Safety Plan (SHSP).
- **1 point.** Actively collaborates in the creation of the SHSP but is not implementing the SHSP as part of agency-specific planning and programming activities.
- **2 points.** Actively collaborates in the creation of the SHSP and implements the SHSP in agency-specific planning and programming activities.

Requirement SP-06.2

1 point. Integrate the Toward Zero Death Vision into the Agency's Vision for Planning

Agency or office incorporates the Toward Zero Death (TZD) vision. Implements TZD as part of planning activities (i.e., use multi-disciplinary and integrated approaches to reduce fatal and serious injuries in crashes). The agency vision for planning reflects intention to cooperate and collaborate across all levels of government.

Requirement SP-06.3

1 point. Develop a Plan that Incorporates Safety into Short- and Long-Range Planning

Develop a plan that incorporates safety into short- and long-range planning that:

- Presents a system-wide approach to reduce the risk of fatal and serious injuries based on data-driven, systematic, and scientific methods and approaches. These methods and approaches account for regression-to-the-mean and incorporate performance thresholds (quantify base performance).

- Includes safety-specific strategies and lead agencies.
- Supports integrated and multidisciplinary approaches to reduce the number of fatal and serious injuries on the entire public highway system in the region.
- Demonstrates a commitment from the agency to include quantitative safety into programming of projects and activities.

The plan could be a single statewide plan or a combination of SOPs at headquarters and district/regional levels, or a plan for a county, metropolitan area, or regional council area.

One of the following scores applies:

- **0 points.** No plan exists. For MPOs, transportation plans do not align with the State SHSP; for state DOTs, the other safety plans for the state (LRTP, HSP, HSIP, CVSP) do not align with the SHSP.
- **1 point.** Develop a system-wide approach to identify expenditure on programs, projects, and activities targeting a reduction in fatal and serious injuries in the region (could be a single statewide or regional safety plan as part of a collaborative effort across all, or a combination of SOPs at headquarters and district/regional levels of government [federal, state, and local]).

Requirement SP-06.4

1 point. Integrate Quantitative Safety Performance Measures into Performance-Based Planning Processes

One of the following scores applies:

- **0 points.** Safety is not integrated into a performance-based planning process or the agency uses crash rates as a measure to identify system needs.
- **1 point.** Integrate quantitative safety performance measures into a performance-based planning process. Use quantitative safety performance measure(s) to quantify safety performance in terms of the number of crashes or severity. For example, the number of fatal and serious injury crashes, the number of fatal and serious injuries, or the number of fatal and injury crashes involving vulnerable users (pedestrians, bicyclists, motorcyclists, older users, and children). Network screening, as presented in Chapter 4 of the AASHTO Highway Safety Manual, presents advanced measures that account for regression to the mean and offer higher statistical reliability than, for example, crash rate methods.

Requirement SP-06.5

1-3 points. Integrate Quantitative Safety Considerations in the Selection and Evaluation of Strategies in the Planning Process

Scoring is based on the following, cumulative elements.

- **Requirement SP-06.5a**
2 points. Integrate Quantitative Safety Performance Measures
 Incorporate and integrate quantitative safety performance measures into the selection and evaluation of strategies for different user groups (for example, pedestrians, bicyclists, motorcyclists, vehicle occupants).
- **Requirement SP-06.5b**
1 points. Select Systemic Treatment Strategies with Proven Safety Effectiveness
 Select strategies that include systemic treatments with proven effectiveness in reducing fatal and serious injuries (may be operational or safety-specific in nature).

Requirement SP-06.6

3 points. Integrate Statistically Sound Approaches to Determine Projected Safety Performance as Part of the Long-Range Transportation Planning Process.

Adopt and integrate advanced, statistically sound quantitative methods to set performance baselines and estimate the anticipated future safety performance during the long-range transportation planning process. The agency is using tools that rely on macro-level predictive models to provide a quantitative and statistically reliable forecast of crashes for a given future travel demand (using output from travel demand models), and socio-demographics if no particular improvements in safety culture, infrastructure, EMS, and other areas occur other than what exists at the base year of the analysis. PlanSafe is an example of such an analysis tool (developed and updated through NCHRP and can be found in a TRB report at <http://www.trb.org/Main/Blurbs/163790.aspx>).

Requirement SP-06.7

1-4 points. Collect and Maintain Data (Safety and Non-Crash Information) for the Public Roadway System for use in Activities Related to Planning for Safety and to Incorporate Safety into Long-Range Transportation Planning.

Scoring is based on the following, cumulative elements.

- **Requirement SP-06.7a**

1 point. Actively Participate in State Traffic Records Coordinating Committee

Actively participates and supports the state Traffic Records Coordinating Committee (TRCC) and jointly funds initiatives related to improvement of data management and linkage initiatives.

- **Requirement SP-06.7b**

1 point. Develop, Maintain, and Use GIS-based Data

Develops, maintains, and uses GIS-based data files for the entire public roadway system, crash* and noncrash information in planning for safety and incorporating safety into long-range transportation planning.

- **Requirement SP-06.7c**

1 point. Create, Maintain, and Use GIS-based Data

Creates, maintains, and uses GIS-based data for safety analysis and for use in consideration of safety as part of long-range planning. NOTE: for MPO or regional agencies, this point does not include the creation of a GIS-based crash data file but includes support to the state in the development of a GIS-based roadway layer for all public roadways in the state.

- **Requirement SP-06.7d**

1 point. Routinely Join Roadway, Operations, Asset Management, Medical and Other Datasets

Routinely joins roadway, operations, asset management, medical, and other datasets spatially with crash data in the analysis for identification of potential safety improvements and prioritization of planning programs, projects, and activities.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of agency vision statements and vision statements for planning and planning-related programs that reflect adoption and inclusion of a Toward Zero Death vision into the planning process and related activities.
2. Requirements set for safety project funding (e.g., HSIP).

3. Project reports documenting the evaluation of future anticipated safety performance for short-, medium-, and long-range transportation plans as part of the planning process.
4. Documentation on the processes the agency uses to select, evaluate, and prioritize projects for inclusion into short-, medium-, and long-range transportation planning activities.
5. Documentation to identify alignment across different state and regional plans (SHSP, STIP, TIP, CVSP, and HSIP), regardless of whether these plans have a safety focus or not.
6. Relevant agency policies or manuals.
7. Documentation of evaluation of policies, projects, and activities to assess the impact on fatal and serious injury crashes and fatal and serious injury crashes involving vulnerable users.
8. NHTSA State Traffic Records Assessment Report and FHWA State Data Capability Assessment Report for assessments performed within the last 3 years.

SP-07: Multimodal Transportation and Public Health

1-15 points

Goal: Expand travel choices and modal options by enhancing the extent and connectivity of multimodal infrastructure. Support and enhance public health by investing in active transportation modes.

Sustainability Linkage

A multimodal transportation network supports the social and economic principles by increasing transportation options, reducing traffic congestion and emissions, and encouraging the use of active modes to enhance public health.



Background and Scoring Requirements

Background

The agency provides choices and opportunities for multimodal, active transportation networks while meeting access and mobility needs.

For the purpose of this criterion, the key terms are defined as follows:

- **“Multimodal”** - Multimodal refers to a transportation system that provides travelers with well-connected and integrated bicycle, pedestrian, and transit networks, in addition to automobile infrastructure. Multimodal can also refer to the provision of travel options for inter-city passenger travel, such as rail, train, bus, or ferry as alternatives to air travel.
- **“Active transportation modes”** - Active transportation modes refer to modes of transportation that increase levels of physical activity and are considered to primarily include biking, walking, and transit (Approximately 30% of transit users receive the CDC recommended amount of daily physical activity. Source: Besser, L. and A. Dannenberg, *Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations*, American Journal of Preventative Medicine, 2005.)

In addition to many other widely used references, the following may be useful:

1. *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, American Association of State Highway and Transportation Officials, Washington, DC, July 2004.
2. *Guide for the Development of Bicycle Facilities*, 3rd Edition, American Association of State Highway and Transportation Officials, Washington, DC, 1999.
3. *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, Institute of Transportation Engineers, Washington, DC, March 2010 at <http://library.ite.org/pub/e1cff43c-2354-d714-51d9-d82b39d4dbad>.
4. *A Resident's Guide for Creating Safe and Walkable Communities*, Federal Highway Administration, Washington, DC, February 2008 at http://safety.fhwa.dot.gov/PED_BIKE/ped_cmnty/ped_walkguide/index.cfm.
5. *Center for Disease Control: Transportation Recommendations at* <http://www.cdc.gov/transportation/recommendation.htm>.
6. *The Hidden Health Costs of Transportation*, American Public Health Association, February 10, 2010 at http://www.apha.org/~media/files/pdf/topics/transport/hidden_health_costs_of_transportation_background.ashx.

Scoring Requirements

To achieve points, the agency must demonstrate that it produces, monitors, and maintains an integrated multimodal transportation plan that emphasizes active modes. Points are awarded for this criterion based on the following requirements.

Requirement SP-07.1

1-2 points. Develop Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-07.1a**
1 point. Develop Goals and Objectives for Enhancing Multimodal Infrastructure
The agency has developed goals and objectives for enhancing the extent and connectivity of multimodal infrastructure within its jurisdiction, including transit and non-motorized modes.
- **Requirement SP-07.1b**
1 point. Develop Goals and Objectives Related Transportation and Public Health
The agency has developed goals and objectives related to active transportation and the improvement of public health.

Requirement SP-07.2

2 points. Engage Stakeholders

The agency regularly engages public health and active mode stakeholders throughout the transportation planning process and incorporates their feedback into the creation of transportation plans and programs. That is, successfully involve and interact with an institution or stakeholder early, often, and on an on-going basis throughout the planning process.

Requirement SP-07.3

1-5 points. Develop a System-wide Program

The agency's planning process integrates multimodal and active mode infrastructure needs, projects, and programs. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second. The third element is independent.

- **Requirement SP-07.3a**
1 point. Include Active, Non-Motorized Projects and Programs in Plan
The agency includes and prioritizes active, non-motorized transportation projects and programs as a component of the LRTP. Examples of projects include the expansion of transit, pedestrian, and bicycle infrastructure, facilities, and services. Examples of programs include the implementation of Safe Routes to School.
- **Requirement SP-07.3b**
1 additional point. Integrate Transit, Pedestrian, Bicycle and Roadway Networks
The agency's LRTP integrates transit, pedestrian, bicycle, and roadway networks so that intermodal connections are safe and convenient.
- **Requirement SP-07.3c**
3 points. Evaluate Health Impacts of the Plan
The agency has evaluated the health impacts of the LRTP to determine whether the planned transportation investments will help the agency to meet its public health and active transportation goals.

Requirement SP-07.4

1-6 points. Measure Progress and Demonstrate Sustainable Outcomes

The agency evaluates its progress toward meeting its multimodal and public health goals and makes adjustments as necessary. Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-07.4a**

1 point. Implement Investments that Expand Travel Choices and Support Public Health

The agency is implementing transportation investments that expand travel choices and modal options and support and enhance public health.

- **Requirement SP-07.4b**

2 points. Incorporate Sustainable Performance Measures

The agency has incorporated sustainable, multimodal and public health-related performance measures into its LRTP and can demonstrate ongoing monitoring of its progress toward meeting its goals.

- **Requirement SP-07.4c**

3 points. Measure Progress and Demonstrate Sustainable Outcomes

The agency can document that it has met its multimodal transportation and public health goals and objectives.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation plans that incorporate multimodal and active mode projects and programs.
2. Documentation of regular public health and active mode stakeholder engagement, and the incorporation of their feedback into transportation plans and programs. Documentation may include technical advisory committee membership rosters, meeting agendas and minutes, and interview summaries, among others.
3. A programming and prioritization evaluation framework that demonstrates the prioritization of multimodal and active mode projects and programs.
4. The results of transportation plan evaluations that estimate the public health impacts of the proposed transportation projects and programs.
5. Progress reports and analyses of the agency's progress at meeting its multimodal and public health goals.

SP-08: Freight and Goods Movement

1-15 points

Goal: Implement a transportation system plan that meets freight access and mobility needs while also supporting triple bottom line sustainability principles.

Sustainability Linkage

Freight and goods movement planning benefits all of the triple bottom line principles by supporting economic prosperity through improved freight efficiency and reliability, reducing fuel consumption and related emissions, and reducing adverse impacts of freight on communities.



Background and Scoring Requirements

This criterion is related to SP-05: Access and Affordability. This criterion focuses on access for freight and goods movement, while SP-05 focuses on access for people.

Background

A more sustainable freight system provides convenient access to goods and markets, allows for multiple freight modes, reduces congestion on roadways, and reduces freight inefficiencies and adverse impacts on communities (noise, emissions, vibrations, etc.).

Examples of goods movement issues that may be considered in a transportation planning context are described below:

- **Farm to market:** The goals and objectives of a particular state support the increased access of farmers to food/product markets. The current transportation system provides inferior access to markets from specific farming regions in the state. The State DOT collects data and performs a sketch planning accessibility analyses. These analyses help the State identify and scope specific improvements to enhance access to these areas.
- **Metropolitan Freight Mobility Study:** The MPO conducts a comprehensive, systems-level mobility study specifically addressing freight movement needs, issues, and potential solutions. The MPO identifies freight bottlenecks, such as truck access to intermodal terminals, and uses data and tools to evaluate alternative solutions. The MPO engages the freight carriers in the conduct of the study.

Scoring Requirements

To achieve points, the agency must demonstrate that it has evaluated or improved freight mobility, reliability, and/or intermodal freight connections. Agencies can earn points according to the following; each of the scoring options is independent and can be achieved without prerequisites:

Requirement SP-08.1

2-3 points. Engage Stakeholders

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-08.1a**

2 points. Engage a Wide Variety of Stakeholders

The agency regularly engages a wide variety of freight service providers, stakeholders, workers, and representatives in creating plans and programs to ensure freight activity supports sustainable economic activity that fits well in the context of the metropolitan area and community.

- **Requirement SP-08.1a**

1 additional point. Utilize Institutional Mechanisms

The agency utilizes institutional mechanisms to facilitate the engagement. Examples of institutional mechanisms include freight representatives serving on a decision-making board or advisory committee.

Requirement SP-08.2

2 or 4 points. Freight Mobility Needs

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-08.2a**

2 points. Consider Multimodal Freight Mobility Needs in Plan

The agency considers multimodal freight mobility needs (aviation, marine, rail, interstate, pipeline, and intermodal) in the planning process and/or the LRTP. Freight mobility goals and evaluation criteria are included when developing the program or plan.

- **Requirement SP-08.2b**

2 points. Include Sustainable Performance Measures

The agency includes and monitors sustainability-related freight mobility performance measures in planning documents. Examples of performance measures can be found in NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf.

Requirement SP-08.3

2 or 4 points. Freight Reliability

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-08.3a**

2 points. Include Provisions for Maintaining and Improving Freight Reliability and Interconnections

The agency includes in the LRTP or other appropriate plan (for example, a freight rail plan) specific provisions for maintaining and improving freight reliability and interconnectedness between freight modes for both inter- and intra-city freight, in ways that enhance sustainability (e.g., improve safety and fuel economy and/or reduce noise and emissions). Examples of provisions include information exchange, infrastructure investments, technology, and other best practices.

- **Requirement SP-08.3b**

2 points. Include and Monitor Sustainable Freight Reliability Performance Measures

The agency includes and monitors sustainability-related freight reliability performance measures in planning documents.

Requirement SP-08.4

2 or 4 points. Intermodal Freight Connectors

Intermodal freight connectors are the public roads leading to major intermodal terminals. Although they account for less than 1 percent of National Highway System mileage, they are key conduits for the timely and reliable delivery of goods. Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-08.4a**

2 points. Provide for Planning, Evaluating, Maintaining, and Improving Intermodal Freight Connections

The agency provides for planning, evaluating, maintaining, and improving intermodal freight connectors at all levels (federal, state, and local). Measures and criteria to encourage coordination among the freight modes (e.g., rail, port, airport, and other) in ways that enhance sustainability are included.

- **Requirement SP-08.4b**

2 points. Include Sustainable Freight-Connectivity Performance Measures

The agency includes and monitors sustainability-related performance measures for intermodal freight connectors in planning documents.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A stakeholder involvement/public involvement plan or a similar description of the efforts used to engage the freight community in creating transportation plans and programs.
2. Documentation of freight mobility goals, objectives, and policies.
3. A freight section in plans (or a freight plan) that includes freight performance measures and implementation strategies/actions.
4. Plan and program recommendations that address sustainable freight and goods movement best practices.

SP-09: Travel Demand Management

1-15 points

Goal: Reduce vehicle travel demand throughout the system.

Sustainability Linkage

Transportation Demand Management (TDM) supports all of the triple bottom line principles by reducing energy consumption and related emissions, improving awareness of available travel choices, and reducing costs of travel and congestion.



Affected Triple Bottom Line Principles

Background and Scoring Requirements

This criterion relates to SP-14: Transportation Systems Management & Operations; while both can help to mitigate congestion, SP-09 focuses primarily on reducing SOV travel demand and SP-14 focuses on optimizing the efficiency of the transportation system. Accordingly, the spatial or temporal shifting of travel demand to off-peak periods and less congested facilities is covered in SP-14.

Background

TDM is a tool that seeks to reduce vehicle travel by making it easier for travelers to elect travel options other than driving alone (such as transit, bicycle, walking, ridesharing, and teleworking). Common types of TDM strategies include, but are not limited to:

1. Travel option education and outreach programs
2. Challenge/incentive programs for non-auto modes
3. Rideshare and car-sharing programs
4. Parking pricing and policies
5. Road/vehicle pricing policies
6. Land use policies (that promote a mixed-use, pedestrian-friendly built environment)
7. Employer trip reduction programs (e.g., transit benefits, trip end facilities, parking cash-out programs, teleworking, etc)
8. Transportation Management Organizations (TMO), among others

These strategies represent a range of approaches to TDM, including those that are more appropriate for implementation at the state level (e.g., road/vehicle pricing policies, etc.) and those that are more appropriate for implementation at the MPO and/or local government level (e.g., rideshare programs, parking policies, etc.). Additionally, some of these strategies may work best in urban contexts (e.g., TMOs), while others are well suited to either urban or rural settings (e.g., rideshare programs). Additional TDM guidance and reference materials are available on the FHWA website at <http://ops.fhwa.dot.gov/tdm/index.htm>.

The requirements for earning points under this criterion are described below. To achieve the most points, TDM performance measures and a means of quantifiably assessing outcomes is required. It should be noted that for all the scoring requirements below, an agency may earn the points for implementing the requirements themselves or for providing support/funding (such as grants or technical assistance) to other agencies within its jurisdiction (e.g., transit agencies, MPOs, councils of governments (COG), and/or non-profit agencies, etc.) for achieving the requirements. This may often be the case for state DOTs.

Scoring Requirements

Requirement SP-09.1

1-2 points. Set TDM Goals and Objectives

Scoring is based on the following, cumulative elements:

- **Requirement SP-09.1a**

1 point. Develop Quantifiable TDM Goals and Objectives

The agency has developed quantifiable TDM goals and objectives for reducing travel demand for the transportation network within its jurisdiction. Examples of TDM goals and objectives include vehicle miles of travel (VMT) reduction goals and/or mode split targets.

- **Requirement SP-09.1b**

1 additional point. TDM Goals and Objectives are Consistent with State and Metropolitan Goals and Objectives

The TDM goals and objectives are also consistent with relevant state and/or metropolitan goals and objectives for reducing travel demand.

Requirement SP-09.2

2 or 4 points. Implement a TDM Program

The agency is implementing a comprehensive TDM program that includes several of the various types of TDM strategies described in the Background paragraph above. One of the following scores applies:

- **0 points.** The agency is implementing less than two of the TDM strategies described in the Background paragraph above.
- **2 points.** The agency is implementing a TDM program that includes two or three of the TDM strategies described in the Background paragraph above.
- **4 points.** The agency is implementing a comprehensive TDM program that includes several (four or more) of the TDM strategies described in the Background paragraph above.

Requirement SP-09.3

2 or 4 points. Develop TDM Performance Measures & Monitor Progress

The agency has quantifiable TDM performance measures and can demonstrate ongoing monitoring of its TDM program. Examples of common TDM performance measures include non-SOV mode share, VMT reduced, and vehicle trips reduced. Additionally, TDM performance measures may assess the success of TDM education and outreach programs by tracking the number of participants in various TDM programs or surveys. Additional examples of performance measures can be found in NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf. One of the following scores applies:

- **0 points.** The agency does not have TDM performance measures and is not conducting ongoing monitoring of their TDM program.
- **2 points.** The agency has quantifiable TDM performance measures, but is not conducting ongoing monitoring of their TDM program.
- **4 points.** The agency has quantifiable TDM performance measures and can demonstrate ongoing monitoring of their TDM program.

Requirement SP-09.4

3 or 5 points. Demonstrate Sustainable Outcomes

One of the following scores applies.

- **0 points.** The agency cannot document that they have met or are making measurable progress toward meeting their TDM goals and objectives.
- **3 points.** The agency can document that they have made measurable progress toward meeting their TDM goals and objectives.
- **5 points.** The agency can document that it has met its TDM goals and objectives and that its TDM program has contributed to those outcomes. For example, the agency can show that VMT has been reduced or that non-SOV mode-share has increased for its jurisdiction (in accordance with its TDM goals and objectives), and can reasonably attribute a proportion of that to its TDM program.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency transportation plans (long range, corridor, CMP, non-motorized, project-selection criteria, etc.) that include a TDM component.
2. A published document, website, brochure, and/or administrative report (or equivalent) that provides evidence of the agency's TDM goals and objectives.
3. Documentation of the implementation of the TDM strategies described in the Background section above.
4. An annual or periodically updated report of TDM program progress, which includes the TDM performance measures, baseline data collection, and the results from ongoing monitoring of the TDM program over time. This can be done independently or as part of an existing regular reporting cycle.
5. An independent review or TDM program evaluation.

SP-10: Air Quality

1-15 points

Goal: To plan, implement, and monitor multimodal strategies to reduce emissions and to establish a process to document emissions reductions.

Sustainability Linkage

Reducing emissions and improving air quality supports the environmental and social principles by reducing emissions and improving quality of life.



Scoring Requirements

This criterion is related to SP-07: Multi-Modal Transportation and Public Health, SP-09: Travel Demand Management, SP-11: Energy and Fuels, and SP-14: Transportation Systems Management and Operations. While the strategies in this criterion help serve multiple goals, this criterion is focused primarily on the reduction of criteria air pollutants.

Background

Air quality issues are expected to be addressed based on the implementation of emissions reducing transportation strategies. To obtain credit for this criterion, the agency should perform the following process steps:

- Through interagency consultation, discuss what emissions reduction strategies or programs are to be included in transportation planning documents and implemented.
- Establish a process to design, test, evaluate, and deploy the selected strategies or programs.
- Develop measures for the prioritization of transportation projects or strategies in the LRTP and TIP, based on their emission reduction potential.
- Use EPA, or another approved emissions model, to estimate and quantify emissions reductions.
- Communicate findings and emissions reduction results to stakeholders and other areas with similar air quality challenges.

Scoring Requirements

Requirement SP-10.1

2-10 points. Implement Strategies to Reduce Emissions

The agency is implementing multimodal strategies as part of a transportation plan to reduce emissions. The agency receives 2 points for implementing strategies from each of the categories listed below, for a total of 10 points. A report published in 2010: NCHRP 25-25 (Task 59): Evaluate the Interactions between Transportation-Related Particulate Matter, Ozone, Air Toxics, Climate Change, and Other Air Pollutant Control Strategies at [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25\(59\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25(59)_FR.pdf), provides good background information on these strategies.

Scoring for this requirement is based on the following, cumulative elements:

- **Requirement SP-10.1a**

2 points. Implement Transportation Demand Management Strategies

Transportation demand management strategies, including land use strategies and strategies that reduce vehicle miles travelled, increase transit services, and promote non-motorized modes of transportation.

- **Requirement SP-10.1b**

2 points. Implement Transportation System Management Strategies

Transportation system management strategies, including congestion relief and traffic management strategies such as pricing or idling restrictions.

- **Requirement SP-10.1c**

2 points. Implement Vehicle Technologies

Vehicle technologies including diesel emissions reduction strategies, such as truck stop electrification, funding school bus retrofits, retrofits of state or local maintenance and construction equipment, and clean vehicle strategies such as replacing diesel buses with CNG or hybrid buses.

- **Requirement SP-10.1d**

2 points. Implementing Fuel Technologies

Fuel technologies including renewable energy measures (reduces emissions from power plants or fuel consumption): solar lighting, solar or wind energy at rest areas, renewable electricity generation or biofuel crops in ROW, mandates for use of biofuels in fleet or construction vehicles, etc.

- **Requirement SP-10.1e**

2 points. Implement Dust Control Strategies

Dust controls, including paving unpaved roads, and strategies to control construction-related dust.

Requirement SP-10.2

2 or 5 points. Conduct Emissions Analysis

Conduct emissions analysis to document emissions reductions from the transportation strategies implemented. One of the following scores applies:

- **0 points.** No emissions analysis is performed.
- **2 points.** The agency conducts a qualitative assessment of the emissions reduction potential of all the strategies implemented.
- **5 points.** The agency conducts a quantitative emissions analysis to document emissions reduction for all the strategies implemented.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Plan and policy review that demonstrates emissions reduction transportation strategies or programs are included in transportation planning documents.
2. Documentation of the transportation strategies or programs implemented.
3. Methodology documentation for estimating emissions.
4. Calculations and/or documentation showing that the transportation strategies reduced the emissions of at least one criteria pollutant.

SP-11: Energy and Fuels

1-15 points

Goal: Reduce the energy and fossil fuel consumption from the transportation sector and document it in the transportation planning process.

Sustainability Linkage

Reducing energy and fossil fuel consumption from the transportation sector provides multiple sustainability benefits and supports all of the triple bottom line principles by reducing fuel spending, greenhouse gas emissions, and energy dependence.



Background and Scoring Requirements

Background

There are many ways an agency can reduce the energy and fossil fuel consumption in the transportation system within its jurisdiction. Types of strategies include improving the fuel efficiency of vehicles (for autos, transit, trucks, etc.), as well as encouraging the switch to alternative fuels. Examples of the types of strategies that are implementable by states and/or MPOs include, but are not limited to:

- Providing incentives for the purchase and/or use of high fuel efficiency or alternatively fueled vehicles (e.g., feebates, accelerated vehicle retirement programs, allowing hybrids to drive solo in HOV lanes, etc.)
- Implementing public eco-driving and anti-idling campaigns. Eco-driving is a technique that refers to the behaviors and practices that individual drivers can use to improve the fuel economy of their vehicles. Research has shown that ample opportunity exists to reduce fuel consumption by increasing eco-driving practices (ULI, 2009; ITF 2009). Examples of eco-driving techniques include: avoiding rapid acceleration and braking, not exceeding 55 mph, and avoiding idling (including vehicle “warm-ups”), among others.
- Providing alternative fueling infrastructure (e.g., electric vehicle charging corridors, Truck-Stop Electrification (TSE) programs, etc.)

Additional strategies include shifting travel to less energy-intensive modes, reducing travel demand, and optimizing travel speeds for fuel-efficiency. Examples of these types of strategies are described in more detail in SP-07: Multimodal Transportation and Public Health, SP-09: Travel Demand Management, and OM-13: Transportation Management and Operations, respectively. Additionally, while this criterion is primarily focused on reducing on-road energy and fossil-fuel consumption, the use of renewable energy for system-wide operations (solar variable message signs, solar highways, etc.) also reduces transportation energy use.

Additional examples of strategies and guidance for reducing energy and fossil fuel use from transportation are available at the following resources:

1. State and Local Energy Programs Resource Center; AASHTO Transportation and Climate Change Resource Center at <http://climatechange.transportation.org/energy>.
2. TRB Special Report 307: Policy Options for Reducing Energy Use and Greenhouse Gas Emissions from U.S. Transportation, 2011 at <http://www.trb.org/Publications/Blurbs/165535.aspx>.

3. Transportation's Role in Reducing U.S. Greenhouse Gas Emissions, prepared for FHWA by Cambridge Systematics Inc., April 2010 at <http://www.dot.gov/affairs/2010/dot7510.htm>.
http://ntl.bts.gov/lib/32700/32779/DOT_Climate_Change_Report_-_April_2010_-_Volume_1_and_2.pdf.
4. Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions, Urban Land Institute (ULI) report prepared by Cambridge Systematics Inc., July 2009 at <http://movingcooler.info>.
5. Integrating Climate Change into the Transportation Planning Process, prepared for FHWA by ICF International, July 2008 at <http://www.fhwa.dot.gov/hep/climatechange/index.htm>.
6. Union of Concerned Scientists, State of Charge: Electric Vehicles' Global Warming Emissions and Fuel Cost Savings Across the United States (2012) at http://www.ucsusa.org/clean_vehicles/smart-transportation-solutions/advanced-vehicle-technologies/electric-cars/emissions-and-charging-costs-electric-cars.html.
7. Potential Design, Implementation, and Benefits of a Feebate Program for New Passenger Vehicles in California: Interim Statement of Research Findings (2010)) at http://pubs.its.ucdavis.edu/publication_detail.php?id=1400.
8. US Environmental Protection Agency, Study of Exhaust Emissions from Idling Heavy-Duty Diesel Trucks and Commercially Available Idle Reducing Devices, October 2002 at <http://www.epa.gov/smartway/documents/publications/epaidlingtesting.pdf>.
9. US Department of Energy, Idle Reduction Technology Demonstrations, Nov. 2004 at <http://www.nrel.gov/vehiclesandfuels/fleettest/pdfs/36717.pdf>.

Scoring Requirements

Toward the goal of including and integrating energy and fossil fuel considerations into its transportation planning process (i.e., TIP, STIP, UPWP, LRTP, and/or corridor planning), an agency can achieve points under this criterion through data collection and analysis, performance measurement, and quantifiably assessing outcomes. Agencies can earn points according to the following: each of the scoring options is independent and can be achieved without prerequisites:

Requirement SP-11.1

1-2 points. Set Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-11.1a**
1 point. Develop Energy and Fossil Fuel Reduction Goals and Objectives
The agency has developed energy and/or fossil fuel reduction goals and objectives for the transportation system within its jurisdiction.
- **Requirement SP-11.1b**
1 additional point. Goals and Objectives Consistent with State and Metropolitan Goals and Objectives
The goals and objectives are consistent with relevant state and/or metropolitan goals and objectives for reducing energy and fossil fuel consumption.

Requirement SP-11.2

2 or 4 points. System-Level Data Collection and Forecasting

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-11.2a**

2 points. Develop and Maintain Baseline Inventory of Energy and Fossil Fuel Consumption

The agency (or cooperating agencies) has developed and maintains a baseline inventory of current energy and/or fossil-fuel consumption (for all fuel types and modes) from transportation.

- **Requirement SP-11.2b**

2 additional points. Forecast Energy and Fuel Consumption

The agency uses an appropriate model or method to forecast energy and fuel consumption (based upon on-road VMT) associated with its LRTP, including business-as-usual and alternative scenarios (as appropriate). The agency uses this information to inform transportation decision-making and the development of the LRTP.

Resources related to conducting transportation energy data, inventories, and forecasts can be found on the USDOT website here: <http://climate.dot.gov/ghg-inventories-forecasts/index.html>.

Requirement SP-11.3

2 or 4 points. Develop a Plan and Implement Strategies to Reduce Transportation-related Energy and/or Fossil Fuel Usage

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-11.3a**

2 points. Include Energy and Fossil Fuel Reduction Strategies in Plan

Energy and fossil fuel reduction strategies are included in the LRTP, and the LRTP includes a discussion of the impacts of including these strategies.

- **Requirement SP-11.3b**

2 points. Implement Strategies to Reduce Energy and Fossil Fuel Consumption

The agency (or cooperating agencies) implements transportation strategies to reduce transportation-related energy and fossil fuel consumption and related emissions (such as those described in the Background section above). These may include strategies implemented primarily to reduce energy use, as well as strategies implemented primarily for other purposes (e.g., congestion relief, air quality, motorized travel demand reduction, etc).

Requirement SP-11.4

1-5 points. Measure Progress and Demonstrate Sustainable Outcomes

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-11.4a**

1 point. Incorporate Energy and Fossil Fuel Performance Measures

The agency has incorporated energy and fossil fuel reduction performance measures into the transportation planning process. Examples of performance measures include fuel expenditure reductions, gallons of fuel consumed, and greenhouse gases reduced, among others. Additional examples of performance measures can be found in NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf.

- **Requirement SP-11.4b**

2 points. Monitor Progress and Demonstrate Sustainable Outcomes

The agency demonstrates ongoing monitoring of its progress toward reducing energy and fossil-fuel consumption.

- **Requirement SP-11.4c**

2 points. Meet Energy and Fossil Fuel Goals

The agency can document that they have met its energy and fossil-fuel consumption goals.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following types of documentation (or equal where not available):

1. A published document, website, brochure, and/or administrative report (or equivalent) that provides evidence of the agency's energy goals and objectives.
2. Transportation-related energy and fossil fuel inventories, forecasts, and/or methodology reports that quantify energy and fossil fuel consumption.
3. Plan contents (in TIP, STIP, UPWP, LRTP, and/or corridor planning) that include strategies/programs addressing energy and fossil fuel use.
4. Documentation of the implementation of the strategies described in the Background/Introduction section of this criterion.
5. An annual or periodically updated report of progress, which includes the results from ongoing monitoring over time.

SP-12: Financial Sustainability

1-15 points

Goal: Evaluate and document that financial commitments made across transportation system plans are reasonable and affordable.

Sustainability Linkage

Financial sustainability supports the economic principle by improving economic prosperity for current and future generations, and ensuring that there are sufficient financial resources to advance the projects and program goals of the community.



Background and Scoring Requirements

The intent of this criterion is to encourage the use of advanced best practices in cost estimating and revenue forecasting.

Background

In 1991, Congress enacted “fiscal constraint” provisions as part of the *Intermodal Surface Transportation Efficiency Act*. Fiscal constraint in the context of sustainability goes beyond formulaically meeting regulatory requirements; it should ensure that the estimated capital costs and operating expenditures of the transportation system are reliable, and that they are in line with anticipated revenues. In addition, subsequent plan implementation should adhere to the constraints imposed by anticipated revenues and costs. This ensures that future generations are able to continue to benefit affordably from future transportation investments.

The following are three sources of additional information related to financial sustainability:

1. The FHWA/FTA Final Rule on statewide and metropolitan transportation planning and programming and congestion management processes/systems was published in the Federal Register on February 14, 2007 and became effective on March 16, 2007. This Final Rule can be accessed at <http://edocket.access.gpo.gov/2007/07-493.htm> (HTML version) or <http://edocket.access.gpo.gov/2007/pdf/07-493.pdf> (PDF version).
2. Best Practices in Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints. February 2010. The report was prepared as part of National Cooperative Highway Research Program Project 20-68A U.S. Domestic Scan. Further information on the NCHRP 20-68A U.S. Domestic Scan program is available at <http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570>. Best practices cited in this report are summarized below.
3. Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction. 2007. This report was prepared as part of the National Cooperative Highway Research Program Project 8-49 to help address problems of cost escalation and support the development of consistent and accurate project estimates through all phases of the development process. The report is available at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_574.pdf.

Scoring Requirements

Agencies can earn points according to the following; each of the scoring options is independent and can be achieved without prerequisites:

Requirement SP-12.1

2-7 points. Advanced Revenue Forecasting

Use an inter-agency, cooperative approach for advanced revenue forecasting practices to develop a reasonable finance plan that considers risk and includes contingencies. Advanced revenue forecasting is a dynamic process that considers a wide range of sources, “nontraditional” financing mechanisms, risk management techniques, and forecasts that are updated on a regular basis. Include cost estimations and actual costs of ongoing operations and maintenance of systems in LRTPs and TIPs/STIPs. Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-12.1a**

2 points. Engage in Regular and Comprehensive Coordination and Information Sharing

The agency engages in regular and comprehensive coordination and information sharing among affected agencies (including State DOTs, MPOs, and transit operators) during the development of revenue forecasts.

- **Requirement SP-12.1b**

3 points. Undertake Systemic Forecast Updates

The agency undertakes systematic forecast updates. Significant changes in forecast revenues are addressed in a planning process to prevent unsustainable deficits or funding gaps.

- **Requirement SP-12.1c**

2 points. Establish Processes for Engaging Stakeholders

The agency has established processes for engaging stakeholders in a dialogue about the implications of any changes in revenue forecasts.

Evidence of the use of advanced revenue forecasting practices could include:

- Evidence of leadership emphasis on rigorous fiscal discipline;
- Incorporation of risk management techniques into revenue forecasts;
- Inclusion of local and state sources as part of the revenue forecast and coordination with other potential funding sources;
- Involvement of appropriately qualified revenue estimating organizations for the state or local unit of government responsible to elected officials for overall revenue estimates;
- Coordination of STIP and Metropolitan Transportation Plan development with state budget development to mirror respective fiscal constraints;
- Involvement of a professional economist in revenue forecasting;
- Use of committees to establish consensus regarding the revenue forecast;
- Evidence of policies or guidelines for monitoring and updating forecasts, especially at major decision points for projects and plans;
- Objective analysis of “nontraditional”, innovative financing mechanisms and the expected revenues from those approaches; and
- Evaluation of past revenue forecasts and understanding why they did or did not turn out as expected.

Requirement SP-12.2

2-8 points. Advanced Cost Estimating

Use an inter-agency, cooperative approach for advanced project cost estimating practices that considers both capital and lifecycle costs (which would include maintenance and operations), risks, and contingencies. An example of advanced cost estimating includes factoring in a variety of land use/transportation growth scenarios and associated future infrastructure construction and maintenance costs. Scoring for this requirement is based on the following, cumulative elements.

- **Requirement SP-12.2a**

2 points. Keep Accurate Records of Changes to Project Scope

As projects progress through the planning process and ultimately construction, the agency keeps accurate records of all changes to the project scope and documents their impact on costs.

- **Requirement SP-12.2b**

3 points. Use Project-Specific Cost Estimating Procedures

As the project development process progresses, the agency avoids formula-driven cost estimating procedures in favor of project-specific methods.

- **Requirement SP-12.2c**

3 points. Complete Systemic Cost Updates Regularly

The agency completes systematic cost updates regularly, including cost estimates for ongoing system operations, and maintenance and changes to costs as projects develop. Cumulative or major changes in project costs are reflected in updated financial plans/fiscal constraint determinations of subsequent transportation plans, Transportation Improvement Programs (TIPs), and STIPs.

Evidence of the use of advanced cost estimating practices could include:

- Evidence of leadership emphasis on fiscal discipline;
- Coordination between preconstruction and construction personnel in preparation of cost estimates;
- Feedback loops from lessons learned during construction for future cost estimating practices; and
- Practices for tracking changes in project scopes and subsequent relationship to cost estimating and revenue forecasting procedures.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. State or metropolitan TIPs
2. State or metropolitan revenue forecasts or studies
3. Minutes of meetings of policy making or governing Boards, Committees, or Commissions
4. Major project-level financial plans and cost estimating reports
5. Independent reviews of agency construction or revenue estimates or procedures
6. Financial plan sections of long-range plans

SP-13: Analysis Methods

1-15 points

Goal: Agencies adopt and incentivize best practices in land use, socioeconomic and transportation systems analysis methods.

Sustainability Linkage

The use of analysis methods can help an agency measure progress toward meeting its sustainability goals by providing the means to estimate, evaluate, and communicate the expected social, environmental, and economic outcomes of changes in transportation policies, services, and the built environment.



Background and Scoring Requirements

Background

Transportation planning includes numerous tools and practices within the profession to inform decisions regarding transportation infrastructure, policy, plans, management of the systems, or project implementation. The analytical framework for transportation planning and policy along with the relationship to comprehensive planning drives the development of the analytical tools and practices. Understanding the interplay between land use, socioeconomic systems, transport systems, and the environment is central to developing more sustainable transportation systems and communities. To assist in accomplishing this, tools and practices need to reflect these dynamics at the appropriate scale (national, state, metropolitan, local, etc.) and provide relevant performance measures as part of the decision-making process.

Scoring Requirements

Requirement SP-13.1

1 or 3 points. Quality of Data

The transportation data resources used as the basis for the analysis and the development of tools such as travel demand models are of a sufficient quality and coverage to support the conclusions. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-13.1a**

1 point. Demonstrate Analysis Based on Suitable Data

The agency demonstrates that the analysis has a strong foundation in observed data suitable for developing tools which model the land use, socioeconomic, transport, and environmental systems.

- **Requirement SP-13.1b**

2 additional points. Demonstrate Data Used is Evaluated and Updated Regularly

The agency demonstrates that the data used in planning analysis are evaluated and updated on a regular basis.

Requirement SP-13.2

2 or 4 points. Program Support

The agency has a plan (or equivalent) which includes:

- A specific multi-year development program for maintaining transportation data resources and improving analysis methods.
- Specifications for the data resources and methods that explicitly address sustainability principles.
- Identification of an adequate level of funding required to implement the data collection and modeling tasks, that is also reflected in the Unified Planning Work Program (UPWP) or equivalent.
- Resources which include support for experienced technical management and a mix of technical staff and/or contract staff.

One of the following scores applies:

- **0 points:** Agency does not have a current strategic plan, program or equivalent.
- **2 points:** A strategic plan, program or equivalent exists; only some of the areas described in the above paragraph are addressed.
- **4 points:** A strategic plan, program or equivalent is in place and it addresses all of the areas described in the paragraph above.

Requirement SP-13.3

2 points. Technical Committee

The agency's organizational structure includes a technical committee to review data collection/quality, planning assumptions, and forecasting methods. This committee may be comprised of state and local transportation planning professionals, private consultants, and other individuals having interest in the forecasting process. The technical committee's role is to provide review and feedback on the analytical methods and tools utilized by the agency.

Requirement SP-13.4

3 or 6 points. Peer Review

The agency has convened a peer review of its analysis methods (e.g., the peer review program offered by the Travel Model Improvement Program (TMIP), which can be found at: http://www.fhwa.dot.gov/planning/tmip/resources/peer_review/.) The review included an assessment of the primary data used to develop the analytical tools and an assessment of the calibration and validation results of the tools, methods, and practices. In addition, the review has demonstrated that the methods are sensitive to the actions being tested, such as the expected and desired changes in transportation policies, supply, services, and the built environment. Results of the peer review are used as inputs to the plan and describe improvements to the analytical methods. One of the following scores applies:

- **0 points:** A peer review of the agency's analytical methods, tools, and practices has not been conducted.
- **3 points:** A peer review of at least one of the agency's major analytical tools, such as the travel demand model, has been conducted.
- **6 points:** All of the agency's analysis methods, tools, and practices have been peer reviewed.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following transportation documentation sources (or equal where not available):

1. Forecasting tools and methods documentation, including calibration, validation, and sensitivity results.
2. A technical committee charter, meeting schedules, and/or proceedings.
3. A forecasting methods or analysis tools strategic plan, program or equivalent which provides reference to the level of funding for analysis methods and data.
4. Documentation of the most recent peer review, including the stated purpose, a list of participants, recommendations arising from the review, and the agency's plan and/or schedule to address the peer review recommendations.

SP-14: Transportation Systems Management and Operations

1-15 points

Goal: Optimize the efficiency of the existing transportation system.

Sustainability Linkage

Improving the efficiency of the existing transportation system supports all of the triple bottom line principles by improving mobility and reducing funding needs, congestion, and resource consumption.



Background and Scoring Requirements

This criterion relates to SP-09 Travel Demand Management; while both can help to mitigate congestion, SP-09 focuses primarily on reducing travel demand and SP-14 focuses on optimizing the use of the existing transportation system.

Background

The intent of the Transportation Systems Management and Operations (TSM&O) criterion is to encourage active management of the transportation system and to implement these strategies in lieu of, or strategically in conjunction with, capacity expansion. Common types of TSM&O strategies include, but are not limited to:

1. Intelligent Transportation Systems (traveler information, transit signal priority, ramp metering)
2. Active Traffic Management (variable speed displays, dynamic lane assignment)
3. Incident Management (emergency service patrols)
4. Event Management

These strategies can help to increase the efficiency of the system by shifting travel demand to off-peak periods and less congested facilities, optimizing travel speeds for fuel efficiency, and utilizing existing capacity to the greatest extent possible. Additional TSM&O strategies can be found in OM-13: Transportation Management and Operations and PD-14: ITS for System Operations.

Scoring Requirements

Requirement SP-14.1

1-2 points. Set TSM&O Policies, Goals, and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-14.1a**

1 point. Develop Clearly Defined TSM&O Policies, Goals and Objectives

The agency has developed clearly defined TSM&O policies, goals, and objectives for improving the efficiency of the transportation system within its jurisdiction.

- **Requirement SP-14.1b**

1 additional point. TSM&O Policies, Goals, and Objectives Consistent with State and Metropolitan Goals and Objectives

The TSM&O policies, goals, and objectives are also consistent with relevant state and/or metropolitan goals and objectives for improving transportation system efficiency.

Requirement SP-14.2

1-4 points. Develop a Plan for TSM&O Strategies

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second and/or third.

- **Requirement SP-14.2a**

1 point. Include TSM&O Strategies

TSM&O strategies are included in the LRTP, or other planning documents, as appropriate.

- **Requirement SP-14.2b**

1 additional point. Include Discussion of Impacts of TSM&O Strategies

The LRTP, or equivalent, includes a discussion of the impacts of including TSM&O strategies.

- **Requirement SP-14.2c**

2 additional points. Consider and Prioritize TSM&O Strategies

The TSM&O strategies are considered and prioritized in the LRTP, or other planning documents. Where appropriate, these strategies are considered in lieu of, or strategically in conjunction with, capacity expansion.

Requirement SP-14.3

2 or 4 points. Support or Implement TSM&O Strategies

One of the following scores applies:

- **0 points.** TSM&O strategies are not being implemented or funded by the agency.
- **2 point.** Some, but not all, TSM&O strategies identified as priorities are being implemented by the agency or funded through inclusion in the transportation improvement program (TIP and/or STIP) for which the agency has responsibility.
- **4 points.** . All of the TSM&O strategies identified as priorities are being implemented by the agency or funded through inclusion in the transportation improvement program (TIP and/or STIP) for which the agency has responsibility.

Requirement SP-14.4

3 or 5 points. Establish Performance Goals and Monitor Progress

One of the following scores applies:

- **0 points.** The agency has not developed TSM&O performance measures.
- **3 points.** The agency has developed TSM&O performance measures and can demonstrate steady progress towards meeting its TSM&O goals and objectives. Examples of performance measures can be found in [NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#).
- **5 points.** The agency has developed TSM&O performance measures, and can document that it has met its TSM&O goals and objectives and that the implementation of its TSM&O strategies contributed to this outcome.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency transportation plans that include a TSM&O component (either integrated throughout or called out separately).
2. A TIP and/or STIP that includes a list of implementable TSM&O strategies and technologies that are applicable to the system.
3. Plan and project selection documents showing early consideration of operational strategies and projects, such as the congestion management process for MPOs with populations over 200,000.
4. An annual or periodically updated report of progress, which includes the results from ongoing monitoring of the agency's progress towards meeting its TSM&O goals and objectives over time.

SP-15: Linking Asset Management and Planning

1-15 points

Goal: Leverage transportation asset management data and methods within the transportation planning process to make informed, cost-effective program decisions and better use existing transportation assets.

Sustainability Linkage

Incorporating transportation asset management data and economic analysis methods throughout system planning supports the environmental and economic triple bottom line principles by improving the cost effectiveness of decisions, extending the life of assets, and reducing the demand for raw materials.



Background and Scoring Requirements

Background

As defined by the American Association of State Highway and Transportation Officials' Subcommittee on Asset Management, "Transportation Asset Management is a strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively through their life cycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision-making based upon quality information and well defined objectives." That is, it is focused on prioritizing maintenance and preventative activities in the most effective manner from a life cycle perspective rather than making "worst first" type decisions.

In addition to many other references, the following may be useful:

- FHWA's *Asset Management Position Paper* further describes the relationship between planning and asset management and can be found at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/amppplan.cfm>.
- TRB publication 1924, *Linking Asset Management to Strategic Planning Processes: Best Practices from State Departments of Transportation*, which can be ordered at <http://pubsindex.trb.org/view.aspx?id=775715>.
- FHWA's Publication 806, *Beyond the Short Term Transportation Asset Management for Long-Term Sustainability, Accountability and Performance*, at http://www.fhwa.dot.gov/asset/10009/tam_topr806.pdf.
- NCHRP Report 551, *Performance Measures and Targets for Transportation Asset Management*, at: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_551.pdf.
- FHWA peer exchange summary notes, *Integrating Asset Management into the Metropolitan Planning Process: A Peer Exchange*, at <http://www.fhwa.dot.gov/planning/statewide/intassetmgmt.htm>.
- Midwest Transportation Knowledge Network, *Data and synthesis report*, at <http://members.mtkn.org/measures>.
- FTA's *Transit Asset Management Practices: A National and International Review*, explores State of Good Repair best practices and case studies of State DOTs and transit agencies and can be found at: http://www.fta.dot.gov/documents/TAM_A_National_and_International_Review_-_6.10_FINAL.pdf.
- TCRP Synthesis publication 92: *Transit Asset Condition Reporting: A Synthesis of Transit Practice*, at: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_92.pdf.

Scoring Requirements

Points are awarded based on a set of best practices to be incorporated within the transportation planning process.

Requirement SP-15.1

3 points. Incorporate Asset Management Based Performance Measures

Leverage performance-based planning and programming components of asset management to analyze and evaluate tradeoffs in long-range transportation planning processes. An agency has identified at least one performance measure for each asset management goal and objective in order to track progress over time. These performance measures should help evaluate and communicate the impacts and implications of different plan alternatives, and provide criteria for analyzing and evaluating tradeoffs. Examples of asset management related performance measures include, but are not limited to: pavement condition; bridge condition; remaining service life; percentage of total planned maintenance complete; cost-effectiveness; route continuity; corridor completion; state of good repair for transit rolling stock, signal systems, guideways, and facilities; and sidewalk and bicycle inventories.

Requirement SP-15.2

4 or 8 points. Incorporate Asset Management Data and Economic Analysis to Prioritize Investments

Incorporate asset management data and leverage economic analyses, including Life-Cycle Cost Analyses (LCCA) and Benefit-Cost Analysis (BCA) to apply basic cost and performance data to screen a large number of potential project alternatives, assisting in the development of program budgets and areas of program emphasis.

Scoring is based on the following, cumulative elements.

- **Requirement SP-15.2a**

4 points. Leverage LCCA to Evaluate Project Alternatives and Prioritize Investments

Leverage LCCA to evaluate project alternatives and prioritize investments. LCCA is used to compare the life-cycle costs of two or more alternatives to accomplish a given project or objective, enabling the least cost alternative to be identified. LCCA is an engineering economic analysis tool that allows transportation officials to quantify the differential costs of alternative investment options for a given project. LCCA can be used to study either new construction projects or to examine preservation strategies for existing transportation assets. For more information, refer to FHWA's website on Asset Management Life-Cycle Cost Analysis at <http://www.fhwa.dot.gov/infrastructure/asstmgt/lcca.cfm>.

- **Requirement SP-15.2b**

4 points. Leverage BCA to Compare Projects and Prioritize Investments

Leverage BCA to compare projects and prioritize investments. BCA attempts to capture all benefits and costs accruing to society from a project or course of action, regardless of which particular party realizes the benefits or costs, or the form these benefits and costs take. Used properly, BCA reveals the economically efficient investment alternative (i.e., the one that maximizes the net benefits to the public from an allocation of resources). For more information, refer to FHWA's website on Asset Management Benefit-Cost Analysis at <http://www.fhwa.dot.gov/infrastructure/asstmgt/primer05.cfm>.

Requirement SP-15.3

4 points: Prioritize Maintenance and Preservation

The agency prioritizes transportation decisions that support the maintenance and good repair of existing transportation assets. Evidence includes the extent to which maintenance, preservation, and repair projects are included in the STIP/TIPs. UPWPs, and other similar annual work plans are the direct result of the identification,

prioritization, and selection of projects in the LRTP process and/or the extent to which those projects are completed.

In order to demonstrate this, monitor performance and demonstrate attainment of the agency's maintenance and preservation goals over at least a one-year period. These goals may be linked to infrastructure condition and should also be focused on the need and investment in maintenance and preservation activities. Examples of metrics that would accomplish this include:

- The percent completion of annual maintenance and preservation plan;
- Pavement maintenance and/or preservation funding;
- Funds for a preservation program—cash flow planned vs. actual expenditures; or
- The dollar value of deferred maintenance needs.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency policy on incorporating asset management goals and objectives into the transportation planning process and documentation of those goals and objectives in transportation planning documents.
2. Performance measures for each goal and objective.
3. Documentation of the process used to incorporate asset management data in making strategic resource allocation decisions.
4. Documentation that demonstrates monitoring and attainment of performance measures.

SP-16: Infrastructure Resiliency

1-15 points

Goal: Anticipate, assess, and plan to respond to vulnerabilities and risks associated with current and future hazards (including those associated with climate change) to ensure multi-modal transportation system reliability and resiliency. Identify a range of vulnerability and risks to both existing and planned transportation infrastructure.



Affected Triple Bottom Line Principles

Sustainability Linkage

Planning for infrastructure resiliency in the face of potential hazards supports all of the triple bottom line principles by reducing spending on infrastructure replacement, improving the safety and security of multimodal transportation system users, and providing energy savings from long-lasting investments, among others.

Background and Scoring Requirements

This criterion complements and expands on the requirements discussed in *SP-15: Linking Asset Management and Planning*.

Background

Helpful online references and tools for this criterion include FHWA's climate adaptation page and FHWA's vulnerability assessment framework, at: http://www.fhwa.dot.gov/environment/climate_change/adaptation/ and http://www.fhwa.dot.gov/environment/climate_change/adaptation/publications_and_tools/vulnerability_assessment_framework/ (note that more direct links will be available by Version 1.2 update).

For the purposes of this credit, key terms are defined as follows:

- “Hazards” are conditions or circumstances that may result in undesirable outcomes. Natural hazards may include seismic and extreme weather events, and/or the effects of climate variability and change. Man-made hazards may include security threats or structural failures from terrorism.
- “Extreme weather events” refers to flooding, hurricanes, fires, tsunamis, droughts, and winter storms, for example.
- “Climate variability and change” refers to long-term variations in climate, such as changes in sea level, temperature, precipitation intensity, and coastal storms, among others. While sea level rise primarily affects coastal regions, changes in the frequency and intensity of warm/cold weather days, precipitation events (flooding/droughts), and storms can affect infrastructure throughout the United States.
- “Vulnerability” in this context refers to the degree to which transportation infrastructure can be adversely affected by various hazards.
- “Vulnerability Assessment” is an assessment of the potential consequences of hazards on the durability and performance of specific transportation infrastructure (e.g., inundation of roads and enhanced scour of structures).

- “Risk” is the potential for an unwanted outcome resulting from an event—in this case, a climate stressor or other hazard. It is determined by the product of (a) the likelihood of the impact, and (b) the consequence of the impact.
- “Risk Assessment” is an assessment of the likelihood and potential consequences of exposure to a hazard.

Scoring Requirements

Requirement SP-16.1

1-2 points. Hazard Identification

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement SP-16.1a**

1 point. Conduct System-Level Assessment of Potential Hazards

The agency has conducted a system-level assessment of potential hazards such as seismic events, relative sea level rise, storm activity/intensity, temperature and heat waves, precipitation events, lake levels, stream flow, etc.

- **Requirement SP-16.1b**

1 additional point. Identify Locations Potentially Vulnerable or At-Risk

The agency has identified locations potentially vulnerable and/or at risk as a result of current and future hazards, and includes a discussion of the potential implications on the transportation system in the LRTP.

Requirement SP-16.2

2-4 points. Vulnerability Assessment

A vulnerability assessment focuses on how existing or planned transportation facilities may fare given current and future hazards. A vulnerability assessment should cover transportation assets in the planning area or a substantial subset of that area, as appropriate. Asset data on key existing and planned assets should be used. This could include elevations of the assets (not just the land), drainage capabilities, types of pavements and their ability to withstand excessive heat, more intense freeze-thaw cycles, and a variety of stress factors through time.

Investigating past events and resulting impacts can inform the assessment of vulnerabilities to seismic and storm events, and the impacts of long-term climate change effects. By comparing historical events with historical maintenance and repair needs, agencies can estimate how well specific assets might withstand certain stressors. For example, agencies could consider effects of past weather events on emergency response and evacuations required or on the services provided by an asset (e.g., changes in VMT and/or the value of goods transported).

One of the following scores applies:

- **0 points.** The agency has not conducted a vulnerability assessment of its assets.
- **2 points.** The agency has conducted a GIS based vulnerability assessment and considered hazard consequences for some of its planned, programmed, and existing facilities throughout the transportation system.
- **4 points.** The agency has conducted a GIS based vulnerability assessment and considered hazard consequences on all planned, programmed, and existing facilities throughout the transportation system.

Requirement SP-16.3

2 or 4 points. Risk Assessment

A risk assessment is a method for estimating the likelihood of a particular impact resulting from a defined set of stressors, including climate change related impacts, and also assesses the consequences of the impact in terms of how it affects the surrounding community, metropolitan area, or state.

One of the following scores applies:

- **0 points.** The agency has not conducted a risk assessment of its assets.
- **2 points.** The agency has conducted a risk assessment for some of its planned, programmed, and existing facilities throughout the transportation system.
- **4 points.** The agency has conducted a risk assessment and considered the consequences on all planned, programmed, and existing facilities throughout the transportation system.

Requirement SP-16.4

2 or 5 points. Develop and Implement Adaptation Strategies

Adaption strategies are actions taken to respond to the vulnerabilities and risks associated with current and future hazards (including those associated with climate change) to ensure transportation system reliability and resiliency. Examples of strategies include, but are not limited to the relocation of critical infrastructure, evacuation route planning, and disaster preparedness programs, among others. Additional examples are available on the USDOT website at <http://climate.dot.gov/impacts-adaptations/index.html> and in TRB Transportation Research E-Circular E-C152 at <http://onlinepubs.trb.org/onlinepubs/circulars/ec152.pdf>. This requirement may be scored in proportion to the agency's estimate of its progress toward meeting this requirement.

One of the following scores applies:

- **0 points.** The agency has not developed adaptation strategies.
- **2 points.** The agency has developed, but not yet implemented, adaptation strategies to manage the impacts the agency can reasonably expect to occur.
- **5 points.** The agency has developed and is implementing adaptation strategies to manage all of the impacts the agency can reasonably expect to occur based on its completed vulnerability and risk assessments.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Transportation planning document(s) (LRTP, TIP/STIP, and/or UPWP) that contain evidence of the consideration of hazard identification, vulnerability assessment, risk assessment, and/or adaptation strategies.
2. Hazard Mitigation Plan(s).
3. Documentation of a vulnerability assessment of critical transportation infrastructure. This could include studies on the vulnerability of specific areas.
4. Documentation of a risk assessment of critical infrastructure. This should address the process used, an assessment of likelihood, and the resulting assessment of risk.

SP-17: Linking Planning and NEPA

2-10 points

Goal: Integrate system planning process information, analysis, and decisions with the project-level environmental review process, and reference it in NEPA documentation.

Sustainability Linkage

The NEPA process encompasses all of the triple bottom line principles, typically at the project level. This criterion ensures that information and decisions made in the system planning process generate useful information regarding sustainability impacts, and that data and those sources are consistent between system-level and project-level planning.



Background and Scoring Requirements

Background

The intent of this criterion is to ensure that transportation planning conducted at the system and programmatic level informs project-level implementation, specifically during the environmental review process. Because system-level planning leads to the programming of various projects, systems-level information should be consistent with the needs of project-level NEPA analysis and integrate without rework or with minimal updating.

The agency should have tools and processes in place to ensure analysis, decisions, and documents that are completed during the system planning process, such as corridor, subarea, or metropolitan plans, inform the environmental analysis conducted to meet NEPA requirements during project development. This prevents duplication of work, unnecessary expense, delays, and confusion for the public and policymakers. To successfully link planning to NEPA, it is vital to involve a wide range of partners, including resource and regulatory agencies, NEPA practitioners, planning and development partners, legal counsel, and the public.

Three sources of additional information on these best practices include:

1. The FHWA Guidance on Using Corridor and Subarea Planning to Inform NEPA, published April 5, 2011. This guidance can be accessed at http://www.environment.fhwa.dot.gov/integ/corridor_nepa_guidance.pdf.
2. The FHWA Planning and Environmental Linkage (PEL) tool kit at <http://environment.fhwa.dot.gov/integ/edctools.asp>.
3. Appendix A to 23 CFR Part 450—Linking the Transportation Planning and NEPA processes. The FHWA/FTA Final Rule on statewide and metropolitan transportation planning and programming and congestion management processes / systems was published in the Federal Register on February 14, 2007 and became effective on March 16, 2007. The guidance in Appendix A is located at <http://edocket.access.gpo.gov/2007/07-493.htm> (HTML version) and <http://edocket.access.gpo.gov/2007/pdf/07-493.pdf> (PDF version).
4. The U.S. Department of Transportation's Strategic Sustainability Performance Plan (SSPP), published June 2011, provides high-level guidance to all USDOT agencies pursuant to Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance. The SSPP establishes USDOT's sustainability implementation framework and requires USDOT agencies to integrate sustainability principles both between policy and planning, as well as between planning and the NEPA process. This guidance can be accessed at http://www.dot.gov/sustainability/sspp_2011.pdf.

Scoring Requirements

Points are awarded for this criterion based on the following requirements:

Requirement SP-17.1

2 or 4 points. Document Linkages between System Planning and NEPA

Agency has documented the following procedures that link system-level planning analyses to project-level NEPA analysis:

- The agency has formal agreements or procedures in place to consult with and involve resource/environmental agencies (including State, local, Tribal, and Federal agencies, including FHWA) at the systems-level.
- The agency provides public review of system-level planning studies. Both the public and agencies have a reasonable opportunity to comment during the transportation planning process.
- The agency utilizes data sources for system planning that is as consistent as possible with the needs of project-level NEPA analysis (e.g., GIS software, census year, etc.).
- The agency produces documentation of system planning decisions that assists in meeting NEPA documentation requirements. For example, purpose and need statements are developed for major projects recommended in the plan, or examination and elimination of alternatives are adequately assessed and documented at the planning level to meet NEPA needs in later phases.

Documented procedures could include official documentation such as policy and procedures manuals or similar guidance documents, or unofficial documentation such as flowcharts, best practices, or other similar documents.

One of the following scores applies:

- **0 points.** No documented procedures exist or undocumented procedures exist that do not cover all four of the bullets above.
- **2 points.** Undocumented procedures exist that cover all four of the bullets above, or documented procedures exist that cover one or two of the bullets above.
- **4 points.** Documented procedures exist that cover all four of the bullets above.

Requirement SP-17.2

1-2 points. Consult NEPA Practitioners

The agency consults with NEPA practitioners throughout the system-level planning process to ensure the material produced is consistent with the needs of downstream use (e.g., project-level NEPA) so that it:

- Can be incorporated into subsequent NEPA documents in accordance with CEQ regulations, and FHWA and FTA guidelines;
- Will aid in establishing or evaluating the purpose and need of the projects, reasonable alternatives, impacts on the built and natural environment, or mitigation measures; and
- Is in a form that is accessible during the NEPA scoping process and can be appended or referenced in the NEPA document.

One of the following scores applies:

- **0 points.** NEPA practitioners are not consulted during system-level planning.
- **1 point.** NEPA practitioners are consulted occasionally but not systematically to help ensure materials are consistent with downstream needs as noted above.
- **2 points.** NEPA practitioners are fully integrated in the planning process to help ensure materials are consistent with downstream needs as noted above.

Requirement SP-17.3

2 or 4 points. Apply System Planning Results to NEPA Projects

Agency successfully incorporates information (e.g., analyses, decisions, and documents from the system-level planning process) into project-level NEPA documents. In addition, clear documentation of conversations, meetings, and decisions is passed from system planning to the project manager of specific projects.

The information for FHWA & FTA review and consideration can be used in ways such as the following:

- Foundation for projects' purpose and need statements;
- Inputs to preliminary screening of alternatives and elimination of unreasonable alternatives;
- Inputs to projects' potential impacts on the environment;
- Methods to mitigate the projects' environmental impacts;
- Evaluations of indirect and cumulative effects;
- Linkages with housing, development, economic, and environmental goals.

One of the following scores applies:

- **0 points.** System-level information is not included in project-level NEPAs.
- **2 points.** System-level information and documentation are occasionally but not systematically included or referenced in project-level NEPAs.
- **4 points.** System-level information and documentation are fully integrated in project-level NEPAs.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency program that specifies the consultation of a NEPA practitioner throughout the system-level transportation planning process.
2. Documentation of how the planning process supports subsequent project development and NEPA work.
3. Written agency procedures for linking the system-level planning process with NEPA.
4. Current case studies showing how transportation system planning results, designed to inform NEPA, were successfully incorporated into the NEPA process and included in the NEPA document, including how the agency can continue to improve that process.

Project Development

PD-01: Economic Analysis	PD-01
PD-02: Life-Cycle Cost Analyses	PD-02
PD-03: Context Sensitive Project Delivery	PD-03
PD-04: Highway and Traffic Safety	PD-04
PD-05: Educational Outreach	PD-05
PD-06: Tracking Environmental Commitments	PD-06
PD-07: Habitat Restoration	PD-07
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PD-01: Economic Analyses

2-5 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☒ Rural Extended ☐ Urban Basic ☒ Urban Extended

Goal: Using the principles of benefit-cost analysis (BCA) or economic impact analysis (EIA), provide evidence that the user benefits, including environmental, economic, and social benefits, and justify the full life-cycle costs.



Sustainability Linkage

Conducting an economic analysis supports all of the triple bottom line sustainability principles by ensuring that agencies consider improvements where user benefits exceed the investment costs for the project through analysis of impacts to local businesses, emissions, safety, and others.

Background and Scoring Requirements

Background

For the purpose of this criterion, the key terms are defined as follows:

- **“Benefit-Cost Analysis”** – A BCA assesses the user and agency benefits of projects and programs in comparison to their costs. It normally includes all direct user and agency costs and benefits that the agency is able to estimate, including operating costs, travel time costs, and often other impacts such as crash and pollution costs, but broader economic impacts are excluded in traditional BCA. Benefit-cost analysis is typically applied in transportation studies to identify the NPV of the societal benefits that can be associated with a project or program, net of the investment costs. This includes benefits that are not reflected in any monetary transaction.
- **“Broader economic impacts”** – Broader economic impacts include: (1) indirect impacts, which occur when industries that are directly affected by goods and services from other industries, and (2) induced impacts, which occur from increased household spending due to higher regional wages. Impacts (1) and (2) are considered “follow-on” impacts, and while they are typically included in an EIA, they are explicitly excluded from a BCA.
- **“Economic Impact Analysis”** – An EIA is concerned with the monetary transactions that affect the generation of income in an area’s economy due to the investment in the program or project. It does not include the travel time or other costs or benefits for which money is not exchanged; however, it includes indirect and induced impacts on business growth that are not included in benefit-cost analysis. However, it does include much broader estimates of impacts than direct impacts. It asks the question: “What does the economy of interest look like with or without a project or program?” as measured by the quantity of and the types of transactions that are forecasted to occur under each scenario. Impacts are shown by the change in jobs, in worker income, and in GDP or gross state product (GSP) that results in future years as a consequence of the transportation programs or projects. FHWA has a primer on EIAs at <http://www.fhwa.dot.gov/infrastructure/asstgmt/primer08.cfm>.

Scoring Requirements

Requirement PD-01.1

2-5 points. Perform Economic Analyses

Scoring is based on the following, cumulative elements.

- **Requirement PD-01.1a**

2 points. Benefit-Cost Analysis

A BCA for the project must be completed using minimum acceptable industry practices. U.S. DOT provides guidance on developing a BCA under the TIGER Grant Federal Register notices (see <http://www.dot.gov/tiger/application-resources>). In addition, FHWA has developed two project-level BCA tools including: (1) BCA.Net, which is a web-based BCA tool designed to support the highway project decision-making process; and (2) STEAM, which is a corridor and system-wide analysis tool that computes the net value of mobility and safety benefits attributable to regionally important transportation projects. If using the analysis to compare alternatives, one alternative that may be included is a no-build option. Performing a BCA for a project facilitates justification that the environmental, economic, and social benefits expected justify the investment costs for the project. A BCA should not be confused with life-cycle cost analyses, which are leveraged to compare different alternatives (see PD-02) and are the starting point for a BCA.

- **Requirement PD-01.1b**

3 additional points. Economic Impact Analysis

Perform an EIA, which includes the following (if relevant):

- Forecasting and quantification of revenues and costs of the project;
- Quantification of benefits, including social, environmental, and economic factors; and
- Quantification of impacts to regions, land values, and businesses.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Results from a Benefit-Cost and/or Economic Impact Analyses.
2. Documentation of techniques and underlying assumptions for any economic model(s) used to generate results.

PD-02: Life-Cycle Cost Analyses

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

Goal: Reduce life-cycle costs and resource consumption through the informed use of life-cycle cost analyses of key project features during the decision-making process for the project.

Sustainability Linkage

Conducting a life-cycle cost analysis supports the environmental and economic principles by promoting efficient use of materials and resources.



Background and Scoring Requirements

Background

Life-Cycle Cost Analysis (LCCA) is an engineering economic analysis tool that allows transportation officials to quantify the differential costs of alternative investment options for a given project. LCCA can be used to study either new construction projects or to examine preservation strategies for existing transportation assets. LCCA considers all agency expenditures (including planning, engineering, design, construction, maintenance, operations, and administration costs) and user costs (including time, safety, fuel, and other vehicle operating costs associated with normal operations and work zone delays) throughout the life of an alternative, not only initial investments. More than a simple cost comparison, LCCA offers sophisticated methods to determine and demonstrate the economic merits of the selected alternative in an analytical and fact-based manner.

Scoring Requirements

Requirement PD-02.1

1-3 points. Complete Life-Cycle Cost Analysis/Analyses

Complete calculations for LCCA of key project features in accordance with generally accepted engineering economics practices. Comparing multiple design alternatives is encouraged but not required. Scoring is based on the following, cumulative elements.

- **Requirement PD-02.1a**

1 point. Perform LCCA for Pavement Structures Alternatives

Perform an LCCA of all pavement structure alternatives considered in accordance with the method described in the FHWA's Technical bulletin for Life-Cycle Cost Analysis. This may be completed manually, or by using the FHWA's free RealCost software, which can be found at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/lccasoft.cfm> or any equivalent software. This requirement may also be accomplished by using pre-determined pavement designs based on context-specific best practices that are part of a formal Pavement Management System if the pavement design was established based on LCCA analyses (e.g., if within a specific region it has been determined through LCCA analyses that a specific pavement type/mix is most appropriate for bus lanes).

- **Requirement PD-02.1b**

1 point. Perform LCCA for Stormwater Infrastructure Alternatives

Perform an LCCA of all stormwater infrastructure alternatives considered. This analysis should include costs for planning, design, initial construction, maintenance (including appropriate BMP maintenance), and operations. With respect to BMPs, careful consideration should be given to factors such as frequency of scheduled maintenance, chronic maintenance problems (e.g., clogging), and failure rates that add to the overall cost of BMP implementation.

- **Requirement PD-02.1c**

1 point. Perform LCCA for Major Features

Perform an LCCA of the project's major feature (bridges, tunnels, retaining walls, or other items not listed in the preceding options) for each of the alternatives considered. For bridges, perform an LCCA in accordance with the guidance in the National Cooperative Highway Research Program (NCHRP) Report 483 (Hawk, 2003). The report provides standard input values for a wide range of potential bridge projects and referenced sources for other input data. LCCA software may be used, including RealCost, with some minor adjustments to the spreadsheet or a bridge LCCA may also be completed by hand.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one of the following documentation sources (or equal where not available):

1. Calculations for the LCCA, including a summary of inputs and outputs.
2. A copy of the owner-agency policy on LCCA if one exists.
3. Calculations for the LCCA performed as part of a Pavement Management System process to set best practice pavement designs.

PD-03: Context Sensitive Project Development

1-5 points

SCORECARDS:

☐ Paving

☒ Rural Basic

☒ Rural Extended

☒ Urban Basic

☒ Urban Extended

Goal: Deliver projects that harmonize transportation requirements and community values through effective decision-making and thoughtful design.



Affected Triple Bottom Line Principles

Sustainability Linkage

Implementing Context Sensitive Solutions (CSS) supports all of the triple bottom line sustainability principles by ensuring that environmental resources, community values, and economic context of a project are all considered during project development.

Background and Scoring Requirements

Background

Context Sensitive Solutions (CSS) is defined as a collaborative, interdisciplinary approach that involves all stakeholders to provide a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions.

Evidence should exist that the following principles of CSS were applied in the project development process through a formal CSS program or equivalent process that accomplishes the same principles. A public involvement process does not necessarily meet this criterion unless the public and other stakeholders are engaged in two-way communications that ultimately influence the vision and design of the project. For smaller projects that typically do not require involvement of many people, or direct management by stakeholders, this credit's review and documentation process should be scaled accordingly.

Scoring Requirements

Requirement PD-03.1

2 points. Six Step Framework for CSS-based Project Development

Did the project development process generally follow the six-step CSS framework described in NCHRP report 480 at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_480a.pdf and NCHRP report 642 at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_642.pdf, or an equivalent process? NCHRP report 480 describes a general process for incorporating CSS at a project level:

1. Develop a decision-making process and management structure;
2. Define the problem;
3. Develop the project and the evaluation framework for the project;
4. Determine alternatives;
5. Screen the alternatives; and
6. Evaluate and select an alternative.

Requirement PD-03.2

1 point. Deployment of a Multi-disciplinary Team

Did the project development process feature a “cradle-to-grave,” project team that included planners, traffic engineers, public involvement specialists, design engineers, environmental experts, safety specialists, landscape architects, right-of-way staff, freight experts, construction engineers, and others to work on projects who worked together to achieve the desired CSS-based vision for the project?

Requirement PD-03.3

1 point. Creation of Public “Champions”

As a result of CSS-influenced project development process, were external “champions” for the project created in the affected community who were engaged and proactive in supporting it?

Requirement PD-03.4

1 point. Acceptance of Project-level “Problems, Opportunities, and Needs”

Was acceptance achieved among project stakeholders on the problems, opportunities, and needs that the project should address and the resulting vision or goals for addressing them?

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of the CSS or equivalent process applied on the project.

PD-04: Highway and Traffic Safety

1-10 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

Goal: Safeguard human health and reduce social and economic impacts from crashes by incorporating science-based quantitative safety analysis processes within project development that will reduce serious injuries and fatalities within the project footprint.



Sustainability Linkage

Reducing fatal and serious injuries contributes to the social and economic principles by reducing the impacts associated with personal and public property damage, injury, and loss of life.

Background and Scoring Requirements

Background

For the purpose of this criterion, the key terms are defined as follows:

- **“Nominal safety”** – Refers to the extent to which a site (corridor, intersection, segment, or area) meets currently applicable design standards and guidelines. *Substantive* safety refers to actual or anticipated safety performance as defined by crash frequency and crash severity. Substantive safety reflects the science of safety: objective knowledge built on science-based discoveries of data-driven assessments of the safety impacts of road design, road user actions or behaviors, and vehicle attributes.
- **“Road Safety Audits” or “Road Safety Assessments”** – The formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. RSAs *qualitatively* report on potential road safety issues and identify opportunities for improvements in safety for all road users based on input from designers, traffic engineers, maintenance experts, law enforcement, and human factors experts. RSAs are particularly beneficial at the planning and design stages of project development. Guidance on RSAs can be found at <http://safety.fhwa.dot.gov/rsa>.

Scoring Requirements

Requirement PD-04.1

2 points. Incorporate Human Factors Considerations into RSA

One of the following scores applies:

- **0 points.** Rely solely on published design and operational performance standards during the project development process.
- **2 points.** Evaluate, document, and incorporate interactions between road users and the roadway using fundamentals captured in Chapter 2 of the *Highway Safety Manual*, which can be purchased at https://bookstore.transportation.org/collection_detail.aspx?ID=135, and the *Human Factors Guideline for Road Systems* (NCHRP Report 600 series, which can be found at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_600Second.pdf). Road Safety Audits (RSA)/Assessments are completed in accordance with FHWA’s *Road Safety Audit Guidelines* and include

human factors principles (from Chapter 2 of the *Highway Safety Manual* and the *Human Factors Guideline for Road Systems*).

Requirement PD-04.2

1 point. Build Awareness among the Public Regarding Contributing Factors to Crashes

Use media, for example the agency website or flyers, to raise awareness among the public about contributing factors to crashes on the existing facility or similar facilities on the network in a manner that is easy to understand. The purpose of these awareness efforts would be to support an improved understanding of road users about their personal responsibility in preventing crashes and to improve overall safety culture.

Requirement PD-04.3

1-6 points. Explicit Consideration of Safety using Quantitative, Scientifically Proven Methods

Best practices for using quantitative safety methods and measures to identify and evaluate, for example, safety improvements or actions, are presented in the advanced approaches in the HSM that account for regression to the mean (RTM), the impact of countermeasures presented in Part D of the HSM, and highly rated CMFs in the FHWA CMF Clearinghouse. Predictive methods for evaluation of quantitative safety refers to analytical approaches that result in a calculation of the predicted and/or expected frequency and/or severity of crashes for a given site or set of conditions. Such methods are described in the *AASHTO Highway Safety Manual*, which can be purchased at <http://www.highwaysafetymanual.org>. They incorporate the use of safety performance functions, crash modification factors that meet the HSM inclusion rules, and local or state-specific calibration.

Tools that can be used in this process include AASHTO SafetyAnalyst, the Interactive Highway Safety Design Model (IHSDM), spreadsheet tools developed to apply the predictive methods in the HSM, and analytical tools that use substantive safety as the basis of the analysis. While crash rates have been in use for many years, these (and other methods that do not account for the characteristics of crash data and the impact of, for example, RTM) do not represent state of the practice.

The *Integrating the HSM into the Highway Project Development Process* guide (FHWA 2012, at http://www.camsys.com/pubs/hsm_integration.pdf) describes examples of the application of the HSM in the project development process.

Incorporate substantive safety performance into project development decision-making through the use of scientifically proven and statistically reliable predictive methods for evaluation of quantitative safety. Significant project decisions include establishment of project type and design criteria, selection of project design alternatives, and development of preliminary and final design details, including the use of design exceptions as necessary.

No credit is given for using design and operational performance standards and guidelines to assess nominal safety of the project throughout the project development process; or using less reliable quantitative safety methods such as crash rates to forecast future anticipated safety performance; or conducting RSAs that only assess nominal safety performance to describe safety (for example, assessing and documenting whether design standards and guidelines are met).

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement PD-04.3a**

1 point. Establish the Project Type

Establish the project type during scoping of project alternatives through a quantitative and statistically reliable process. This process includes consideration of historic safety performance of the existing facility or similar facilities.

- **Requirement PD-04.3b**

2 points. Develop and Evaluate the Project Design and/or Operational Alternatives

Develop and evaluate project design and/or operational alternatives using explicit consideration of substantive safety through quantitative, statistically reliable methods.

- **Requirement PD-04.3c**

3 points. Use Quantitative and Statistically Reliable Methods and Knowledge

Use quantitative and statistically reliable methods and knowledge to assess substantive safety performance in the development of preliminary and final design details. Where a project includes design exceptions, evaluate the safety impact of the design exception(s) with these methods, and identify potential mitigating actions to improve safety performance. Note: if the project has no design exceptions, the agency can earn 3 points by documenting that their policies and processes for evaluation and documentation of design exceptions incorporate substantive safety principles described above.

Requirement PD-04.4

1 point. Evaluate Safety Performance of the Project after Implementation

Given the relative rarity of crashes, a statistically reliable post-evaluation period may take several years. As agencies may wish to complete a sustainability assessment sooner than that, earning one credit for this step is possible by documenting that agencies (a) have formal safety project evaluation policy and process in place that are statistically reliable, and (b) indicating that the agency intends to apply such process to this project.

A statistically reliable evaluation process includes at least the following elements:

Collection and recording of the traffic volumes, roadway, and crash data for the three years prior to implementation for use after implementation.

Keeping record of the implementation date (i.e., actual start of construction work and completion date of construction (last day before official opening) is recorded for use after implementation).

The agency is able to retrieve the abovementioned information for a post-implementation safety performance review.

The method used in the evaluation process is advanced enough to account for regression to the mean (RTM).

The Empirical Bayes (EB) before-after study (with or without comparison sites) method is considered the most appropriate means assessing the safety effectiveness of a treatment. The EB method accounts for regression to the mean (RTM) effects which are common to highway and traffic safety studies and applications. The HSM provides details on how to conduct post-implementation evaluations to demonstrate statistically valid safety effects. The evaluation shall assess three to five years of before and after data in determining the effect of the project on crashes and crash severity. The EB methods rely on predictive methods, for example, the use of safety performance functions, crash modification factors that meet the HSM inclusion rules, and local or state-specific calibration. If such models do not exist or calibrations of the HSM models have not been completed, the naive before-after study approach is acceptable.

One of the following scores applies:

- **0 points.** Perform no post-evaluation of the project, or use only less reliable methods such as crash rates to evaluate the safety performance of the project after implementation.
- **1 point.** Use a statistically reliable, science-based method to evaluate the safety effectiveness of the implemented project.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more following documentation sources (or equal where not available):

1. Documentation of examples where human factors were considered in the project development process; or, if an RSA took place, documentation of the RSA, which may include resumes or biographies of RSA team members demonstrating their experience and qualifications to conduct RSAs. The documentation needs to include evidence that the fundamentals of human factors were applied (reflect knowledge and application of Chapter 2 of the HSM and the *Human Factors Guideline for Road Systems* (NCHRP 600 series).
2. Documentation of public awareness or information presented to the public to support a change in safety culture. These will include information (quantitative) on contributing factors, for example, speeding, drinking and driving, and distracted driving based on historic crash performance.
3. Documentation of the project scoping process, including data and analysis describing how the existing facility's safety performance was used to make decisions on scope of project improvements.
4. Project reports, technical memos, or other supporting documentation that demonstrate application of HSM-quality evaluations of the project and alternatives considered. These include documentation of the existing safety performance (frequency, crash type, severity) and comparison with an appropriate benchmark. Include analysis of the expected safety performance of alternatives considered (with specific reference to SPFs and CMFs used), as well as how quantitative safety was considered as part of overall project decision-making.
5. Design exception review and evaluation reports approved by the appropriate agency authority that include quantitative estimates of the expected safety performance of the design exception, specific mitigation measures, and estimates of the quantitative safety performance of the proposed mitigation measures. Where no design exceptions were required, documentation of the agency's processes and procedures for design exceptions that cite reference to and use of substantive, science-based crash analyses and methods.
6. Documentation of the post-implementation effectiveness evaluation of the project, including a collection of crash data before and after implementation, and shall follow the Empirical Bayes process or advanced methods that account for RTM. Where post-evaluation requires a lengthy period beyond project implementation, documentation of the agency's formal process for evaluation with a statement of intent or policy regarding post-evaluation can be submitted.

PD-05: Educational Outreach

2 points

SCORECARDS:



Goal: Increase public, agency, and stakeholder awareness of the integration of the principles of sustainability into roadway planning, design, and construction.



Sustainability Linkage

Educational outreach supports all of the triple bottom line principles by communicating to the public how social, environmental, and economic issues relate to roadway projects.

Background and Scoring Requirements

Background

This criterion awards points for incorporating public educational outreach that promotes and educates the public about sustainability including social, environmental, and economic principles. Specifically, this criterion requires communicating how sustainability principles are being integrated into the planning, design, construction, and operational phases of the roadway project. Credit can be achieved by leveraging public involvement processes where possible.

Note that performing a routine public involvement process does not accomplish this criterion unless it includes specific efforts to educate the audience about the sustainability of the project. Also note that the word “sustainability” does not have to be used specifically, and that terminology should be appropriate to the audience.

Scoring Requirements

Requirement PD-05.1

2 points. Install Educational Elements or Perform Educational Activities

Install or perform a minimum of two different educational elements from the Table PD-05.1.A.

TABLE PD-05.1.A. REQUIREMENTS FOR EDUCATIONAL ELEMENTS (CONTINUED ON NEXT PAGE)

Requirement	Educational Element	Recommended Requirements
PD-05.1a	Include sustainability in a Project Development Process	Specifically include sustainability as a consideration in a project development process that harmonizes transportation requirements and community values through effective decision-making and thoughtful design. Examples of this type of development process include complete streets, context sensitive solutions, neighborhood-aware design, and similar.
PD-05.1b	Include sustainability in Public Involvement	Specifically include sustainability education and promotion of sustainability as a project element throughout the public involvement process for the project.

Requirement	Educational Element	Recommended Requirements
PD-05.1c	Install point-of-interest	Install and maintain off-road point-of-interest kiosk(s) that display(s) information about the project and its sustainability features, as appropriate.
PD-05.1d	Project website	Provide a publicly available and maintained informational project website with capacity for submitting feedback and comments.
PD-05.1e	Stakeholder guide	Include sustainability and how it is being applied to the project in agency and/or stakeholder guide, specification, or policies, as appropriate.
PD-05.1f	School presentations	Perform presentation(s) about the project and its sustainability features for primary and secondary schools.
PD-05.1g	Professional presentations	Perform professional technical presentation(s) about the project and its sustainability features.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Public Involvement and Outreach materials showing sustainability was specifically included.
2. Text or printed copy of the information offered at the kiosk (i.e., brochure or static installation).
3. Website address and/or screen captures.
4. An agency guide, specification, or policy.
5. A copy of school or professional presentations and the date of the presentation.

PD-06: Tracking Environmental Commitments

2-5 points

SCORECARDS:



Goal: Ensure that environmental commitments made by the project are completed and documented in accordance with all applicable laws, regulations, and issued permits.



Sustainability Linkage

Tracking commitments supports the environmental and social principles by ensuring that adherence to commitments made to stakeholders and the environment are consistently met throughout project development.

Background and Scoring Requirements

Scoring Requirements

Requirement PD-06.1

2-3 points. Use Formal Compliance Tracking System

Agencies are responsible for meeting commitments made throughout the project to regulatory agencies, property owners, tenants, the community, and other stakeholders. This criterion requires the project owner to facilitate the tracking and compliance of commitments through a formal environmental compliance tracking system. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement PD-06.1a**

2 points. Use an Environmental Compliance Tracking System (ECTS)

Beginning in project development, use a comprehensive ECTS for the project and related facilities to identify how environmental commitments will be identified, tracked, fulfilled, and verified throughout design and construction. The ECTS should include all regulatory and non-regulatory commitments that apply to the development work and additional properties, including surveys, borings, batch plants, staging, equipment storage, employee parking, and field offices, as well as land that is purchased, leased, occupied, or used for the work.

At a minimum, the system should: identify commitments in a single list; identify an environmental compliance manager; ensure that environmental commitments are communicated from one phase of a project to another; leverage tracking mechanisms (such as databases, forms, or lists); identify training needed for necessary design and construction staff; and provide periodic reports verifying the commitments have been fulfilled. The tracking system should be updated and maintained throughout the project development and any monitoring period.

For more information on environmental compliance tracking systems, see AASHTO's Center for Environmental Excellence at <http://environment.transportation.org/>.

- **Requirement PD-06.1b**

1 additional point. ECTS has Mechanism to Communicate from Planning to Maintenance

The environmental compliance tracking system has a formal mechanism to communicate commitments from transportation planning through design, construction and maintenance.

Requirement PD-06.2

2 points. Assign Independent Environmental Compliance Monitor

The Owner shall require that the principal project constructor assigns an *independent* environmental compliance monitor who will provide quality assurance services and report directly to and make recommendations to the regulatory and Lead Agencies. The Independent Environmental Monitor should be a recognized expert or persons knowledgeable about natural resources protection and construction, and should report directly to regulatory agencies about problems observed during design review and construction phases, including, but not limited to, erosion and sediment control problems.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of the following documentation sources (or equal where not available):

1. Documentation of environmental tracking system, including instructions on what is to be included and how the chain of documentation flows throughout the phases of projects.
2. Contact documents requiring the construction contractor to assign an independent environmental compliance manager.

PD-07: Habitat Restoration

1-3 points

SCORECARDS:

☐ Paving

☒ Rural Basic

☒ Rural Extended

☒ Urban Basic

☒ Urban Extended

Goal: Avoid, minimize, and compensate the loss and alteration of natural (stream and terrestrial) habitat caused by project construction and/or restore, preserve, and protect natural habitat beyond regulatory requirements.



Sustainability Linkage

Minimizing or avoiding impacts to habitat and restoring habitat beyond required regulations enhances the ecosystem and therefore supports the environmental principle of the triple bottom line.

Background and Scoring Requirements

Background

For the purposes of this criterion, the key terms are defined as follows:

- **“Traditional Alternative”** – The traditional alternative is the alternative that would most likely be approached without consideration of impacts to habitat. For new alignments, this is typically the alignment that is most geometrically fitting given the beginning and end points. For reconstruction, this is typically the alignment option that widens the cross-section in-place without shifting alignments.

In no case should the traditional alternative be exaggerated beyond alignments that would be considered appropriate for the context in order to inflate the perceived reduction in impacts to habitats for this criterion.

Credit for enhancement can be obtained for this criterion through project-specific mitigation or through the use of mitigation banking.

Scoring Requirements

Requirement PD-07.1

1-3 points. Avoid or Minimize Impacts to Habitats or Enhance Features

Points shall be achieved per the table PD-07.1.A. Points are **not** cumulative; rather the highest point value earned should be used.

TABLE PD-07.1.A. POINTS AND REQUIREMENTS FOR HABITAT RESTORATION (CONTINUED ON NEXT PAGE)

Requirement	Points	Method
PD-07a	1	Minimize Impacts. Show that an effort has been made to modify the alignment and/or project cross-sections to significantly minimize impacts to habitat as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 50% or more as compared to the traditional alternative.

Requirement	Points	Method
PD-07b	2	Avoid Impacts. Show that an effort has been made to modify the alignment and/or project cross-sections to significantly avoid impacts to habitat as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 75% or more as compared to the traditional alternative.
PD-07c	3	Enhance features. For projects required to mitigate habitat impacts through restorative practices, implement a restoration/preservation approach that restores and/or preserves an upland buffer area surrounding the required stream or wetland mitigation site. The amount of buffer must be an appropriate amount so it improves the habitat quality of the wetland or stream it is protecting.
PD-07d	3	Enhance features. For projects not required to mitigate habitat impacts, implement a habitat restoration effort that mitigates for the habitat of non-listed species under the Federal Endangered Species Act (see Recovery Crediting Guidance, 73 Fed Reg. 44761, July 31, 2008, which can be found at http://www.gpo.gov/fdsys/pkg/FR-2008-07-31/pdf/E8-17579.pdf).

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one of the following documentation sources (or equal where not available):

1. Contract documents showing the baseline conditions of the site (including existing habitat quality) and improvements to be constructed and planted.
2. Technical reports or permitting documentation that describes the species which are intended to benefit from the site and the value of the habitat lift (above and beyond requirements) that is satisfying this criterion.
3. Technical report that describes minimization that occurred throughout the project development process.

PD-08: Stormwater

1-9 points

SCORECARDS:

☐ Paving

☒ Rural Basic

☒ Rural Extended

☒ Urban Basic

☒ Urban Extended

Goal: Improve stormwater quality from the impacts of the project and control flow to minimize their erosive effects on receiving water bodies and related water resources, using management methods and practices that reduce the impacts associated with development and redevelopment.



Affected Triple Bottom Line Principles

Sustainability Linkage

Implementing more sustainable stormwater management practices supports the environmental principle by improving water quality, managing runoff, and using technology that mimics natural hydrology.

Background and Scoring Requirements

Background

For the purpose of this criterion, the key terms are defined as follows:

- **“Best Management Practices”** – BMPs are stormwater management techniques that mimic natural hydrology to treat pollutants.
- **“Low-Impact Development”** – The US EPA defines LID as an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions. LID has been characterized as a sustainable stormwater practice by the Water Environment Research Foundation and others.

Scoring Requirements

To calculate the total number of points achieved for this criterion, follow the directions in each of the scoring sections below for Water Quality, Flow Control, and Low-Impact Development (LID), and add the points achieved in each of the three areas up to a maximum of nine points total.

Requirement PD-08.1

1-3 points. Water Quality Treatment

Treat pollutants from at least of 80 percent of the total annual runoff volume. Use Table PD-08.1.A to calculate the number of points achieved for water quality based on the amount of runoff volume treated, pollutants treated, and the target impervious surface area treated. For retrofit projects, first use Table PD-08.1.B to determine an equivalent value to use for Target Impervious Surface Area in Table PD-08.1.A, column 3.

TABLE PD-08.1.A. WATER QUALITY – REDEVELOPED ROADWAYS

(1)	(2)	(3)	(4)
Amount of Runoff Treated (% of Annual Volume)	Target Pollutant	Target Imp. Surface Area (% of Added) ¹	Points
80–89%	Sediment	101%–125%	0
		>125%	1
	Sediment, and Metals or Other ²	101%–125%	1
		>125%	2
90% +	Sediment	101%–125%	1
		>125%	2
	Sediment, and Metals or Other ²	101%–125%	2
		>125%	3

Column 3 – For retrofit projects, see Table PD-08.1.B for equivalent percentages to use.

1 – % of Added = Treated Impervious Surface Area ÷ Added Impervious Surface Area

2 – Other basin-specific pollutant of concern is targeted

TABLE PD-08.1.B. RETROFIT PROJECTS – CALCULATING EQUIVALENT TARGET IMPERVIOUS SURFACE AREA

(1)	(2)	(3)
Existing Impervious on Project (acres)	% of Existing Impervious Area Treated	Equivalent (% of Added) ¹
0–1.0	0–50%	101%–125%
	50.1%–100%	>125%
1.1–5.0	0–40%	101%–125%
	40.1%–100%	>125%
5.1–10.0	0–30%	101%–125%
	30.1%–100%	>125%
>10.0	0–20%	101%–125%
	20.1%–100%	>125%

Column 3 – Percentage to use in Table PD-08.1, column 3; Table PD-08.2.A, column 3; and Table PD-08.3.B, column 2

Requirement PD-08.2

1-3 points. Flow Control

Manage the flow from at least of 80 percent of the total runoff volume, and is based on controlling peak flows or durations from the project site. Use Table PD-08.2.A to calculate the number of points achieved for flow control based on the amount of runoff treated, what was treated, and the target impervious surface area treated. For retrofit projects, first use Table PD-08.1.B (above) to calculate the equivalent value to use for Target Impervious Surface Area in column 3 of Table PD-08.2.A.

TABLE PD-08.2.A. FLOW CONTROL

(1)	(2)	(3)	(4)
Amount of Runoff Managed (% of Total Volume)	Flow Control Standard Used	Target Imp. Surface Area (% of Added) ¹	Points
80–89%	Peak Rate	101%–125%	0
		>125%	1
	Flow Durations	101%–125%	1
		>125%	2
90% +	Peak Rate	101%–125%	1
		>125%	2
	Flow Durations	101%–125%	2
		>125%	3

Column 3 – For retrofit projects, use Table PD-08.1.B for equivalent percentages.

Requirement PD-08.3

1-3 points. Use Effective BMPs

Use effective BMPs or stormwater management techniques that mimic natural hydrology to treat pollutants. Table PD-08.3.A identifies BMPs considered most effective for specific target pollutants. If the project uses one, proceed to Table PD-08.3.B to calculate the number of points achieved for Effectiveness/LID based on the target impervious surface area treated. For retrofit projects, first use Table PD-08.1.B (above) to calculate the equivalent value to use for Target Impervious Surface Area in Table PD-08.3.B, column 2.

TABLE PD-08.3.A. EFFECTIVE BMPS AND INFILTRATION/VOLUME REDUCTION

Target Pollutant	BMP					
	Detention Pond	Wet Pond	Wetland	Biofilter	Media Filter	Infiltration /LID ¹
Suspended Solids	X	X	X	X	X	X
Total Copper	X			X		X
Dissolved Copper		X		X		X
Total Lead		X		X	X	X
Dissolved Lead		X				X
Total Zinc		X	X		X	X
Dissolved Zinc				X		X
Total Phosphorus ²		X	X	-		X

1 – Provide 100% infiltration for the water quality storm/volume using a pond, LID techniques, or a combination.

2 – Phosphorus or other additional basin-specific pollutant

TABLE 5. PD-08.3.B. EFFECTIVE BMPS AND INFILTRATION/VOLUME REDUCTION

(1)	(2)	(3)	(4)
Effective BMP/Infiltration/LID Used?	Target Imp. Surface Area (% of Added) ¹	Points for Rural Projects	Points for Urban Projects
Yes	101%–125%	1	2
	125% +	2	3

Column 1 – See Table PD-08.3.A for Effective BMPs, Infiltration and LID practices.

Column 2 – For retrofit projects, see Table PD-08.1.B for equivalent percentages.

Column 3 – Project location is outside growth area/higher densities established by MPO.

Column 4 – Project location is inside growth area/higher densities established by MPO.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Project Drainage Report or other relevant calculations and studies.
2. Project Contract Documents.

PD-09: Ecological Connectivity

1-3 points

SCORECARDS: ☐ Paving ☒ Rural Basic ☒ Rural Extended ☐ Urban Basic ☒ Urban Extended

Goal: Avoid, minimize, or enhance wildlife, amphibian, and aquatic species passage access, and mobility, and reduce vehicle-wildlife collisions and related accidents.



Sustainability Linkage

Improving ecological connectivity supports all of the triple bottom line sustainability principles by improving habitat for species while reducing accidents, therefore preventing the impacts associated with personal and public property damage, injury, and the loss of life.

Background and Scoring Requirements

Background

For the purpose of this criterion, the key terms are defined as follows:

- **“Traditional Alternative”** – The traditional alternative is the alternative that would most likely be approached without consideration of impacts to habitat. For new alignments, this is typically the alignment that is most geometrically fitting given the beginning and end points. For reconstruction, this is typically the alignment option that widens the cross-section in-place without shifting alignments. In no case, should the traditional alternative be exaggerated beyond alignments that would be considered appropriate for the context in order to inflate the perceived reduction in impacts to habitats for this criterion.

Credit for enhancement can be obtained for this criterion through project-specific mitigation or through the use of mitigation banking.

Scoring Requirements

In order to achieve points for this criterion, the following prerequisite must be met.

Prerequisite PD-09.1P

0 points. Conduct Ecological Assessment

Conduct a site-specific ecological assessment of the roadway project using GIS data or regional expertise. Report the resulting impacts that the roadway has on the major ecosystems, according to the best scientific knowledge available. A project or resource agency biologist should be involved with the assessment. The ecological assessment should be consistent with the State-approved wildlife action plans, if available.

Requirement PD-09.1

1-3 points. Avoid or Minimize Impacts to Ecological Connectivity or Enhance Features

Points shall be achieved per Table PD-09.1.A on the following page. Points are **not** cumulative; rather the highest point value earned should be used. Note that more points are available for enhancing features on new alignments

than existing alignments because more opportunities typically exist to improve ecological connectivity on new alignments.

TABLE PD-09.1.A. POINTS AND METHODS TO MINIMIZE IMPACTS TO AND ECOLOGICAL CONNECTIVITY

Requirement	Points	Method
PD-09.1a	1	Minimize Impacts. Show that an effort has been made to modify the alignment and/or project cross-sections to significantly minimize impacts to ecological connectivity as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 50% or more as compared to the traditional alternative.
PD-09.1b	2	Avoid Impacts. Show that an effort has been made to modify the alignment and/or project cross-sections to significantly avoid impacts to ecological connectivity as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 75% or more as compared to the traditional alternative.
PD-09.1c	2	Enhance features. For existing alignments only. Replace in-kind, retrofit, or upgrade any and all existing culverts and wildlife fencing structures or planting deemed structurally deficient, damaged, obsolete, insufficiently sized, or otherwise inadequate. Actions must be approved by the project ecologist, resource/regulatory biologist, or other appropriate staff.
PD-09.1d	3	Enhance features. For new alignments only. Install new dedicated or multi-use wildlife crossing structures and protective fencing (if needed) or planting as recommended by the wildlife assessment. Actions must be approved by the project ecologist, resource/regulatory biologist, or other appropriate staff.
PD-09.1e	3	Restore features. Re-establish past habitats, infrastructure, or add connectivity to re-establish corridors and habitats. Actions must be approved by the project ecologist, resource/regulatory biologist, or other appropriate staff.

Dedicated wildlife crossings are structural features of the roadway that are not used by motorized vehicles. Where deemed appropriate by an ecologist, crossings may be shared by non-motorized modes of transport. No points will be awarded in the following conditions:

1. For projects that maintain or rehabilitate existing ecological connections to out-of-date or current standards (i.e., routine maintenance of drainage culverts does not qualify).
2. Pre-existing ecological connectivity features: all new features or upgrades must be due to and completed as part of the roadway project.
3. Projects that add wildlife connectivity features where such features are clearly outside of the project context.
4. Projects located in a network that is systematically inadequate. However, points could be awarded for such projects where it is demonstrated that a program is in place at the owner agency for systematic improvements on that network, and that this project fits this program.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one of the following documentation sources (or equal where not available):

1. Ecological study performed for the project provided in NEPA documentation. State permitting documentation that includes an ecological connectivity element.
2. Contract documents showing wildlife crossing improvements.
3. Technical report that describes minimization that occurred throughout the project development process.

PD-10: Pedestrian Access

1-2 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☐ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Improve the safety and convenience of pedestrian networks for people of all ages and abilities by providing or enhancing facilities within the project footprint.



Sustainability Linkage

Promoting pedestrian access supports all of the triple bottom line sustainability principles by improving safety, access, and mobility for the public while also increasing the modal choices available to travelers, reducing traffic congestion and emissions.

Background and Scoring Requirements

Background

To receive credit for this criterion, the project must accommodate pedestrians of all ages, unless pedestrians are specifically (and appropriately) prohibited from the project. To receive full credit, these facilities should go beyond minimum standards and requirements and strive to create safe, comfortable, attractive, and convenient pedestrian networks.

Project features that qualify for this criterion must enhance or help achieve at least the first three of the following four factors:

- **Safety:** Improved safety for pedestrians of all ages and abilities through well-designed facilities that promote safe behaviors.
- **Comfort:** Pedestrian facilities that are comfortable will have adequate width to permit greater volumes of walkers; provide space for passing slower pedestrians; and will be well maintained.
- **Connectivity:** Improved connectivity through development of convenient pedestrian infrastructure that connects homes to places of employment, schools, shopping, services, transit, and recreation areas.
- **Aesthetics and Environment:** Creating a pleasing, safe, and enjoyable pedestrian facility with features such as landscaping, art, furniture, lighting, and social amenities (such as benches and gathering spaces) as appropriate to promote the use of the facilities.

Scoring Requirements

Potential practices that would qualify as methods to improve existing or implement new features that address safety, comfort, connectivity, and aesthetics and environment include:

- **Improved intersection design for pedestrians.** Improve pedestrian intersections by including elements beyond simple crosswalks, such as:
 - Countdown signal heads
 - Narrower lanes (to shorten crossing distances)
 - Pedestrian medians

- Corner refuge islands
- **As appropriate for context, widen sidewalks to address safety, comfort, and connectivity.** Widening sidewalks, in some cases, can improve conditions for pedestrians.

Prerequisite PD-10.1P

0 points. Meet ADA Requirements

Facilities must meet ADA requirements to receive credit. No credit is given for improvements and retrofits to bring existing facilities up to required ADA standards.

Requirement PD-10.1

1-2 points. Install Pedestrian Features

One of the following scores may apply:

- **Requirement PD-10.1a**

1 point. Install Features that Improve Safety, Comfort, and Connectivity

Implement new or improve existing features (such as those mentioned above) for existing pedestrian facilities that address safety, comfort, and connectivity. Current facilities do not qualify for this criterion without additional effort, such as upgrades, improvements, or construction of new facilities. The attempt to enhance the pedestrian transportation experience should be deliberate and a direct result of the project. No credit is given for improvements and retrofits to bring existing facilities into ADA compliance.

OR

- **Requirement PD-10.1b**

2 points. Install Features that Improve Safety, Comfort, Connectivity, and Aesthetics and Environment

Implement features (such as those listed above) in the design and construction of new pedestrian facilities that address all four of the factors listed above. New facilities include physical or constructed changes to the roadway structure, dimensions, or form that enhance safe, comfortable, convenient, and attractive pedestrian access within the right-of-way or roadway corridor.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and need or other planning documents addressing pedestrian access on the roadway project, including how it fits with existing land uses and/or existing General and Transportation Plans.
2. Results of public input on proposed pedestrian facilities, if any.
3. Contract documents showing enhanced pedestrian facilities incorporated.

PD-11: Bicycle Access

1-2 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☐ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Promote bicycling in communities by providing or enhancing safe and convenient bicycling facilities within the project footprint.



Affected Triple Bottom Line Principles

Sustainability Linkage

Promoting bicycle access supports all of the triple bottom line sustainability principles by improving safety, access, and mobility for the public while also increasing the modal choices available to travelers, reducing traffic congestion and emissions.

Background and Scoring Requirements

Background

To receive credit for this criterion, the project must include bicycle facilities that foster use by bicyclists, unless bicyclists are specifically (and appropriately) prohibited from the project. These facilities should go beyond minimum standards and requirements and strive to create safe, comfortable, attractive, and convenient bicycling networks.

Project features that qualify for this criterion must enhance or help achieve at least the first two of the following factors:

- **Safety:** Improved bicyclist safety through well-designed facilities that promote safe behaviors.
- **Comfort:** Facilities that are comfortable will have adequate width to permit greater volumes of bicyclists and will be well maintained.
- **Connectivity:** Improved connectivity through development of convenient bicycle infrastructure that connects homes to places of employment, schools, shopping, services, transit, and recreation areas.
- **Aesthetics and Environment:** Creating a pleasing, safe, and enjoyable bicycle facility with features such as landscaping, lighting, and parking (including bicycle share parking) as appropriate to promote the use of the facilities.

Potential practices that would qualify as methods to improve existing or implement new features that address safety, comfort, connectivity, and/or aesthetics and environment include:

- **Improved facilities.** Improve bicycle facilities by including elements such as:
 - Wide shoulders
 - Shared use paths
 - Bicycle parking (lockers, racks, etc.)
 - Bicycle bridges and tunnels
 - Signage
 - Bicycle detectors in driving lanes
 - Bicycle friendly stormwater drains

- Dimension upgrades
- Resurfaced bicycle lanes

Scoring Requirements

Prerequisite PD-11.1P

0 points. Meet ADA Requirements

Facilities must meet ADA requirements to receive credit. No credit is given for improvements and retrofits to bring existing facilities up to required ADA standards.

Requirement PD-11.1

1-2 points. Install Bicycle Features

One of the following elements may apply:

- **Requirement 11.1a**

1 point. Install Features that Improve Safety and Connectivity

Implement new or improve existing features (such as those mentioned below) for existing bicycle facilities that improve safety and connectivity. Current facilities do not qualify for this criterion without additional effort, such as upgrades, improvements, or construction of new facilities. The attempt to enhance bicycle transportation experience should be deliberate and a direct result of the project.

OR

- **Requirement PD-11.1b**

2 points. Install Features that Improve Safety, Comfort, Connectivity, and Aesthetics and Environment

Implement features (such as those mentioned below) in the design and construction of new bicycle facilities that enhance safety, comfort, connectivity, and aesthetics and environment. New facilities include physical or constructed changes to the roadway structure, dimensions, or form that provide safe, convenient, and attractive bicycle access within the right-of-way (ROW) or roadway corridor. To be eligible for this credit, the bicycle facilities must be Class I (separated) or Class II (bike lanes). Lanes shared with motorized vehicles and shoulders do not meet this requirement.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and Need addressing bicycle access within the roadway project, including how it fits with existing land uses and/or existing General and Transportation Plans, project analysis, or a Bicycle Master planning process.
2. Results of public input on proposed bicycle facilities, if any.
3. Copy of the contract specification and plans for proposed bicycle facilities.
4. Total cost associated with new or improved bicycle facilities.

PD-12: Transit and HOV Access

1-5 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☐ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Promote use of public transit and carpools in communities by providing new transit and high occupancy vehicle (HOV) facilities, or by upgrading existing facilities within the project footprint.



Sustainability Linkage

Promoting transit and HOV access supports all of the triple bottom line sustainability principles by improving access and mobility for the public while also increasing the modal choices available to travelers, reducing traffic congestion and emissions.

Background and Scoring Requirements

Scoring Requirements

Transit and HOV facilities installed for this requirement shall be consistent with the need, purpose, and appropriateness for transit and HOV access within the project footprint. To receive credit for this criterion, the project must include contextually appropriate transit and/or HOV facilities that go beyond minimum design standards and requirements, and strive to create safe, versatile, attractive, and convenient transit and HOV networks that are integrated with pedestrian and bicycling networks.

Requirement PD-12.1

1–5 points. Install Transit Features

Achieve the requirements within the project footprint listed in Table PD-12.1.A, which is roughly based on the Federal Transit Authority (FTA) criteria from *Characteristics of Bus Rapid Transit for Decision-Making (CBRT)* at http://www.fta.dot.gov/documents/CBRT_2009_Update.pdf and *TCRP 90, Bus Rapid Transit* by Diaz and Hinebaugh (2009) at http://www.nbrti.org/docs/pdf/tcrp_rpt_90v1.pdf, and *Guide for High-Occupancy Vehicle (HOV) Facilities, 3rd Edition*, AASHTO, (2004) which can be purchased at https://bookstore.transportation.org/item_details.aspx?ID=114.

Points are **not** cumulative; rather the highest point value achieved should be used.

TABLE PD-12.1.A. AVAILABLE POINTS FOR TRANSIT AND HOV ACCESS FEATURES (CONTINUED ON NEXT PAGE)

Requirement	No. Points	Requirement Description
PD-12.1a	1	<p>Any of one the following:</p> <ul style="list-style-type: none">Enhance at least 50 percent of transit station or stop amenities (lighting, trash/recycling bins, benches, bike parking, pay phones, heating and/or cooling, etc.)Improve at least 50 percent of the transit and HOV facility signage (related to transit and HOV) and vehicular access (beyond basic ADA requirements)Provide transit shelters at more than 50 percent of the corridor stations/stops

Requirement	No. Points	Requirement Description
		<ul style="list-style-type: none"> Provide seamless pedestrian and bicycle access to stations within at least a half-mile and three-mile catchment area (see FR notice at https://www.federalregister.gov/articles/2011/08/19/2011-21273/final-policy-statement-on-the-eligibility-of-pedestrian-and-bicycle-improvements-under-federal) or other. Provide new park & ride lots in strategic locations.
PD-12.1b	2	Any one of the following: <ul style="list-style-type: none"> Implement two or more of the improvements from the 1 point list above. Implement physical or constructed changes to the roadway structure, dimensions, or form that provide for future HOV access or minor dedicated transit access within the right-of-way (ROW), such as a carpool lane for HOV vehicle, queue jump lanes for transit vehicles, on-street bus lane, bus rapid transit, or an expressway bus lane.
PD-12.1c	3	Implement physical or constructed changes to the roadway structure, dimensions, or form that provide HOV access or minor dedicated transit access within the ROW, such as a carpool lane for HOV vehicles, queue jump lanes for transit vehicles, or shoulder-running buses .
PD-12.1d	4	Implement physical or constructed changes to the roadway structure, dimensions, or form that provide dedicated transit access within the ROW, such as an on-street bus lane, bus rapid transit, or an expressway bus lane .
PD-12.1e	5	Implement physical or constructed changes to the roadway structure, dimensions, or form that provide exclusive mass transit access within the ROW, such as at-grade or grade-separated transit-ways or transit served park-and-ride lots .

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and need for transit and HOV access on the roadway project, including how it fits with existing land uses and/or existing General and Transportation Plans.
2. Total cost associated with new or improved transit and HOV facilities.
3. Contract specifications and budget items addressing transit and HOV.

PD-13: Freight Mobility

1-7 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☒ Rural Extended ☐ Urban Basic ☒ Urban Extended

Goal: Enhance mobility of freight movements, decrease fuel consumption and emissions impacts, and reduce freight-related noise.

Sustainability Linkage

Enhancing freight mobility supports the environmental and economic sustainability principles by providing features that make freight transportation more efficient, thereby reducing fuel consumption, decreasing emissions, and reducing noise pollution.



Background and Scoring Requirements

Scoring Requirements

Facilities installed for this requirement shall be consistent with the need, purpose, and appropriateness for freight mobility within the project footprint.

Requirement PD-13.1

1 – 7 points Implement Freight Access Features

Implement one or more of the features in Table PD-13.1.A. Points for features are cumulative if roadways have more than one feature; however, this criterion shall not exceed a total of seven points.

**TABLE PD-13.1.A. POINTS AND REQUIREMENTS FOR FREIGHT ACCESS PROJECT FEATURES
(CONTINUED ON THE FOLLOWING PAGE)**

Requirement	Points	Feature	Requirement Descriptions
PD-13.1a	1	No-idling policy and signage (no-idling policy within certain parameters, such as outside air temperature)	<ul style="list-style-type: none">Implementation and appropriate number consistent with project setting
PD-13.1b	1	Construct new rest area or rest stop, or expand existing rest area or rest stop	<ul style="list-style-type: none">Provides a significant number of new truck parking spots at or within a reasonable distance to a rest areaRegion near proposed rest area experiences extensive interstate shoulder, interchange shoulder, and/or off-road, non-assigned parking by tractor-trailers

Requirement	Points	Feature	Requirement Descriptions
PD-13.1c	2	Safety improvements specifically for freight (e.g., additional safety signage, speed warnings systems for hills, other intelligent transportation system solutions)	<ul style="list-style-type: none"> • Implementation and appropriate number consistent with project setting • Meet requirements in the AASHTO Policy on Geometric Design of Streets and Highways such that there are no height, weight, or turning radius restrictions for freight vehicles
PD-13.1d	2	Physical or otherwise constructed grade, alignment, or other design adjustments for truck safety, mobility, and the reduction of freight-related noise	<ul style="list-style-type: none"> • Implementation and appropriate number consistent with project setting • Include railroad overpass clearance improvements for rail links targeted for freight mobility (i.e., do not preclude rail double stack clearance) • Pullout areas for snow chain-up
PD-13.1e	3	Construct new dedicated truck delivery parking areas or repurpose an existing parking area for truck delivery-only.	<ul style="list-style-type: none"> • Speeds 35 miles per hour or less (local traffic) • Accommodate 40-foot delivery trucks • Accessible within the project site (i.e., located in a parking lane on a local street) • Financed with project budget • Appropriate signage (type and number) within project area
PD-13.1f	3	Automated Weigh-In-Motion stations	<ul style="list-style-type: none"> • Accessible within the project site (i.e., located along the right-of-way), or in close proximity to the roadway
PD-13.1g	4	Virtual Weigh-In-Motion stations	<ul style="list-style-type: none"> • Accessible within the project site (i.e., located along the right-of-way) • Within close proximity to the roadway project right-of-way
PD-13.1h	4	Construct a new electrified rest stop or electrify an existing rest stop	<ul style="list-style-type: none"> • Minimum five electric hookups per stop. • Accessible within the project site (i.e., located at a highway exit) • Within close proximity to the roadway project right-of-way.
PD-13.1i	5	Construct a new or convert an existing mixed-traffic lane to a truck-only lane	<ul style="list-style-type: none"> • Minimum density of 10% truck traffic (Hansen et al., 2008) • Minimum volume of 1300 trucks per hour per lane (Hansen et al., 2008)

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and need for freight access on the roadway project.
2. Results of public input on proposed freight upgrades or installations, if any.
3. Contract documents showing freight facilities.

PD-14: ITS for System Operations

1-5 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☒ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Improve the efficiency of transportation systems without adding infrastructure capacity in order to reduce emissions and energy use, and improve economic and social needs.



Affected Triple Bottom Line Principles

Sustainability Linkage

Intelligent Transportation System (ITS) applications support all of the triple bottom line principles by improving mobility, reducing congestion, and improving safety while avoiding environmentally- and economically-costly capacity increases.

Background and Scoring Requirements

Background

Include Intelligent Transportation System (ITS) applications listed in the Federal Highway Administration (FHWA) Office of the Assistant Secretary for Research and Technology's ITS Applications Overview portion of the ITS website at <http://www.itsoverview.its.dot.gov> or equivalent source. FHWA's operations website is located at <http://ops.fhwa.dot.gov>. Table PD-14.1.A lists the standard ITS applications and FHWA and RITA ITS website categories allowable for this criterion. All applications installed should be compliant with owner and/or state architecture (inter-operability). Visit the aforementioned website for more information on each of these applications.

Scoring Requirements

Requirement PD-14.1

1-5 points. Install ITS Features

Install one or more allowable applications for the categories in Table PD-14.1.A as defined per the FHWA ITS Applications Overview website referenced above, or equivalent. Points are awarded based on how many categories are installed; multiple applications in one category do not achieve additional points. Points for installing applications from multiple categories are cumulative; however, this criterion shall not exceed a total of five points.

TABLE PD-14.1.A. ALLOWABLE ITS APPLICATIONS FOR INTELLIGENT TRANSPORTATION SYSTEMS (CONTINUED ON NEXT PAGE)

Requirement	Points	Category	Allowable Applications (Install 1 or More per Category)
PD-14.1a	1	Electronic Payment & Pricing	Electronic Toll Collection Congestion Pricing Value Pricing
PD-14.1b	1	Emergency Management / Response & Recovery	Hazardous Materials Management Emergency Vehicle Signal Preemption Early Warning System Evacuation & Re-Entry Management

Requirement	Points	Category	Allowable Applications (Install 1 or More per Category)
PD-14.1c	1	Enforcement	Speed Enforcement Traffic Signal Enforcement Managed Lane Enforcement Ramp Meter Enforcement
PD-14.1d	1	Information Dissemination	Dynamic Message Signs (DMS) Highway Advisory Radio (HAR) Dynamic Parking
PD-14.1e	1	Information Management	Data Archiving
PD-14.1f	1	ITS Infrastructure Backbone	Empty conduits, pullboxes, and pull ropes for future ITS accommodation.
PD-14.1g	1	Lane Management	Reversible Flow Lanes Congestion Pricing Lane Control Variable Speed Limits
PD-14.1h	1	Ramp Control	Ramp Metering Ramp Closures Priority Access
PD-14.1i	1	Response and Treatment	Fixed Winter Maintenance Mobile Winter Maintenance Bridge Anti-Icing Systems
PD-14.1j	1	Road Weather Management	Pavement Conditions Atmospheric Conditions Water Level
PD-14.1k	1	Surveillance	Traffic Surveillance Infrastructure Surveillance
PD-14.1l	1	Traffic Control	Adaptive Signal Control Advanced Signal Systems Special Events Vehicle Restrictions
PD-14.1m	1	Traffic Incident Management	Call Boxes Service Patrols
PD-14.1n	1	Traveler Information	Internet/Wireless 511
PD-14.1o	1	Crash Prevention and Safety	Highway-Rail Crossing Warning Systems Active Collision Warning Active Animal Warning

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A list of the ITS applications and their corresponding categories.
2. Contract documents showing ITS applications to be installed on the project.
3. Photo(s) or other documentation of installed applications.

PD-15: Historical, Archaeological and Cultural Preservation

1-3 points

SCORECARDS:

☐ Paving

☒ Rural Basic

☒ Rural Extended

☒ Urban Basic

☒ Urban Extended

Goal: Preserve, protect, or enhance cultural and historic assets, and/or feature National Scenic Byways Program (NSBP) historic, archaeological, or cultural intrinsic qualities in a roadway



Affected Triple Bottom Line Principles

Sustainability Linkage

Preserving historical, archaeological, and cultural resources supports the social principle by emphasizing significant features that are valued by the community and by providing educational facilities or visual and/or physical access where applicable.

Background and Scoring Requirements

Scoring Requirements

In order to achieve points for this criterion, one of the following prerequisites must apply:

Prerequisite PD-15.1P

0 points. Listed in US National Register of Historic Places

Any part of the project or resource within the project boundaries is listed in the United States National Register of Historic Places (NRHP) or has been determined eligible for the National Register by a State, Local, or Tribal Historic Preservation Officer.

OR

Prerequisite PD-15.2P

0 points. Along America's Byways® or Equivalent

Any portion of the project is along one of America's Byways® (National Scenic Byway or All-American Road – www.byways.org), a State Scenic Byway, an Indian Tribe Scenic Byway, or other route that was designated or officially recognized as such because of its significant *historical, cultural, and/or archaeological* features.

Requirement PD-15.1

1-3 points. Avoid or Minimize Impacts to Historical, Archeological or Cultural Qualities or Enhance Features

Points shall be achieved per table PD-15.1.A on the next page. Points are **not** cumulative; rather the highest point value earned should be used.

TABLE PD-15.1.A. POINTS AND REQUIREMENTS FOR HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL PRESERVATION

Requirement	Points	Method
PD-15.1a	1	Minimize Impacts. Show that an effort has been made to minimize “adverse effects” to the features from Prerequisite PD-15.1P , as described in Section 106 of the National Historic Preservation Act (NHPA).
PD-15.1b	2	Avoid Impacts. Show that measures have been taken to specifically avoid impacts to the features from Prerequisite PD-15.1P .
PD-15.1c	3	Enhance features. Protect, preserve, and/or enhance historic, archaeological, or cultural resources. This could be done through the installation of informational or interpretive facilities (e.g., viewpoint, kiosk, sign, or other installation for visitors detailing historical, archaeological, or cultural significance), where appropriate, to explain the resources or direct roadway users to the site, or through other activities.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of the eligibility of the resource or location for the United States NRHP.
2. Documentation from associated organization(s), indicating what recognition of a tribal or other appropriate interests were or will be represented.
3. Description of project features and policies that minimize adverse effects according to Section 106 of NHPA.
4. Description of activities to avoid or improvements to enhance features.

PD-16: Scenic, Natural, or Recreational Qualities

1-3 points

SCORECARDS:

☐ Paving

☒ Rural Basic

☒ Rural Extended

☐ Urban Basic

☒ Urban Extended

Goal: Preserve, protect, and/or enhance routes designated with significant scenic, natural, and/or recreational qualities in order to enhance the public enjoyment of facilities.



Sustainability Linkage

Preserving scenic, natural, or recreational qualities supports the social principle by providing the public with an opportunity for increasing their appreciation and respect of the natural environment through facilities such as visitor centers, recreational features, and/or scenic viewpoints, and through promoting community use of facilities.

Background and Scoring Requirements

Scoring Requirements

In order to achieve points for this criterion, both of the following prerequisites must apply:

Prerequisite PD-16.1P

0 points. Location along America's Byway® or Equivalent

Any portion of the project is along one of America's Byways® (National Scenic Byway or All-American Road – www.byways.org), a State Scenic Byway, an Indian Tribe Scenic Byway, or other route that was designated or officially recognized as such because of its significant scenic, natural, and/or recreational qualities. This includes bridges spanning scenic and recreational waterways.

AND

Prerequisite PD-16.2P

0 points. Maintain Access

Existing access to scenic, natural, or recreational qualities has not been removed as a part of this project unless it is specifically removed to protect the scenic, natural, and/or recreational qualities themselves.

Requirement PD-16.1

1-3 points. Avoid or Minimize Impacts to Scenic, Natural, or Recreational Qualities or Enhance Features

Points shall be achieved per Table PD-16.1.A on the next page. Points are **not** cumulative; rather the highest point value earned should be used.

TABLE PD-16.1.A. POINTS AND REQUIREMENTS FOR SCENIC, NATURAL, OR RECREATIONAL QUALITIES

Requirement	Points	Method
PD-16.1a	1	Minimize Impacts. Show that an effort has been made to minimize “adverse effects” to the features from Prerequisite PD-16.1P.
PD-16.1b	1	Provide Access. Provide at least one access from the project to a designated area for vehicles to exit the traffic stream, stop, and experience scenic, natural, or recreational features along the roadway. These areas may be scenic viewpoints or overlooks, welcome centers, tourist activities, or information centers or recreation areas. They must be identified with signage conforming to 23 CFR 655 (the Manual on Uniform Traffic Control Devices, current revision) Part 2 – Signs.
PD-16.1c	2	Avoid Impacts. Show that measures have been taken to specifically avoid impacts to the features from Prerequisite PD-16.1P.
PD-16.1d	3	Enhance Features. Protect, preserve, or enhance scenic, natural, and/or recreational qualities along the roadway. This may include improvements to existing access points, signage, views, or to the scenic, natural, and/or recreational qualities themselves. Also included would be protecting these qualities by the removal of an existing access point if it has been determined that the access threatens them.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of the following documentation sources (or equal where not available):

1. Documentation of national, State, or Indian tribe designation if a byway designation is used to satisfy this criterion or other documentation showing scenic, natural, or recreational values of a project.
2. Contract documents showing roadside access point or other protection, preservation, or enhancements.
3. Description of activities to minimize impacts to features.
4. Description of activities to avoid or improvements to enhance features.

PD-17: Energy Efficiency

1-8 points

SCORECARDS:



Goal: Reduce energy consumption of lighting systems through the installation of efficient fixtures and the creation and use of renewable energy.

Sustainability Linkage

Reduction of energy consumption and conversion to renewable energy sources support the environmental and economic sustainability principles by reducing the demand for fossil fuel generated energy, reducing emissions, and reducing in long-term energy costs.



Background and Scoring Requirements

Scoring Requirements

Requirement PD-17.1

1 point. Evaluate Energy Needs and Implement Alternatives

Evaluate energy needs for the project and implement alternatives to reduce power consumption while still meeting lighting and safety standards. These alternatives could include reduction of lighting; retrofit or installation of energy efficient luminaires, beacons, and traffic signal equipment and lamps; and installation of renewable energy sources.

Requirement PD-17.2

1-6 points. Reduce Total Energy Consumption

Reduce the energy consumption on the project through the installation of energy efficient lighting and signal fixtures (e.g. LED lighting, induction lighting, or other new technology that is Underwriters Laboratories Inc. (UL) Listed for the intended use) and through the installation of autonomous, on-site, renewable power sources (e.g., solar panels). All lighting facilities and systems considered for this criterion must be appropriate for the project. This means that installing pedestrian safety lighting on a project with no pedestrian accessibility will not be awarded credit. Similarly, lighting for new and/or improved driveways and parking lots are subject to the credits only if they are included within the project scope and budget boundaries.

Points are awarded based on the percentage of reduced power use. To determine this reduction, compare the annual power consumption for the baseline condition to the power consumption for the energy efficient electrical system design. Calculations for power consumption should be based on the following assumptions:

- The baseline condition should be calculated using the existing electrical system and assuming new improvements were to be constructed with high-pressure sodium (HPS) luminaires with cut-off optics.
- The baseline condition should be based on the lighting system operating 12 hours/day and 7 days/week.
- The two designs must both meet the same lighting standards.
- Wattage used for energy consumption shall be based on luminaire "input wattage" not lamp wattage.

- Use Table PD-17.2.A to calculate the number of points awarded based on these calculations.

[illegible]

1 point. Establish Auditing Plan

Scoring Sources

1. Documentation of energy usage evaluation and reduction plan.
2. Calculations documenting energy usage if the roadway project was to be constructed with high-pressure sodium (HPS) luminaires and fixtures, the expected energy usage as designed, and the resulting energy savings as a percentage of calculation no. 1.
3. Contract documents and/or cut sheets of the luminaires being installed on the project.
4. Sample cut sheets and specifications for each technology installed on the project that shows the expected wattage of the component(s) used or generated.
5. Documentation of plan for auditing energy use after construction.

PD-18: Site Vegetation

1-3 points

SCORECARDS:



✓ Rural Basic



✓ Urban Basic



Goal: Promote sustainable site vegetation within the project footprint by selecting plants and maintenance methods that benefit the ecosystem.



Sustainability Linkage

Using sustainable site vegetation supports the environmental and economic sustainability principles by protecting the ecosystem by choosing non-invasive and non-noxious species, and by reducing maintenance costs.

Background and Scoring Requirements

Background

For the purpose of this criterion, the key terms are defined as follows:

- **“Native plant species”** – Plants native to the EPA Level III ecoregion that contains the roadway project site or known to naturally occur within 200 miles of the roadway construction site (Sustainable Sites Initiative, 2009a).
- **“Non-invasive plant species”** – The following items must be performed to ensure that a plant species is considered “non-invasive”: 1) Consult existing local (e.g. city, county, state, park service) vegetation policy and procedure that is applicable to the roadway project and is specifically formulated to prevent the use of invasive plant species and noxious weeds; 2) Use local and/or regional lists to identify invasive plant species; and 3) Comply with local and/or national noxious weed laws.
- **“Noxious species”** – Non-native plants that, once established, are highly destructive, competitive and difficult to control. They have economic and ecological impacts and are very difficult to manage once they get established. Some are toxic or a public health threat to humans and animals, while others destroy native and beneficial plant communities.
- **“Site vegetation”** – All vegetation associated with a particular roadway project and shall include all vegetation within the roadway’s right-of-way or disturbed area associated with the roadway project (whichever is greater). This can include, but is not limited to, roadside vegetation, decorative planting (e.g., planter boxes or potted plants in urban areas), and vegetation contained in stormwater facilities (e.g., bioswales and rain gardens).

Scoring Requirements

In order to achieve points for this criterion, the following prerequisite must be met:

Prerequisite PD-18.1P

0 points. All site vegetation shall use non-invasive species only, use non-noxious species only, use seeding that does not require consistent mowing for a viable stand of grass, and minimize disturbance of native species.

Requirement PD-18.1**1 – 3 points. Implement Sustainable Site Vegetation Feature**

Implement one or more of the features in Table PD-18.1.A. Points for features are cumulative if roadways have more than one feature; however, this criterion shall not exceed a total of three points.

TABLE PD-18.1.A. SITE VEGETATION POINTS

Requirement	Points	Feature	Minimum Requirements
PD-18.1a	1	Non-mechanical maintenance	No mowing or other mechanical means of maintenance is required.
PD-18.1b	1	No long-term irrigation	Do not use water (no irrigation) after the plant establishment period.
PD-18.1c	1	Greywater or reclaimed water irrigation – plant establishment	Use greywater to irrigate plants if needed during the plant establishment period.
PD-18.1d	1	Greywater or reclaimed water irrigation – ongoing	Use greywater to irrigate plants if needed beyond the plant establishment period.
PD-18.1e	1	Native species	<ul style="list-style-type: none"> • Use native plant species only. (Non-native plants transplanted from impact areas within the project limits may be used.) • Salvage rare plants and retain existing vegetation where possible. • Remove all invasive existing plant species or, in cases where eradication is impossible, implement management plan.
PD-18.1f	1	Long-term vegetation planning	Have a management plan to maintain the corridor, including management of site vegetation and management of invasive species (or continued efforts to eradicate them). This could include a plan and/or financing to support site vegetation in the project corridor.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A vegetation or landscape plan showing type, size, and location of all plant species. This can often be found in the standard project plans.
2. The specification sections relating to site vegetation. These are typically found in the technical specifications.
3. A copy of, or reference to (e.g., web address), the policy or procedure used to select plant species.
4. A design study report approved by the appropriate agency or authority that includes analysis of existing site vegetation, impacts, reuse of vegetation, references to evaluate the invasive species and noxious plants, and planned vegetation species.

PD-19: Reduce and Reuse Materials

1-8 points

SCORECARDS:



Goal: Reduce lifecycle impacts from extraction and production of virgin materials by recycling materials.

Sustainability Linkage

Reducing and reusing materials supports the environmental and economic principles of the triple bottom line by reducing the consumption of raw materials, reducing landfill waste, and encouraging cost savings.



Background and Scoring Requirements

Background

This criterion focuses on reducing and reusing materials while *PD-20: Recycle Materials* focuses on efforts to recycle materials per the descriptions and definitions provided below.

When pavements are originally constructed, the best materials available at the time are usually sourced and used during construction. As resources diminish, that often means that the best materials available for reconstruction are already in place in the existing infrastructure. In addition to reducing waste, recycling pavements allows us to reclaim the best materials that were originally available for construction.

Programs for waste reduction in the United States have generally taken on the concept of the 3Rs: reduce, reuse, and recycle. For the purposes of this criterion, as well as to *PD-20: Recycle Materials*, the key terms are defined as follows:

- **“Reducing”** is used in this tool to refer to processes that reduce the need for virgin paving and structural materials. Examples include soil stabilization methods to reduce the need for structural backfill or to reduce the required thickness of a new pavement or overlay; pavement preservation technologies that extend the life of existing pavements and reduce the need for new materials; bridge preservation technologies that extend the life of existing bridges and reduce the need for new structures and materials; retrofitting existing bridge structures to reduce the need for new structures and materials; or processes that incorporate existing pavement structures into new pavement structures (such as crack-and-seat and rubblization) to reduce the need for new materials and avoid the transportation of the existing used materials which would otherwise be removed from a project.
- **“Reusing”** is the reuse of a material or by-product from another industry for a new function in a transportation application. Examples of the beneficial use of industrial by-products include the incorporation of materials such as coal ash, fly ash, foundry sand, slag, asphalt shingles, construction and demolition materials, or other materials into a transportation project. These reused materials replace traditional materials with similar properties in specific applications. The reuse of these materials should assure that the engineering properties of the final product or mixture are equal to or better than obtained from using traditional materials, and that their economic value is demonstrated in accordance with the FHWA Recycling Policy. Reused materials provide environmental benefit by reducing the unnecessary landfilling of these

materials. With proper engineering, these materials can be successfully incorporated into transportation applications and provide economic value to our projects.

- **“Recycling”** is the use of old materials for a new and similar use in a transportation application, or the salvaging and reprocessing of previously used materials from other transportation applications into a new transportation project. See PD-20: Recycle Materials for examples.
- **“Retrofit”** is defined as the reinforcement of structures to become more resistant and resilient to the forces of natural hazards and other environmental factors such as aging and weathering. It involves the consideration of changes in the mass, stiffness, damping, load path, and ductility of materials, as well as radical changes such as the introduction of energy absorbing dampers and base isolation systems.
- **“Existing pavement material”** is defined as all material within the project limits in the existing pavement structure (including surfacing and base material). This includes travelled lanes and shoulders, and pavement structures for physically separated bicycle and pedestrian pathways.
- **“Existing structural material”** is defined as all material within the project limits in existing non-pavement structures such as bridges (including overpasses), retaining walls, and stormwater infrastructure, such as vaults, pipes, and culverts. All existing structural materials include their foundations, for which volumes may be difficult to estimate. Where actual weights are not available, reasonable estimates may be used or volume may be estimated. To compute volume of hollow structural sections such as prefabricated members or corrugated steel, estimate the mass of the material and adjust for material density to determine volume. Note that for typical reinforced concrete sections, the steel does not need to be separated from the composite section for purposes of volume calculations and a composite density may be used.

Scoring Requirements

Implement one or more of the methods listed below. **Points for different scoring requirements are cumulative; however, this criterion shall not exceed a total of eight points.**

Requirement PD-19.1

2-4 points. Pavement Preservation

Perform pavement preservation activities such as crack sealing, chip sealing, slurry sealing, microsurfacing, or thin ACP overlays that extend the remaining service life of pavements. This scoring requirement applies to pavement preservations and not rehabilitation or reconstruction activities. An FHWA memo defining pavement preservation can be found at <http://www.fhwa.dot.gov/pavement/preservation/091205.cfm>. Points are awarded based on increase in remaining service life per Table PD-19.1.A.

TABLE PD-19.1.A. POINTS AWARDED FOR PAVEMENT PRESERVATION ACTIVITIES

Points	Increase in Remaining Service Life ¹
1	1 to 2 years
2	2 to 5 years
3	5 to 7 years
4	7 to 10 years

¹ More than 10 years is considered rehabilitation and isn't eligible for this scoring requirement.

Requirement PD-19.2

1-3 points. Reduce Pavement Materials

Reduce the amount of new pavement materials needed through soil stabilization methods to reduce the need required thickness of a new pavement or processes that incorporate existing pavement structures into new pavement structures (such as fractured slab techniques, including crack-and-seat and rubblization). Points are awarded per Table PD-19.2.A based on the percentage of pavement area treated calculated based on the entire area of existing pavement materials that are preserved or reconstructed.

TABLE PD-19.2.A. POINTS AWARDED FOR REDUCING PAVEMENT MATERIALS

Points	Percentage Pavement Area Treated
1	50–74%
2	75–99%
3	100%

Requirement PD-19.3

2-4 points. Bridge Preservation

Perform bridge preservation activities such as deck overlays, crack sealing, joint sealing, removing channel debris, lubricating bearings, cathodic protection, electrochemical chloride extraction and cleaning, and painting that extend the remaining service life of bridges. This scoring requirement applies to bridge preservations and not rehabilitation or reconstruction activities. For definitions and examples of bridge preservation, see the FHWA Bridge Preservation Guide, which can be found at <http://www.fhwa.dot.gov/bridge/preservation/guide/guide.pdf>. Points are awarded based on increase in remaining service life per Table PD-19.3.A.

TABLE PD-19.3.A. POINTS AWARDED FOR BRIDGE PRESERVATION ACTIVITIES

Points	Increase in Remaining Service Life
2	2 to 5 years
3	5 to 7 years
4	7 to 10 years

Requirement PD-19.4

1-3 points. Retrofitting Bridges

Retrofit existing bridge structures to reduce the need for new structures and materials. This could include methods such that improve or add: stainless steel wire mesh composites, full height steel jackets, elastomeric bearings, steel restrainer cables, shear keys, fiber reinforced polymers wraps, shape memory alloy devices, metallic and viscoelastic dampers, or pipe seat extenders. Points are awarded based on increase in remaining service life per Table PD-19.3.A above.

Requirement PD-19.5

1-3 points. Repurpose Pavements or Structures

Reuse existing pavements, structures, or structural elements for a new use by repurposing them for a use that requires equal or less loading. The purpose of this scoring requirement is to maintain and leverage existing pavements, structures, and structural elements for new uses where possible instead of using new materials. One method is to maintain existing pavements when new alignments are proposed and use the existing pavement for a new use, such as realigning a highway but maintaining the old one as a frontage road or multiuse path. Another method is to convert existing pavement to a different use, such as converting parking to travelled lanes (or vice versa) or converting pavement to multiuse paths or plazas. Points are awarded per Table PD-19.5.A based on the percentage of existing pavement material (by area) reused and repurposed calculated based on the entire area of existing pavement materials included in the project.

TABLE PD-19.5.A. POINTS AWARDED FOR REUSING AND REPURPOSING PAVEMENTS IN PLACE

Points	Percentage Pavement Reused and Repurposed
1	25–49%
2	50–74%
3	75% or more

Requirement PD-19.6

1-3 points. Reuse Industrial By-Products

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement PD-19.6a**

1 point. Use By-Products for Pipe Bedding or Backfill

Using foundry sand or other industrial by-products in pipe bedding and backfill.

- **Requirement PD-19.6b**

2 points. Use By-Products in Roadway Elements

Reuse industrial by-products in pavement materials, ancillary structures, and other roadway elements. These could include one or more of the following: coal ash, fly ash, foundry sand, slag, tires, asphalt shingles, and construction and demolition materials.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more following documentation sources (or equal where not available):

1. Calculations showing the remaining service life of pavements or bridges expected before the project and after, and clearly demonstrating an extended service life as a result of the treatments applied.
2. Calculation of the percentage pavement area treated, including the area of pavement treated and the existing pavement area preserved and retrofitted.
3. The approved mix design for the pavement materials.

PD-20: Recycle Materials

1-8 points

SCORECARDS: ✓Paving ✓Rural Basic ✓Rural Extended ✓Urban Basic ✓Urban Extended

Goal: Reduce lifecycle impacts from extraction, production, and transportation of virgin materials by recycling materials.

Sustainability Linkage

Recycling materials supports the environmental and economic principles of the triple bottom line by reducing the consumption of raw materials, reducing landfill waste, and encouraging cost savings.



Background and Scoring Requirements

Background

This criterion focuses on recycling of materials while *PD-19: Reduce and Reuse Materials* focuses on efforts to reduce and reuse materials per the descriptions and definitions provided below.

When pavements are originally constructed, the best materials available at the time are usually sourced and used during construction. As resources have diminished, that often means that the best materials available for reconstruction are already in place in the existing infrastructure. In addition to reducing waste, recycling pavements allows us to reclaim the best materials that were originally available for construction.

Programs for waste reduction in the United States have generally taken on the concept of the 3Rs: reduce, reuse, and recycle. For the purposes of this criterion, as well as for *PD-19: Reduce and Reuse Materials*, the key terms are defined as follows:

- **“Reducing”** is used in this tool to refer to processes that reduce the need for virgin paving and structural materials. See *PD-19: Reduce and Reuse Materials* for examples.
- **“Reusing”** is the reuse of a material or by-product from another industry for a new function in a transportation application. See *PD-19: Reduce and Reuse Materials* for examples.
- **“Recycling”** is the use of old materials for a new and similar use in a transportation application, or the salvaging and reprocessing of previously used materials from other transportation applications into a new transportation project. Examples of recycling solutions include the incorporation of reclaimed asphalt pavement (RAP) and recycled concrete aggregate (RCA); cold-in-place recycling (CIR); hot-in-place recycling (HIR); and full depth reclamation (FDR). Also included are the salvage and recycling of aggregate, rock, asphalt, concrete, wood, metal (rebar, sign posts, signal poles, etc.), and other materials that have previously been used in other transportation applications and can be incorporated into a new project. Examples include the salvage and recycling of sign posts, signal poles, luminaries, rock or concrete used as rip-rap, and asphalt millings used as a shouldering material. For bridges, an example would be using recycled steel girders from a roadway bridge for a new pedestrian structure.
- **“Existing pavement material”** is defined as all material within the project limits in the existing pavement structure (including surfacing and base material). This includes travelled lanes and shoulders, and pavement structures for physically separated bicycle and pedestrian pathways.

- **“Existing structural material”** is defined as all material within the project limits in existing non-pavement structures, such as bridges (including overpasses), retaining walls, and stormwater infrastructure such as vaults, pipes, and culverts. All existing structural materials include their foundations, for which volumes may be difficult to estimate. Where actual weights are not available, reasonable estimates may be used or volume may be estimated. To compute volume of hollow structural sections such as prefabricated members or corrugated steel, estimate the mass of the material and adjust for material density to determine volume. Note that for typical reinforced concrete sections, the steel does not need to be separated from the composite section for purposes of volume calculations and a composite density may be used.

Scoring Requirements

Implement one or more of the methods listed below. Points for different methods are cumulative; however, this criterion shall not exceed a total of eight points.

Requirement PD-20.1

1-5 points. Recycled Asphalt Pavement or Recycled Concrete Aggregate

Use RAP or RCA in new pavement lifts or granular base course or embankments. The recycled materials can originate on the project or from an offsite source, but no points are awarded for removing paving materials from the project and sending them offsite to be recycled.

Points are awarded based on the Average Recycled Content (ARC) per the following calculation and using Table PD-20.1.A as follows below.

$$ARC (\%) = \frac{\sum r_n}{\sum W_n} \times 100\%$$

Where:

r_n is the total weight or volume of RAP or RCA.

W_n is the total weight or volume of either all existing pavement materials or all bedding, backfill, and granular embankment materials per the method of recycling used.

n represents the number of materials considered in accordance with the method used.

TABLE PD-20.1.A. POINTS FOR AVERAGE RECYCLED CONTENT (PERCENT BY WEIGHT OR VOLUME OF MATERIALS)

Recycling Method Used	Points Earned				
	1	2	3	4	5
Percent average recycled material (ARC) required for recycling in pavements	10%	20%	30%	40%	50% or more
Average recycled material (ARC) required for granular base or embankments	20%	30%	40%	50%	60% or more

Requirement PD-20.2

2-6 points. In-Place Asphalt Pavement Recycling

Recycle pavement materials in place using cold-in-place recycling, hot-in-place recycling, and full depth reclamation methods. Points are awarded based on the percentage of pavement area recycled compared to the entire area of existing pavement materials as shown in Table PD-20.2.A.

TABLE PD-20.2.A. POINTS AWARDED FOR IN PLACE RECYCLING

Percentage Pavement Area Recycled	Points Awarded by Method of Recycling		
	HIR	CIR	FDR
50–74%	2	3	4
75–99%	3	4	5
100%	4	5	6

Requirement PD-20.3

1 point. Recycle Minor Structural Elements

Relocate and reuse at least 90 percent of the minor structural elements, including existing luminaires, signal poles, and sign structures that are required to be removed and/or relocated onsite. Signs mounted on posts are not included in this criterion.

In order to achieve credit, the minor structural elements must be moved and reused onsite. Elements shall be counted by numbers of foundations without regard to size of the structure. In this case, a signal pole would be counted as a single structure and an overhead sign structure would be counted twice because it has two foundations.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more following documentation sources (or equal where not available):

1. A calculation that shows the computed percentage of pavement and/or structural material recycled.
2. Calculation of the percentage pavement area recycled in-place.
3. A calculation that shows the percentage of luminaires, signal poles, and sign structures reused.

PD-21: Earthwork Balance

1-3 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☒ Rural Extended ☐ Urban Basic ☒ Urban Extended

Goal: Reduce the need for transport of earthen materials by balancing cut and fill quantities.

Sustainability Linkage

Balancing cut and fill quantities in a project supports the environmental and economic sustainability principles by reducing the environmental and economic costs associated with the transport of earthen materials.



Background and Scoring Requirements

Scoring Requirements

Requirement PD-21.1

3 points. Balance Cut and Fill Volumes within 10 Percent

Balance earthwork cut (excavation) and fill (embankment) volumes such that the percent difference between cut and fill is less than or equal to 10 percent of the average total volume of material moved. For purposes of this criterion, it is recommended that the owner use the following method and definitions, or equivalent, to compute cut and fill volumes. Include miscellaneous additional cut and fill such as outlet ditches and muck excavations, and account for moisture and density as well as shrink and swell. Note that for purposes of this criterion, all volumes are positive quantities.

One of the following scoring requirements may apply.

- **Requirement PD-21.1a**

3 points. Balance Cut and Fill Volumes without Construction Banking

Show that that design volumes (for projects that haven't been constructed) or actual construction volumes (for projects that have been constructed) meet:

$$\frac{(A + C) - (B + D)}{\frac{1}{2}(A + C + B + D)} \times 100\% \leq 10\%$$

A = Volume of Cross Section Cut

B = Volume of Cross Section Fill

C = Volume of Miscellaneous Cut

D = Volume of Miscellaneous Fill

Include the following materials in the calculations: (1) Soil stabilizer materials or other soil additives, (2) Removed topsoil materials, and (3) Unused cut or imported fill materials placed in stockpiles.

Exclude the following materials from the calculations: (1) Mechanical stabilizers such as rock bolts and geotextile fabric materials, (2) Structural aggregate for base courses in pavements, foundations, or superstructures such as bridges, (3) Structural backfill and drain rock specifically intended for utility trenches and stormwater infrastructure, and (4) Rock (Stable Rock, defined by the Occupational Health and Safety

Administration) cuts sourced within the project boundary that are intended for use as structural aggregate within the project boundary.

OR

- **Requirement PD-21.1b**

1 point. Balance Cut and Fill Volumes Using Construction Banking

Show that the design volumes (for projects that haven't been constructed) or actual construction volumes (for projects that have been constructed) meet the Requirement PD-21.1a only if construction banking is used and the following requirements are met:

- Construction banking may be accomplished using adjacent projects or other phases of the same project.
- Trucking distance from banking stockpiles to project limits must be less than 10 miles.
- Banking stockpiles must be used and earthwork balanced within a period of 24 months.
- All stockpiles must have a temporary erosion and sedimentation control (TESC) plan in place and appropriate measures must be installed. Maintenance for TESC methods must be accounted for in the project being evaluated or the adjacent project sharing earthwork banking and maintenance must be completed and documented.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Grading plan, reporting total cut and fill quantities and total miscellaneous cut/fill.
2. Inspector or Contractor's actual construction earthwork volumes for the project, including actual cut and fill, volume of unused embankment materials, and volumes of imports to and exports from site.

PD-22: Long-Life Pavement Design

5 points

SCORECARDS: ☒ Paving ☒ Rural Basic ☒ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Minimize life-cycle costs by designing long-lasting pavement structures.

Sustainability Linkage

Including long-life pavement supports the environmental and economic principles by reducing the life-cycle costs of the road and the need for raw materials over time.



Background and Scoring Requirements

Background

The definition of long-life pavement for this criterion is:

- Service life of 40+ years for new construction and major reconstruction projects that add travel lanes to an existing roadway or bridge. Service life of 20+ years for small reconstruction and bridge replacement projects that do not expand capacity of the roadway, preservation projects, and restoration projects.
- Pavement will not exhibit premature construction and materials-related distress.
- Pavement will have reduced potential for cracking, faulting, and spalling.
- Pavement will maintain desirable ride and surface texture characteristics with minimal intervention activities, if warranted, for ride and texture, joint resealing, and minor repairs.

This criterion is not applicable to roads that are not surfaced with hot mix asphalt (HMA) or portland cement concrete (PCC), such as gravel roads, dirt roads, and roads sealed with bituminous surface treatments. Existing pavements that are to at least partially remain in place (in any condition) can also qualify for this criterion. In these cases, evaluation shall be based on the final pavement structure, which may include (1) existing pavement remaining in place, and (2) any new pavement structure added. In this manner, a diamond grind of an existing PCC pavement or an overlay of an existing HMA pavement can qualify for this criterion if the resultant pavement structure meets the requirements stated above.

Scoring Requirements

Requirement PD-22.1

5 points. Long-Life Pavement

Design at least 75 percent of the total new or reconstructed pavement surface area for regularly trafficked lanes of pavement to meet long-life pavement design criteria. Compute the total surface area of all trafficked lanes and show that, at a minimum, 75 percent of that area is designed for long-life. Do not include shoulders, medians, sidewalks, and other paved areas in the computation.

Pavement design must be in accordance with a design procedure that is formally recognized, adopted, and documented by the project owner. In many instances (but not all), this could be the process described in the 1993 AASHTO Design of Pavement Structures manual or the process described in AASHTO MEPDG-1 Mechanistic-Empirical Pavement Design Guide, Interim Edition: A Manual of Practice.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

- Calculations indicating the total percentage of trafficked lane pavement surface areas designed for long-life.
- The project owner's formally recognized, adopted, and documented pavement design procedure.
- Documentation showing long-life pavement was designed using a minimum 20- or 40-year service life (per the appropriate requirements above).

PD-23: Reduced Energy and Emissions in Pavement Materials

3 points

SCORECARDS: ☒ Paving ☒ Rural Basic ☒ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Reduce energy use in the production of pavement materials.

Sustainability Linkage

Reducing energy use in the production of pavement materials supports all of the triple bottom line principles by lessening impacts to air quality through reduced emissions and reducing energy consumption.



Background and Scoring Requirements

Scoring Requirements

Implement one or more of the methods listed below. **Any of the following requirements (Requirements PD-23.1, PD-23.2, or PD-23.3) earn 3 points, however, this criterion shall not exceed a total of 3 points.**

Requirement PD-23.1

3 points. Asphalt Production

Use low-energy material for at least 50 percent of the total project pavement material (hot mix asphalt (HMA) or concrete) by weight. One of the following scores may meet this requirement:

- **Requirement PD-23.1a**

3 points. Warm Mix Asphalt

Use Warm Mix Asphalt. Reduce the mixing temperature of hot mix asphalt by a minimum of 50°F from that recommended as the mixing temperature by the asphalt binder supplier. Mixing temperature shall be measured as the temperature of the mixture as it exits the mixing drum (for drum plants) or pugmill (for batch plants). This credit requires a recommended HMA mixing temperature to be provided by the asphalt binder supplier. This recommended temperature should be as if no WMA technology were to be used. If the recommended mixing temperature is provided as a range, use high end of the range for calculation of the required 50°F degree reduction.

OR

- **Requirement PD-23.1b**

3 points. Asphalt Production Using Fuel Saving Technologies

Burn recycled oil, waste materials, or other fuel saving technologies in HMA plant to reduce conventional fuel usage by a minimum of 25 percent. Recycled oils, garbage, or other materials that would otherwise go to waste that are used for burner fuel or any other fuel technologies that can be shown to reduce the normal electricity or petroleum fuel usage by 25 percent.

Requirement PD-23.2

3 points. Raw Material – Cement Production

One of the following scores may meet this requirement:

- **Requirement PD-23.2a**

3 points. Cement Production Using ENERGY STAR® Certified Plant

Use an ENERGY STAR® certified cement production plant for cement materials used on the project. To be ENERGY STAR® certified, the plant must score in the top 25 percent based on the EPA National Energy Performance Energy Rating System.

OR

- **Requirement PD-23.2b**

3 points. Cement Production Using Fuel Saving Technologies

Burn recycled oil, waste materials, or other fuel saving technologies in cement production plant to reduce conventional fuel usage by a minimum of 25 percent. Recycled oils, garbage, or other materials that would otherwise go to waste that are used for burner fuel or any other fuel technologies that can be shown to reduce the normal electricity or petroleum fuel usage by 25 percent.

Requirement PD-23.3

3 points. Concrete Production

One of the following scores may meet this requirement.

- **Requirement PD-23.3a**

3 points. Concrete Production in Plant with Demonstrated Reduction in Energy and Carbon Footprint

Concrete shall be supplied from a concrete plant that can demonstrate a carbon footprint and embodied energy 15 percent below the national averages as established in the National Ready Mixed Concrete Association's (NRMCA) Sustainable Concrete Plant Guidelines (<http://www.nrmca.org/sustainability/Certification/SCP%20Guidelines%20Version%201.1.pdf>). Carbon footprint and embodied energy shall be calculated using the NRMCA Carbon Calculator (<http://www.nrmca.org/sustainability/Certification/PlantCertification.asp>).

OR

- **Requirement PD-23.3b**

3 points. Concrete Production in NRMCA Sustainable Concrete Plant

Concrete shall be supplied from a concrete plant that is an NRMCA Sustainable Concrete Plant Certified Silver (<http://www.nrmca.org/sustainability/Certification/PlantCertification.asp>).

OR

- **Requirement PD-23.3c**

3 points. Cement Production Using Limestone Additive

Blended cement using limestone addition. Per ASTM C 150/AASHTO M85 the use of 5 percent ground limestone in cement is permitted, which reduces the cement clinker in concrete and ultimately reduces the carbon footprint (<http://www.fhwa.dot.gov/pavement/concrete/pubs/hif11025/index.cfm>).

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Calculations to show at least 50 percent of the total project pavement material meets requirement options 1, 2, 3, or 4.
2. Asphalt or concrete pavement mix designs showing the requirements of options 1 or options 3 were met.
3. Documentation for the cement production facility, asphalt plant, or concrete mixing plant showing the requirements were met.

PD-24: Contractor Warranty

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

Goal: Improve quality and minimize life-cycle costs by promoting the use of extended contractor warranties for pavement.

Sustainability Linkage

Using extended contractor warranties for pavement promotes higher quality construction and supports the environmental and economic principles of the triple bottom line by minimizing life-cycle costs and raw material usage.



Background and Scoring Requirements

Background

The intention of this criterion is to include a 3- or 5-year pavement warranty in the contract specifications. This warranty duration is intended to be long enough to cover any pavement performance issues due to poor quality construction, but short enough so as not to create warranty bonding issues associated with contractor assumption of risk for unduly long periods of time. Ultimately, warranties must meet all applicable local and federal regulations. Federal regulations are described in 23 CFR 635, Subpart D, Section 413, Guarantee and Warranty Clauses. Also refer to the Transportation Research Board's Transportation Research Circular Number E-C154, Development of Warranty Programs for Hot-Mix Asphalt Pavements dated June 2011 for additional information on this topic.

Scoring Requirements

Requirement PD-24.1

1 or 3 points. Require Extended Pavement Warranty

The project construction contract should include a warranty for constructed portions of the pavement structure to include surfacing (e.g., hot mix asphalt, portland cement concrete, etc.), as well as any underlying layers (e.g., granular base material). Other items may also be included in the warranty but are not required for this criterion. Points are awarded based on the length of the warranty period as follows:

- **1 point. 3-year warranty**
- **3 points. 5-year warranty**

For both time periods, the warranty shall be defined by the owner and may include contractor input if desired. As a minimum, the contractual warranty specifications shall include:

- Definition of what product(s) are warranted
- Length of the warranty period
- Responsibilities of the owner
- Responsibilities of the contractor
- Responsibility for maintenance

- Conflict resolution process
- Contractor quality control plan
- Measurement methods
- Performance-based requirements and associated threshold levels that require corrective action by the contractor
- Requirements for remedial corrective action
- Requirements for elective or preventative actions
- Basis of payment
- Final warranty acceptance

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of the following documentation sources (or equal where not available):

1. Contract documents including the warranty specifications.

PD-25: Construction Environmental Training

1 point

SCORECARDS:

☐ Paving

☒ Rural Basic

☒ Rural Extended

☒ Urban Basic

☒ Urban Extended

Goal: Provide construction personnel with the knowledge to identify environmental issues and best practice methods to minimize impacts to the human and natural environment.

Sustainability Linkage

Environmental training for construction personnel supports the environmental and social principles by ensuring that workers understand the importance of protecting and enhancing the human and natural environment, follow environmental regulations, and implement sustainable construction methods correctly.



Background and Scoring Requirements

Scoring Requirements

Requirement PD-25.1

1 point. Implement Formal Environmental Awareness Training

The owner shall require the Contractor to plan and implement a formal environmental awareness training program during construction in order to provide tools and information to assist staff in ensuring that projects stay in compliance with environmental laws, regulations, and policies.

The Contractor shall provide an environmental awareness training plan that is customized to the project, including:

- A list of the types of project personnel to be trained. This list may be by job-type and/or by employer and need not contain actual employee names. Personnel should include members of the owner's organization or its construction representative, and prime and subcontractors. Suggested classifications of personnel to be trained include, but are not limited to, managers, inspectors, superintendents, operators, and laborers.
- A description of the types, goals, and objectives of training to be given. Types of training might include one or more of the following: topic-specific trainings, topic-specific emails, regular toolbox meetings, standing topics on regular agendas, classroom training, and more. This criterion cannot be met by one-time-only discussions of environmental topics, such as at a preconstruction meeting. Training does not have to be lengthy classroom training and it does not need to be dedicated to environmental issues only.
- A process to track training efforts, including dates, means (e.g., online, classroom, field training), topics, the identification of those participating in training, and attendance numbers.
- A process to measure training effectiveness such as self-assessment, pre-test and post-test, and productivity measurement.

The environmental awareness training plan shall address the following training elements as a minimum, or state why any are inappropriate:

- Permit conditions, performance standards, environmental commitments, and environmental regulations related to the project
- Overall importance of environmental issues

- Identifying work activities that present the greatest risk for compliance
- Required environmental qualifications/certifications
- Environmental records management
- Environmental compliance monitoring and reporting procedures
- Environmental notification triggers and emergency response procedures
- Oil spill prevention and response procedures
- Construction stormwater management, erosion and sediment control procedures, and in-water work
- Reduction of air pollution
- Management of known or suspected contamination
- Hazardous materials management

Some types of environmental training may be required by regulation. These requirements should be included in the plan; however, the plan should go above and beyond what is required by regulations and should cover all potential environmental issues.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract Documents showing an Environmental Awareness Training Plan is required.
2. Contractors' Environmental Awareness Training Plan.

PD-26: Construction Equipment Emission Reduction

1-2 points

SCORECARDS: ☒ Paving ☒ Rural Basic ☒ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Reduce air emissions from non-road construction equipment.

Sustainability Linkage

Reducing emissions from construction equipment supports environmental and social principles by lessening impacts to air quality and reducing fossil fuel consumption.



Background and Scoring Requirements

Scoring Requirements

Requirement PD-26.1

1-2 points. Implement Methods to Reduce Emissions

Implement one or more of the methods to reduce emissions in Table PD-26.1.A. **Points for methods are cumulative if roadways have more than one feature; however, this criterion shall not exceed a total of two points.**

TABLE PD-26.1.A. METHODS TO REDUCE CONSTRUCTION EQUIPMENT EMISSIONS (CONTINUED ON NEXT PAGE)

Requirement	No. Points	Method
PD-26.1a	1	Use non-road construction equipment that have engines that meet the current U.S. Environmental Protection Agency (EPA) Tier emission standards (Tier 3/Interim, Tier 4 as of April 2011) in effect for non-road engines of the applicable engine power group and account for at least 50 percent of the non-road construction equipment fleet operating hours for the project.
PD-26.1b	1	Use non-road construction equipment that have diesel retrofit devices for after-treatment pollution control verified by EPA or the California Air Resources Board (CARB) for use with non-road engines and account for at least 50 percent of the non-road construction equipment fleet operating hours for the project.
PD-26.1c	1	Owner shall require contractor to implement a no-idling policy during construction. The policy should include, at a minimum, the following topics (or equivalents): <ul style="list-style-type: none"> When drivers arrive at loading or unloading areas to drop off or pick up passengers, they should turn off their vehicles as soon as practical to eliminate idling time and reduce harmful emissions. Vehicles should not be restarted until passengers are ready to depart. Exceptions include conditions that would compromise passenger safety, such as extreme weather or idling in traffic. Delivery vehicles should turn off their engines while making deliveries to the construction site. All drivers of any company vehicle should receive a copy of the policy and have an opportunity to discuss it at the beginning of construction.

Requirement	No. Points	Method
PD-26.1d	1	Contractor reduces emissions related to hauling earthwork onsite by using larger non-road hauling vehicles.
PD-26.1e	2	Use non-road construction equipment that have engines that meet the current U.S. EPA Tier emission standards (Tier 3/Interim, Tier 4 as of April 2011) in effect for non-road engines of the applicable engine power group and account for at least 75 percent of the non-road construction equipment fleet operating hours for the project.
PD-26.1f	2	Use non-road construction equipment that have diesel retrofit devices for after-treatment pollution control verified by EPA or the CARB for use with non-road engines and account for at least 75 percent of the non-road construction equipment fleet operating hours for the project.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A signed letter from the prime contractor stating the total non-road construction fleet operating hours and the percentage of those operating hours that meet at least one of the three criteria.
2. Provide a list of all non-road construction equipment used on the project that contains the following information for each piece of equipment:
 - Make and model of each piece of equipment.
 - Operating hours associated with the project.
3. Contract Documents requiring the Contractor to have a no-idling policy.

PD-27: Construction Noise Mitigation

1-2 points

SCORECARDS: ☐ Paving ☐ Rural Basic ☐ Rural Extended ☒ Urban Basic ☒ Urban Extended

Goal: Reduce annoyance or disturbance to surrounding neighborhoods and environments from road construction noise.

Sustainability Linkage

Reducing noise from construction supports environmental and social principles by reducing impacts to quality of life, community facilities, and sensitive habitat.



Background and Scoring Requirements

Scoring Requirements

Require the Contractor to plan and monitor noise control measures throughout construction with care above and beyond what is typically required by regulations (i.e., NEPA).

Requirement PD-27.1

1 Point. Construction Noise Mitigation Plan

The Owner shall require the Contractor to establish, implement, and maintain a formal Noise Mitigation Plan (NMP) during roadway construction. The Contract Documents should include a requirement for a NMP that contains, at minimum, the following information for all elements of construction:

1. Responsible party for noise mitigation activities, contact information, their responsibilities, and qualifications. Include information for the NMP preparer, if applicable, or if completed by an outside party.
2. Project location and distance to closest receptor of noise. Include a description of the surrounding zoning and parcel information (i.e., commercial, residential, hospitals, schools, parks, sensitive habitat).
3. A list of proposed construction activities (e.g., demolition, excavation, paving, bridge foundations, finishing).
4. Dates and working hours of proposed construction activities.
5. A list of noise-generating devices used during each construction activity listed in #3.
6. A list of noise-mitigating devices used during each construction activity listed in #3, including personal safety equipment requirements for all site employees.
7. Noise permit numbers, agency, or local authority policies associated with construction work, as applicable.
8. Description of noise monitoring standards, methods, and acceptable levels.
9. Description of correction procedures for non-compliant noise levels.
10. Description of complaint or feedback mechanism for public use.
11. Signature of responsible party.

Some state and local owner agencies already have requirements for such plans written into their standard specifications. However, a written specification requiring the prime contractor to have an NMP is insufficient, especially because many local authorities and owner agencies offer certain exemptions to their policies, such as daylight work schedules or projects with minimal areas of land-disturbing activities.

Requirement PD-27.2

1 Point. Monitor Noise Receptors

Require contractor to monitor noise and the effectiveness of mitigation measures at the receptors throughout construction to ensure compliance with the NMP.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract documents requiring contractor to develop a Noise Mitigation Plan and/or monitor noise during construction.
2. Noise Mitigation Plan.
3. Applicable noise permits, or agency or local authority noise policies.

PD-28: Construction Quality Control Plan

2-5 points

SCORECARDS: ✓Paving ✓Rural Basic ✓Rural Extended ✓Urban Basic ✓Urban Extended

Goal: Improve quality by requiring the contractor to have a formal Quality Control Plan (QCP).



Sustainability Linkage

Implementation of a Construction Quality Control Plan promotes higher quality construction and supports the environmental and economic principles of the triple bottom line by minimizing life-cycle costs and raw material usage.

Background and Scoring Requirements

Scoring Requirements

Requirement PD-28.1

3 points. Quality Control Plan

Require the Contractor to plan and implement quality control measures throughout construction with care and for materials above and beyond what is typically required by specifications and regulations. The Owner shall require the Contractor to establish, implement, and maintain a formal QCP during roadway construction. The Contract Documents should include a requirement for a QCP that includes, at a minimum, the following information:

- Key quality control personnel, their responsibilities, and qualifications (resumes, certifications with expiration dates, etc.).
- Project location and locations of major pavement and earthwork sources.
- Procedures used to control quality during construction including (as a minimum):
 - Items to be monitored (including pavement mix designs)
 - Submittals required, approximate dates, responsible person, and submittal process
 - Testing to be done (including testing standards and frequency)
 - When corrective action is required (action limits)
 - Procedures to implement corrective action
 - Procedures to modify QCP if ineffective or when modifications are necessary
 - Critical inspection point notification plan. As an example, 48 hours before concrete delivery, 48 hours before asphalt paving operations begin, etc.
- The QCP should cover all project construction; not just the pavement.
- Subcontractors need to be included in this plan, which typically means identifying a responsible party and obtaining a quality control procedure from the subcontractor. The Prime contractor shall maintain authority to enforce the QCP for work performed by all subcontractors. Expected beginning and ending dates for the subcontractors should be included.
- The QCP should be approved by the owner before construction begins.

Some state and local owner agencies already have requirements for such plans written in to their standard specifications. Such existing requirements should be able to meet the requirements above; however, some only

address construction quality for hot mix asphalt (HMA) or Portland cement concrete (PCC) paving and not construction of the overall project. While paving needs to be covered in the QCP, all other major components of construction (e.g., structures, earthwork, drainage, traffic control items, etc.) must also be covered.

Some state highway agencies use contractor testing in their acceptance process. In these cases, the independent assurance tests must be performed on samples that are taken independently of quality control samples. QCPs are required in these cases, as defined in CFR 637, Title 23.

A large document that repeats language from the contract specifications need not be generated for this scoring requirement. Rather, the document should clearly identify the major aspects of the prime contractor's plan to control project construction quality and who is responsible for quality control for a particular item or process, when key inspections are made, when corrective actions are to be taken, and how they are to be taken.

Requirement PD-28.2

2 points. Quality Price Adjustment Clauses

Leverage the use of Quality Price Adjustment Clauses to link payment and performance of the constructed products. Quality Assurance specifications generally include statistically based acceptance plans, require contractor process control testing, and have provisions for pay adjustments based on the degree of compliance with specified requirements. Quality assurance specifications and programs may lead to better contractor control of the quality of the specified product; however, they do not diminish the need for effective construction inspection. For more information, see FHWA's "Technical Guidance on Price Adjustment Clauses for Quality," January 24, 1992 and <http://www.fhwa.dot.gov/programadmin/contracts/core03.cfm>

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract Document Specifications requiring contractor to establish and implement a project-specific QCP.
2. Contract Document Specifications requiring quality price adjustment clauses.

PD-29: Construction Waste Management

1-3 points

SCORECARDS:



Goal: Utilize a management plan for road construction waste materials to minimize the amount of construction-related waste destined for landfill.



Sustainability Linkage

Managing construction waste supports the environmental and economic principles of the triple bottom line by reducing landfill waste and by encouraging recycling and reuse of construction materials, thereby decreasing raw material consumption.

Background and Scoring Requirements

Background

Construction and Demolition waste constitutes any material that must be hauled off-site for disposal or reprocessing, or, if disposed (stockpiled) within the project right-of-way (ROW), is not intended for use as structural material (e.g., pavements, embankments, shoulders, base materials, and fill). Materials that leave the ROW for reprocessing (recycling) activities to return later for use on within the project boundaries are not considered C&D waste. Typical C&D waste for roadway construction projects may include, but is not limited to, any of the following:

- Paving process waste (e.g., asphalt, concrete)
- Milling waste, concrete slough and grindings, cobble
- Metals (e.g., waste steel rebar, metal guardrails, pipes, luminaires, signs, aluminum, and various household metals)
- Plastic (e.g., waste plastic pipes)
- Excavated soil cuttings and boulders
- Sediment removed from temporary construction settling ponds
- Land clearing debris or excess topsoil
- Hazardous materials including liquids
- Wood and paper products (e.g., packaging materials, copier paper, paper products, cardboard, and pallets)
- Glass
- Household trash or compostables (including recyclable materials generated from mobile office)
- Packaging

The CWMP is typically completed by the prime contractor, submitted to the owner agency for approval, and implemented by all parties on the construction site. The CWMP need only apply to wastes generated during the project construction phase.

Scoring Requirements

Requirement PD-29.1

1 point. Construction and Demolition Waste Management Plan

The Owner shall require the Contractor to establish, implement, and maintain a formal Construction and Demolition Waste Management Plan (CWMP) during roadway construction, or its functional equivalent. The Contract Documents should include a requirement for a CWMP that contains, at minimum, the following information:

- Type of construction and demolition waste expected (C&D waste)
- Expected (or actual) tonnage
- Goal for percentage of waste diverted from landfills
- Contact information of responsible party for hauling
- Destination of waste (e.g., recycling facility, landfill, contractor's backyard)
- Contact information of responsible party at disposal site
- Strategy for waste generated from mobile office activities and personal worker (household) waste
- Opportunities for recycling of construction waste materials.

Requirement PD-29.2

1-2 points. Divert Waste from Landfills

The Owner demonstrates that a percentage of the construction waste, including the materials listed above, has been diverted from landfills. The percentage diverted should be calculated by weight. One of the following scores applies:

- **1 point.** Divert at least 50 percent of the construction waste from landfills.
- **2 points.** Divert at least 75 percent of the construction waste from landfills.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract Document requiring contractor to establish and implement a project-specific CWMP or its functional equivalent.
2. Documentation showing the construction materials were diverted from landfills. This should include trucking tickets with weights, destinations, and materials, and calculations of percentages diverted from landfills.

Operations and Maintenance

INTERNAL OPERATIONS (ADMINISTRATIVE)

OM-01: Internal Sustainability Plan	OM-01
OM-02: Electrical Energy Efficiency and Use	OM-02
OM-03: Vehicle Fuel Efficiency and Use	OM-03
OM-04: Reuse and Recycle	OM-04

INFRASTRUCTURE OPERATIONS & MAINTENANCE

OM-05: Safety Management.....	OM-05
OM-06: Environmental Commitments Tracking System.....	OM-06
OM-07: Pavement Management System.....	OM-07
OM-08: Bridge Management System.....	OM-08
OM-09: Maintenance Management System.....	OM-09
OM-10: Highway Infrastructure Preservation and Maintenance	OM-10
OM-11: Traffic Control Infrastructure Maintenance	OM-11
OM-12: Road Weather Management Program	OM-12
OM-13: Transportation Management and Operations.....	OM-13
OM-14: Work Zone Traffic Control	OM-14

OM-01: Internal Sustainability Plan

1-15 points

Goal: Focus on sustainability improvements within the agency's internal operations that affect all three principles of the triple bottom line.

Sustainability Linkage

Implementation of a sustainability plan shows organizational commitment to all of the triple bottom line principles by being dedicated to the responsible use of natural resources, providing alternative commuting options, and training employees about sustainability.



Background and Scoring Requirements

Background

The purpose of this criterion is to focus on improving the sustainability of the agency itself. Also see the following, related criteria:

- OM-02: Electrical Energy Efficiency and Use
- OM-03: Vehicle Fuel Efficiency and Use
- OM-04: Reuse and Recycle

Where overlap exists with plans identified in these three related criteria, those plans should be included in the Comprehensive Internal Sustainability Plan (CISP) as an element of the plan or by reference.

For the purposes of this criterion, the following definitions apply:

- **“Internal”**– Internal refers to an agency’s internal administrative and maintenance & operations functions and should address the agency’s energy consumption, solid waste production, recycling rate, employee commute, water consumption, stormwater management, and procurement policies. Generally, internal operations refer to those areas over which a transportation agency has complete control. For sustainability planning related to the transportation system that the agency manages, travel demand management programs for agency employees, or professional development education programs, see System Planning and Project Development criteria.
- **“Sustainability”** – The sustainability plan should incorporate all three of the triple bottom line sustainability principles (environmental, social, and economic). A plan does not need to use the term “sustainability” to receive points, so long as the contents of the plan can clearly be demonstrated to relate back to the three sustainability principles.
- **“Plan”** – For this criterion, a plan can be a list of actions that tie back to clearly stated objectives. The plan can be in the form of a published document, website, brochure, or other format, so long as the elements under the requirement section can be clearly demonstrated.
- **“Performance Measurement”** – A fully developed internal sustainability plan should contain a performance measurement system that includes goals, performance metrics, quantifiable targets, strategies, and actions designed to help meet the overall plan objectives.

Scoring Requirements

Requirement OM-01.1

2 points. Executive Commitment

Agency sustainability commitment is endorsed by senior executives. Evidence of this could include an executive order or policy statement, organizational directive, endorsement of the Sustainability Plan, a memo to staff, or other document.

Requirement OM-01.2

4 points. Develop a Comprehensive Internal Sustainability Plan

The agency has a Comprehensive Internal Sustainability Plan that includes goals, performance metrics, quantifiable targets, strategies, and actions designed to help meet the overall plan objectives. Table OM-01.2.A shows examples of each of these components.

TABLE OM-01.2.A COMPONENTS OF A COMPREHENSIVE SUSTAINABILITY PLAN

Component	Example
A goal is the area that needs to be improved.	A transportation agency wants to reduce its environmental footprint.
A performance metric will be used to evaluate the progress being made towards the goal area.	To measure its performance, the agency will track its energy consumption.
A target uses the selected performance metric and identifies specific objectives to be achieved in the future.	The target is to reduce the agency's annual energy consumption 20% below current levels 2 years from now. (The baseline is how much energy the agency currently consumes per year.)
Strategies are categories of actions used to achieve the target.	The agency will use three main strategies to reach the target: (1) consume less electricity, (2) consume less gasoline and diesel fuel, and (3) consume less natural gas.
Actions are specific things that can be done to implement the strategies.	To implement the strategy of consuming less electricity the agency will: (1) replace incandescent light bulbs with compact fluorescents, (2) replace broken office equipment with energy efficient models, and (3) install occupancy sensors in the lighting system.

Common performance metrics for internal sustainability plans include:

- Annual electricity, natural gas, gasoline, and diesel fuel consumption (see OM-02 and OM-03)
- Annual renewable energy consumption (see OM-02)
- Agency fleet fuel efficiency (see OM-03)
- Agency fleet annual vehicle miles traveled (see OM-03)
- Annual tons of solid waste produced (see OM-04)
- Annual recycling rate (see OM-04)

- Annual reams of paper consumed (see OM-04)
- Annual water consumption
- Stormwater infiltrations rates at agency-owned facilities
- Percent of procured items that are sustainably produced, contain recycled materials, produced locally, etc.
- Percent of building inventory meeting green or sustainable building criteria

If an agency is growing in size, one option may be to select performance metrics that are normalized by the number of employees. This way an agency can seek to reduce the amount of materials consumed per employee, rather than the total amount consumed across the agency. However, this approach can result in an overall increase in an agency's environmental footprint, even though it appears to be meeting its sustainability goals.

Requirement OM-01.3

1-3 points. Components of a Comprehensive Internal Sustainability Plan

Scoring is based on the following, cumulative elements:

- **Requirement OM-01.3.a**
1 point. Coordination
 The CISP is integrated with national, state, and/or regional sustainability goals.
- **Requirement OM-01.3.b**
1 point. Implementation
 The CISP has an implementation section that includes responsible parties, timelines, and potential funding sources.
- **Requirement OM-01.3.c**
1 point. Monitoring and Tracking
 The CISP includes a performance measurement system, a plan for monitoring the plan's progress, and a schedule for updating the plan as needed.

Requirement OM-01.4

1-2 points. Employee Engagement and Training

Scoring is based on the following, cumulative elements.

- **Requirement OM-01.4a**
1 point. Sustainability Training
 Training on sustainability is provided for staff, including an introduction to the Comprehensive Internal Sustainability Plan.
- **Requirement OM-01.4b**
1 point. Employee Sustainability Committee
 The agency has an employee committee that promotes sustainability. Sometimes called a green team, this committee is focused on implementing more sustainable measures throughout the agency.

Requirement OM-01.5

1-2 points. Commuting Options

Scoring is based on the following, cumulative elements.

- **Requirement OM-01.5a**

1 point. Implement Travel Demand Management Options

The agency implements at least two Travel Demand Management options including, but not limited to, compressed work weeks, alternative working hours, carpooling/vanpooling support, virtual meetings, teleworking options, bicycle and pedestrian amenities (e.g., parking, showers, lockers, etc.), and subsidized transit.

- **Requirement OM-01.5b**

1 point. Provide Support for Alternative Fuel Vehicles

The agency provides support for alternative fuel vehicles used for commuting. This could include providing electric vehicle plug in stations, providing alternative fuel vanpools, or other options.

Requirement OM-01.6

2 points. Demonstrate Sustainable Outcomes

To earn credit for this scoring requirement, the agency must have a Comprehensive Internal Sustainability Plan as described in scoring requirement OM-01.2. Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Comprehensive Internal Sustainability Plan, or similar document.
2. An attachment to the plan that clearly describes how the plan includes measurements of performance.
3. Plan progress report (likely produced independently of this application) that provides evidence that the agency has been monitoring and tracking its performance towards meeting the plan's goals. The report should include quantifiable metrics (such as water or energy reduced per employee) that demonstrates the agency's commitment to tracking its progress.

OM-02: Electrical Energy Efficiency and Use

1-15 points

Goal: Reduce the consumption of fossil fuels during operation and maintenance of agency owned and/or operated facilities through improvements in efficiency and the use and/or generation of renewable energy sources.

Sustainability Linkage

Reducing energy consumption and converting to renewable energy sources contributes to the environmental and economic principles by reducing fossil fuel usage and associated emissions, and reducing long-term energy costs.



Background and Scoring Requirements

Background

The EPA's Green Power Partnership explains that a Renewable Energy Certificate (REC) represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation. A REC and its associated attributes and benefits can be sold separately from the underlying physical electricity associated with a renewable-based generation source. RECs provide buyers flexibility:

- In procuring green power across a diverse geographical area.
- In applying the renewable attributes to the electricity use at a facility of choice.

This flexibility allows organizations to support renewable energy development and protect the environment when green power products are not locally available. For more information, see the EPA's Green Power Partnership website at <http://www.epa.gov/greenpower/gpmarket/rec.htm>.

Renewable resources shall be as defined by the Green-e Energy National Standard at <http://www.green-e.org> or http://www.green-e.org/getcert_re_stan.shtml#standard.

Scoring Requirements

Requirement OM-02.1

2 or 4 points. Set Energy Reduction and Renewable Energy Usage Goals

Scoring is based on the following, cumulative elements.

- **Requirement OM-02.1a**

2 points. Set Energy Reduction Goal

Set an energy reduction goal to be obtained (usually a percentage reduction as compared to current usage).

- **Requirement OM-02.1.b**

2 points. Set Goal for Buying RECs

Set a goal for buying RECs (in addition to energy reduction goals) that is at least equivalent to one of the following options:

- Your current state's Renewable Portfolio Standard (RPS). Currently 24 states and the District of Columbia have RPSs in place representing more than half of the energy consumed in the United States.
- Your state's non-binding renewable energy goal. Five other states (as of July 2011) have non-binding goals for renewable energy.
- If your state does not have a RPS or a non-binding goal, 20 percent of operational energy use should be used as the goal.

Requirement OM-02.2

2 or 4 points. Develop a Plan

Develop a documented plan that outlines how the energy reduction and renewable energy goals set above will be accomplished. The plan (could be multiple documents) should state what energy-efficiency measures are planned and how renewable energy will be procured for operations and maintenance of facilities, including roadway lighting, traffic control, rest areas, maintenance & operations facilities, and other agency-operated administration facilities. This should include current energy usage and projected energy usage for the next two years as a minimum. Owned renewable energy sources may be factored into these calculations.

One of the following scores applies:

- **0 points.** No plan is created.
- **2 points.** A plan is developed to meet either the energy reduction or renewable energy usage goals.
- **4 points.** A plan is developed to meet both the energy reduction and renewable energy usage goals.

Requirement OM-02.3

2 points. Measure Progress and Monitor Performance

Develop and maintain an electricity monitoring system for operations and maintenance that tracks electricity usage for all highway facilities. This database should help to monitor any issues or inefficiencies that may exist or develop over time.

Requirement OM-02.4

1-2 points. Employee Awareness Program

Scoring is based on the following, cumulative elements.

- **Requirement OM-02.4a**

1 point. Employee Awareness Program

Develop and implement an employee awareness program that educates employees about the sources and costs of energy usage in agency-owned/operated facilities and what they could do to reduce energy usage and how that links to sustainability.

- **Requirement OM-02.4b**

1 point. Employee Energy Reduction Committee

Create and maintain an employee committee focused on the reduction of energy consumption. This committee could have a larger focus, but must have reduction of energy usage as one of their goals.

Requirement OM-02.5

2-3 points. Demonstrate Sustainable Outcomes

Scoring is based on the following, cumulative elements.

- **Requirement OM-02.5a**

2 points. Execute Renewable Energy Contract

Execute a contract for a minimum of two years of renewable energy, or create and operate renewable energy facilities within the agency-owned properties to meet the selected goal.

- **Requirement OM-02.5b**

1 point. Monitor Performance and Demonstrate Sustainable Outcomes

Monitor performance and demonstrate attainment of the agency's energy reduction goal over at least a one-year period.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Energy efficiency and renewable energy plan(s) with current energy usage and projected energy usage for the next two years.
2. Copy of the electricity monitoring system.
3. Documentation of employee awareness program and/or employee committee focused on reduction of energy usage.
4. Statement of renewable energy goal and documentation of Green-e contract or equivalent meeting that goal, according to energy projections, for two years. If a Green-e equivalent source is used, documentation to show that the source is indeed equivalent.
5. Documentation showing reduction in energy consumption over the prior year meets goals set.

OM-03: Vehicle Fuel Efficiency and Use

1-15 points

Goal: Reduce fossil fuel use and emissions in vehicles used for operations and maintenance.

Sustainability Linkage

Reducing fossil fuel usage contributes to all of the triple bottom line principles by improving public health, reducing energy usage and costs, and reducing the impacts from associated emissions.



Background and Scoring Requirements

Background

Reduction of fossil fuels is the overall goal of this criteria, whether that is achieved through the use of electric vehicles, alternative fuels, reduced idling, etc. The performance measurement tool should be used to report actual percentage reduction of fossil fuels used. If an increase or decrease in overall fleet size is required during the program, it could be used as an opportunity for improvement. For more information on alternative fuel and efficiency best practices, visit the AASHTO Equipment Management Technical Service webpage at <http://www.emtsp.org/>.

Scoring Requirements

Requirement OM-03.1

2 or 4 points. Set Fuel Usage Goals

Set goals for fossil fuel use reduction and set a time frame in which these goals should be achieved. Some agencies manage their light-duty fleet vehicles separately from their heavy-duty fleet and off-road equipment—in these cases, goals may be included in multiple documents.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** Goals are set for either light-duty fleet or for heavy-duty and off-road equipment.
- **4 points.** Goals are set for both light-duty fleet and for heavy-duty and off-road equipment.

Requirement OM-03.2

2 or 4 points. Develop a Fleet Management Plan

Have a documented fleet management plan that, at a minimum, describes the agency's planned actions to reduce fossil fuel usage, transition to alternative fuels or energy sources, increase overall fuel efficiency, and reduce vehicle miles travelled (VMT). Some examples of reduction actions include:

- **Alternate energy source.** The purchase of vehicles powered by such alternative fuels as electricity, propane, natural gas, E-85, or biodiesel can reduce the use of fossil fuels. Hybrid electric vehicles and even high mileage standard vehicles can also contribute to fossil fuel use reduction.

- **Anti-idling policy.** Anti-idling policies can be implemented that reduce the amount of fuel used unnecessarily when the vehicle is not in motion. These policies often specify a time limit for any vehicle idling or an amount of idling allowed during a certain time frame. There are idling reduction technologies that can be installed on heavy vehicles to help reduce idling. Argonne National Laboratories performed a study comparing some of these technologies for cost and fuel savings. Information from the study can be found at <http://www.transportation.anl.gov/pdfs/EE/533.pdf>.
- **Maintenance and operation.** Proper maintenance and operation can improve fuel efficiency. Training employees to properly inspect vehicles before use, drive efficiently, and identify maintenance issues can help prevent fuel waste.
- **Right-sizing vehicles.** Agencies may want to examine what each vehicle in their fleet is used for and ensure that vehicles are sized appropriately. For example, using light-duty trucks instead of heavy-duty trucks can often meet the needs of the user while reducing the amount of fuel consumed.
- **Vehicle technologies.** Tow plows and wing plows are two examples of modifications of snow plow equipment that can contribute to overall fuel efficiency by using a single vehicle to do more work without requiring significantly more fuel. Installing GPS in vehicles has also been shown to reduce the miles actually travelled by vehicle operators.
- **Employee training.** Appropriate training of staff that operate equipment and vehicles can significantly improve adherence with planned reduction actions and the commitment to help achieve the set goals.

One of the following scores applies:

- **0 points.** No plan is created.
- **2 points.** A plan is developed for either light-duty fleet or for heavy-duty and off-road equipment.
- **4 points.** A plan is developed for both light-duty fleet and for heavy-duty and off-road equipment.

Requirement OM-03.3

3 points. Test Alternative Fuels and Reduction Methods

The agency is actively testing the use of alternative fuels or reduction methods in order to analyze the feasibility for incorporation in the agency's light-duty fleet or heavy-duty or off-road equipment use.

Requirement OM-03.4

2 points. Measure Progress and Monitor Performance

Have a fleet tracking program, spreadsheet, or other document that monitors vehicle use and fuel consumption. This could likely be integrated into an existing vehicle usage or maintenance database. Use this tool to identify where the greatest improvements can be made and to monitor progress once improvements are implemented. This applied to Fuel Reduction Plans described above and/or Testing of Alternative Fuels and Reduction Methods as noted above.

In addition to measuring fuel consumption, other measures may help the organization analyze where fuel consumption is reduced. Examples include measuring vehicle miles traveled or carbon footprint reduction (which would measure emissions reductions as well as fuel reductions).

Requirement OM-03.5

2 points. Demonstrate Sustainable Outcomes

To earn credit for this scoring requirement, the agency must have a fleet tracking program, spreadsheet, or other document that monitors vehicle use and fuel consumption as described in scoring requirement OM-03.4. Use the

fleet tracking system that was set up to measure performance and track progress toward these goals for at least one year. Show that progress has been made toward the stated goals.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Fleet management plan to reduce fossil fuel usage.
2. Copy of fleet performance tracking tool with list of current fleet vehicles and fuel usage.
3. Goal statement and documentation of progress toward goals for at least the first year.

OM-04: Reuse and Recycle

1-15 points

Goal: Create and pursue a formal recycling and reuse plan for agency operated facilities and maintenance activities.

Sustainability Linkage

Reducing, reusing, and recycling materials supports the environmental and economic principles of the triple bottom line by reducing the consumption of raw materials, reducing landfill waste, and encouraging cost savings.



Background and Scoring Requirements

Background

For the purposes of this criterion, the key terms are defined as follows:

- **“Operation and Maintenance Material”** is waste for roadway maintenance and operations included in this criterion includes both office waste and construction and maintenance waste. Office waste includes, but is not limited to, paper products (e.g., packaging materials, copier paper, paper products, cardboard, and pallets), glass, trash, or compostables (including recyclable materials generated from office facilities). Construction and maintenance waste includes, but is not limited to, pavement waste from pothole/roadways repairs, metals (e.g., guiderails, pipes, luminaires, signs, aluminum, and various other metals), excess topsoil or removed vegetation, hazardous materials and liquids, or wood.
- **“Recycle”** is defined as recovering a portion of a used product or material from the waste stream for reprocessing and/or repurposing, and **“Reuse”** is defined as a continued use or repurposing of existing materials without reprocessing. Materials do not need to be reused or repurposed within the same project limits.

The Construction Materials Recycling Association (CMRA) provides links to a variety of localities that offer construction and demolition waste recycling services. The list can be accessed at <http://www.cmra.org>.

Scoring Requirements

The scoring requirements below may be included in the Comprehensive Internal Sustainability Plan discussed in OM-01. If so, additional credit may be taken here for the specific elements of Recycle and Reuse.

Requirement OM-04.1

2 or 4 points. Set Recycle and Reuse Goals

Set goals for operation and maintenance material reuse and recycling. These goals do not need to be included in a formal Recycle and Reuse plan. The documented goals could be part of a Comprehensive Internal Sustainability Plan (see OM-01 Internal Sustainability Plan).

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** Goals are set for either administration (office waste) or maintenance and operations (construction and maintenance waste).
- **4 points.** Goals are set for both administration (office waste) and maintenance and operations (construction and maintenance waste).

Requirement OM-04.2

2 or 4 points. Develop a Recycle and Reuse Plan

Develop a documented plan (could be multiple documents) that outlines how the recycle and reuse goals set above will be accomplished. The plan should describe the agency's proposed recycling and reuse measures at agency-owned and operated facilities, including rest areas, maintenance & operations facilities, and other agency-operated administration facilities. The documented plan could be part of a Comprehensive Internal Sustainability Plan (see OM-01 Internal Sustainability Plan).

Some potential recycle and reuse measures include, but are not limited to:

Keep accurate records and retain all waste handling invoices and receipts.

Locate recycling receptacles in all facilities and offices to encourage waste reduction of basic materials and small items.

Clearly label receptacles and recycling locations. Large color photos of what is recyclable and what is not are often very helpful, especially, for multi-lingual work environments.

Provide waste receptacles that are smaller than the recycling receptacles to provide a visual or behavioral cue indicating that the trash is supposed to be limited and there are ample recycling alternatives.

Provide training to workers to educate them on recycling and reuse and the specifics of the efforts being made to reduce waste.

Create an incentive or recognition plan for workers to engage actively in recycling efforts of personal trash that rewards positive and successful behavior.

Hire an experienced waste transport company to manage site waste and monitor waste streams for unacceptable materials.

Provide handling and storage areas for construction and operations materials to be recycled and reused to provide a visual and behavioral cue indicating that trash is supposed to be limited and there are ample recycling alternatives.

Identify local facilities that accept recyclables or salvaged materials. This is important in designating types of waste to separate and in making arrangements for drop-off or delivery of materials.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** A plan is developed for either administration (office waste) or maintenance and operations (construction and maintenance waste) facilities.
- **4 points.** A plan is developed for both administration (office waste) and maintenance and operations (construction and maintenance waste) facilities.

Requirement OM-04.3

2 or 4 points. Measure Progress and Monitor Performance

Track the agency waste streams and report the amount of waste produced and the amount of material reused and recycled.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** Waste streams are tracked for either administration (office waste) or maintenance and operations (construction and maintenance waste) facilities.
- **4 points.** Waste streams are tracked for both administration (office waste) and maintenance and operations (construction and maintenance waste) facilities.

Requirement OM-04.4

3 points. Demonstrate Sustainable Outcomes

To earn credit for this scoring requirement, the agency must have a Recycle and Reuse Plan as described in scoring requirement OM-04.2. Track the progress toward these goals with the performance measurement system for at least one year. Monitor the percentages of materials that go to waste, reuse, or recycling and show that progress has been made toward the stated goals.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Recycling and Reuse Plan with description of strategies to be used to reduce waste.
2. Recycling and Reuse goals.
3. Agency waste stream report and goal tracking for at least the first year.

OM-05: Safety Management

1-15 points

Goal: Maximize the safety of the existing roadway network through a systematic and comprehensive review of safety data and the allocation of resources in planning and programming to support safety in operations and maintenance.



Sustainability Linkage

Reducing fatal and serious injuries contributes to the social and economic principles by reducing the impacts associated with personal and public property damage, injury, and loss of life.

Background and Scoring Requirements

Scoring Requirements

Requirement OM-05.1

2 or 4 points. Assess Current Safety Performance

Assess the current safety performance of the state or region, identify prevailing trends in fatal and serious injuries based on a variety of metrics, and identify safety performance metrics most appropriate to assess progress in improvement of the safety performance of the state or region.

Prevailing trends reflect the characteristics of the safety performance of the state or region that would most benefit from improvement, that measure performance of the system for vulnerable user groups, and that reflect the reliability of the system (for example, as it relates to incidents and crashes on major through routes). Once the agency identified a set of safety performance metrics that define safety performance for the region (measures that reflect areas associated with the largest amount of fatal and serious injuries and those associated with vulnerable users and system reliability), the agency quantifies the current or base safety performance of the system.

Safety performance metrics typically account for fatal and serious injuries related to, for example, collision types, user groups involved, behavioral characteristics, vehicle types involved, or other crash-related circumstances. Safety performance metrics may also account for, for example, particular fatal and serious crash characteristics showing increasing trends.

Scoring for this requirement is based on the following, cumulative elements.

- **Requirement OM-05.1a**

2 points. Evaluate Safety Performance

For state agencies (for metropolitan or regional agencies see below):

One of the following scores applies:

- **0 points.** Quantify the safety performance of the state in terms of a rate or solely with the use of one metric: the overall number of fatalities or fatal and serious injuries in the state or region.
- **2 points.** Identify safety performance measures for the state and evaluate the safety performance of the state through a quantitative evaluation of the safety performance of the state in terms of:

- The number of fatal and serious injuries across collision types, and user groups; and where particular user behaviors are present that would increase the risk of fatal and serious injury crashes (for example, unbelted vehicle occupants), and
- Fatal and serious crash characteristics that reflect the status of safety culture among road users (for example, drinking and driving).

In most cases, such quantitative assessments are included as part of the development of the SHSP (refer to the *FHWA Strategic Highway Safety Plans: A Champion's Guide to Saving Lives* at <http://safety.fhwa.dot.gov/safetealu/guides/guideshsp040506/guideshsp040506.pdf>; and other SHSP-related resources) and those reflecting safety culture.

For metropolitan or regional agencies (for state agencies see above):

One of the following scores applies:

- **0 points.** Quantify the safety performance of the region in terms of a rate or solely with the use of the overall number of fatalities or fatal and serious injuries in the region.
- **2 points.** Perform a safety performance evaluation that includes:
 - Evaluation of the safety performance of the region across the emphasis areas in the SHSP or agency if this is regional.
 - Evaluation of regional safety performance related databases (crash, roadway, and other databases mentioned in the *FHWA Strategic Highway Safety Plans: A Champion's Guide to Saving Lives* guide at <http://safety.fhwa.dot.gov/safetealu/guides/guideshsp040506/guideshsp040506.pdf>) to identify any additional emphasis areas that may be unique to the region or different from state priorities. These additional emphasis areas reflect regional differences in the nature of these crashes, road network characteristics, and community priorities.

The product of this activity is a list of emphasis areas along with the number of fatal and serious injuries associated with each emphasis area where feasible. The list of emphasis areas would also include those for which the number of associated fatal and serious injuries would be difficult to quantify; for example, EMS, data and analysis, and workforce development.

- **Requirement OM-05.1b**

2 points. Identify Safety Performance Metrics

Identify safety performance metrics for the reduction of fatal and serious injuries in the state or region

One of the following scores applies:

- **0 points.** Use the rate or total number of fatal and serious injuries as the sole safety performance metric for the state or region.
- **2 points.** Identify safety performance metrics for each of the emphasis areas identified during the evaluation of the safety performance of the state or region:
 - For emphasis areas related to particular collision types or users, each of the metrics measures the change in the number of fatal and serious injuries for the particular collision type or user group.
 - For user behavior-related metrics the associated metrics reflect the change in the number of fatal and serious injuries in crashes where these behaviors are present; and the change in the portion of overall fatal and serious injuries where the behavior is reported. For example, if an emphasis area is identified as: *Reduce the fatal and serious injuries involving drinking and driving*, then the metrics include at least

the following: (a) the number of fatal and serious injuries sustained in crashes where one or more drivers were drinking and driving; and (b) the portion of drivers that were drinking and driving in fatal and serious injury crashes.

- For emphasis areas that cannot be readily measured in terms of fatal and serious injuries, metrics would identify improvement in these areas based on other criteria. For example, for EMS, the metrics may include the number of drivers that die on the scene and the number of drivers that die on their way to a hospital or trauma center.

NOTE: Metropolitan or regional agencies. Evaluate the incidence of fatal and serious injury crashes in the jurisdiction and identify emphasis areas based on the evaluation. For a metropolitan area, not all the emphasis areas in the SHSP may be applicable due to the urban nature of the area, and for rural counties, some of the more urban emphasis areas may not be relevant.

Requirement OM-05.2

3 points. Set Goals and Targets

Set goals and targets for each of the safety performance metrics identified for the reduction in fatal and serious injuries.

For state agencies (for metropolitan or regional agencies see below):

Safety performance metrics should be consistent with the emphasis areas in the state SHSP.

For metropolitan or regional agencies (for state agencies see above):

Set safety performance metrics for each of the emphasis areas identified during the evaluation process described earlier, and where applicable, metrics in the SHSP that also reflects prevailing trends in the region.

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-05.2a**

1-2 points. Set Safety Goals

One of the following scores applies:

- **0 points.** Set no safety performance goals, or performance goals are expressed solely as a rate (for example, crash rate, and fatal and serious injury crash rate).
- **1 point.** Set safety performance goals that can be readily achieved under current program and agency activity priorities.
- **2 points.** Set long-term goals and intermediate targets for improvements in the safety performance metrics in addition to the State's fatality reduction goal (which is set under an agreement reached between NHTSA and GHSA). Goals and targets set by the agency should reflect meaningful reductions on an ongoing basis; acceleration in reductions that would require a concerted effort to achieve. These goals should measure the numeric change in fatalities and serious injuries across emphasis areas, and the incidence of behaviors that increases the risk of fatal and serious injury crashes.

For example, for the emphasis area "Reduce drinking and driving," the safety performance metrics would include: (a) change in the outcome of crashes where one or more drivers were drinking (change in the number of fatal and serious injuries sustained in crashes where one or more drivers were drinking); and b) change in the portion of fatal and serious injury crashes where one or more drivers were drinking. In other words, the

metrics should direct, for example, changes in user behavior in addition to overall reductions within an emphasis area.

- **Requirement OM-05.2b**

Two points must be earned on OM-05.2a to accomplish this requirement.

1 additional point. Integrate Safety Goals with Maintenance & Operations

Integrate these goals to make resource decisions for maintenance, repair, and operations activity.

Requirement OM-05.3

1-2 points. Develop a Plan

Develop a plan to support the reduction in fatal and serious injuries in the state or region.

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-05.3a**

1 point. Develop Statewide or Regional Safety Plan

One of the following scores applies:

- **0 points.** No plan exists, or the plan does not (a) incorporate all the emphasis areas; (b) identify strategies and lead agencies; and (c) present a system-wide approach to identify expenditure on programs, projects, and activities targeting a reduction in fatal and serious injuries in the region.
- **1 point.** Develop a statewide or regional safety plan as part of a collaborative effort across all levels of government (federal, state, and local level). The plan:
 - Presents a system-wide approach to reduce the risk of fatal and serious injuries that rely on systematic and scientific methods and approaches that (i) account for regression-to-the mean; (ii) are aimed at reducing the overall severity of crashes rather than the frequency of crashes; and (iii) incorporate performance thresholds (base performance).
 - Includes specific strategies and lead agencies for each the emphasis areas in the plan.
 - Supports integrated and multidisciplinary approaches to reduce the number of fatal and serious injuries on the entire public highway system.
 - Demonstrates a commitment to prioritize safety improvements through their programming decisions for safety projects and the use of safety funding.

The plan could be a single statewide plan or a combination of SOPs at headquarters and district/regional levels; or a plan for a county, metropolitan area, or regional council area.

- **Requirement OM-05.3b**

One point must be earned on OM-05.2a to accomplish this requirement.

1 additional point. Include Strategies and Activities to Support Improvement of Data and Analysis

Include, as part of the plan, specific strategies and activities to support improvement of data and analysis capabilities across the public highway system. For example, improvement of the quality and accuracy of crash location information within a geographic framework (GIS), improved traffic record systems, improved analysis tools, linkage across databases (for example, medical, asset management, incident management). These activities should be part of the larger state traffic records program coordinated and supported by the state Traffic Records Coordinating Committee (TRCC). The benefits of such a process include, but are not limited to:

improved data quality, improved safety performance metrics, improved reliability of analysis results, improved the ability to identify appropriate emphasis area needs, improved implementation by targeting funding where it is needed most, improved reliability of economic evaluations, and improved ability to evaluate and monitor the safety performance of the public highway system.

Requirement OM-05.4

1 or 3 points. Implement the Plan

For state agencies (for metropolitan or regional agencies see below):

One of the following scores applies:

- **0 points.** No plan exists, or implementation of projects, activities, and programs occur within agencies without integration or collaboration across state and regional agencies in support of the common goal to reduce fatal and serious injuries on the public highway system.
- **3 points.** Implement the plan in an integrated and multidisciplinary manner. Implementation needs to incorporate proactive and reactive approaches to fatal and serious injury reduction:
 - Programming and implementation of projects, activities, and programs reflects priorities of the plan.
 - Implementation of strategies within the plan occurs in an integrated, coordinated, and multidisciplinary way, involving different technical areas (planning and engineering), other disciplines such as EMS and public health.
 - Specified implementation actions require the involvement of different state, federal, and local agencies across multiple disciplines.
 - Implementation includes strategies that are proactive as well as reactive.
 - Implementation reflects an approach that incorporates consideration of the reduction of the risk that a crash occurs, reduction of the risk of fatal and serious injury during the crash, and reduction of the crash outcome. For example, drinking and driving increases the risk of a crash occurring; installation of cable median barrier reduces the risk of fatal and serious injury during a crash; and short response times by qualified and skilled EMS improves the likelihood that injured victims will survive the crash.
 - Consider implementation of systemic approaches to reduce fatal and serious injury risk on the public highway system.

For metropolitan or regional agencies (for state agencies see above):

One of the following scores applies:

- **0 points.** No plan exists, or implementation of projects, activities, and programs occur within agencies without integration or collaboration across state and regional agencies in support of the common goal to reduce fatal and serious injuries on the public highway system.
- **1 point.** Implement the plan in close cooperation with local agencies. Facilitate and support allocation of funding that reflects the priorities of the plan to the extent possible.
- **3 points.** Adopt PlanSafe or its equivalent as an integral part of the agency's technical process for conducting transportation planning.

PlanSafe is an advanced quantitative tool that uses macro-level predictive models to assess the impact of long-range planning (20-year horizon) on safety performance. The results provide a quantitative and statistically reliable forecast of crashes for a given future travel demand (using output from travel demand models) and socio-demographics if no particular improvements in safety culture, infrastructure, EMS, and other areas occur other

than what exists at the base year of the analysis. Future forecast assists in identifying actual improvements in safety performance needed over longer period (20 years) to meet long-term safety performance goals. A TRB report on PlanSafe can be found at <http://www.trb.org/Main/Blurbs/163790.aspx>.

Requirement OM-05.5

1-3 points. Measure Progress and Monitor Performance

Advanced methods set a baseline for performance without change brought about by the plan, accounts for the unique nature of crash data, and account for volume and socio-demographic changes. Agencies can use tools such as PlanSafe to estimate anticipated performance of the system without intervention and compare results with actual performance with implementation.

Statistically sound approaches accounts for crash data as count data that are heavily skewed. Agencies can use the advanced evaluation methods in Chapter 9 of the Highway Safety Manual (HSM) for project and program evaluation (these advanced methods account for regression to the mean (RTM) effects that are common to safety studies and applications). While treatments at sites require monitoring over the first year to identify any unintended effects, it is necessary to extend the evaluation period to a three to five year before and after period to support statistically valid evaluation.

One of the following scores applies:

- **0 points.** Measure progress and change in the system safety performance solely based on the overall crash rate, crash rates for typical facilities, the rate of fatal and serious injuries, or the total number of fatal and serious injuries.
- **1 point.** Measure progress using some of the safety performance metrics previously identified. The evaluation is limited to an overall summary of the number of fatal and serious injuries across the state or region.
- **2 points.** Measure the performance of the public highway system in the region using advanced and statistically sound methods to perform evaluations of the safety performance of the system.
- **3 points.** Measure the performance of the public highway system in the region using advanced and statistically sound methods to perform evaluations of the safety performance of the system AND incorporate project and program evaluations into the monitoring process. Use statistically sound evaluation approaches.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. The agency's plan for safety improvements.
2. The state SHSP, Highway Safety Plans, and Annual Report submitted annually for the Highway Safety Program for NHTSA.
3. Annual review of safety performance of the system, data, trends, and 3- or 5-year averages.
4. Annually collected documentation that measures safety performance of the road network, including fatalities and serious injuries for all facilities within their jurisdiction. The report would outline changes in aggregate safety performance across the safety performance metrics, identify the actions taken through projects, activities and programs to reduce the fatal and serious injury crashes, and results from evaluations of the safety performance of implemented projects, activities, and programs.
5. Maintenance project reports, technical memos, or other supporting documentation that demonstrate application of evaluation methods such as those described in the HSM; and report on the existing system safety performance (frequency, crash type, severity) and comparisons with appropriate benchmarks.

6. Memoranda or calculations documenting the effectiveness over the life of the solution, treatment, or countermeasure in reducing crashes. Using processes outlined in the AASHTO HSM determine the benefit-cost ratio (reduction in total crash cost anticipated for the project investment), or net present value (difference between the anticipated reduction in total crash cost and the project investment) for the project.
7. Research report that documents a post-implementation effectiveness evaluation of projects. Such a report shall include collection of actual crash data before and after implementation, and shall follow the Empirical Bayes process or advanced methods that account for RTM where feasible. Feasible refers to the availability to perform the evaluation using predictive methods; for example, availability of calibrated HSM SPFs or state-specific SPFs available for appropriate application of the EB method.
8. A report that documents system safety performance evaluation and performance across various performance measures identified as part of the state or regional safety plan.
9. A capital improvement program description that documents how the agency specifically prioritizes ongoing safety improvements through allocation of funds to safety-based programs. For example, documentation of the projects funded in safety-based programs and their relative anticipated impact on fatal and serious injury crashes.

OM-06: Environmental Commitments Tracking System

1-15 points

Goal: Ensure that environmental commitments made during project development related to operations and maintenance are documented, tracked, and fulfilled.

Sustainability Linkage

Tracking commitments supports the environmental and social principles by ensuring that adherence to commitments made to stakeholders and the environment are consistently met throughout project development.



Background and Scoring Requirements

Background

Scoring Requirements OM-06.2 through OM-06.5 are intended to allow for scalability in the type and detail-level of Environmental Compliance Tracking System (ECTS), from processes to disseminate information, to forms that are passed through part or all of a project's lifecycle, to a formal database driven ECTS.

Scoring Requirements

Requirement OM-06.1

2 points. Develop a Comprehensive Environmental Compliance Tracking System

Develop and use a comprehensive ECTS that ensures that commitments made during project development are tracked, fulfilled, and verified throughout operations & maintenance activities. In this case, a system could include a wide range of solutions from project worksheets to detailed databases. Points are achieved by incorporating the following elements:

The ECTS should include all regulatory and non-regulatory commitments that apply to the development work and additional properties, including: stormwater management facilities, wetland restoration areas, stream restoration areas, reforestation areas, sound walls, wildlife crossing structures, surveys, borings, batch plants, staging, equipment storage, employee parking, and field offices; and land that is purchased, leased, occupied, or used for the work.

Requirement OM-06.2

1-5 points. Integrate Key Functions of an ECTS

At a minimum, the ECTS should identify commitments in a single list, identify environmental compliance manager(s), and be updated and maintained as projects are constructed and throughout any monitoring period.

Scoring is based on the following, cumulative elements:

- **Requirement OM-06.2a**

1 point. Communicate from Planning through Operations & Maintenance

Ensure that environmental commitments are communicated from project development (including project planning, design, and construction) to operations & maintenance.

- **Requirement OM-06.2b**
1 point. Leverage Tracking Mechanisms
Leverage tracking mechanisms (such as databases, forms, or lists).
- **Requirement OM-06.2c**
1 point. Identify Training Needs
Identify periodic training needed for necessary maintenance and operations staff.
- **Requirement OM-06.2d**
1 point. Provide Reports
Provide periodic reports verifying the commitments have been fulfilled.
- **Requirement OM-06.2e**
1 point. Establish Quantifiable Performance Metrics
Establish quantifiable performance metrics for the environmental commitment tracking system. These can either be assigned to individual roadways and bridges or the aggregated network.

Requirement OM-06.3

2 points. Require Use of ECTS

The agency has official policies and procedures in place that require use of the ECTS by project development, construction, and maintenance and operations staff.

Requirement OM-06.4

2 points. GIS-based ECTS

The agency has an ECTS that is geographic information system (GIS)-based and on a platform consistent with the agency's planning, asset management, and maintenance systems, if applicable.

Requirement OM-06.5

2 or 4 points. Measure Progress and Monitor Performance

To earn credit for this scoring requirement, the agency must have a CISP as described in scoring requirement OM-06.1. Use established quantifiable performance metrics for the environmental commitment tracking system (assigned to individual roadways and bridges or the aggregated network) to evaluate the overall performance of the environmental commitment tracking program.

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-06.5a**
2 points. Set Goals
Set goals for compliance with environmental commitments and set a time frame in which these goals should be achieved.
- **Requirement OM-06.5b**
2 additional points. Measure Performance and Demonstrate Sustainable Outcomes
Use the environmental commitment tracking system that was set up to measure performance and track progress toward these goals for at least one year. Show that progress has been made toward the stated goals.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Copies of the databases, forms, lists, and hold points used for environmental commitment tracking.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.

OM-07: Pavement Management System

1-15 points

Goal: Leverage a pavement management system to balance activities that extend the life and function of pavements with impacts to the human and natural environment.

Sustainability Linkage

Maintaining and using a pavement management system supports the environmental and economic principles by optimizing the management of pavements, including preservation, restoration, and replacement, to maximize their lifetime. This reduces costs, the environmental impacts of construction, and raw material usage.



Background and Scoring Requirements

Scoring Requirements

Requirement OM-07.1

1 point. Develop a Pavement Management System and Collect Data

The agency has a Pavement Management System (PMS). An effective PMS is a systematic process that provides information for use in implementing cost-effective pavement reconstruction, rehabilitation, and preventative maintenance programs, and results in pavements designed to accommodate current and forecasted traffic in a safe, durable, and cost-effective manner. The PMS should be based on the *AASHTO Pavement Management Guide*, which can be purchased at https://bookstore.transportation.org/Item_details.aspx?id=2024 and should include:

- An inventory;
- A condition assessment;
- Determination of needs;
- Prioritization of projects needing maintenance and rehabilitation;
- A method to determine the impact of funding decisions; and
- A feedback process.

Note, the first three functions are requirements of Statement 34 of the Governmental Accounting Standards Board (GASB 34) which can be found at <http://www.gasb.org/cs/BlobServer?blobkey=id&blobwhere=1175824063624&blobheader=application%2Fpdf&blobcol=urldata&blobtable=MungoBlobs>. This information must be stored in a retrievable format and made available to the agency's PMS user.

One of the following scores applies:

0 points. The agency does not have a PMS that includes all six functions shown above.

1 point. The agency has a PMS that includes all six of the functions noted above and collects system-wide data.

Requirement OM-07.2

1-3 points. Track Pavement Network Performance

Points are assigned for tracking pavement network performance. Scoring is based on the following, cumulative elements.

- **Requirement OM-07.2a**

1 point. Track Using Common Metrics

Track overall network condition using common metrics. At least one of the following common metrics should be used as a minimum: roughness (any commonly accepted measure is acceptable), cracking (or structural condition), rutting and faulting (for concrete pavements). The network condition should also state or show the fraction of the overall network the agency categorizes as “acceptable” and “deficient.” The specific definitions of these terms are left to the agency but they must be clearly identified in the PMS documentation.

- **Requirement OM-07.2b**

2 points. Measure Project Timeliness

Have measures related to project timeliness of rehabilitation, preservation, and maintenance activities. For example, an agency may identify projects and activities to be completed within 3 years that they can later assess to evaluate the timeliness of their actual implementation.

Requirement OM-07.3

2 points. Set Goals and Monitor Progress

Set pavement system performance goals and monitor progress toward goals.

One of the following scores applies:

0 points. Do not set quantifiable goals relating to both condition and timeliness as noted above; or set quantifiable goals relating to both condition and timeliness but do not monitor, or have not monitored progress towards goals for at least one year after goal establishment.

2 points: Set quantifiable goals relating to both condition and project timeliness as noted above, including when these goals are to be achieved, and monitor progress towards goals for at least one year after goal establishment.

Requirement OM-07.4

1-7 points. Leverage Data to Demonstrate Sustainable Outcomes

To earn credit for this scoring requirement, the agency must have a Pavement Management System as described in scoring requirement OM-07.1. Scoring is based on the following, cumulative elements.

- **Requirement OM-07.4a**

2 points. Leverage PMS Data to Prioritize Projects

Prioritize projects based on system modeling, scenario analyses, trade-off analyses, and system optimization rather than a “worst-first” approach.

- **Requirement OM-07.4b**

2 points. Leverage LCCA to Predict Costs

Leverage life-cycle cost analysis (LCCA) techniques to predict costs and to perform short- and long-term budget forecasting.

- **Requirement OM-07.4c**

1 point. Include Pavement Preservation in Annual Plan

Include routine pavement preservation needs in the annual UPWP or STIP/TIP that are based on the condition and timeliness goals set above.

- **Requirement OM-07.4d**

- 2 points. Link Pavement Repair, Preservation and Maintenance to Projects**

- Leverage a PMS to link pavement repair, preservation, and maintenance projects to adjacent capital projects.

Requirement OM-07.5

1 or 2 points. Sustainable Specifications

To earn credit for this scoring requirement, the agency must have a Pavement Management System as described in scoring requirement OM-07.1. In addition to having and using a PMS, consider sustainable pavement solutions, including warm mix asphalt, long life pavement, recycled asphalt pavement, and others.

One of the following scores applies:

0 points. The agency is testing sustainable pavement solutions.

1 point. The agency has special provisions specific to at least one sustainable pavement solution that allow the use of this solution.

2 points. The agency has standard specifications and/or special provisions specific to at least one sustainable pavement solution and requires the consideration of sustainable pavements as a first solution.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Existence and use of a PMS.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Documentation of PMS goals including quantifiable objectives and timeframes.
4. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.
5. Standard specifications or special provisions.

OM-08: Bridge Management System

1-15 points

Goal: Leverage a bridge management system (BMS) to balance activities that extend the life and function of bridges with impacts to the human and natural environment.

Sustainability Linkage

Maintaining and using a bridge management system supports the environmental and economic principles by optimizing the management of bridge structures, including preservation, restoration, and replacement, to maximize their lifetimes. This reduces costs, the environmental impacts of construction, and raw material usage.



Background and Scoring Requirements

Background

Bridge preservation is defined as actions or strategies that prevent, delay, or reduce deterioration of bridges or bridge elements, restore the function of existing bridges, keep bridges in good condition, and extend their life. Preservation actions may be preventive or condition-driven.

Scoring Requirements

Requirement OM-08.1

1 or 2 points. Develop a Bridge Management System and Collect Data

An effective BMS for bridges on and off Federal-aid highways that should be based on the *AASHTO Guidelines for Bridge Management Systems* which can be purchased at https://bookstore.transportation.org/item_details.aspx?id=343. It supplies analyses and summaries of data, uses mathematical models to make forecasts and recommendations, and provides the means by which alternative policies and programs may be efficiently considered. An effective BMS should include, as a minimum, formal procedures for:

- Collecting, processing, and updating data;
- Predicting deterioration;
- Identifying alternative actions;
- Predicting costs;
- Determining optimal policies;
- Performing short- and long-term budget forecasting; and
- Recommending programs and schedules for implementation within policy and budget constraints.

One of the following scores applies:

- **0 points.** The agency does not have a BMS or has a BMS but does not collect data.
- **1 point.** The agency has a BMS that includes at least five of the seven procedures noted above and collects system-wide data.
- **2 points.** The agency has a BMS that includes at all seven of the procedures noted above and collects system-wide data.

Requirement OM-08.2

1-4 points. Track Bridge Network Performance

Points are assigned for tracking bridge network performance. Scoring is based on the following, cumulative elements.

- **Requirement OM-08.2a**

1 point. Track Overall Bridge Network Condition Using Common Metrics

Track overall bridge network condition using common metrics. Create a database of structural health for each bridge managed by the agency. Rate the superstructure, substructure, and deck of each bridge on the ten-point scale defined for reporting to the National Bridge Inventory, or gather more quantified data using an element level inspection approach.

- **Requirement OM-08.2b**

1 point. Operational limits.

Report any bridges that are in service with posted weight limits or have functional limitations.

- **Requirement OM-08.2c**

2 points. Project timeliness.

Have measures related to project timeliness of rehabilitation, preservation, and maintenance activities. For example, an agency may identify projects and activities to be completed within 3 years that they can later assess to evaluate the timeliness of their actual implementation.

Requirement OM-08.3

1 or 2 points. Set Goals and Monitor Progress

Set bridge system performance goals and monitor progress toward goals.

One of the following scores applies:

- **0 points.** Set quantifiable goals relating to less than two of the three metrics listed above for agency bridges; or set quantifiable goals relating to at least two of the three metrics listed above for agency bridges but do not monitor or have not monitored progress towards goals for at least one year after goal establishment.
- **1 point:** Set quantifiable goals relating to at least two of the three metrics listed above for agency bridges, including when these goals are to be achieved, and monitor progress towards goals for at least one year after goal establishment.
- **2 points.** Set quantifiable goals relating to all three of the metrics listed above for agency bridges, including when these goals are to be achieved, and monitor progress towards goals for at least one year after goal establishment.

Requirement OM-08.4

1-7 points. Leverage Data to Demonstrate Sustainable Outcomes

To earn credit for this scoring requirement, the agency must have a Bridge Management System as described in scoring requirement OM-08.1. Scoring is based on the following, cumulative elements:

- **Requirement OM-08.4a**

2 points. Use BMS to Perform Sophisticated Modeling

Use BMS to perform sophisticated modeling, including forecasting, scenario analyses, trade-off analyses, and system optimization.

- **Requirement OM-08.4b**

2 points. Leverage LCCA to Predict Costs

Leverage life-cycle cost analysis (LCCA) techniques to predict costs and to perform short- and long-term budget forecasting.

- **Requirement OM-08.4c**

1 point. Include Preservation in Annual Plan

Include routine bridge preservation needs in the annual UPWP or STIP/TIP that are based on the condition and timeliness goals set above.

- **Requirement OM-08.4d**

2 points. Link Repair, Preservation and Maintenance to Projects

Leverage BMS to link bridge repair, preservation, and maintenance projects to adjacent capital projects.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Existence and use of a BMS.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Documentation of BMS goals including quantifiable objectives and timeframes.
4. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.
5. Standard specifications or special provisions.

OM-09: Maintenance Management System

1-15 points

Goal: Leverage a Maintenance Management System (MMS) to inventory, assess, analyze, plan, program, implement, and monitor maintenance activities to effectively and efficiently extend the life of the system, improve the service, and reduce the impacts to the human and natural environment.



Affected Triple Bottom Line Principles

Sustainability Linkage

Utilizing an MMS supports all of the triple bottom line principles by facilitating efficient and cost-effective decision-making, better leveraging funds, improving system quality and customer satisfaction, and more effectively maintaining assets, which reduces cost and the environmental impacts of construction and raw material use.

Background and Scoring Requirements

Background

An MMS is a computerized database that is designed to integrate an agency's asset management and maintenance management systems in order to optimize the management of maintenance. The MMS provides managers with processes, tools, and data necessary to make decisions in order to help maintenance staff do their jobs more effectively and to help management make informed decisions.

This criterion is largely based on AASHTO's *Guidelines for Maintenance Management Systems* (GMMS), which can be purchased at https://bookstore.transportation.org/item_details.aspx?id=413. The following definitions from the GMMS apply:

- "Maintenance Management" – refers to all of the actions that managers undertake in their daily responsibilities of overseeing the maintenance program.
- "Maintenance Management System" – the set of tools, technologies, and processes that help the manager make better decisions and manage more effectively.

Scoring Requirements

Requirement OM-09.1

1 or 2 points. Integrate Key Elements of MMS

The agency has an MMS that includes, at a minimum, modules for:

- Planning, including asset inventory, maintenance activity guidelines, customer input, performance targets, and condition assessment.
- Programming and Budgeting, including performance-based budget analysis, annual work program, and annual budget.
- Resource Management, including resource needs analysis, staffing allocations, equipment management, and private contracting.
- Scheduling, including work needs identification, customer service program, and short-term work scheduling.

- Monitoring and Evaluation, including performance measures, work reporting, and management analysis.
- Maintenance Support and Administration, including permit processing and tracking, Adopt-a-Highway program, risk management, and stockpile management.

One of the following scores applies:

- **0 points.** The agency does not have an MMS or has an MMS that has less than three of the modules listed above.
- **1 point.** The agency has an MMS that has three or four of the modules listed above.
- **2 points.** The agency has an MMS that has five or six of the modules listed above.

Requirement OM-09.2

2 points. Integrate Vehicle-Based Technology

Leverage vehicle-based technologies, such as GPS, weather information systems, etc., to connect to MMS and provide input information, such as end of shift reports. Also leverage MMS outputs to vehicles to assist with efficient and effective maintenance operations.

Requirement OM-09.3

1-5 points. Integrated Maintenance Management System

The agency has an MMS that integrates, at a minimum, a Pavement Management System (PMS, see OM-07), a Bridge Management System (BMS, see OM-08), Road Maintenance Plan (RMP, see OM-10), and a Traffic Control Maintenance Plan (TCMP, see OM-11).

Points will be assigned for integration of specific features listed below (see GMMS for more definition). Scoring is based on the following, cumulative elements:

- **Requirement OM-09.3a**
1 point. Roadway Inventory Systems
- **Requirement OM-09.3b**
1 point. Financial Management Systems
- **Requirement OM-09.3c**
1 point. Construction/Project Management Systems
- **Requirement OM-09.3d**
1 point. Equipment Management Systems
- **Requirement OM-09.3e**
1 point. Environmental Commitment Tracking System (see OM-02)

Requirement OM-09.4

3 points. Leverage MMS to Define Projects

The MMS ties into the agency's PMS and BMS and exchanges information. That information is used to link pavement/bridge repair, preservation, and maintenance projects to adjacent maintenance needs (e.g., updating traffic safety devices and signage within the same project limits).

Requirement OM-09.5

2-3 points. Maintenance Quality Assurance

Maintenance Quality Assurance (MQA) is a process that uses quantitative quality indicators to assess the performance of maintenance programs. These programs are outcome-based and provide statistically valid, reliable, and repeatable measures of asset conditions.

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-09.5a**

2 points. MQA Relates Maintenance to Performance

The agency has a MQA program that relates highway maintenance to highway performance.

- **Requirement OM-09.5a**

1 additional point. MQA Used to Understand Relationship between Costs and Outcomes

The MQA program is being used to help managers to understand maintenance conditions, set priorities, and document the relationship between costs and outcomes.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Existence and use of a MMS.
2. Documentation of features and elements of the MMS.
3. Documentation of MQA processes and procedures.

OM-10: Highway Infrastructure Preservation and Maintenance

1-15 points

Goal: Make paved roadway surfaces, bridges, tunnels, roadsides, and their appurtenance facilities last longer and perform better by undertaking preservation and routine maintenance on them.

Sustainability Linkage

Infrastructure preservation and maintenance activities support all of the triple bottom line principles by better leveraging funds, improving system quality and customer satisfaction, and more effectively maintaining assets, which reduces cost and the environmental.



Background and Scoring Requirements

Background

Preservation and maintenance activities for pavements, bridges, and their appurtenant facilities should be generated from a Pavement Management System (PMS, see OM-07) and a Bridge Management System (BMS, see OM-08), in conjunction with a Maintenance Management System (MMS, OM-09), if these systems exist within an organization.

The organization and operation of preservation and maintenance functions within different agencies are unique. As a result, for example, the Road Maintenance Plan (RMP) discussed in this criterion or the Traffic Control Maintenance Plan (TCMP) discussed in OM-11 may be multiple documents that cover different assets, functions, or geographies. For the purposes of this tool, the user should score the RMP, including all relevant documents necessary to cover the assets and functions discussed in each criterion and scoring requirement.

Scoring Requirements

Requirement OM-10.1

1-4 points. Develop a Road Maintenance Plan

Develop and implement an RMP that covers highway infrastructure systems and includes the four core assets listed below and their appurtenant facilities. The RMP refers to document(s) that address, at a minimum, responsible parties/organizations, inventory of assets, standards, schedule, methods/standard operating procedure (SOP) to be used, and funding sources. The RMP should include preservation and maintenance (including repair, cleaning, and litter control) activities for the following infrastructure systems.

Core assets that must be included:

- Pavements
- Bridges
- Tunnels
- Stormwater system
- Appurtenant facilities to the assets listed above

Additional assets that may be included:

- Shoulders and sidewalks
- Slopes, rock-fall, and slope protection
- Vegetation
- Appurtenant facilities to the assets listed above

One of the following scores applies:

- **0 points.** The agency does not have an RMP that covers the four core systems listed above.
- **1 point.** The agency has an RMP consisting of multiple documents that covers the core assets only.
- **2 points.** The agency has an RMP consisting of multiple documents that covers the core assets and at least two additional assets noted above, or the agency has a consolidated RMP that covers the core assets only.
- **3 points.** The agency has an RMP consisting of multiple documents that covers the core assets and all of the additional assets noted above, or the agency has a consolidated RMP that covers the core assets and at least two of the additional assets noted above.
- **4 points.** The agency has a consolidated RMP that covers the core assets and all of the additional assets noted above.

Requirement OM-10.2

2 or 4 points. Establish Metrics and Measure Performance

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-10.2a**

2 points. Establish Quantifiable Metrics

Establish quantifiable performance metrics for the RMP. Separate metrics may be established for the above categories of infrastructure assets. These can be assigned to individual roadways or the aggregated network. Measures could be based on condition of infrastructure, functionality of drainage systems, effluent water quality, presence of noxious weeds or obstructive vegetation, and other relevant parameters. Measures could be qualitative and/or quantitative.

- **Requirement OM-10.2b**

2 additional points. Use Metrics to Evaluate Performance

Use these to evaluate the overall performance of the roadside infrastructure maintenance plan/SOP on an annual basis.

Requirement OM-10.3

1 or 3 points. Set Goals and Monitor Progress

To earn credit for this scoring requirement, the agency must have a Road Maintenance Plan as described in scoring requirement OM-10.1. Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-10.3a**

1 point, Set Quantifiable Goals

Set quantifiable goals relating to the metrics above for agency infrastructure assets, including when these goals are to be achieved. For example, an agency might set a goal that all drainage structures are to be cleaned annually.

- **Requirement OM-10.3b**

2 additional points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

Requirement OM-10.4

2 or 4 points. Sustainable Maintenance and Operations

Scoring is based on the following, cumulative elements.

- **Requirement OM-10.4a**

2 points. RMP Highlights Activities that Contribute to Sustainability during Maintenance & Operations

The RMP specifically addresses sustainability and highlights procedures, specifications, and activities that contribute to sustainability during preservation and maintenance activities. For example, non-idling procedures could be included in standard operating procedures for maintenance crews.

- **Requirement OM-10.4b**

2 points. RMP Includes Activities that Contribute to Sustainability of Infrastructure Assets

The RMP specifically addresses sustainability and includes procedures, specifications, or measures that contribute to the sustainability of infrastructure assets. For example, a standard operating procedure could require that drainage grates within pedestrian/bicycling limits and with existing openings parallel to the traveled way be replaced with reticulate grates that will not catch wheelchair or bicycle tires.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A list of each item that addresses responsible parties, schedule, methods, standard operating procedure (SOP), and funding sources.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Document goals for the maintenance plan, including quantifiable objectives and timeframes. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.

OM-11: Traffic Control Infrastructure Maintenance

1-15 points

Goal: Increase safety and operational efficiency by maintaining roadway traffic controls.

Sustainability Linkage

Infrastructure preservation and maintenance activities supports all of the triple bottom line principles by better leveraging funds, improving system quality and customer satisfaction, and more effectively maintaining assets, which reduces cost and the environmental impacts of construction and raw material use.



Background and Scoring Requirements

Background

This criterion covers the preservation and maintenance of permanent traffic control, Intelligent Transportation System (ITS), and safety devices. Two related criteria include OM-14: Work Zone Traffic Control, which includes temporary traffic control, ITS, and safety devices, and OM-13: Transportation Management and Operations, which covers the operation of permanent traffic control and ITS systems.

Preservation and maintenance activities for traffic control infrastructure should be generated in conjunction with a Maintenance Management System (OM-09), if one exists within an organization.

The organization and operation of preservation and maintenance functions within different agencies are unique. As a result, the Traffic Control Maintenance Plan (TCMP) may actually be multiple documents that cover different assets, functions, or geographies. For the purposes of this tool, the user should score the TCMP including all relevant documents necessary to cover the assets and functions discussed in each criterion.

Scoring Requirements

Requirement OM-11.1

1 or 2 points. Develop a Traffic Control Maintenance Plan

The agency shall have and implement a comprehensive TCMP. This plan must address, at a minimum, responsible parties/organizations, standards, schedule, methods to be used, and funding sources for the following items:

- Pavement marking maintenance and repair: Restriping activities;
- Sign maintenance and repair: Reflectivity assessment, sign replacement, signpost repair;
- Safety device (e.g., guardrail, traffic attenuators, delineators, etc.) maintenance and repair;
- Traffic signal maintenance and repair;
- Roadway lighting maintenance and repair: Electrical service, bulb replacement; and
- Intelligent transportation system (ITS) maintenance and repair.

One of the following scores applies:

- **0 points.** The agency does not have a TCMP that covers the items listed above.
- **1 point.** The agency has a TCMP consisting of multiple documents that covers all of the relevant items listed above or the agency has a consolidated TCMP that covers at least four of the six items listed above.
- **2 points.** The agency has a consolidated TCMP that covers all of the relevant items listed above.

Requirement OM-11.2

2 or 4 points. Establish Metrics and Measure Performance

To earn credit for this scoring requirement, the agency must have a Road Weather Management Plan as described in scoring requirement OM-12.1. Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-11.2a**

2 points. Establish Quantifiable Metrics

Establish quantifiable performance metrics for the TCMP. These can be based on evaluation of individual roadways or the aggregated network, and should be based on level-of-service, readability of signage, adequacy of lighting, presence of deficient traffic control devices, timeliness of maintenance activities, and other relevant parameters.

- **Requirement OM-11.2b**

2 additional points. Use Metrics to Evaluate Performance

Use these to evaluate the overall performance of the TCMP.

Requirement OM-11.3

1 or 3 points. Set Goals and Monitor Progress

To earn credit for this scoring requirement, the agency must have a Traffic Control Maintenance Plan as described in scoring requirement OM-11.1. Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-11.3a**

1 point. Set Quantifiable Goals

Set quantifiable goals relating to the metrics above for agency traffic control devices, including when these goals are to be achieved. For example, an agency might set a goal that all painted centerline stripes are to be repainted bi-annually.

- **Requirement OM-11.3b**

2 additional points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

Requirement OM-11.4

3 or 6 points. Sustainable Maintenance and Operations

Scoring is based on the following, cumulative elements.

- **Requirement OM-11.4a**

3 points. TCMP Highlights Activities that Contribute to Sustainability during Maintenance & Operations

The TCMP specifically addresses sustainability and highlights procedures, specifications, and activities that contribute to sustainability during preservation and maintenance activities. For example, non-idling procedures could be included in standard operating procedures for maintenance crews.

- **Requirement OM-11.4b**

3 points. TCMP Includes Activities that Contribute to Sustainability of Infrastructure Assets

The TCMP specifically addresses sustainability and **includes** procedures, specifications, or measures that contribute to the sustainability of infrastructure assets. For example, a standard operating procedure could require that HPS luminaires to be replaced shall be upgraded to more efficient lamps (e.g., LED).

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A list of each item that addresses responsible parties, schedule, methods, and funding sources.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Documentation of the goals of the maintenance plan, including quantifiable objectives and timeframes.
4. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.

OM-12: Road Weather Management Program

1-15 points

Goal: Plan, implement, and monitor road weather management (including snow and ice control) program to reduce environmental impacts with continued or better level of service.

Sustainability Linkage

Implementing an effective and efficient road weather management program supports all of the triple bottom line principles by improving safety, increasing mobility, reducing delay and traffic interruptions, increasing productivity of the labor force, and reducing impacts of materials used for management on the human and natural environments.



Background and Scoring Requirements

Background

Intelligent Transportation Systems (ITS)-related solutions are included in OM-13: Transportation Management and Operations and are not duplicated here.

Scoring Requirements

Requirement OM-12.1

2 points. Develop a Road Weather Management Program

A Road Weather Management Program (RWMP) includes strategies that can be used to mitigate the impacts of rain, snow, ice, fog, high winds, flooding, tornadoes, hurricanes, avalanches, and other inclement weather impact on traffic. The RWMP will vary in size and scope depending on the needs of the agency. It could be a combination of multiple documents that cover management of different conditions or different regions, or could be a single, consolidated document. For the purposes of evaluating this criterion, the agency should consider all applicable materials and respond according per the majority of their practices.

Requirement OM-12.2

2-3 points. Set Goals and Monitor Progress

To earn credit for this scoring requirement, the agency must have a Road Weather Management Plan as described in scoring requirement OM-12.1. Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-12.2a**

2 points. Establish Quantifiable Metrics

Establish quantifiable performance metrics for the RWMP program. Measures could be based on level of service, amount of materials used per event, and other relevant parameters. Measures could be qualitative and/or quantitative.

- **Requirement OM-12.2b**

1 additional point. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

Requirement OM-12.3

1-3 points. Implement a Road Weather Information Systems

Roadway Weather Information Systems (RWIS) are a way to monitor pavement and weather conditions in real-time using sensors to measure atmospheric, pavement, and/or water level conditions. Atmospheric data include air temperature and humidity, visibility distance, wind speed and direction, precipitation type and rate, tornado or waterspout occurrence, lightning, storm cell location and track, as well as air quality. Pavement data include pavement temperature, pavement freezing point, pavement condition (e.g., wet, icy, flooded), pavement chemical concentration, and subsurface conditions (e.g., soil temperature). Water level data include tide levels (e.g., hurricane storm surge) as well as stream, river, and lake levels near roads. This data allows the operator to make the best decisions about how to respond, for example, when to apply chemicals, how much to apply, and what type of chemical to apply, thereby reducing the amount of salt and chemical applied and increasing its effectiveness.

The agency implements a RWIS which measures the weather and road conditions using sensors on the side of the road to track weather and road conditions to plan and implement the appropriate treatment actions. The RWIS should provide timely information on prevailing and predicted conditions to both transportation managers and motorists (e.g., posting fog warnings on Changeable Message Signs and listing flooded routes on web sites).

One of the following scores applies:

- **0 points.** The agency does not have an RWIS.
- **1 point.** The agency is testing an RWIS in only a few locations.
- **2 points.** The agency implements a RWIS in select areas identified, but has not implemented a system agency-wide.
- **3 points.** The agency implements a RWIS agency-wide in most or all areas identified vulnerable to weather conditions (e.g., mountain passes, high wind areas, bridges, etc.)

Requirement OM-12.4

1-2 points. Implement the Standards of Practice or Standard Operating Procedure (SOP) for Snow and Ice Control

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-12.4a**

1 point. Include Snow and Ice Control in RWMP

Have an RWMP that includes, at a minimum, the following elements specific to snow and ice control:

- Reducing salt use in environmentally sensitive areas
- Existence of an anti-icing program
- Conducting periodical training program for proper use of salt and chemicals
- Best Management Practice (BMP) for chemical storage facilities
- Proper storage of chemical and chemical-abrasive stockpiles
- Proper calibration of equipment
- Reducing cost and improving fuel efficiency by planning and optimizing routes

- **Requirement OM-12.4b**

1 additional point. Include Performance Standards to Demonstrate Sustainability

The agency's program includes performance standards that take into account sustainability, and demonstrate a reduction in materials and truck fuel usage.

Requirement OM-12.5

2 points. Implement Materials Management Plan

Successful implementation of a Materials Management Plan to monitor quantities of salt applied and level of service (e.g., interstates bare and dry 1 hour after event) during and after an event; includes salt, chemicals (de-icing agents), sand, etc.

Requirement OM-12.6

1-3 points. Implement a Maintenance Decision Support System

Develop a Maintenance Decision Support System (MDSS) to improve the effectiveness and efficiency of roadway weather treatments and implement best practices. The MDSS can be based on weather report monitoring or based on RWIS sensing technologies installed roadside or mounted on maintenance vehicles to measure and monitor the road conditions.

One of the following scores applies:

- **0 points.** The agency does not have an MDSS.
- **1 point.** The agency has MDSS processes that are not based on roadside or vehicle mounted sensing technologies.
- **2 points.** The agency has MDSS processes that are based on either roadside or vehicle mounted sensing technologies.
- **3 points.** The agency has MDSS processes that are based on both roadside and vehicle mounted sensing technologies.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Road Weather Management Program, and related plans and programs.
2. Materials Management Plan, MDSS, and documentation of RWIS for the jurisdiction (state, county, city). A qualified plan should include quantitative goals for reductions in chloride and other chemical applications, reduction of plow truck mileage, and a description of the tools and hardware used to monitor and operate the snow and ice control activities. A qualifying plan shall outline specific strategies to be implemented by specific agencies or stakeholders to achieve the plan.
3. Annual reports of plan progress, including data supporting goal performance and actions taken during the previous period. Minutes of monthly or quarterly meetings of interagency stakeholders to demonstrate active efforts to implement the plan.

OM-13: Transportation Management and Operations

1-15 points

Goal: Maximize the utility of the existing roadway network through use of technology and management of operations.

Sustainability Linkage

Transportation management and operations support all of the triple bottom line principles. More efficient operations of the roadway network will result in a reduction of fossil fuel usage and related emissions; a reduction in the number and severity of crashes and therefore private and public property loss, injury, and loss of life; and a reduction in the resources and related costs needed to expand capacity of the network.



Background and Scoring Requirements

Background

This criterion covers the operation of permanent traffic control and ITS systems. Three related criteria include: OM-11: Traffic Control Infrastructure Maintenance, which covers the preservation and maintenance of permanent traffic control, ITS, and safety devices; OM-12: Road Weather Management Program; and OM-14: Work Zone Traffic Control, which includes temporary traffic control, ITS, and safety devices.

The intent of this criterion is to encourage active management of vehicles within the existing roadway infrastructure to alleviate the major causes of congestion, including insufficient capacity (bottlenecks), substandard transportation operations systems (such as traffic signal systems with poor signal timing), incidents (crashes, disabled vehicles), weather (snow, ice, fog), work zones, and non-recurring events (special events).

Scoring Requirements

The plans and applications included in the following scoring requirements will vary in size and scope depending on the needs of the agency. They could be a combination of multiple documents that cover management of different conditions or regions, or could be a single, consolidated document. For the purposes of evaluating this criterion, the agency should consider all applicable materials in aggregate and respond according per the majority of their practices unless further direction is provided.

Additionally, implementation of applications may vary from test projects, to geographic improvements, to statewide implementation both as applicable/relevant and as the agency is rolling-out or testing specific technologies. For the purposes of evaluating this criterion, the agency should consider whether the technologies are implemented in a majority of the relevant areas and respond accordingly unless further direction is provided.

Requirement OM-13.1

3 points. Conduct Enhanced or Expedited Compliance

The agency takes steps or measures beyond (or faster than) what is required under existing operations regulations and certifications to improve mobility and user level of service. Existing regulations and certifications include Congestion Management Process, work zone rules, Real Time Traveler Information, and the Manual on Uniform Traffic Control Devices. Examples of measures that “enhance” compliance include procedures for work zone

impact assessments, which are encouraged but not required under regulation. Enhancements might also include the development of public information and outreach strategies.

Requirement OM-13.2

1-6 points. Include Operation-Based Programs and Develop Performance Measures

The agency has in place programs and plans for system-wide improvements to the mobility and safety of the roadway network. Implement strategies and technologies to increase user level of service, roadway capacity, and while decreasing collisions and their effects on mobility. These can include use of incident response teams, provision of communication services, and inclusion of system-wide ITS. These can also include programs for small investments focused on relieving bottlenecks, programs for coordinating signals and enhancing signal timing efficiency, programs to coordinate work zones within metropolitan areas, traffic smoothing techniques (ramp meters or variable speed facilities), managed lanes, and variable/managed use of pavement by time of day (reversible lanes, use of shoulders, etc). Information about common ITS practices can be accessed from the National ITS program (<http://www.iteris.com/itsarch/index.htm>) and the Federal Highway Administration's (FHWA) Research and Innovative Technology Administration (RITA) Intelligent Transportation Systems Joint Program Office (<http://www.its.dot.gov>). Table OM-13.1 shows standard ITS technologies available for this criterion.

Install one or more allowable system-wide applications for the categories in Table OM-13.2.A. Points are awarded based on how many categories are installed system-wide (in areas identified as relevant to application). Multiple applications in one category do not achieve additional points. Points for installing applications from multiple categories are cumulative; however, this criterion shall not exceed a total of six points.

TABLE OM-13.2.A ITS TECHNOLOGIES (CONTINUED ON NEXT PAGE)

Requirement	Points	Category	Allowable Applications (Install 1 or More per Category)
OM-13.2a	1	Traffic Management	Statewide traffic operation Center coordinated traffic signal systems Local agency traffic management centers Traffic surveillance systems Traffic signal control systems Adaptive signal control systems Advanced signal systems Coordinated signal operations (inter-jurisdictional) Specialized signal heads Traffic control Lane management applications Special event transportation management systems Automated systems enforcing speed limits Traffic incident management
OM-13.2b	1	Traveler Information	Pre-trip information (Internet web sites, 511, other telephone, radio/ TV, or kiosks) Enroute information Traveler Services Information

Requirement	Points	Category	Allowable Applications (Install 1 or More per Category)
OM-13.2c	1	Transit Management	Transit ITS and central operations Transit trip planner Transit signal priority Automatic vehicle location (AVL) Computer-aided dispatch (CAD) systems Operations and fleet management Advanced traveler information systems (ATIS) Integrated corridor management (ICM)
OM-13.2d	1	Electronic Payment and Pricing	Electronic toll collection (ETC) systems Multi-use payment systems Congestion pricing
OM-13.2e	1	Information Management	Archived data management systems Transportation management centers Information dissemination (portable dynamic message signs (DMS)), Highway advisory radio (HAR)
OM-13.2f	1	Road Weather Management	Road weather surveillance, monitoring, and prediction Advisory strategies (e.g., road weather information dissemination) Control strategies (e.g., traffic control based on adverse weather) Treatment strategies (e.g., winter maintenance)
OM-13.2g	1	Incident Management	Signal timing changes Detours and alternate routes 511 messaging Information dissemination (portable dynamic message signs)
OM-13.2h	1	Communication linkages	Center-to center (C2C) Communications
OM-13.2i	1	Commercial Vehicle Operations	Commercial vehicle information systems and networks (CVISN) <ul style="list-style-type: none"> • Credentials administration • Safety assurance • Electronic screening • Carrier operations and fleet management • Security operations • Weigh-in-motion stations

Requirement	Points	Category	Allowable Applications (Install 1 or More per Category)
OM-13.2j	1	Emergency Management	Emergency medical services Hazardous materials management Advanced automated collision notification (ACN) Telemedicine Response and recovery Emergency traveler information Early warning system Coordinated emergency response Collision notification systems
OM-13.2k	1	Advanced Vehicle Safety Systems	Road geometry warning Intersection collision warning systems Animal Warning Collision Avoidance systems (CICAS) Forward collision warning systems (FCW) Road departure warning (RDCW) Lane departure warning (LDW)
OM-13.2l	1	Maintenance and Construction Management	Work zone management Winter maintenance

Requirement OM-13.3

3 points. Integrate operations strategies and projects into systems planning and establish performance goals and monitor progress

The agency considers operations strategies and projects early during systems planning and project selection to maximize their potential to improve mobility and to account for the effect of operational strategies in determining infrastructure needs.

Requirement OM-13.4

2-3 points. Set Goals and Monitor Progress

Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-13.4a**

2 points. Establish Safety and Mobility Performance Metrics

Establish at least one safety and one mobility performance metric to evaluate the performance of the operational system that is relevant to the implementation of ITS solutions. Examples include travel times, incident response times, and incident frequency.

- **Requirement OM-13.4b**

1 additional point. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Improvement plan with list of implementable strategies and technologies that are applicable to the system.
2. Well developed (mature) programs in place for signal timing and coordination, work zone coordination, and incident management.
3. Performance metric and report of where the greatest improvements can be made.
4. Plan and project selection documents showing early consideration of operation strategies and projects.
5. List of goals to be achieved and proof of progress toward these goals for the first year, as defined by the performance metric.

OM-14: Work Zone Traffic Control

1-15 points

Goal: Plan, implement, and monitor Work Zone Traffic Control (WZTC) methods that maximize safety of workers and system users with continued or better level of service.

Sustainability Linkage

Work zone traffic control supports all of the triple bottom line principles by improving safety for construction workers and, for system users, reducing crash-related and construction-related congestion, user costs, and incident-related costs.



Background and Scoring Requirements

Background

This criterion covers WZTC related to preservation and maintenance activities undertaken by an agency's staff (or contracted staff) and programmatic WZTC activities. It does not include project-specific WZTC. Two related criteria include OM-11: Traffic Control Infrastructure Maintenance, which covers the preservation and maintenance of permanent traffic control, ITS, and safety devices, and OM-13: Transportation Management and Operations, which covers the operation of permanent traffic control and ITS systems.

The agency must have a program, committee, or task force that reviews and establishes policies regarding WZTC. In addition to ensuring compliance of the FHWA Work Zone Safety and Mobility Rule as required to receive federal funding on projects, the task force agenda includes training, standards, new products, innovative practices, and legislation.

Scoring Requirements

Requirement OM-14.1

1-3 points. Develop a Program

Develop a WZTC program that includes the following elements:

- Have a policy in place to conduct an annual Work Zone Process Review using FHWA's Work Zone Process Review Toolbox at http://ops.fhwa.dot.gov/wz/prtoolbox/pr_toolbox.htm to review how an agency's work zone management is performing on a system-wide basis.
- Examine current work zone trends and issues in work zone safety, and identify current contributing factors that cause injury and fatal work zone crashes.
- Update and adopt new policies and procedures as needed to correct shortcomings in work zone safety policies and to improve level of service in work zones.
- Work with law enforcement to ensure work zone accident reports are accurately reported.
- Organize and provide training both for workers and for use in drivers' education classes.
- Review new technologies and innovations for use in work zones.

- Consider FHWA's WZTC self-assessment tool and best practices, which can be found at http://ops.fhwa.dot.gov/wz/decision_support/self-assess.htm.

One of the following scores applies:

- **0 points.** The agency does not have a WZTC program that covers two or more of the elements listed above.
- **1 point.** The agency has a WZTC program that covers two or three of the elements listed above.
- **2 points.** The agency has a WZTC program that covers four or five of the elements listed above.
- **3 points.** The agency has a WZTC program that covers six or seven of the elements listed above.

Requirement OM-14.2

2 or 4 points. Set Goals and Monitor Progress

To earn credit for this scoring requirement, the agency must have a Work Zone Traffic Control program as described in scoring requirement OM-14.1. Scoring is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **Requirement OM-14.2a**

2 points. Establish Quantifiable Metrics

Establish quantifiable performance metrics for the WZTC program. Measures could be based on level of service, number and severity of accidents, and other relevant parameters. Measures could be qualitative and/or quantitative.

- **Requirement OM-14.2b**

2 additional points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

Requirement OM-14.3

1-2 points. Use Intelligent Transportation Systems (ITS) to Anticipate and Reduce Congestion

In order to obtain credit for this criterion, the agency must routinely maintain signal systems and ITS during construction. Use ITS to anticipate and reduce congestion caused by highway work zones and to warn drivers of an upcoming work zone. This could include the use of portable camera systems, highway advisory radios, variable speed limits, ramp metering, traveler information, merge guidance, queue detection information, and traffic analysis tools (e.g., Quick Zone), and is aimed at increasing safety for both workers and road users.

One of the following scores applies:

- **0 points.** The agency does not use ITS to anticipate and reduce congestion.
- **1 point.** The agency allows and has a few projects using ITS to anticipate and reduce congestion.
- **2 points.** The agency routinely uses ITS to anticipate and reduce congestion.

Requirement OM-14.4

1 point. Apply and Review ITS Technologies and Innovations

Apply and review new ITS technologies and applications for use in work zones, such as:

- Use of safety intrusion alarms in work zones
- Use of CB Wizard to broadcast alert messages to truck drivers
- Drone radar and radar speed advisory devices

Requirement OM-14.5

1-3 points. Leverage Contracting Innovations

Contracting incentives can encourage contractors to reduce and optimize construction time lines and therefore reduce impact to the travelling public and exposure of workers to traffic. Strategies such as Lane Rental, A+B bidding, Interim completion dates, and flexible start dates can be effective strategies for reducing impact to the public.

One of the following scores applies:

- **0 points.** The agency does not use innovative contracting to encourage contractors to reduce and optimize construction time lines.
- **1 point.** The agency has test cases that use innovative contracting to encourage contractors to reduce and optimize construction time lines.
- **2 points.** The agency routinely includes the use of innovative contracting to encourage contractors to reduce and optimize construction time lines in design-build contracts only.
- **3 points.** The agency routinely includes the use of innovative contracting to encourage contractors to reduce and optimize construction time lines in both design-bid-build and design-build contracts.

Requirement OM-14.6

1 point. Coordinate with the Public

Agency uses a public involvement or WZTC representative to communicate regularly with property owners and businesses affected by work. Consideration is given to reduce impacts to businesses through effective and clear WZTC (e.g., driveway open or business open signage).

Requirement OM-14.7

1 point. Promote Public Awareness

Participate in National Work Zone Awareness Week and develop a campaign to promote work zone safety awareness.

Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of the Work Zone Traffic Control program, committee, or task force including its members, goals, actions, and scope.
2. Documentation of policies, procedures, and guidance for the use of ITS in work zone traffic control.
3. Summary of Contracting Innovations and when they are appropriate to use.
4. Documentation of the activities to promote public awareness of work zone safety.

