



INVEST

ECONOMIC • SOCIAL • ENVIRONMENTAL

Version 1.3

Sustainable Highways Self-Evaluation Tool



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INVEST Version 1.3

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Primary Authors and Core Team Members

SCJ Alliance

Lisa Reid, Project Manager

CH2M HILL

Tim Bevan, Principal-in-Charge

Anneke Davis

Tim Neuman

Kathleen Penney

Samuel Seskin

Mariah VanZerr

University of Washington

Jeralée 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 user selected criteria from INVEST 1.2 as of September 2015. It includes System Planning for States (SPS), System Planning for Regions (SPR), 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, 1.2, and 1.3

Development of Version 1.1

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.

The release of Version 1.1 in January 2015 introduced minor edits, formatting changes, and tool enhancements that did not affect scoring of projects or programs. That is, in terms of scoring projects and programs, Version 1.0 = Version 1.1 and no translation was required.

Modifications Included in Version 1.2

With the release of Version 1.2 in September 2015, FHWA completed the responses to comments that required more substantial changes than Version 1.1. Version 1.2 included significant changes to criteria, scorecards, modules, and scoring in INVEST and did significantly affect the scoring of all existing projects and programs. The changes introduced include the following:

Changes to Criteria

- Adding an Innovative Criterion to all modules that users can define to take credit for sustainable innovations and emerging technologies not already included in INVEST.

- Adding five new criteria to the Project Development module, including: Low-Impact Development (separated from Stormwater), Infrastructure Resiliency in Planning and Design, Permeable Pavement, Light Pollution, and Noise Abatement.
- Removing the Contractor Warranty criterion and adding similar concepts to the Long-Life Pavement criterion.
- Modifying existing criteria to clarify scoring, adding new methods of achieving credit, and adding more opportunities to earn partial credit.

Other Changes

- Separating the System Planning module into two modules: System Planning for States (or infrastructure owners), and System Planning for Regions (and MPOs). This allows modifications to the criteria to make each module more applicable to the types of activities that the respective types of organizations perform.
- Adding a Recreational/Scenic scorecard to better represent criteria applicable to projects such as those designed by Federal Lands.
- Linking Case Studies to online criteria write-ups, making the case-studies searchable and adding the ability to share user examples of Innovative Criteria.
- Introducing a new guide to applying INVEST in the real world called *Using INVEST to Accomplish Your Goals*.
- Reorganizing the website and renaming tabs to aid in navigation.
- Launching scoring tool enhancements that include streamlined Program/ Project Registration Fields, new sortable fields in My Workspace, consolidation of actions in My Workspace into graphical icons, display of status and rating of evaluations in My Workspace, improved tools to manage collaborators, scoring status icons and the ability to lock criteria already scored, and an improved process to customize a scorecard.

The website includes a page under ABOUT called [Version 1.2](#) that describes changes made to INVEST in Version 1.2.

Modifications Included in Version 1.3

After 2-1/2 years of continued testing and use of Version 1.2, FHWA launched another set of updates to INVEST including Version 1.3 (this version) and an upcoming update, Version 2.0 (expected early 2019). Version 1.3 includes minor edits, criteria clarifications, and fixes to broken resource hyperlinks. Version 1.3 **does not affect scoring**, and therefore replaces Version 1.2.

Project and Program Scoring in Version 1.3

New Projects and Programs

All new project and program evaluations started will be in Version 1.3 and it is no longer possible to start a new project or program evaluation using Version 1.1 of INVEST.

Existing Projects and Programs

Existing evaluations (prior to the launch of Versions 1.2 and 1.3) remain in Version 1.1 until the user makes the decision to translate them to Version 1.3, which can be done when scoring the project by selecting the option and confirming the user's intent.

Users choosing to leave their existing scorecards in Version 1.1 will be able to continue scoring and will have access to the Version 1.1 scoring tool by selecting to continue scoring the existing project or program. It is anticipated that this

access will be available for several years. Users will be notified when this option is phased out before changes are made.

Translating a Project or Program to Version 1.3

When choosing to translate a project or program to Version 1.3, all relevant scores will be maintained (that is, response to questions that have not changed will remain unchanged). In addition, all notes, collaborators, and uploads will remain. The user will need to rescore items in many of the existing criteria to reflect changes included in Version 1.3 and will need to score new criteria; a matrix describing the changes to each of the criteria and necessary scoring updates is available for download at <http://www.sustainablehighways.com/1811/version-12.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 four modules to self-evaluate the entire lifecycle of transportation services, including System Planning for States or Regions (SPS or SPR), 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 1.3 includes a total of eighty-one criteria organized into these four modules.

1. **System Planning for States (SPS) and System Planning for Regions (SPR)** cover 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 that agencies are eligible for based on their scores on

the first three criteria. There is one scorecard for each of the System Planning modules 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 thirty-three criteria that are generally organized from planning to design to construction. The criteria are further organized into seven scorecards for the evaluation of projects. The scorecards are designed to identify applicable criteria based on the project type and location. Six of these scorecards pre-identify criteria that are most likely to be applicable for the project type and location. The seventh scorecard is a custom scorecard option, which is a dynamic scorecard that allows the user to select criteria:

- 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.
- Scenic and Recreational – for typically rural scenic and recreational projects, such as those developed by Federal Lands.
- Custom - for projects that do not fit any of the pre-defined scorecard options or that want to use the self-defined Innovative Criterion, 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 11 criteria 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 thirty-three PD criteria based on the type project. The custom scorecard includes eleven core criteria plus user-selected criteria to make a custom self-evaluation for projects that don't fit well into the six defined scorecards.

Table 1 - Project Development Criteria by Scorecard

Project Development by Criteria Scorecard							
	Paving	Urban Basic	Urban Extended	Rural Basic	Rural Extended	Scenic and Recreational	Custom Core Criteria ¹
PD-01: Economic Analyses			✓		✓		
PD-02: Life-Cycle Cost Analyses	✓	✓	✓	✓	✓		✓
PD-03: Context Sensitive Project Development		✓	✓	✓	✓	✓	
PD-04: Highway and Traffic Safety	✓	✓	✓	✓	✓	✓	✓
PD-05: Educational Outreach		✓	✓	✓	✓	✓	
PD-06: Tracking Environmental Commitments	✓	✓	✓	✓	✓	✓	✓
PD-07: Habitat Restoration		✓	✓	✓	✓	✓	
PD-08: Stormwater Quality and Flow Control		✓	✓	✓	✓	✓	
PD-09: Ecological Connectivity			✓	✓	✓	✓	
PD-10: Pedestrian Facilities		✓	✓			✓	
PD-11: Bicycle Facilities		✓	✓			✓	
PD-12: Transit and HOV Facilities		✓	✓			✓	
PD-13: Freight Mobility			✓		✓		
PD-14: ITS for System Operations		✓	✓		✓		
PD-15: Historic, Archaeological, and Cultural Preservation		✓	✓	✓	✓	✓	
PD-16: Scenic, Natural, or Recreational Qualities			✓	✓	✓	✓	
PD-17: Energy Efficiency		✓	✓	✓	✓		
PD-18: Site Vegetation, Maintenance and Irrigation		✓	✓	✓	✓	✓	
PD-19: Reduce, Reuse, and Repurpose Materials	✓	✓	✓	✓	✓	✓	✓
PD-20: Recycle Materials	✓	✓	✓	✓	✓	✓	✓
PD-21: Earthwork Balance			✓		✓	✓	
PD-22: Long-Life Pavement	✓	✓	✓	✓	✓	✓	✓
PD-23: Reduced Energy and Emissions in Pavement Materials	✓	✓	✓	✓	✓	✓	✓
PD-24: Permeable Pavement	✓	✓	✓	✓	✓	✓	✓
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	✓	✓	✓	✓	✓	✓	✓
PD-30: Low Impact Development		✓	✓	✓	✓	✓	
PD-31: Infrastructure Resiliency Planning and Design			✓		✓	✓	
PD-32: Light Pollution		✓	✓	✓	✓		
PD-33: Noise Abatement		✓	✓				
Total Number of Criteria in Scorecard	11	27	34	23	29	27	11

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, data is 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 self-assessment scoring tool. The site is organized into the following three primary sections, which are described in more detail below:

- **ABOUT** – Provides background information about INVEST and its goals and benefits
- **LEARN** – Provides a guided tour through the INVEST website to learn about sustainable highways and integrating sustainability best practices into projects and programs.
- **CRITERIA** – 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
- **RESOURCES** – Consolidates resources including a library, case studies and cost narratives, and other links and support documents that provide valuable information for users.

In addition to these primary sections, the website also contains a links to **My Workspace** in the header of each page.

About

The **ABOUT** section provides background information on the following topics:

- **Goals** – INVEST Goals
- **History** – Development and history of INVEST
- **Benefits** – The benefits of using INVEST
- **Version 1.1** – A summary of revisions made in Version 1.1.
- **Version 1.2** – A summary of revisions made in Version 1.2.
- **Version 1.3** – A summary of revisions made in Version 1.3.

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:

- **Sustainability and Highways** –discusses definitions of sustainability, sustainable highways, and why and how to measure sustainability
 - When Does INVEST Measure Sustainability?
 - What is Sustainability?
 - What is a Sustainable Highway?
 - Why Measure Sustainability?
 - How is Sustainability Measured?

- **Getting to Know INVEST** – defines sustainability, the triple bottom line, and the need to measure sustainability were all elements that contributed to the structure and organization of INVEST
 - What is INVEST?
 - How Does INVEST Measure Sustainability?
 - How are the Criteria Organized?
 - How are the Criteria Presented?
 - Are the Criteria Weighted?
- **System Planning** – discusses the basics of the System Planning modules.
 - About the System Planning Module
 - Why and When would I Score a System Planning Program?
 - Who Can Use the System Planning Modules?
 - How Do I Use INVEST to Score a System Planning Program?
 - What Does the System Planning Score Mean?
- **Project Development** – discusses the basics of the Project Development module.
 - About the Project Development Module– discusses the basics of 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?
- **Operations and Maintenance** – discusses the basics of the Operations and Maintenance module.
 - 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?
- **Using INVEST to Accomplish Your Goals** –includes examples of how transportation agencies are using INVEST.
 - Advance Better Business Practices
 - Integrate Sustainability into Projects and Programs
 - Improve Education and Understanding of Sustainability
 - Facilitate Internal and External Communication and Outreach
 - INVESTing Time
 - Relating INVEST to other Sustainability Tools

Criteria

The **CRITERIA** 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.

Score

There are 2 operations under the **SCORE** section, including:

- **My Workspace** – this is where all scoring begins and can also be launched from the top menu bar on any page
- **Translate to Version 1.2** – this is an information page that explains the basics of the translation and how to proceed

Resources

The **RESOURCES** section provides additional information useful to INVEST users, including:

- **INVEST Library** – provides downloadable copies of compendia and printed portions of *Using INVEST to Accomplish Your Goals* from **LEARN**
- **Case Studies and Examples** – provides searchable database of case studies and Innovative Criterion examples
- **Cost Savings** – provides cost narratives that explore building a business case for implementing some practices of the INVEST tool
- **Innovative Criterion** – interface for developing and submitting an Innovative Criterion for use in the Project Development custom scorecard
- **FHWA Sustainability Highways Initiative** – link to FHWA’s website
- **Webinars & Events** – provides current and past INVEST webinar and other event information
- **FAQ** – Frequently Asked Questions
- **Provide Comments** – interface tool for users to submit questions and comments to the INVEST team
- **Privacy** – FHWA’s privacy notice

My Workspace

My Workspace is the primary interface to begin all project and program scoring. From this page you can launch the following services:

- **Scoring Tutorial** – this is an illustrated guide to using the scoring functions
- **Start a New Project or Program** – to create a project or program to score, you begin here to enter the basic information
- **Continue Working on an Existing Project or Program** – contains a sortable list, organized by module of all of your existing project and programs that are being scored, provides basic information about each, and allows you to quick launch the following actions:
 - Edit – editing existing project or program Information, including the scorecard being used
 - Duplicate – to duplicate a project or program
 - Print – to print a copy of the current score
 - Score – launches the scoring tool for the project or program
 - Delete – requires confirmation to delete a project or program
 - Collaborate – allows you to add or remove other users that can help score a project

Criteria

The remainder of this document contains the criteria write-ups for all eighty (80) criteria contained in the System Planning (for States and Regions), Project Development, and Operations & Maintenance modules of INVEST v1.2. However, if users download the compendium from the library, this may contain only the modules selected.

System Planning for States

SPS-01: Integrated Planning: Land Use and Economic Development	SPS-01
SPS-02: Integrated Planning: Natural Environment.....	SPS-02
SPS-03: Integrated Planning: Social	SPS-03
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SPS-05: Access and Affordability	SPS-05
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SPS-12: Financial Sustainability.....	SPS-12
SPS-13: Analysis Methods	SPS-13
SPS-14: Transportation Systems Management & Operations	SPS-04
SPS-15: Linking Asset Management and Planning	SPS-15
SPS-16: Infrastructure Resiliency	SPS-16
SPS-17: Planning and Environmental Linkages	SPS-17

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

State

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 has different regulatory, policy, and institutional frameworks, plans, and goals related to economic development, land use, or the interaction of transportation with economic development or land use. The criterion allows for flexibility in the activities and types of plans agencies use to forward economic development and land use goals. The intent of this criterion is to encourage agencies to integrate sustainability into transportation, land use, and economic development planning.

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

- **“Above and beyond”** means incorporating language in the goals and objectives that is stronger than federal requirements to “consider” the likely effect of transportation policy decisions on land use and development.
- **“Applicable economic development and land use plans”** include any local, metropolitan or statewide plans that address land use and/or economic development within the agency’s jurisdiction.
- **“Consistent”** refers to the relationship between the types and intensities of permitted development and the types and intensities of planned transportation investments.
- **“Institutional mechanisms”** refers to an agreed-upon, two-way communication process for sharing information and collecting feedback.
- **“Integration”** means developing transportation, land use, and economic development plans consistently and collaboratively.
- **“Land use and economic development plans”** 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, urban renewal plans, and economic overlay zones, among others.

- **“Regularly engages”** means going above and beyond consulting once; it means successfully involving and interacting with land use and economic development agencies early, often, and on an on-going basis throughout the planning process.
- **“Sustainable Actions”** 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”** refers to the economic, environmental, and social principles of the triple bottom line.

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 facilitate economic development goals near planned transportation improvements, such as job creation or business retention.

Scoring Requirements

Requirement SPS-01.1

1-2 points. Develop and Adopt Goals and Objectives

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

- **Requirement SPS-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 federal, state, regional and/or local requirements. The goals and objectives should further the integration of land use and economic development considerations into regional or local decision-making.

- **Requirement SPS-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 SPS-01.2

2-3 points. Engage Partner Agencies

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

- **Requirement SPS-01.2a**

2 points. Engage Land Use and Economic Development Agencies

The agency regularly engages land use and economic development agencies, such as MPOs, 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 SPS-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 SPS-01.3

2 points. Use Best Practice Quantitative Methods

The agency uses best practice quantitative methods (e.g. integrated land use and transportation models, Strategic Highway Research Program (SHRP2) economic analysis tools, and other proprietary economic assessment tools) 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 website](#)¹, FHWA's [Toolkit for Integrating Land Use and Transportation Decision-Making website](#)², and FHWA's [Toolbox for Regional Policy Analysis website](#)³, and FHWA's [Strategic Highway Research Program \(SHRP2\) Economic Analysis Tools](#)⁴.

Requirement SPS-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 SPS-01.5

1-6 points. Demonstrate Sustainable Outcomes

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

- **Requirement SPS-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 SPS-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](#)⁵.

- **Requirement SPS-01.5c**

3 additional points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-01.5b and show measurable advancement towards stated goals.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Travel Model Improvement Program website, <https://www.fhwa.dot.gov/planning/tmip/>
2. FHWA, Toolkit for Integrating Land Use and Transportation Decision-Making website, https://www.fhwa.dot.gov/planning/processes/land_use/toolkit.cfm
3. FHWA's Toolbox for Regional Policy Analysis website, <https://www.fhwa.dot.gov/planning/processes/tools/toolbox/bibliography.cfm>
4. FHWA, SHRP2 Economic Analysis Tools, https://www.fhwa.dot.gov/goshrp2/Solutions/Capacity/C03_C11/Economic_Analysis_Tools
5. NCHRP, *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*⁴ at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf.

Additional Resources

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

6. FHWA's Planning Tools and Practices for Land Use Integration at https://www.fhwa.dot.gov/planning/processes/land_use/land_use_tools/index.cfm
7. 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>
8. 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)
9. Travel Model Improvement Program Clearinghouse: Land Use at https://www.environment.fhwa.dot.gov/nepa/Travel_LandUse/travel_landUse_rpt.aspx
10. AASHTO Center for Environmental Excellence: Land Use at https://environment.transportation.org/teri_database/view_ideas.aspx?focus_filter=8
11. 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 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.)
5. 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.

SPS-02: Integrated Planning: Natural Environment

State

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

- **"Applicable environmental plans, policies, and goals"** include any local, metropolitan or statewide plan that addresses ecological considerations and natural resources within the agency's jurisdiction.
- **"Consistent"** Transportation plans are consistent with ecological sustainability when planned transportation projects support and enhance sustainable ecological function and support local, metropolitan and/or state natural resource plans, policies, and goals.
- **"Ecological"** refers to the natural environment—specifically the ecosystems and natural resources on which life depends.
- **"Engage"** means to successfully involve and interact with an institution or stakeholder.
- **"Environmental plans, policies, and goals"** 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.
- **"Institutional mechanisms"** refers to an agreed-upon, two-way communication process for sharing information and collecting feedback.
- **"Integrated"** plans and planning means and ends are consistent, internally and with each other, and when they are developed in a collaborative manner.
- **"Regularly"** Early, often, and on an on-going basis throughout the planning process.
- **"Sustainable Actions"** 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.

- **“System or landscape-scale”** refers to the geographic extent of the system under study. Implies a level of detail sufficient for making decisions at that scale (note: the detail needed for a corridor level analysis is not required).

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 SPS-02.1

1-2 points. Develop and Adopt Goals and Objectives

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

- **Requirement SPS-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 SPS-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 SPS-02.2

2-3 points. Engage Natural Resource and Regulatory Agencies

Scoring is based on the following, cumulative requirements.

- **Requirement SPS-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 SPS-02.2b**

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 SPS-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 (such as participating in mitigation banking, etc.), 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 FHWA's [Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects website](#)¹.

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 SPS-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 SPS-02.4

1-6 points. Demonstrate Sustainable Outcomes

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-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 SPS-02.4b**
2 points. LRTP Includes Performance 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's [Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#)².
- **Requirement SPS-02.4c**
3 points. Monitor Progress and Demonstrate Sustainable Outcomes
Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPR-02.4b and show measurable advancement towards stated goals.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects website, http://www.environment.fhwa.dot.gov/ecological/eco_index.asp
2. NCHRP, *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

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.

SPS-03: Integrated Planning: Social

State

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

- **"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.
- **"Consistent"** means that planned transportation improvements support the achievement of the community's vision and goals for sustainability.
- **"Integrated"** means developing transportation plans consistently with community vision and goals for sustainability.
- **"Regularly engages"** means going above and beyond consulting once; it means successfully involving and interacting with an institution or stakeholder early, often, and on an on-going basis throughout the planning process.
- **"Sustainable Actions"** 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"** refers to the economic, environmental, and social principles of the triple bottom line.
- **"Vision and Goals"** refers to desired outcomes for the future that are determined by the community through an inclusive, comprehensive, and collaborative process.

Scoring Requirements

Requirement SPS-03.1

2 points. Work toward a Shared Vision

Statewide transportation planning agencies establish a vision for overall sustainability efforts, and transportation-related goals and objectives are consistent with that vision. The vision should reflect the values of stakeholders and citizens within the state. 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 SPS-03.2

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

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-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.

According to FHWA's [Archived Participation by Interested Parties website](#)¹, interested parties for a Statewide LRTP include:

- Citizens
- Affected public agencies
- Representatives of public transportation employees
- Freight shippers
- Providers of freight transportation services
- Private providers of transportation
- Representatives of users of public transportation
- Representatives of users of pedestrian walkways & bicycle transportation facilities
- Representatives of the disabled
- Other interested parties

- **Requirement SPS-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 SPS-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 SPS-03.3

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

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-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 International Association for Public Participation (IAP2) [Public Participation Spectrum](#)² or Arnstein's [Ladder of Citizen Participation](#)³.

- **Requirement SPS-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 SPS-03.4

1-6 points. Demonstrate Sustainable Outcomes

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-03.4a**

1 point. Implement Investments that Support Vision and Goals

The agency is implementing transportation investments that support statewide vision and goals and help achieve sustainability outcomes.

- **Requirement SPS-03.4b**

2 points. Include Performance Measures for Effectiveness of Public Involvement

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's [Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#)⁴.

- **Requirement SPS-03.4c**

3 points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-03.4b and show measurable advancement towards stated goals.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA's Archived Participation by Interested Parties website,
http://www.fhwa.dot.gov/planning/public_involvement/archive/interparties_table.cfm
2. IAP2, Public Participation Spectrum,
http://c.ymcdn.com/sites/www.iap2.org/resource/resmgr/foundations_course/IAP2_P2_Spectrum_FINAL.pdf
3. Arnstein, Sherry R., *Ladder of Citizen Participation*, JAIP, Vol.35, No.4, July 1969,
<https://www.tandfonline.com/doi/abs/10.1080/01944366908977225>
4. NCHRP, *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*,
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

5. FHWA, *Transportation Planning Process: Key Issues*, https://www.planning.dot.gov/documents/briefingbook/bbook_07.pdf
6. FHWA, Context Sensitive Solutions website, <http://contextsensitivesolutions.org>
7. FHWA, Transportation Planning Capacity Building: Public Involvement Techniques website, http://www.planning.dot.gov/PublicInvolvement/pi_documents/toc-foreword.asp
8. HUD, EPA & US DOT, Partnership for Sustainable Communities website, <http://www.sustainablecommunities.gov>
9. NCHRP, *Synthesis 407: Effective Public Involvement Using Limited Resources*, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_407.pdf
10. FHWA, *How to Engage Low-Literacy and Limited-English-Proficiency Populations in Transportation Decision-making*, http://www.fhwa.dot.gov/planning/publications/low_limited/webbook.pdf
11. International Association for Public Participation (IAP2), IAP2 primary website, <http://iap2usa.org>
12. American Planning Association, *Journal of the American Planning Association* (JAPA), <https://www.planning.org/japa/>

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 L RTP.
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.

SPS-04: Integrated Planning: Bonus

State

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 SPS-04.1P

0 points. Achieve 10 points on each SPS-01, SPS-02, and SPS-03

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

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

Requirement SPS-04.1

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

As noted by FHWA's [Planning Processes – Metropolitan Transportation Planning website](#)¹, "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. Statewide planning for sustainable transportation outcomes is 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:

- FHWA's *Case Study on Sacramento's Blueprint*²: Integrating community participation, urban planning and design, and quantitative analysis in the public involvement process.
- FHWA's *Case Study on Florida DOT's ETDM Process*³: The development of a process for early and continuous resource agency input, and GIS analysis, into the agency's planning and decision making process.
- 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.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Planning Processes – Metropolitan Transportation Planning website, http://www.fhwa.dot.gov/planning/processes/metropolitan/legislation_and_regulations/
2. FHWA, *Case Study on Sacramento's Blueprint*, http://www.fhwa.dot.gov/planning/processes/land_use/case_studies/sacramento_ca/index.cfm
3. FHWA, *Case Study on Florida DOT's ETDM Process*, http://environment.fhwa.dot.gov/integ/case_florida.asp

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

4. Godschalk and Rouse, *Sustaining Places: Best Practices for Comprehensive Plans*, American Planning Association, PAS 578, 2015, <https://www.planning.org/publications/report/9026901/>

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 Statewide planning framework, 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).

SPS-05: Access and Affordability

For States

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

Background

This criterion is related to *SPS-08: Freight and Goods Access and Mobility*. This criterion includes a focus on access for people, while SPS-08 includes a focus on access for freight and goods access and mobility. 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:

- **Complete Streets:** The transportation facility provides access to community destinations and public places—whether walking, driving, bicycling, or taking public transportation.
- **Jobs to Housing Imbalance:** Jobs and housing are concentrated in separate areas and jobs are not located adjacent to appropriate workers due to land development patterns.
- **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 of 1990](#)¹ (ADA), and more broadly to the principles of universal design, which go above and beyond ADA requirements.
- The [Rehabilitation Act of 1973](#)² as signed into law on September 26, 1973. Section 504 of the Act provides that no otherwise qualified individual with a disability in the United States shall, solely by reason of his or her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.
- 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.
- Connected streets, traditional street patterns that facilitate walking and shorter trip length (not cul-de-sacs).

Access and Equity

- Executive Order 12898, called the [Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations](#)³ states that "Each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."
- 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 SPS-05.1

1-6 points. Discussion/Consideration in Planning Documents

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

- **Requirement SPS-05.1a**

1 point. Aggregate and Synthesize Physical Access Data

Aggregate and synthesize available and relevant physical access data and analyses from state and partner agencies, such as MPOs or COGs, into system planning documents. To achieve points, the data from partner agencies must include:

- Identification of specific population groups or areas where physical access is an issue,
- A discussion of time and cost barriers, as well as their consequences, and
- Specific, planned programs or improvements that address physical access issues.

- **Requirement SPR-05.1b**

1 point. Aggregate and Synthesize Access and Equity Data

Aggregate and synthesize available and relevant access and equity data and analyses from state and partner agencies, such as MPOs or COGs, into system planning documents. To achieve points, the data from partner agencies must include:

- Identification of specific population groups or areas where access and equity is an issue,
- A discussion of time and cost barriers, as well as their consequences, and
- Specific, planned programs or improvements that address access and equity issues.

- **Requirement SPR-05.1c**

2 points. Aggregate and Synthesize Affordability Data

Aggregate and synthesize available and relevant affordability data and analyses from state and partner agencies, such as MPOs or COGs, into system planning documents. To achieve points, the data from partner agencies must include:

- Identification of specific population groups or areas where affordability is an issue,
- A discussion of time and cost barriers, as well as their consequences, and
- Specific, planned programs or improvements that address affordability issues.

- **Requirement SPS-05.1d**

2 points. Include Documentation of Outreach Communications

For all dimensions of accessibility included in SPR-05.1a, SPR-05.1b and SPR-05.1c, the planning document includes documentation of outreach with partner agencies and stakeholders as appropriate to coordinate information and analyses sharing. In addition, information collected from partner agencies shall include documentation of targeted, enhanced outreach or communications that was used to engage interested and affected population groups or areas in the planning process.

Requirement SPS-05.2

2-5 points. Use Quantitative Analysis in the Development of Plans and Policies

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-05.2a**

2 points. Integrate Quantitatively Evaluated Accessibility and Affordability Concerns

The agency integrates travel model, census, geospatial, and other data that has quantitatively evaluated the nature and distribution of accessibility and affordability concerns in its jurisdiction into the development of plans and policies. For a statewide plans and policy development, this data will typically be collected and evaluated by partner agencies, such as other state agencies or MPOs.

- **Requirement SPS-05.2b**

3 points. Integrate Quantitative Analysis of How System Addresses Concerns

The agency integrates a quantitative analysis of how its system plan or program addresses or improves concerns/issues into the development of plans and policies. These concerns and issues might include:

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

For a statewide plans and policy development, this analysis will typically be performed by partner agencies, such as other state agencies or MPOs.

Requirement SPS-05.3

2 or 4 points. Regular Monitoring of Plans and Programs

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

- **Requirement SPS-05.3a**

2 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 SPS-05.3b**

2 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.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. U.S. Department of Justice, *Americans with Disabilities Act of 1990*, <https://www.eeoc.gov/eeoc/history/35th/1990s/ada.html>
2. U.S. Department of Justice, *Rehabilitation Act of 1973*, <http://www.dol.gov/oasam/regs/statutes/sec504.htm>
3. U.S. Department of Justice, *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), <https://www.federalregister.gov/articles/1994/02/16/94-3685/federal-actions-to-address-environmental-justice-in-minority-populations-and-low-income-populations>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

1. Yingling Fan and Arthur Huang, *How Affordable is Transportation? An Accessibility-Based Evaluation* (2011), CTS Report 11-12, Transitway Impacts Research Program, Center for Transportation Studies, <http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=2024>
2. Todd Litman, *Transportation Affordability: Evaluation and Improvement Strategies* (2013), Victoria Transport Policy Institute, <http://www.vtpi.org/affordability.pdf>
3. Todd Litman, *Evaluating Accessibility for Transportation Planning: Measuring People's Ability to Reach Desired Goods and Activities* (2015), Victoria Transport Policy Institute, <http://www.vtpi.org/access.pdf>
4. EPA, GeoPlatform Online, <http://epa.maps.arcgis.com/home/webmap/viewer.html?webmap=cb6ee8434c054e3bba37995f06e644d3#>

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 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.

SPS-06: Safety Planning

For States

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 fatalities 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.

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

- **“Reflects intention to cooperate and collaborate across all levels of government”** indicates that all levels of government, from executive level management to the management of day-to-day field operations and maintenance are aligned and will work together to implement strategies to achieve a common goal. These disciplines may be aligned to different organizations (e.g. MPOs and DOTs).
- **“Use multi-disciplinary and integrated approaches”** means combining and leveraging approaches from relevant disciplines to develop collaborative solutions to address a common issue. In this case, approaches for reducing fatalities and serious injuries in crashes would likely combine elements from geometric, structural, ITS, and other disciplines. These disciplines may be aligned to different organizations (e.g. MPOs and DOTs).
- **“System-wide”** means statewide for DOTs.

Scoring Requirements

Requirement SPS-06.1

1-2 points. Engage and Collaborate with Partner Agencies in the Update and Implementation of the State Strategic Highway Safety Plan (SHSP)

To earn credit for this scoring requirement, DOT's must engage and collaborate with partner agencies throughout the state during the update and implementation of the statewide SHSP.

One of the following scores applies:

- **0 points.** Does not engage or collaborate with partner agencies in the update and implementation of the SHSP.
- **1 point.** Actively engages and collaborates with partner agencies in the update of the SHSP but is not implementing the SHSP as part of agency-specific planning and programming activities.
- **2 points.** Actively engages and collaborates in the update and implementation of the SHSP and implements the SHSP in agency-specific planning and programming activities.

Requirement SPS-06.2

1-3 points. Integrate and Develop Strategies to Support a Vision of Zero Traffic Fatalities (e.g. Toward Zero Death Vision, Target Zero, or Vision Zero, etc.)

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-06.2a**

1 point. Integrate the Vision of Zero Traffic Fatalities into the Agency's Vision for Planning

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

- **Requirement SPS-06.2b**

2 points. Develop Strategies to Support Toward Zero Death Vision

Develop strategies/plan to support the vision of zero traffic fatalities (plan similar to one in SPS 06.3 but specifically calls out strategies to support the vision of zero traffic fatalities).

Requirement SPS-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 fatalities 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 fatalities and serious injuries on all public roads 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. 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 fatalities 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 SPS-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 only 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 fatalities and serious injury crashes, the number of fatalities and serious injuries, or the number of fatalities and injury crashes involving vulnerable users (e.g. pedestrians, bicyclists, motorcyclists, older users, children). Network screening, as presented in Chapter 4 of the AASHTO *Highway Safety Manual*¹, presents advanced measures that account for regression to the mean and offer higher statistical reliability than, for example, crash rate methods.

Requirement SPS-06.5

1 or 2 points. Integrate Quantitative Safety Considerations in the Selection and Evaluation of Strategies in the Planning Process

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-06.5a**
1 point. Integrate Quantitative Safety Performance Measures in Project Prioritization
 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 SPS-06.5b**
1 point. Select Systemic Treatment Strategies with Proven Safety Effectiveness
 Select strategies that include systemic treatments with proven effectiveness in reducing fatalities and serious injuries (may be operational or safety-specific in nature).

Requirement SPS-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.

Requirement SPS-06.7

1-3 points. Collect, Maintain and Use Data (Safety and Non-Crash Information) for all public roads 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 requirements:

- **Requirement SPS-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 SPS-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 SPS-06.7c**

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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, *Highway Safety Manual*, First Edition with 2014 Supplement,
https://bookstore.transportation.org/collection_detail.aspx?ID=135

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, 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.

SPS-07: Multimodal Transportation and Public Health

State

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. In rural areas, the agency examines the viability of the system as a whole in providing choices and opportunities for multimodal and active transportation networks.

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

- **“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 Center for Disease Control’s recommended amount of daily physical activity. Source: *Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations*¹.)
- **“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 passenger car or air travel.
- **“Public Health”** in this context means negative or positive impacts on human health due to transportation planning, programming and design, typically in the areas of safety, air quality, physical activity, access to goods, services and opportunities, or noise.

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 SPS-07.1

1-2 points. Develop Goals and Objectives

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

- **Requirement SPS-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 SPS-07.1b**

- 1 point. Develop Goals and Objectives Related to Transportation and Public Health**

- The agency has developed goals and objectives related to active transportation and the improvement of public health.

Requirement SPS-07.2

3 points. Engage Stakeholders

The agency regularly engages the public and includes public health officials and active mode stakeholders throughout the transportation planning process and incorporates their feedback into the creation of transportation plans and programs. Public Involvement successfully involves and interacts with an institution or stakeholder early, often, and on an on-going basis throughout the planning process.

Requirement SPS-07.3

1-4 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 requirements. The first requirement must be accomplished to earn the requirement. The third requirement is independent.

- **Requirement SPS-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, bicycle, light or heavy rail, and ferry infrastructure, facilities, and services. Examples of programs include the implementation of Safe Routes to School.

- **Requirement SPS-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 SPS-07.3c**

- 2 points. Evaluate Health Impacts of the Plan**

- The agency considers health impacts during system and scenario planning processes to determine whether the planned transportation investments will help the agency to meet its public health and active transportation goals. For Example, the Centers for Disease Control conducted a Health Impact Assessment pilot project in coordination with the [Nashville area MPO 2035 Regional Transportation Plan²](#) to intercept and alter health outcomes such as obesity, physical inactivity, asthma, injuries, and social equity in conjunction with the Northeast Corridor Study proposed Transit Oriented Development (TOD) sites.

Requirement SPS-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 requirements:

- **Requirement SPS-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 SPS-07.4b**
2 points. Address Jurisdictional Issues Related Multimodal Facilities
 The agency addresses jurisdictional issues related to multimodal design that facilitate project programming and project development. For example, using intergovernmental agreements to multimodal design issues are addressed for STIP projects.
- **Requirement SPS-07.4c**
1 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 SPS-07.4d**
2 points. Measure Progress and Demonstrate Sustainable Outcomes
 Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-07.4b and show measurable advancement towards stated goals.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. Besser, L. and A. Dannenberg, Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations (2005), American Journal of Preventative Medicine,
https://www.cdc.gov/healthyplaces/articles/besser_dannenberg.pdf
2. Nashville Area MPO, Nashville Area MPO 2035 Regional Transportation Plan (2010), pp. 201-205,
http://www.nashvillempo.org/docs/lrtp/2035rtp/Docs/2035_Doc/2035Plan_Complete.pdf

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

3. American Association of State Highway and Transportation Officials (AASHTO), *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, 1st Edition
 (2004), https://bookstore.transportation.org/item_details.aspx?id=119
4. AASHTO, *Guide for the Development of Bicycle Facilities*, 4th Edition
 (2012), https://bookstore.transportation.org/item_details.aspx?ID=1943
5. Institute of Transportation Engineers, Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (March 2010), <http://library.ite.org/pub/e1cff43c-2354-d714-51d9-d82b39d4dbad>
6. Federal Highway Administration, A Resident's Guide for Creating Safe and Walkable Communities (February 2008), http://safety.fhwa.dot.gov/PED_BIKE/ped_cmnty/ped_walkguide/index.cfm
7. Center for Disease Control, Transportation Recommendations website,
<http://www.cdc.gov/transportation/recommendation.htm>
8. American Public Health Association, The Hidden Health Costs of Transportation (February 2010),
https://www.apha.org/-/media/files/pdf/factsheets/hidden_health_costs_transportation_backgrounder.ashx
9. FHWA, Metropolitan Area Transportation Planning for Healthy Communities, https://www.fhwa.dot.gov/planning/health_in_transportation/resources/healthy_communities/

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.

SPS-08: Freight and Goods Access and Mobility

State

1-15 points

Goal: Implement a transportation 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

Background

This criterion is related to SPS-05: Access and Affordability. This criterion includes a focus on access for freight and goods, while SPS-05 includes a focus on access for people.

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

- **“Engage”** means to successfully involve and interact with an institution or stakeholder.
- **“Institutional mechanisms”** refers to an agreed-upon, two-way communication process for sharing information and collecting feedback.
- **“Planning Process”** is a series of steps taken early in a project life cycle or decision-making process to define solutions for an issue or multiple issues (common examples include system-level plans and policies, long-range transportation plans, statewide plans, corridor plans, facility plans, area plans). A planning process typically contains the following steps: establish the plan purpose; develop goals, objectives, evaluation criteria, and performance measures and targets; analyze existing conditions; determine needs (based on scenarios or trends); develop and evaluate options; set priorities; develop a funding program; develop the plan; implement and monitor effectiveness of the plan.
- **“Regularly”** means early, often, and on an on-going basis throughout the planning process.
- **Freight stakeholders** include shippers, carriers, third party logistics providers, facility operators, governments, universities and communities near freight facilities.

Sustainable Freight System

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 state transportation planning context are described below:

- **Economic sector analysis:** States may review different economic sectors important to the state and the transportation routes and modes critical for maximizing efficiencies or other state goals, and identify investment priorities based on those routes and modes. For example, examination of a specific agricultural

sector would review the access of farmers to food/product markets. If the current transportation system provides inferior access to markets from specific farming regions in the state, The State DOT could collect data and perform a planning-level accessibility analysis. The analysis would then help the State identify and program specific improvements to enhance access to these areas. This type of analysis could be done for any economic sector important to the state.

- **Freight Mobility Study:** A State may conduct a comprehensive, systems-level mobility study specifically addressing freight movement needs, issues, and potential solutions within a state or a region of the state (can be urban or rural). The State identifies key freight bottlenecks and examines quality of truck access to intermodal terminals, and uses data and tools to evaluate alternative solutions. The State engages freight and other stakeholders throughout the study.
- **Reliability Analysis:** A State may conduct an analysis that examines key routes to understand where there are issues with travel time reliability, and during what time periods (peak hour, mid-day, etc.) these issues occur. Solutions could then be focused on the most critical locations.

Mobility and Access

Mobility and access are both important for freight movement. Mobility relates to the ability and efficiency of moving goods from Point A to Point B. Access relates to the ability and ease of transferring goods (e.g. ability and ease of getting to a Port; ability and ease for producers to access transport opportunities for their goods).

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 SPS-08.1

1-2 points. Develop Goals and Objectives

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

- **Requirement SPS-08.1a**

1 points. Consider Freight Access Goals

The agency includes in the LRTP or other appropriate plan (e.g. a freight rail plan) specific goals for maintaining and improving freight connectivity between modes and to freight generators 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 include systematic elimination of bottlenecks through infrastructure investments, using technology to ease port access, and anti-idling goals.

- **Requirement SPS-08.1b**

1 points. Consider Freight Mobility Goals

The agency considers multimodal freight mobility needs (aviation, marine, rail, interstate, pipeline, and intermodal) in the planning process. Freight mobility goals (such as freight reliability) and evaluation criteria are included in project prioritization and selection for the development of the STIP or Statewide Long Range Plan.

Requirement SPS-08.2

2-3 points. Engage Stakeholders

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

- **Requirement SPS-08.2a**

2 points. Engage a Wide Variety of Stakeholders

The agency regularly engages a variety of freight stakeholders in creating plans and programs. This helps to ensure the transportation system supports freight movement and sustainable economic activity as appropriate. The State would develop a stakeholder involvement plan.

- **Requirement SPS-08.2b**

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. The decision-makers may use freight model data or use freight mobility or access as a criterion for solution prioritization in a planning process.

Requirement SPS-08.3

2 or 4 points. Develop Performance Measures and Monitor Progress

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

- **Requirement SPS-08.3a**

2 points. Include Freight Access Performance Measures

The agency includes and monitors sustainability-related freight access performance measures in planning documents (e.g. intermodal connections or linkages to freight generators).

- **Requirement SPS-08.3b**

2 points. Include Freight Mobility Performance Measures

The agency includes and monitors sustainability-related freight mobility performance measures (e.g. truck delay, travel time reliability, other national or state freight goals) in planning documents. Other examples of performance measures can be found in NCHRP [*Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*](#)¹.

Requirement SPS-08.4

2-6 points. Demonstrate Sustainable Outcomes/Implementation

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

- **Requirement SPS-08.4a**

2 points. Freight Access - Provide for Planning, Evaluating, Maintaining, and Improving Intermodal Freight Connections and Linkages to Freight Generators

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

- **Requirement SPS-08.4b**

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

Freight mobility can be measured in a variety of ways, including reliability, travel time, through-put or volumes. The agency provides for planning, evaluating, maintaining and enhancing freight mobility utilizing appropriate quantitative measures and monitoring for freight modes.

- **Requirement SPS-08.4c**

2 points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPR-08.3a and SPR-08.3b and show measurable advancement towards stated goals.

Resources

The following resources are referenced in this criterion and consolidated here:

1. NCHRP, *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies* at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

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 regional 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.

SPS-09: Travel Demand Management

State

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.



Background and Scoring Requirements

Background

This criterion relates to SPS-14: Transportation Systems Management & Operations; while both can help to mitigate congestion, SPS-09 focuses primarily on reducing SOV travel demand and SPS-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 SPS-14.

It is important to clarify that this criterion is specific to planning for the transportation facilities that an agency owns and operates. Criterion OM-01 includes Travel Demand Management options specific to an agency's internal staff and operations. For the purposes of this criterion, the key terms are defined as follows:

- **“Transportation Management Organization (TMO)”** refers to an independent entity dedicated to solving transportation problems in a particular geographic area through actively managing transportation demand and encouraging alternate travel modes.
- **“TDM Program”** means the coordinated & consistent implementation of strategies that aim to reduce SOV travel demand and/or redistribute that demand in space and time.

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 that might be implemented by a DOT include, but are not limited to:

1. Education and outreach programs on Travel options (can include integrating programs developed by regional agencies)
2. Rideshare and car-sharing programs
3. Road/vehicle pricing policies
4. Land use policies that promote a mixed-use, transit-oriented development, pedestrian-friendly built environment (coordination with partner agencies)

In addition, regional agencies may implement some of the following TDM strategies:

5. Challenge/incentive programs for non-auto modes
6. Parking pricing and policies
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., land use policies, 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 FHWA's [Travel Demand Management Website](#)¹.

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 (COGs), public-private partnerships, and/or non-profit agencies, etc.) for achieving the requirements. This may often be the case for state DOTs.

Scoring Requirements

Requirement SPS-09.1

1-3 points. Set TDM Goals and Objectives

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-09.1a**

1 point. Develop TDM Goal and Objective Supportive of Metropolitan Goals and Objectives

The statewide agency includes a goal and objective to coordinate and support TDM activities of its regional and metropolitan partner agencies.

- **Requirement SPS-09.1b**

2 additional points. 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 in coordination with partner agencies. Examples of TDM goals and objectives include vehicle miles of travel (VMT) reduction goals, transportation options goals, and/or mode split targets.

Requirement SPS-09.2

3 or 6 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.
- **3 points.** The agency is implementing a TDM program that includes two or three of the TDM strategies described in the Background paragraph above.
- **6 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 SPS-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's *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*³. 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 SPS-09.4

2 points. Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPSR-09.3 and show measurable advancement towards stated goals.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Travel Demand Management Website, <http://ops.fhwa.dot.gov/tdm/index.htm>
2. NCHRP, Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

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.

SPS-10: Air Quality & Emissions

State

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

Background

This criterion is related to SPS-07: Multi-Modal Transportation and Public Health, SPS-09: Travel Demand Management, SPS-11: Energy and Fuels, and SPS-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.¹

This criterion is specific to the planning process. Strategies for the State's own fleet/internal operations are covered in the Operations and Maintenance criteria of INVEST.

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 or participate in the selected strategies or programs.
- Develop measures for the prioritization of transportation projects or strategies in the Statewide Transportation Plan and STIP, based on their emission reduction potential.
- Communicate findings and emissions reduction results to stakeholders

Scoring Requirements

Requirement SPS-10.1

2 points. Develop and Adopt Goals and Objectives

The agency has developed goals and objectives consistent with partner agencies (MPOs and other) for the reduction of air emissions in transportation planning documents, such as the Statewide Transportation Plan, STIP and others. Examples of goals and objectives include: coordinate with MPOs, regional councils of government, state environmental agencies and others to help implement measures designed to enhance air quality; provide for a variety of projects or transportation control measures that positively impact air emissions (e.g. TSMO, TDM, transit, bicycle, pedestrian); educate the public about air quality issues and transportation choices or preferences

Requirement SPS-10.2

4 points. Coordinate with Partner Agencies

The agency regularly coordinates with partner agencies throughout the transportation planning process, to reduce barriers and further the prospects for implementation of strategies to improve air quality. This coordination utilizes institutional mechanisms such as ad hoc or standing committees.

Requirement SPS-10.3

1-5 points. Implement Strategies to Reduce Emissions

Partner with the MPO, other regional planning organizations or state environmental agencies and local jurisdictions through planning documents or processes to coordinate and implement strategies consistent with their strategies as part of a transportation plan to reduce emissions. NCHRP [Report 25-25: Evaluate the Interactions between Transportation-Related Particulate Matter, Ozone, Air Toxics, Climate Change, and Other Air Pollutant Control Strategies](#)¹ provides good background information on these strategies. Strategies for the State's own fleet are covered in the Operations and Maintenance criteria.

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

- **Requirement SPS-10.3a**

1 point. Implement Transportation Demand Management Strategies

Partner with the state environmental agency, MPO or other regional planning organization and/or local jurisdictions to coordinate and implement transportation demand management strategies.

- **Requirement SPS-10.3b**

1 point. Implement Transportation System Management Strategies

Partner with the state environmental agency, MPO or other regional planning organization and/or local jurisdictions to coordinate and implement transportation system management strategies to reduce emissions, including congestion relief and traffic management strategies such as signal systemization.

- **Requirement SPS-10.3c**

1 point. Implement Vehicle Technologies

Partner with the state environmental agency, MPO or other regional planning organization(s) to coordinate and implement vehicle technologies including diesel emissions reduction strategies, such as funding school bus retrofits, retrofits of state or local maintenance and construction equipment, and clean vehicle strategies such as retrofitting or replacing diesel buses or engines with CNG or hybrid or other clean technology buses. Support of policies and investments that support the development of infrastructure for vehicle technologies.

- **Requirement SPR-10.3d**

2 points. Implementing Fuel Technologies

Fuel technologies including alternative fuels (such as biodiesel, bioalcohol, batteries and fuel cells, vegetable oil, solar, other biomass sources) for vehicles or infrastructure. Support of policies and investments that support the development of infrastructure for fuel technologies.

Requirement SPS-10.4

2 points. Develop Performance Measures

The agency has quantifiable air emissions performance measures incorporated into its transportation planning documents. Examples of performance measures can be found in NCHRP [Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#)².

Requirement SPS-10.5

2 points. Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-10.4 and show measurable advancement towards stated goals.

Resources

The following resources are referenced in this criterion and consolidated here:

1. NCHRP, *Report 25-25 (Task 59): Evaluate the Interactions between Transportation-Related Particulate Matter, Ozone, Air Toxics, Climate Change, and Other Air Pollutant Control Strategies*, [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25\(59\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25(59)_FR.pdf)
2. NCHRP, *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*⁴s at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

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.

SPS-11: Energy and Fuels

For States

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

It is important to clarify that **this criterion is specific to planning for the transportation system that an agency manages**. The Operations & Maintenance (OM) criteria include various approaches that an agency could leverage to affect the reduction of energy and fossil fuel consumption related to its internal staff and the maintenance and operations of its facilities and fleet.

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., through construction specifications, incentives for vehicle sharing, incentives for switches to high fuel efficiency vehicles, 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 (Source: [Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions](#)¹). 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, preferential parking for electric vehicles at park & ride lots, 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 SPS-07: Multimodal Transportation and Public Health, SPS-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.

Scoring Requirements

Requirement SPS-11.1

1-2 points. Set Goals and Objectives

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

- **Requirement SPS-11.1a**

1 point. Develop Energy and Fossil Fuel Reduction Goals and Objectives

The agency has developed quantitative energy and/or fossil fuel reduction goals and objectives for the transportation system.

- **Requirement SPS-11.1b**

1 additional point. Goals and Objectives Consistent with other State Goals and Objectives

The goals and objectives are consistent with other relevant state goals and objectives for reducing energy and fossil fuel consumption (e.g. climate strategy).

Requirement SPS-11.2

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

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

- **Requirement SPS-11.2a**

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

Cooperate with partner agencies to develop and maintain a baseline inventory of current energy and/or fossil-fuel consumption (for all fuel types and modes) from transportation.

- **Requirement SPS-11.2b**

2 additional points. Forecast Energy and Fuel Consumption

Cooperate with partner agencies (e.g. state department of energy) that use 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), or conduct such forecasting. Use this information to inform transportation decision-making and the development of the statewide LRTP and corridor plans. Resources related to conducting transportation energy data, inventories, and forecasts can be found on the USDOT's [Transportation and Climate Change website](#)².

Requirement SPS-11.3

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

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-11.3a**

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

Coordinate with partner agencies and integrate energy and fossil fuel reduction strategies in the LRTP, corridor plans, and scenario planning, as appropriate. Transportation planning documents include a discussion of the impacts of including these strategies.

- **Requirement SPS-11.3b**

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

Coordinate with partner agencies and integrate 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 SPS-11.4

1-5 points. Develop Performance Measures, Monitor Progress, and Demonstrate Sustainable Outcomes

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-11.4a**

2 points. 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's *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*³.

- **Requirement SPS-11.4b**

3 points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-11.4a and show measurable advancement towards stated goals.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. Urban Land Institute (ULI), *Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions* (July 2009), <https://www.transit.dot.gov/about/moving-cooler-analysis-transportation-strategives-reducing-greenhouse-gas-emissions> and <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/MovingCoolerExecSummaryULI.pdf>
2. USDOT, Transportation and Climate Change website, <https://www.transportation.gov/climate-change-clearinghouse>
3. NCHRP, *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

4. AASHTO Center for Environmental Excellence: Energy/Greenhouse Gas Emissions, https://environment.transportation.org/environmental_topics/energy_greenhouse/
5. TRB, *Special Report 307: Policy Options for Reducing Energy Use and Greenhouse Gas Emissions from U.S. Transportation* (2011), <http://www.trb.org/Publications/Blurbs/165535.aspx>
6. FHWA, *Transportation's Role in Reducing U.S. Greenhouse Gas Emissions Volume 1 and Volume 2* (April 2010), <https://rosap.ntl.bts.gov/view/dot/17789>

7. FHWA, *Integrating Climate Change into the Transportation Planning Process* (July 2008), https://www.fhwa.dot.gov/environment/sustainability/energy/publications/integrating_climate_change/index.cfm
8. Union of Concerned Scientists, *State of Charge: Electric Vehicles' Global Warming Emissions and Fuel Cost Savings Across the United States* (2012), http://www.ucsusa.org/clean_vehicles/smart-transportation-solutions/advanced-vehicle-technologies/electric-cars/emissions-and-charging-costs-electric-cars.html
9. UC Davis, *Potential Design, Implementation, and Benefits of a Feebate Program for New Passenger Vehicles in California: Interim Statement of Research Findings* (2010), <https://gsm.ucdavis.edu/research/potential-design-implementation-and-benefits-feebate-program-new-passenger-vehicles> and https://gsm.ucdavis.edu/sites/main/files/file-attachments/2010_ucd-its-rr-10-13.pdf
10. US Environmental Protection Agency, *Study of Exhaust Emissions from Idling Heavy-Duty Diesel Trucks and Commercially Available Idle Reducing Devices* (October 2002), <http://www.epa.gov/smartway/documents/publications/epaidlingtesting.pdf>
11. US Department of Energy, *Idle Reduction Technology Demonstrations* (November 2004), <http://www.nrel.gov/vehiclesandfuels/fleetttest/pdfs/36717.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 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 STIP, 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.

SPS-12: Financial Sustainability

State

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

Background

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

Fiscal Constraint

"Fiscal constraint has remained a key component of transportation plan and transportation improvement program since enactment of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. FHWA and FTA developed and issued the Final Rule on statewide and metropolitan transportation planning and programming processes, published in the Federal Register on February 14, 2007 with an effective date of March 16, 2007." Source: FHWA's [Financial Planning and Fiscal Constraint for Transportation Plans and Programs Questions & Answers website](#)¹.

Fiscal constraint in the context of sustainability goes beyond formulaically meeting regulatory requirements; it should ensure that the estimated capital or project costs and operating expenditures of the transportation system are reliable, are in line with anticipated revenues, and are available. 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.

Reasonable Revenue Funding

According to FHWA's [Financial Planning and Fiscal Constraint for Transportation Plans and Programs Questions & Answers website](#)¹,

"Revenue forecasts that support a Statewide Transportation Improvement Program (STIP), metropolitan transportation plan, or a metropolitan Transportation Improvement Program (MTIP) may take into account new funding sources and levels of funding not currently in place, but which are "reasonably expected to be available" (see 23 CFR 450.216(m), 23 CFR 450.322(f)(10)(ii), and 23 CFR 450.324(h), respectively). New funding sources are revenues that do not currently exist or that may require additional actions before the State DOT, MPO, or public transportation operator can commit such funding to transportation projects. In addition, future revenues may be projected based on historic trends, including consideration of past legislative or executive actions. To be considered "reasonable," the financial information and financial plans that accompany the TIP, STIP, and metropolitan transportation plan must identify strategies for ensuring the availability of these new revenue sources in the years when they are needed for project development and implementation [see 23 CFR 450.216(m)].

Determining whether a future funding source is "reasonable" requires a judgment decision. Two important considerations in determining whether an assumption is "reasonable" are: (a) evidence of review and support of the new revenue assumption by State and local officials and (b) documentation of the rationale and procedural steps to be taken with milestone dates for securing the funds. Source: FHWA's [Financial Planning and Fiscal Constraint for Transportation Plans and Programs Questions & Answers website](#)¹.

Some examples of "reasonable" and "not reasonable" assumptions from FHWA's [Financial Planning and Fiscal Constraint for Transportation Plans and Programs Questions & Answers website](#)¹, are shown in Table 1. Note that the examples labeled "reasonable" do not necessarily meet the special test of "available funds" or "committed funds" as discussed on the website.

TABLE SPS-12.1. FHWA Examples of Reasonable/Not Reasonable Revenue Assumptions (continued on next page)

Example Type	Revenue Assumption Example
Reasonable	A new toll or other user fee dedicated to a particular project or program may be reasonable if there is clear evidence of support by the Governor, legislature, and/or other appropriate local/regional decision-makers and a strategy exists with milestones for securing those approvals within the time period for implementing the affected projects.
Reasonable	A new tax for transportation purposes requiring local and/or State legislation and/or support from the Governor is reasonable if there is clear evidence of sufficient support (both governmental and public) to enact the new tax and a strategy exists for securing those approvals within the time period for implementing the affected projects.
Reasonable	If a State or local jurisdiction has past historical success in incrementally increasing gas taxes for transportation purposes, it is reasonable to assume that this trend (and the historic rate of increase) over a comparable period of time will continue.
Reasonable	A new bond issue for a particular project or program may be reasonable if there is clear evidence of support by the legislature, Governor and/or other appropriate decision-makers and a strategy exists with milestones for securing those approvals within the time period for implementing the affected projects or program.
Not Reasonable	Assuming new funds from an upcoming Statewide, regional, or local ballot initiative would not be reasonable if polls indicate a strong likelihood of defeat or there is a history of repeated defeat of similar ballot initiatives in recent years. However, this assumption could be reasonable if a new strategy has been developed to achieve success where past attempts have failed, and is supported by State and/or local decision-makers.
Not Reasonable	A 25 percent increase in gas tax revenues over five years is not reasonable if the growth over the previous five years was only 15 percent. However, special circumstances may justify and support a significantly higher increase than the historic rate, provided there is clear evidence of support from State and/or local decision-makers.

Example Type	Revenue Assumption Example
Not Reasonable	An assumption that a single metropolitan area will receive funding for multiple large-scale transportation projects under a federal discretionary program (e.g., FTA's New Starts) is not reasonable if the assumption would result in that one metropolitan area receiving a disproportionately high percentage of the total national program dollars.

Scoring Requirements

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

Requirement SPS-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.

Evidence of the use of advanced revenue forecasting practices could include the following (Source: Best Practices in Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints):

- 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.

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-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 SPS-12.1b**

3 points. Undertake Systemic Forecast Updates

The agency undertakes systematic forecast updates using reasonable revenue projections per the Background discussion above and updated traffic modeling and analyses. Significant changes in forecast revenues are addressed in a planning process to prevent unsustainable deficits or funding gaps.

- **Requirement SPS-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.

Requirement SPS-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 development scenarios and associated future infrastructure construction and maintenance costs.

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-12.2a**

2 points. Keep Accurate Records of Changes to Project Scope

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

- **Requirement SPS-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 SPS-12.2c**

3 points. Complete Systemic Cost Updates Regularly

The agency completes systematic cost updates regularly, including cost estimates for its ongoing system operations, and the 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 and commitment on fiscal discipline;
- Coordination between preconstruction and construction personnel in preparation of cost estimates;
- Evaluation the completed project cost estimation process, and 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.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA's Financial Planning and Fiscal Constraint for Transportation Plans and Programs Questions & Answers Website, https://www.fhwa.dot.gov/planning/guidfinconstr_qa.cfm

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

2. Federal Register, 49 CFR Part 613: Final Rule on statewide and metropolitan transportation planning and programming and congestion management processes/systems (February 14, 2007), <https://www.gpo.gov/fdsys/pkg/FR-2007-02-14/pdf/07-493.pdf>
3. NCHRP, Best Practices in Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints (February 2010), <http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570>
4. NCHRP, Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction (2007), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_574.pdf

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 (including project selection criteria)
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

SPS-13: Analysis Methods

State

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, local, etc.) and provide relevant performance measures as part of the decision-making process.

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

- **“Analysis Methods”** include forecasting process tools such as land use and travel demand models, and the data associated with the development and implementation of those tools and methods.

Scoring Requirements

Requirement SPS-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 requirements. The first requirement must be accomplished to earn the second.

- **Requirement SPS-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 SPS-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 an established evaluation and update cycle.

Requirement SPS-13.2

1-4 points. Program Framework and Funding

The agency has a strategic plan, analysis program, or equivalent that includes the areas listed in SPS-13.2a through SPS-13.2d. Scoring is based on the following, cumulative requirements:

- **Requirement SPS-13.2a**

1 point. Multi-year Development Program

Program includes a specific multi-year development program for maintaining transportation data resources and improving analysis methods.

- **Requirement SPS-13.2b**

1 point. Specifications that Address Sustainability Principles

Program includes specifications for the data resources and methods that explicitly address sustainability principles.

- **Requirement SPS-13.2c**

1 point. Adequate Funding to Implement Identified Work

Program includes identification of an adequate level of funding required to implement the data collection and modeling tasks, which is also reflected in the appropriate work plan.

- **Requirement SPS-13.2d**

1 point. Technical Resources

Program identifies and includes resources which include support for experienced technical management and a mix of technical staff and/or contract staff.

Requirement SPS-13.3

2-8 points. External Review

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-13.3a**

2 points. Technical Committee

The agency's organizational structure includes a technical committee to ensure the technical review of data collection/quality, planning assumptions, and forecasting methods. This committee may be comprised of state and local transportation planning professionals, private consultants, academia, and/or other individuals having interest and expertise 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 SPS-13.3b**

3 points. Peer Review of Analysis Method, Tools and Practices

The agency has convened a peer review of its analysis methods (e.g., the peer review program offered by FHWA's [Travel Model Improvement Program \(TMIP\) Website](#)¹.) 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.

- **Requirement SPS-13.3c**

3 points. Peer Review of Travel Models

The agency has convened a peer review of its travel model (e.g., the peer review program offered by FHWA's [Travel Model Improvement Program \(TMIP\) Website](#)¹.) Results of the peer review are used as inputs to the plan and describe improvements to the actual analytical methods used.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA's Travel Model Improvement Program (TMIP) Website,
http://www.fhwa.dot.gov/planning/tmip/resources/peer_review_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 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.

SPS-14: Transportation Systems Management and Operations

State

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 reliability and reducing funding needs, congestion, and resource consumption. Optimizing the use of the existing transportation system also has safety benefits, because traffic flow is smoothed, often leading to less crashes.



Background and Scoring Requirements

Background

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

The intent of the Transportation Systems Management and Operations (TSMO) 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 TSMO strategies include, but are not limited to:

1. Intelligent Transportation Systems (traveler information, transit signal priority, ramp metering)
2. Active Traffic Management (adaptive signal control, real-time message boards, variable speed displays, dynamic lane assignment)
3. Incident Management (collision notification and avoidance, emergency service patrols)
4. Event Management
5. Road Weather 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 TSMO strategies can be found in OM-13: Transportation Management and Operations and PD-14: ITS for System Operations.

Scoring Requirements

Requirement SPS-14.1

1-2 points. Develop and Adopt TSMO Goals and Objectives

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

- **Requirement SPS-14.1a**

1 point. Develop TSMO Goals and Objectives

The agency has developed clearly defined TSMO goals, and objectives for improving the efficiency and safety of the transportation system within its jurisdiction. The goals and objectives are incorporated into TSMO

policies and the Statewide Long Range Transportation Plan (LRTP) and encourage transportation investments that support and enhance long-term Transportation Systems Management and Operations.

- **Requirement SPS-14.1b**

1 additional point. TSMO Goals and Objectives Consistent with Planning Documents

The TSMO, goals and objectives are also consistent with or surpass relevant local, state and/or metropolitan goals and objectives for improving transportation system efficiency and safety.

Requirement SPS-14.2

1-4 points. Develop a Plan for TSMO Strategies

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

- **Requirement SPS-14.2a**

1 point. Include TSMO Strategies

TSMO strategies are included in the LRTP and STIP, or other planning documents, as appropriate.

- **Requirement SPS-14.2b**

1 point. Include Discussion of Impacts of TSMO Strategies

The Statewide LRTP, or equivalent, includes a discussion of the impacts of including TSMO strategies.

- **Requirement SPS-14.2c**

2 points. Consider and Prioritize TSMO Strategies

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

Requirement SPS-14.3

2 or 4 points. Support or Implement TSMO Strategies

One of the following scores applies:

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

Requirement SPS-14.4

2 points. Develop Performance Measures

The agency includes sustainability-related TSMO 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](#)¹.

Requirement SPS-14.5

3 points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-14.3 and show measurable advancement towards stated goals.

Resources

The following resources are referenced in this criterion and consolidated here:

1. NCHRP, *Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies* at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

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 TSMO component (either integrated throughout or called out separately).
2. A STIP that includes a list of implementable TSMO 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 TSMO goals and objectives over time.

SPS-15: Linking Asset Management and Planning

State

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.

Scoring Requirements

Requirement SPS-15.1

2 points. Develop Goals and Objectives

The agency has developed clearly defined goals and objectives for linking asset management and planning in their planning documents, including their LRTP, STIP or other planning documents. 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
- The dollar value of deferred maintenance needs

Requirement SPS-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 requirements:

- **Requirement SPS-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 [Asset Management Life-Cycle Cost Analysis website](#)¹.

- **Requirement SPS-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 [Asset Management Life-Cycle Cost Analysis website](#)¹.

Requirement SPS-15.3

2 points. Develop 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 SPS-15.4

1-3 points. Demonstrate Sustainable Outcomes

Scoring is based on the following, cumulative requirements:

- **Requirement SPS-15.4a**

1 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, and 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.

- **Requirement SPS-15.4b**

2 points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-15.3 and show measurable advancement towards stated goals.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Asset Management Benefit-Cost Analysis website,
<https://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

2. FHWA, *Asset Management Position Paper*, <http://www.fhwa.dot.gov/infrastructure/asstmgmt/ampplan.cfm>
3. TRB, *Linking Asset Management to Strategic Planning Processes: Best Practices from State Departments of Transportation*, Publication 1924, <http://pubsindex.trb.org/view.aspx?id=775715>
4. FHWA, *Beyond the Short Term Transportation Asset Management for Long-Term Sustainability, Accountability and Performance*, Publication 806, http://www.fhwa.dot.gov/asset/10009/tam_topr806.pdf
5. NCHRP, *Report 551: Performance Measures and Targets for Transportation Asset Management*, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_551.pdf
6. FHWA, *Integrating Asset Management into the Metropolitan Planning Process: A Peer Exchange*, https://www.fhwa.dot.gov/planning/processes/statewide/practices/asset_management/index.cfm
7. Midwest Transportation Knowledge Network, Data and Synthesis Report, <https://transportation.libguides.com/mtkn>
8. FTA, *Transit Asset Management Practices: A National and International Review* (June 2010), https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/TAM_A_National_and_International_Review_-_6.10_FINAL_0.pdf
9. TRB, *TCRP Synthesis publication 92: Transit Asset Condition Reporting: A Synthesis of Transit Practice*, http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_92.pdf

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.

SPS-16: Infrastructure Resiliency

State

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.



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

Background

Helpful online references and tools for this criterion include FHWA's [Climate Adaptation Website](#)¹ and FHWA's [Vulnerability Assessment Framework Website](#)².

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

- **"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.
- **"Extreme weather events"** refers to flooding, hurricanes, fires, droughts, and winter storms, for example.
- **"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.
- **"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.
- **"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).

Climate Change and Resiliency Vulnerability and Risk Assessments

The following steps are part of a process of identifying potential climate change and natural hazards, evaluating the vulnerabilities of infrastructure posed by those hazards and performing a risk assessment to estimate the likelihood of such an event happening.

Hazard Identification

An important first step in evaluating and addressing infrastructure resiliency is the identification of potential hazards to the infrastructure system, such as seismic events, relative sea level rise, storm activity/intensity, temperature and heat waves, precipitation events, lake levels, stream flow, volcanism, etc. Subsequent to the identification of potential hazards, agencies typically perform an assessment of locations (and transportation infrastructure) and their respective severity of risk relative to the hazards identified. Severity is typically stated in terms of not vulnerable/at-risk, potentially vulnerable/at-risk, or vulnerable/at-risk assets, with potentially vulnerable and at-risk being the generally preferred terms.

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).

The vulnerability assessment should include an assessment of all relevant natural hazards, not just climate related events. That said, FHWA's [Climate Adaptation website](#)¹ has a section dedicated to [Climate Change Vulnerability Assessment Framework website](#)² that has valuable tools and resources for performing this work.

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 they affect the surrounding community, metropolitan area, or state.

Scoring Requirements

Requirement SPS-16.1

1 point. Conduct System-Level Assessment of Potential Hazards

This scoring requirement incorporates the elements of the Hazard Identification topic discussed in the Background section of this criterion. 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, changes in stream flow, volcanism, etc.

Requirement SPS-16.2

2 or 3 points. Vulnerability Assessment

This scoring requirement incorporates the elements of the Vulnerability topic discussed in the Background section of this criterion. One of the following scores applies:

- **0 points.** The agency has not conducted a vulnerability assessment of its assets.
- **2 points.** The agency has identified locations potentially vulnerable or at risk of current and future hazards and has conducted a vulnerability assessment and considered hazard consequences for some of its planned, programmed, and existing facilities that were identified in the vulnerability assessment as potentially vulnerable and/or at risk.
- **3 points.** The agency has identified locations potentially vulnerable or at risk of current and future hazards and has conducted a vulnerability assessment and considered hazard consequences on most of its planned, programmed, and existing facilities that were identified in the vulnerability assessment as potentially vulnerable and/or at risk.

Requirement SPS-16.3

2 or 3 points. Risk Assessment

This scoring requirement incorporates the elements of the Risk Assessment topic discussed in the Background section of this criterion. 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.
- **3 points.** The agency has conducted a risk assessment and considered the consequences on most of its planned, programmed, and existing facilities throughout the transportation system.

Requirement SPS-16.4

2-4 points. Develop and Implement Adaptation and Resilience Strategies

Adaption and Resilience strategies are actions taken to respond to the vulnerabilities and risks associated with current and future hazards 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's [Climate Change & Impacts website](#)³, in TRB's *E-C152: Adapting Transportation to the Impacts of Climate Change*⁴, and FEMA's [Hazard Mitigation Planning Risk Assessment website](#)⁵. 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.
- **1 point.** The agency has developed, but not yet implemented, adaptation strategies to manage some of the impacts the agency can reasonably expect to occur.
- **2 points.** The agency has developed, but not yet implemented, adaptation strategies to manage most of the impacts the agency can reasonably expect to occur.
- **3 points.** The agency has developed and is implementing adaptation strategies to manage some of the impacts the agency can reasonably expect to occur based on its completed vulnerability and risk assessments.
- **4 points.** The agency has developed and is implementing adaptation strategies to manage most of the impacts the agency can reasonably expect to occur based on its completed vulnerability and risk assessments.

Requirement SPS-16.5

2 points. Coordinate with Partner Agencies

The agency regularly coordinates with partner agencies within its jurisdiction throughout the transportation planning process, to reduce barriers and further the prospects for implementation of strategies to address infrastructure resiliency. This coordination utilizes institutional mechanisms such as ad hoc or standing committees.

Requirement SPS-16.6

2 points. Prioritize Investments

The agency has a formal mechanism to evaluate and prioritize infrastructure improvements that are identified as part of the risks identified in SPS 16.2 and SPS-16.3 and the strategies identified in SPS-16.4.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Climate Adaptation website, http://www.fhwa.dot.gov/environment/climate_change/adaptation/
2. FHWA, Climate Change Vulnerability Assessment Framework website, http://www.fhwa.dot.gov/environment/climate_change/adaptation/adaptation_framework/
3. USDOT, Climate Change & Impacts website, <https://www.transportation.gov/sustainability/climate/climate-change-impacts>
4. TRB, E-C152: Adapting Transportation to the Impacts of Climate Change, <http://onlinepubs.trb.org/onlinepubs/circulars/ec152.pdf>
5. FEMA, Hazard Mitigation Planning Risk Assessment website, <http://www.fema.gov/hazard-mitigation-planning-risk-assessment>

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 transportation infrastructure. This could include studies on the vulnerability of specific areas.
4. Documentation of a risk assessment of infrastructure. This should address the process used, an assessment of likelihood, and the resulting assessment of risk.

SPS-17: Planning and Environmental Linkages

State

15 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.

This criterion is specifically focused on NEPA, however, an equivalent environmental review process is appropriate.

FHWA's Planning and Environmental Linkages (PEL) Program¹ represents a collaborative and integrated approach to transportation decision-making that 1) considers environmental, community, and economic goals early in the transportation planning process, and 2) uses the information, analysis, and products developed during planning to inform the environmental review process. The [PEL website](#)¹ is a resource that describes the connection between the goals and objectives of FHWA's Every Day Counts and their PEL program; includes a set of tools designed to help agencies identify areas where they can strengthen PEL; shares case studies that summarize state and metropolitan approaches to implementing PEL in transportation decision-making; provides an exhaustive set of resources on PEL legislation, regulations, guidance, and implementation; and provides links to available training and workshops.

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.

Scoring Requirements

Requirement SPS-17.1

2 points. Develop Goals and Objectives

The agency has developed landscape-level goals and objectives for linking system and corridor planning with NEPA documentation and implementing PEL Best Practices.

Requirement SPS-17.2

1-2 points. Document Linkages between System Planning and NEPA

Document 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 & FTA) 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.
- **1 point.** Undocumented procedures exist that cover all four of the bullets above, or documented procedures exist that cover one or two of the bullets above.
- **2 points.** Documented procedures exist that cover all four of the bullets above.

Requirement SPS-17.3

2 points. Executive Level Commitment

The agency can document communication from executive management to staff level regarding agency's commitment to strengthening planning and environment linkages. This might include, but is not limited to:

- Internal memoranda
- Management directives
- Policy statements
- Dedicated resources for integration (staff, funding, time, etc.)

Requirement SPS-17.4

2-3 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.
- **2 points.** NEPA practitioners are consulted occasionally but not systematically to help ensure materials are consistent with downstream needs as noted above.
- **3 points.** NEPA practitioners are fully integrated in the planning process to help ensure materials are consistent with downstream needs as noted above.

Requirement SPS-17.5

2 or 4 points. Apply NEPA Principles and Methods during System Planning

Planning processes, including long-range, corridor, and sub-area studies, feature components that use NEPA principles and methods and 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.

Examples of planning analysis and methods that could be incorporated into NEPA, include:

- Purpose and need or Goals and objectives statements
- Regional development and growth
- Local land use, growth management and development
- Population and employment
- general travel corridor and/or general mode(s) definition Basic description of the environmental setting Preliminary screening of alternatives and elimination of unreasonable alternatives Environmental mitigation activities
- Indirect and cumulative impacts assessment
- programmatic level mitigation system level measures to avoid, minimize or mitigate impacts of proposed transportation projects

One of the following scores applies:

- **0 points.** Planning processes, including long-range, corridor, and sub-area studies do not feature components that use NEPA principles and methods or include less than 4 of those listed above.
- **2 points.** Planning processes, including long-range, corridor, and sub-area studies, feature components that use NEPA principles and methods, including at least 4 of those listed above.

- **4 points.** Planning processes, including long-range, corridor, and sub-area studies, feature components that use NEPA principles and methods, including at least 6 of those listed above.

Requirement SPS-17.6

1-2 points. Demonstrate Sustainable Outcomes

Scoring is based on the following, cumulative requirements. The first requirement must be achieved to earn the second.

- **Requirement SPS-17.6a**

1 point. Include PEL Performance Measures

Planning and policy documents include PEL implementation performance measures such as decreased number of major design changes due to environmental factors; regulatory/resource agencies demonstrating a greater understanding of transportation planning process, etc. FHWA's *A Guide to Measuring Progress in Linking Transportation Planning and Environmental Analysis*² provides additional information on measuring PEL performance.

- **Requirement SPS-17.6b**

1 additional point. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in SPS-17.6a and show measurable advancement towards stated goals.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Planning and Environmental Linkages Website, <http://www.environment.fhwa.dot.gov/integ/index.asp>
2. FHWA, *A Guide to Measuring Progress in Linking Transportation Planning and Environmental Analysis*, http://environment.fhwa.dot.gov/integ/meas_progress.asp

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

3. Federal Register, 23 USC 168 Integration of Planning and the Environmental Review Process, <http://www.gpo.gov/fdsys/pkg/USCODE-2013-title23/pdf/USCODE-2013-title23-chap1-sec168.pdf>
4. Federal Register, 23 USC 169 Development of programmatic mitigation plans, <http://www.gpo.gov/fdsys/pkg/USCODE-2012-title23/pdf/USCODE-2012-title23-chap1-sec169.pdf>
5. Federal Register, 23 CFR 450.212 and 450.318 Transportation Planning Studies and Project Development, <http://www.gpo.gov/fdsys/pkg/CFR-2014-title23-vol1/pdf/CFR-2014-title23-vol1-sec450-212.pdf> and <http://www.gpo.gov/fdsys/pkg/CFR-2014-title23-vol1/pdf/CFR-2014-title23-vol1-sec450-318.pdf>
6. FHWA, Guidance on Using Corridor and Subarea Planning to Inform NEPA (April 2011), http://www.environment.fhwa.dot.gov/integ/corridor_nepa_guidance.pdf.
7. Federal Register, Appendix A to 23 CFR Part 450—Linking the Transportation Planning and NEPA processes (February 2007), <https://www.gpo.gov/fdsys/granule/CFR-2016-title23-vol1/CFR-2016-title23-vol1-part450-appA-493.pdf>
8. FHWA, Strategic Sustainability Performance Plan (SSPP) (2011) https://www.transportation.gov/sites/dot.gov/files/docs/SSPP_2011.pdf

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
PD-08: Stormwater Quality and Flow Control	PD-08
PD-09: Ecological Connectivity.....	PD-09
PD-10: Pedestrian Facilities	PD-10
PD-11: Bicycle Facilities.....	PD-11
PD-12: Transit and HOV Facilities	PD-12
PD-13: Freight Mobility	PD-13
PD-14: ITS for System Operations.....	PD-14
PD-15: Historic, Archaeological, and Cultural Preservation.....	PD-15
PD-16: Scenic, Natural, or Recreational Qualities	PD-16
PD-17: Energy Efficiency	PD-17
PD-18: Site Vegetation, Maintenance and Irrigation	PD-18
PD-19: Reduce, Reuse and Repurpose Materials	PD-19
PD-20: Recycle Materials	PD-20
PD-21: Earthwork Balance	PD-21
PD-22: Long-Life Pavement Design.....	PD-22
PD-23: Reduced Energy and Emissions in Pavement Materials.....	PD-23
PD-24: Permeable Pavement	PD-24
PD-25: Construction Environmental Training	PD-25

Project Development (continued)

PD-26: Construction Equipment Emission Reduction.....	PD-26
PD-27: Construction Noise Mitigation	PD-27
PD-28: Construction Quality Control Plan	PD-28
PD-29: Construction Waste Management.....	PD-29
PD-30: Low Impact Development.....	PD-29
PD-31: Infrastructure Resiliency Planning and Design	PD-29
PD-32: Light Pollution.....	PD-29
PD-33: Noise Abatement.....	PD-29

PD-01: Economic Analyses

2-5 points

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 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 the number of disenfranchised communities, jobs, in worker income, and in gross domestic product (GDP) or gross state product (GSP) that results in future years as a consequence of the transportation programs or projects. For more information, review the FHWA’s SHRP2 [Solutions Easier to Use Tools for Improved Economic Analysis website](#)¹.

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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, SHRP2 Solutions Easier to Use Tools for Improved Economic Analysis website, http://www.fhwa.dot.gov/goshp2/solutions/capacity/c03_c11/economic_analysis_tools
2. U.S. DOT, TIGER BCA Resource Guide (2014), <http://www.dot.gov/policy-initiatives/tiger/tiger-bca-resource-guide-2014>

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

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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Life-Cycle Cost Analysis Primer (2002) at <https://www.fhwa.dot.gov/asset/lcca/010621.pdf>
2. FHWA, Life-Cycle Cost Analysis in Pavement Design - Interim Technical Bulletin (1998), Publication No. FHWA-SA-98-079 at http://www.wsdot.wa.gov/NR/rdonlyres/7A7CC34A-6336-4223-9F4A-22336DD26BC8/0/LCCA_TB.pdf
3. FHWA, RealCost software, at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/lccasoft.cfm>
4. NCHRP, Report 483 – Bridge Life-Cycle Cost Analysis (2003) at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_483.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. 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

1-10 points

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

Sustainability Linkage

Implementing Context Sensitive Solutions 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 incorporated in both a project development and public involvement process and the outcomes of using that process in design (per FHWA's [Context Sensitive Solutions website](#)¹). The outcomes are referred to as Context Sensitive Design (CSD) in this document.

Definitions

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

- **“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. Some of the key principles of a CSS process are that it:
 - Engages stakeholders (not just involves them),
 - Embraces a multimodal approach (this is not mentioned anywhere in the article and is key to CSS/CSD),
 - Serves and respects the environmental and social context of the transportation network, and
 - Applies to all of the activities of the transportation agency.

The FHWA office of Office of Project Development & Environmental Review develops and implements programs and activities that advance environmental stewardship and streamlining for FHWA-funded projects, through the application of National Environmental Policy Act (NEPA) principles and the NEPA process. CSS/D is a part of those principles and processes.

- **Context Sensitive Design (CSD)”** is a model for transportation project development. Proposed transportation projects must be planned not only for its physical aspects as a facility serving specific transportation objectives, but also for their effects on the aesthetic, social, economic and environmental values, needs, constraints and opportunities in a larger community setting. Projects designed using this model:
 - Are in harmony with the community and preserve the environmental, scenic, aesthetic, historic, and natural resource values of the area.
 - Are safe for all users.
 - Solve problems that are agreed upon by a full range of stakeholders.

- Meet or exceed the expectations of both designers and stakeholders, thereby adding lasting value to the community, the environment, and the transportation system.
- Demonstrate effective and efficient use of resources (people, time, budget,) among all parties.
- **“Context Sensitive Project Development”** in this document, refers to the development of a project, from planning through design using the process of CSS and resulting in CSD outcomes. The FHWA NEPA project development process is an approach to balanced transportation decision-making that takes into account the potential impacts on the human and natural environment and the public’s need for safe and efficient transportation. The use of CSS with a CSD outcome can be an integral part of this process.
- **“Objectionable views”** are defined as views from the project that are unpleasant or offensive and that arouse distaste or opposition from the community. These views should be defined through a CSS process by community stakeholders.

Relationship with Other Criteria

Several key outcomes of a CSD process are covered in other criteria and are not repeated here. Please refer to the following criteria in addition to PD-03:

- PD-07: Habitat Restoration
- PD-09: Ecological Connectivity
- PD-10: Pedestrian Facilities
- PD-11: Bicycle Facilities
- PD-12: Transit and HOV Facilities
- PD- 15: Historic, Archeological, and Cultural Preservation
- PD-16: Scenic, Natural, or Recreational Qualities
- PD-18: Site Vegetation, Maintenance and Irrigation
- PD-32: Light Pollution
- PD-33: Noise Abatement

Scoring Requirements

Requirement PD-03.1

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

Evidence exists 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, the six-step process defined below should be scaled accordingly.

A NEPA-based project development process generally follows the six-step CSS framework described in National Cooperative Highway Research Program (NCHRP) [*Report 480: A Guide to Best Practices for Achieving Context Sensitive Solutions*](#)² and [*NCHRP Report 642: Quantifying the Benefits of Context Sensitive Solutions*](#)³, or an equivalent process. [*NCHRP Report 480: A Guide to Best Practices for Achieving Context Sensitive Solutions*](#)² describes a general six-step 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. Deploy a Multi-disciplinary Team

Project Development features a “cradle-to-grave,” project team that includes 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 throughout project development and who work together to achieve the desired CSS-based vision for the project.

Requirement PD-03.3

1 point. Create Public “Champions”

As a result of CSS performed during the project development process, external “champions” for the project are created in the affected community who are engaged and proactive in supporting the project and who advocate for the project.

Requirement PD-03.4

1 point. Leverage Visualization Tools

Visualization techniques, ranging from project alternative renderings to photo-simulations, are used to assist in the decision regarding design choices.

Requirement PD-03.5

1 point. Design to the Scale of the Project

The appropriate scale of the project is considered and features that adjust the scale of the roadway to the context are incorporated, such as median islands, pedestrian refuge islands, curb bump-outs, bus pull-outs, or other similar features.

Requirement PD-03.6

1-2 points. Obstruct Objectionable or Distracting Views

Points are achieved by removing or obstructing objectionable or distracting views. This may be accomplished through the use of construction screening, vegetative screens, fences, or other similar means. Points shall be achieved per the Table PD-03.6.A. Points are **not** cumulative; rather the highest point value should be used.

TABLE PD-03.6.A. AVAILABLE POINTS FOR OBSTRUCTING OBJECTIONABLE OR DISTRACTING VIEWS

Requirement	No. Points	Requirement Description
PD-03.6a	1	Enhance Features. Obstruct objectionable views during construction.
PD-03.6b	2	Enhance Features. Obstruct objectionable views permanently.

Requirement PD-03.7

1 point. Incorporate Appropriate Context Design Features

Credit is achieved by integrating context sensitive aesthetic treatments, as determined by participating stakeholders, into the design of transportation facilities. Examples may include street furniture, signage, community identifiers, lighting, or appurtenances. Community murals identified as part of a roadway project by the local community that are incorporated into the project would also qualify.

Requirement PD-03.8

1 point. Bridge and Structural Element Aesthetics

Points are achieved if aesthetics for these structural items are incorporated into the design. Structural elements include bridges, sound walls, box culverts, large headwalls, guard rails, and retaining walls. Elements that should be considered when evaluating the structure's aesthetics include Visual Design Elements and Aesthetic Design Qualities. Visual Design Elements include: line, shape, form, color, and texture. Aesthetic Design Qualities include: order, proportion, rhythm, harmony, balance, contrast, scale, illusion, and unity.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Context Sensitive Solutions website, <http://contextsensitivesolutions.org/>
2. NCHRP, Report 480: *A Guide to Best Practices for Achieving Context Sensitive Solutions* (2002), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_480a.pdf
3. NCHRP, Report 642: *Quantifying the Benefits of Context Sensitive Solutions* (2009), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_642.pdf

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

4. FHWA, Environmental Review Toolkit website, <https://www.environment.fhwa.dot.gov/index.asp>

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.
2. Contract Documents.
3. Technical Memoranda and Reports.

PD-04: Highway and Traffic Safety

1-10 points

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 on the [FHWA website](#)¹.

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](#)² and the [Human Factors Guideline for Road Systems](#)³. 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](#)² and the [Human Factors Guideline for Road Systems](#)³).

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](#)². 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](#)⁴, 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](#)⁵ guide 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 requirements:

- **Requirement PD-04.3a**

1 point. Establish the Project Type as Defined in the HSM

Establish the project type, as defined in the HSM, 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.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Safety website, <http://safety.fhwa.dot.gov/rsa>
2. AASHTO, Highway Safety Manual, <http://www.highwaysafetymanual.org> and https://bookstore.transportation.org/collection_detail.aspx?ID=135
3. NCHRP, Human Factors Guideline for Road Systems (NCHRP Report 600 series), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_600Second.pdf
4. AASHTO, SafetyAnalyst, <http://safetyanalyst.org/>
5. FHWA, Integrating the HSM into the Highway Project Development Process (2012), https://safety.fhwa.dot.gov/hsm/hsm_integration/hsm_integration.pdf

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

6. FHWA, *Road Safety Audit Guidelines*, 2006, http://safety.fhwa.dot.gov/rsa/guidelines/documents/FHWA_SA_06_06.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 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

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.



Affected Triple Bottom Line Principles

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.

Resources

None referenced.

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

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 requirements. The first requirement 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 planning, design, construction, and operations and maintenance. 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 website](#)¹.

- **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 operations and maintenance. To earn credit, this ECTS must be used on this project from planning through construction and handed off to maintenance and operations.

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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, Center for Environmental Excellence website, <http://environment.transportation.org/>

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

1-7 points

Goal: Avoid, minimize, rectify, reduce, 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.

- **“Mitigation”** – Per the Council on Environmental Quality (CEQ)’s *NEPA Act, Part 1508 Terminology and Definitions*¹, mitigation includes:
 - Avoiding the impact altogether by not taking a certain action or parts of an action.
 - Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
 - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
 - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
 - Compensating for the impact by replacing or providing substitute resources or environments.

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 table PD-07.1.A on the next page. Points are **not** cumulative; rather the highest point value earned should be used.

TABLE PD-07.1.A. POINTS AND REQUIREMENTS FOR HABITAT RESTORATION

Requirement	Points	Method
PD-07.1a	1	Minimize Impacts to Habitat. 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.
PD-07.1b	2	Avoid or Eliminate Impacts to Habitat. 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. Alternatively, the project can eliminate the impacts to habitat as part of the project.
PD-07.1c	2	Relocate Species. For project required to mitigate habitat impacts through relocation, selectively relocate impacted species prior to construction where doing so has been documented in surveys, to prevent loss of species.
PD-07.1d	3	Rectify or Compensate Habitat 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-07.1e	3	Rectify or Compensate Habitat Features. For projects not required to mitigate habitat impacts, implement a habitat restoration effort that mitigates for the habitat of non-listed, Candidate species under the Federal Endangered Species Act (see the Federal Register's Recovery Crediting Guidance ²). For example, provide nesting locations for birds or other wildlife.

Requirement PD-07.2

1-2 points. Avoid or Minimize Impacts to High Quality Aquatic Resources (HQAR)

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-07.2.A. POINTS AND REQUIREMENTS FOR HABITAT RESTORATION

Requirement	Points	Method
PD-07.2a	1	Minimize Impacts to HQAR. Completely avoid HQAR as defined by the US Army Corp of Engineers <u>and</u> provide a buffer less than 100-feet.
PD-07.2b	2	Avoid Impacts to HQAR. Completely avoid HQAR as defined by the US Army Corp of Engineers <u>and</u> provide a buffer of at least 100-feet.

Requirement PD-07.3

1-2 points. Avoid or Minimize Impacts to High Quality Environmental Resources

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

TABLE PD-07.3.A. POINTS AND REQUIREMENTS FOR HABITAT RESTORATION

Requirement	Points	Method
PD-07.3a	1	Minimize Impacts to High Quality Environmental Resources. Show that an effort has been made to modify the alignment and/or project cross-sections to significantly minimize the impacts to high quality environmental resources, such as sites with threatened or endangered species, 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. Potential methods of avoidance include the use of retaining wall, berms, plantings, and reducing right of way footprint.
PD-07.3b	2	Avoid Impacts to High Quality Environmental Resources. Show that an effort has been made to modify the alignment and/or project cross-sections to significantly minimize the impacts to high quality environmental resources, such as sites with threatened or endangered species, 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. Potential methods of avoidance include re-routing of the alignment, using retaining wall to minimize right of way takes, or bridging of the resource.

Resources

The following resources are referenced in this criterion and consolidated here:

1. CEQ, *NEPA Act, Part 1508 Terminology and Definitions*, <https://www.fws.gov/r9esnepa/CEQNEPARegs/1508.pdf>
2. Federal Register, *Recovery Crediting Guidance*, 73 Fed Reg. 44761, (2008), <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 Quality and Flow Control

1-6 points

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.

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

See PD-30: Low Impact Development for scoring of BMPs used on the project.

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 six points total.

Requirement PD-08.1

1-3 points. Water Quality Treatment

Treat target pollutants from at least 80 percent of the total annual runoff volume. To calculate the points earned for this scoring requirement, follow Steps 1 through 4 below:

- Step 1** Calculate the Amount of Runoff Treated (as a percentage of annual volume).
- Step 2** Determine which target pollutants the project's water quality treatment system is designed to treat (sediments or sediments, metals and other basin-specific pollutants).
- Step 3** Calculate the Target Impervious Surface Area Treated as a percentage of added impervious surface area). For retrofit projects, use Table PD-08.1.A on the next page to calculate the equivalent value to use for Target Impervious Surface Area.

See Next Page

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

Existing Impervious on Project (acres)	% of Existing Impervious Area Treated	Equivalent Target Impervious Surface Area Treated (% of Added)
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%

Step 4 Use the Amount of Runoff Treated from Step 1, the Target Pollutants from Step 2, and the Target Impervious Surface Area Treated from Step 3 in Table PD-08.1.B to calculate the points earned for water quality treatment.

TABLE PD-08.1.B. POINTS EARNED FOR WATER QUALITY TREATMENT

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

¹ – Other basin-specific pollutant of concern is targeted

Requirement PD-08.2

1-3 points. Flow Control

Manage the flow from at least 80 percent of the total annual runoff volume. To calculate the points earned for this scoring requirement, follow Steps 5 through 8 below (the steps for this scoring requirement start at 5 to avoid confusion with scoring requirement PD-08.1).

Step 5 Calculate the Amount of Runoff Managed through flow control (as a percentage of total volume).

Step 6 Determine if the flow control standard used is based on peak rates or flow durations.

Step 7 Calculate the Target Impervious Surface Area Managed (as a percent of Added Impervious Surface Area). For retrofit projects, use Table PD-08.2.A to calculate the equivalent value to use for Target Impervious Surface Area.

TABLE PD-08.2.A. RETROFIT PROJECTS – CALCULATING EQUIVALENT TARGET IMPERVIOUS SURFACE AREA

Existing Impervious on Project (acres)	% of Existing Impervious Area Managed	Equivalent Target Impervious Surface Area Managed (% of Added)
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%

Step 8 Use the Amount of Runoff Managed from Step 5, the Flow Control Standard Used from Step 6, and the Target Impervious Surface Area Treated from Step 7 in Table PD-08.2.B to calculate the points earned for flow control management.

TABLE PD-08.2.B. POINTS EARNED FOR FLOW CONTROL MANAGED

(Step 5)	(Step 6)	(Step 7)	(Step 8)
Amount of Runoff Managed (% of Total Volume)	Flow Control Standard Used	Target Imp. Surface Area Managed (% of Added)	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

Resources

None referenced.

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

1-4 points

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. Some examples of restorative features include: <ul style="list-style-type: none"> • Construction of fish ladders. • Acquisition of parcels within the watershed or parcels identified by resource agencies that provide special protection and enhancement of these habitats.

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.

Requirement PD-09.2

1 point. Advanced Consultation and Integration with Broader Ecological Plans

The project team went above and beyond current consultant requirements by engaging natural resource and regulatory agencies throughout the planning process and by ensuring consistency with broader (metropolitan or statewide) planning goals and objectives.

Resources

None referenced.

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 Facilities

1-3 points

Goal: Provide safe, comfortable, convenient, and connected pedestrian facilities for people of all ages and abilities within the project footprint.

Sustainability Linkage

Planning and designing for increased pedestrian activity supports all of the triple bottom line sustainability principles by improving the safety for all users, enhancing livability and quality of life in communities, improving access to economic and educational opportunities and essential services, supporting local businesses and economic development, promoting physical activity and public health, and reducing vehicle emissions.



Background and Scoring Requirements

Background

To receive credit for this criterion, the project must enhance existing pedestrian facilities or provide new pedestrian facilities that are context-sensitive and appropriate. Reconstruction of pedestrian facilities in kind when widening roadways and/or bridges does not meet the requirements of this criterion, although this is still encouraged.

Applicable Pedestrian Guidelines

Per the FHWA Memorandum: [Bicycle and Pedestrian Facility Design Flexibility](#)¹ and the [Questions & Answers about Design Flexibility for Pedestrian and Bicycle Facilities](#)², FHWA recommends a flexible approach to pedestrian facility design. FHWA's [Small Town and Rural Multimodal Networks](#)³ and [Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#)⁴ address designing multimodal networks. The AASHTO [Guide for the Planning, Design, and Operation of Pedestrian Facilities](#)⁵ is the primary national resource for planning, designing, and operating pedestrian facilities. The National Association of City Transportation Officials' (NACTO) [Urban Street Design Guide](#)⁶, and the Institute of Transportation Engineers (ITE) [Designing Urban Walkable Thoroughfares: A Context Sensitive Approach](#)⁷ guide builds upon the flexibilities provided in the AASHTO guide and can be used when designing safe and convenient pedestrian facilities. The NACTO guide does not supersede compliance with 2010 Americans with Disabilities Act (ADA) [Standards for Accessible Design](#)⁸, the [Public Rights-Of-Way Accessibility Guidelines](#)⁹ (PROWAG), and [The Manual on Uniform Traffic Control Devices for Streets and Highways](#)¹⁰ (MUTCD).

Qualifying Features

For pedestrian facilities to meet scoring requirements, improvements must be context sensitive and appropriate, go beyond minimum requirements, meet the needs of users of all ages and abilities, and include features that are safe, comfortable, convenient, and connected, such as those listed below.

- Examples of **Safe and Comfortable** features include:
 - Increased sidewalk width – an increased width allows for pedestrian amenities without impeding on the walkway width and increases pedestrian comfort.

- Improved intersection and midblock crossing design for pedestrians – such as countdown signal heads, leading pedestrian intervals, narrower lanes, pedestrian medians, pedestrian hybrid beacons, raised crosswalks, and curb extensions.
- Trees – provide a physical buffer between pedestrians and moving vehicles, while also providing shade and potentially reducing traffic speeds.
- Sufficient lighting on all sidewalks and crosswalks within the project footprint.
- Landscaping, art, furniture, and social amenities (such as parklets, sidewalk cafes, and other gathering spaces) as appropriate to promote the use of the facilities and create a comfortable, pleasing facility.
- Examples of **Convenient and Connected** features include:
 - New facilities that connect to existing facilities in the vicinity as part of the project.
 - Infrastructure that connects homes to places of employment, schools, shopping, services, transit, and recreation areas.

Scoring Requirements

Prerequisite PD-10.1P

0 points. Meet ADA Requirements

Facilities must meet ADA requirements to receive credit. No credit is given for improvements and it is assumed that retrofits to existing facilities will bring them up to required ADA standards because it is required by law.

Requirement PD-10.1

1 point. Install Missing Pedestrian Connections

Review pedestrian master plans and other relevant local, regional, and state documents to determine if the project presents an opportunity to incorporate missing pedestrian connections AND fill gaps in the pedestrian network as part of the project.

Requirement PD-10.2

1-2 points. Install Safe, Comfortable, Convenient, and Connected Pedestrian Features

One of the following requirements may apply:

- **Requirement PD-10.2a**

1 point. Enhance Existing Pedestrian Facilities

Implement new or improve existing pedestrian facilities to include both safe and comfortable features and convenient and connected features. Current facilities do not qualify for this criterion without additional effort, such as upgrades, improvements, or construction of new features. The attempt to enhance pedestrian transportation should be deliberate and a direct result of the project. No points are earned for improvements and retrofits to bring existing facilities into ADA compliance. Examples of enhancements include curb extensions, pedestrian crossing islands, adding a landscaped buffer to an existing sidewalk, and making intersections safer and more comfortable to navigate on foot.

OR

- **Requirement PD-10.2b**

2 points. Develop New Pedestrian Facilities

Design and construct new pedestrian facilities that include both safe and comfortable features and convenient and connected features. New facilities include physical or constructed changes to the roadway structure, dimensions, or

form that provide pedestrian access within the right-of-way (ROW) or roadway corridor. Examples include adding a pedestrian hybrid beacon to improve crossings, implementing a road diet that narrows crossing distances, or adding traffic calming elements to improve pedestrian safety.

Reconstruction of facilities with the same features does not meet this requirement (e.g. widening road and replacing sidewalk, or constructing a new bridge with the same sidewalk as a prior bridge, etc.)

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, *Bicycle and Pedestrian Facility Design Flexibility* (2013), https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_flexibility.cfm
2. FHWA, *Questions & Answers about Design Flexibility for Pedestrian and Bicycle Facilities* (2014), https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_flexibility_qa.cfm
3. FHWA, *Small Town and Rural Multimodal Networks*, December 2016, https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf
4. FHWA, *Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts*, August 2016, https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/fhwahep16055.pdf
5. AASHTO, *Guide for the Planning, Design, and Operation of Pedestrian Facilities, First Edition* (2004), https://bookstore.transportation.org/item_details.aspx?id=119
6. NACTO, *Urban Street Design Guide* (2013), <https://nacto.org/publication/urban-street-design-guide/streets/>
7. ITE, *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* (2010), <http://library.ite.org/pub/e1cff43c-2354-d714-51d9-d82b39d4dbad>
8. United States Department of Justice, *Americans with Disabilities Act (ADA) Standards for Accessible Design* (2010), https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards_prt.pdf
9. United States Access Board, *Public Rights-of-Way Accessibility Guidelines (PROWAG)* (2011), <https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines>
10. FHWA, *Manual on Uniform Traffic Control Devices for Streets and Highways* (2009 with Revisions 1 and 2, May 2012), <https://mutcd.fhwa.dot.gov/>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

11. FHWA, *Bicycle & Pedestrian Design Guidance website* (2015), http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/
12. United States Access Board, *Shared Use Paths Guidelines and Standards* (2011) at <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks>
13. FHWA, PEDSAFE website, <http://www.pedbikesafe.org/PEDSAFE/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. 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 Facilities

1-3 points

Goal: Provide safe, comfortable, convenient, and connected bicycling facilities within the project footprint.

Sustainability Linkage

Planning and designing for increased bicycling supports all of the triple bottom line sustainability principles by improving the safety for all users, enhancing livability and quality of life in communities, improving access to economic and educational opportunities and essential services, supporting local businesses and economic development, promoting physical activity and public health, and reducing vehicle emissions.



Background and Scoring Requirements

Background

To receive credit for this criterion, the project must enhance existing bicycle facilities or provide new high quality bicycle facilities that meet the needs of people of all ages and abilities, and are context-sensitive and appropriate (not just adding facilities where they are not warranted). Reconstruction of bicycle facilities in kind when widening roadways and/or bridges does not meet the requirements of this criterion, although this is still encouraged.

Applicable Bicycle Guidelines

Per the FHWA Memorandum: [Bicycle and Pedestrian Facility Design Flexibility](#)¹ and the [Questions & Answers about Design Flexibility for Pedestrian and Bicycle Facilities](#)², FHWA recommends a flexible approach to bicycle facility design. The AASHTO [Guide for the Development of Bicycle Facilities](#)³ is the primary national resources for planning, designing, and operating bicycle facilities. The National Association of City Transportation Officials' (NACTO) [Urban Bikeway Design Guide](#)⁴, NACTO [Urban Street Design Guide](#)⁵, and the Institute of Transportation Engineers (ITE) [Designing Urban Walkable Thoroughfares: A Context Sensitive Approach](#)⁶ guide builds upon the flexibilities provided in the AASHTO guide and can be used when designing safe and convenient bicycle facilities. The NACTO guides do not supersede compliance with 2010 Americans with Disabilities Act (ADA) [Standards for Accessible Design](#)⁷, the [Public Rights-Of-Way Accessibility Guidelines](#)⁸ (PROWAG), and [The Manual on Uniform Traffic Control Devices for Streets and Highways](#)⁹ (MUTCD). Additional FHWA resources include FHWA's [Small Town and Rural Multimodal Networks](#)¹⁰, [Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#)¹¹, and the [Separated Bike Lane Planning and Design Guide](#)¹².

Qualifying Features

For bicycle facilities to meet scoring requirements, improvements must be context sensitive and appropriate, go beyond minimum requirements, meet the needs of users of all ages and abilities, and include features that are safe, comfortable, convenient, and connected, such as those listed below.

- Examples of **Safe and Comfortable** features include:
 - Bicycle-friendly stormwater drains (grates)

- Resurfaced bike lanes
- Traffic calming features
- Buffered Bike Lanes/ Contra-Flow Bike Lanes/ Left-Side Bike Lanes
- Separated Bike Lanes (also known as Cycle Tracks and Protected Bike Lanes)
- Intersection treatments such as Bike Boxes, Median Refuge Islands, and Through Bike Lanes
- Separation between high-speed/high-volume traffic and bicyclists, such as
 - Buffered and/or separated bike lanes
 - Parallel bike routes (bike boulevards or bikeways)
 - Shared-Use paths
 - Dedicated bicycle bridges and tunnels
- Bicycle signals, signing, and pavement marking, such as
 - Flashing beacons
 - Signal detection and actuation
 - Colored pavement
 - Bike route wayfinding
- Landscaping specifically intended to enhance bicycle facilities
- Lighting
- Examples of **Convenient and Connected** features include:
 - Parking and bikeshare docks (except bicycle amenities at park-and-ride lots, bicycle parking is included in PD-12: Transit and HOV Facilities)
 - End-of-trip facilities as appropriate to promote the use of the bicycle facilities
 - Facilities that connect homes to places of employment, schools, shopping, and essential services such as health care, transit, and recreation areas
 - New facilities that connect to existing bike facilities as part of the project (for example by linking to a regional trail system)

Scoring Requirements

Requirement PD-11.1

1 point. Fill Gaps in Bicycle Network

Review bicycle master plans and other relevant local, regional, and state documents to determine if the project presents an opportunity to incorporate missing bicycle connections AND fill gaps in the bicycle network as part of the project. High traffic volumes and speeds should not be used as justification for not accommodating bicyclists because destinations may be located along these routes and many of these roadways are the only linkages that connect different parts of communities.

Requirement PD-11.2

1-2 points. Install Safe, Comfortable, Convenient, and Connected Bicycle Features

One of the following requirements may apply:

- **Requirement 11.2a**

1 point. Enhance Existing Bicycle Facilities

Implement new features or enhance existing bicycle facilities to include both safe and comfortable features and convenient and connected features. Current facilities do not qualify for this criterion without additional upgrades, improvements, or construction of new bicycle-focused features. The attempt to enhance bicycle

transportation should be deliberate and a direct result of the project. One way that an existing bicycle facility can be enhanced is to design and implement improvements at intersections, driveways, and other potential conflict points. Providing greater separation between bicyclists and high speed traffic also enhances an existing facility.

OR

- **Requirement PD-11.2b**

2 points. Develop New Bicycle Facilities

Design and construct new bicycle facilities that include both safe and comfortable features and convenient and connected features. New facilities include physical or constructed changes to the roadway structure, dimensions, or form that provide bicycle access within the right-of-way (ROW) or roadway corridor. To earn points, 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. Reconstruction of facilities with the same features does not meet this requirement (e.g. widening road and replacing bike lane, or constructing a new bridge with the same bicycle facilities as a prior bridge, etc.) Transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient bicycling facilities.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, *Bicycle and Pedestrian Facility Design Flexibility* (2013), https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_flexibility.cfm
2. FHWA, *Questions & Answers about Design Flexibility for Pedestrian and Bicycle Facilities* (2014), https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_flexibility_qa.cfm
3. AASHTO, *Guide for the Development of Bicycle Facilities*, 4th Edition (2012), https://bookstore.transportation.org/item_details.aspx?ID=1943
4. NACTO, *Urban Bikeway Design Guide, Second Edition* (2014), <https://nacto.org/publication/urban-bikeway-design-guide/>
5. NACTO, *Urban Street Design Guide* (2013), <https://nacto.org/publication/urban-street-design-guide/>
6. ITE, *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* (2010), <http://library.ite.org/pub/e1cff43c-2354-d714-51d9-d82b39d4dbad>
7. United States Department of Justice, *Americans with Disabilities Act (ADA) Standards for Accessible Design* (2010), https://www.ada.gov/regs2010/2010ADASTandards/2010ADASTandards_prt.pdf
8. United States Access Board, *Public Rights-of-Way Accessibility Guidelines (PROWAG)* (2011), <https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines>
9. FHWA, *Manual on Uniform Traffic Control Devices for Streets and Highways* (2009 with Revisions 1 and 2, May 2012), <https://mutcd.fhwa.dot.gov/>
10. FHWA, *Small Town and Rural Multimodal Networks* (2016), https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf
11. FHWA, *Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts* (2016), https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/fhwahep16055.pdf

12. FHWA, Separated Bike Lane Planning and Design Guide (2015),
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/separatedbikelane_pdg.pdf

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

13. FHWA, Separated Bike Lane Planning and Design Guide (2015),
http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm
14. FHWA, Bicycle & Pedestrian Design Guidance website (2015),
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/index.cfm
15. United States Access Board, *Shared Use Paths* Guidelines and Standards (2011),
<https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths>
16. FHWA, BIKESAFE Bicycle Safety and Countermeasure Selection System,
<http://www.pedbikesafe.org/bikesafe/>

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

Goal: Promote the use of public transit and carpools in communities by dedicating existing facilities to those uses, upgrading existing lanes, or providing new transit and high occupancy vehicle (HOV) facilities.



Sustainability Linkage

Promoting transit and HOV use supports all of the triple bottom line sustainability principles by expanding modal choices while reducing traffic congestion, commuting costs, 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](#)¹ (CBRT), FTA's [TCRP 90, Bus Rapid Transit](#)², and AASHTO's [Guide for High-Occupancy Vehicle \(HOV\) Facilities](#)³.

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 .

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FTA, from Characteristics of Bus Rapid Transit for Decision-Making (CBRT), <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/CBRT.pdf>
2. Diaz and Hinebaugh, TCRP 90, Bus Rapid Transit, 2009, http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_90v1fm.pdf
3. AASHTO, Guide for High-Occupancy Vehicle (HOV) Facilities, 3rd Edition, 2004, https://bookstore.transportation.org/item_details.aspx?ID=114

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

4. NACTO, Transit Street Design Guide (2016), <https://nacto.org/publication/transit-street-design-guide/>

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.
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

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

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 physical capacity increases.



Affected Triple Bottom Line Principles

Background and Scoring Requirements

Background

Include Intelligent Transportation System (ITS) applications listed in the ITS Joint Program Office (JPO), Office of the Assistant Secretary for Research and Technology (OST-R) [ITS Applications Overview website](#)¹ or equivalent source (also see FHWA's [Office of Operations website](#)²). Table PD-14.1.A lists the standard ITS applications and FHWA and ITS JPO website categories allowable for this criterion. All applications installed should be compliant with owner and/or state ITS architecture(s) (inter-operability). Visit the aforementioned website for more information on each of these applications.

The following list from the OST-R [Connected Vehicle Applications website](#)³ describes vehicle technologies that are being developed and researched to address real-world problems:

- **“Vehicle-to-Vehicle (V2V) Communications for Safety:** This research investigates key questions such as are vehicle based safety applications using V2V communications effective and do they have benefits. Research is designed to determine whether regulatory action by the National Highway Transportation Safety Administration is warranted to speed the adoption of these safety capabilities.
- **Vehicle-to-Infrastructure (V2I) Communications for Safety:** This research investigates similar questions about V2I communications, with an initial focus on applications based on the relay of traffic signal phase and timing information to vehicles. The purpose is to accelerate the next generation of safety applications through widespread adoption of V2I communications.
- **Agency Data:** This research assesses what traffic, transit and freight data are available today from various sources, and consider how to integrate data from vehicles acting as "probes" in the system. The goal is to accelerate the adoption of transportation management systems that can be operated in the safest, most efficient and most environmentally friendly way possible.
- **Mobility:** This research examines what technologies can help people and goods effortlessly transfer from one mode of travel (car, bus, truck, train, etc.) or route to another for the fastest and most environmentally friendly trip. The research seeks to make cross-modal travel truly possible for people and goods, and enable agencies and companies to manage their systems in light of the fact that people and goods will be changing modes often.

- **Road Weather Management:** This research considers how vehicle-based data on current weather conditions can be used by travelers and transportation agencies to enable decision-making that takes current weather conditions and future weather forecasts into account.
- **Environment:** This research explores how to enable transportation managers to manage the transportation network in a manner that better accounts for environmental impact.

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 PAGES)

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 Early Warning System Evacuation & Re-Entry Management Emergency Traveler Information Temporary Incident Management
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) In-Vehicle Systems (IVS) In-Terminal/Wayside Dynamic Parking Internet/Wireless 511
PD-14.1e	1	Information Management	Data Archiving
PD-14.1f	1	Lane Management	HOV Facilities Reversible Flow Lanes Congestion Pricing Lane Control Variable Speed Limits Emergency Evacuation Transit Signal Priority

Requirement	Points	Category	Allowable Applications (Install 1 or More per Category)
PD-14.1g	1	Ramp Control	Ramp Metering Ramp Closures Priority Access
PD-14.h	1	Road Weather Management	Pavement Conditions Atmospheric Conditions Water Level Fixed Winter Maintenance Mobile Winter Maintenance Bridge Anti-Icing Systems
PD-14.i	1	Surveillance	Traffic Surveillance Infrastructure Surveillance
PD-14.1j	1	Traffic Control	Adaptive Signal Control Advanced Signal Systems Special Events Vehicle Restrictions
PD-14.1k	1	Traffic Incident Management	Response Routing Service Patrols
PD-14.1l	1	Traveler Information	Internet/Wireless 511
PD-14.1m	1	Crash Prevention and Safety	Highway-Rail Crossing Warning Systems Active Collision Warning Active Animal Warning
PD-14.1n	1	Work Zone Management	Temporary Traffic Management Lane Control Variable Speed Limits Speed Enforcement Intrusion Detection Road Closure Management Queue Warning Systems
PD-14.1o	1	Emerging Technologies	Ongoing Research Applications

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. Office of the Assistant Secretary for Research and Technology (OST-R), ITS Applications Overview website, <https://www.standards.its.dot.gov/LearnAboutStandards/ApplicationAreas>
2. FHWA, Operations website at <http://ops.fhwa.dot.gov>
3. Office of the Assistant Secretary for Research and Technology (OST-R), Connected Vehicle Applications website, https://www.its.dot.gov/cv_basics/index.htm

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: Historic, Archaeological and Cultural Preservation

1-3 points

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

Sustainability Linkage

Preserving historic, 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 as noted in Scoring Requirement PD-15.1:

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)¹ 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)², a State Scenic Byway, an Indian Tribe Scenic Byway, or other route that was designated or officially recognized as such because of its significant *historic, cultural, and/or archaeological* features.

OR

Prerequisite PD-15.3P

0 points. Historic and/or Cultural Significance to Community

Any part of the project or resource within the project boundaries is recognized by the community as having *historic, cultural, and/or archaeological* significance to the community.

See Next Page

Requirement PD-15.1

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

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

TABLE PD-15.1.A. POINTS AND REQUIREMENTS FOR HISTORIC, 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 or PD-15.2P , 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 or PD-15.2P . Or show that impacts to the features were minimized and that the remaining impacts were deemed not adverse.
PD-15.1c	3	Enhance features. Protect, preserve, and/or enhance historic, archaeological, or cultural resources identified in Prerequisite PD-15.1P or PD-15.2P . This could be done through the installation of informational or interpretive facilities (e.g., viewpoint, kiosk, sign, or other installation for visitors detailing historic, archaeological, or cultural significance), where appropriate, to explain the resources or direct roadway users to the site, or through other activities.
PD-15.1d	1	Avoid Impacts. Show that measures have been taken to specifically avoid impacts to the features from Prerequisite PD-15.3P .

Resources

The following resources are referenced in this criterion and consolidated here:

1. NCHRP, United States National Register of Historic Places, <http://www.nps.gov/nr/>
2. FHWA, America’s Byways®, www.byways.org

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.

TABLE PD-17.2.A. POINTS EARNED FOR ENERGY EFFICIENT ELECTRICAL SYSTEM DESIGN

[illegible]

Requirement PD-17.3

1 point. Establish Auditing Plan

Establish a plan for auditing energy use after the project is complete, as part of operations and maintenance.

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 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, Maintenance and Irrigation

1-6 points

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 enhancing and protecting the ecosystem by choosing native and non-invasive 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 per the EPA’s [Level III and IV Ecoregions of the Continental United States website](#)¹ that contains the roadway project site or known to naturally occur within 200 miles of the roadway construction site (also see Sustainable Sites Initiative’s [Guidelines and Performance Benchmarks](#)²).
- **“Non-invasive plant species”** – The following items should be performed to ensure that a plant species is considered “non-invasive”: 1) Consult existing local (e.g. city, county, and State natural resources agencies) vegetation policy and procedure that is applicable to the roadway project and ensure vegetation selected and seed mixes used are specifically formulated to prevent the use of invasive plant species and noxious weeds. The [National Invasive Species Information Center’s website](#)³ provides information on how to identify invasive species, 2) Use local and/or regional lists to identify invasive plant species; and 3) Comply with noxious weed laws. The Natural Resources Conservation Service provides Federal- and State-listed noxious species lists by state at USDA’s [Introduced, Invasive, and Noxious Plants website](#)⁴.
- **“Noxious weeds”** – Plants introduced into an ecosystem, which are often invasive, that once established are highly destructive, competitive and difficult to control. They have economic and ecological impacts and are very difficult to control once established. Some noxious weeds are a public health threat to humans and animals, while others destroy native and beneficial plant communities, increase erosion concerns, and clog waterways.
- **“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). Vegetation includes plants and plant propagules such as seeds.

Highway corridors provide opportunities for the movement of invasive species through the landscape. Invasive plant or animal species can move on vehicles and in the loads they carry. Invasive plants can be moved from site to site during spraying and mowing operations. Weed seed can be inadvertently introduced into the corridor during construction on equipment and through the use of mulch, imported soil or gravel, and sod. Some invasive plant

species might be deliberately planted in erosion control, landscape, or wildflower projects. Millions of miles of highway rights-of-ways traverse public and private lands. Many of these adjacent lands have weed problems and the highway rights-of-way provide corridors for further spread. (*Federal Highway Administration Guidance on Invasive Species*⁵).

As explained by the United States National Arboretum (USNA) on their *Invasive Plants website*⁶, invasive species are particularly problematic in construction areas and road cuts as they thrive where the continuity of a natural ecosystem is breached. Ultimately, invasive plants alter habitats and reduce biodiversity. Rich, diverse plant communities can become barren, inhospitable expanses of invasive plants with little value to wildlife. Invasive plants may even deplete groundwater resources. Plants introduced to North America from other parts of the world have come to dominate millions of acres of forest, desert, prairie, and wetlands by out-competing native species.

Native plant species are beneficial and sustainable for roadway projects as they are well adapted to their native climate and soil types. Once established, native plants require little to no maintenance. Properly selected native plant species do not need insecticides or routine irrigation to thrive (sometimes, spot irrigation is needed to control invasive species). Native plants provide habitat for native animals and insects; native wildlife prefers native plants.

While not as beneficial to a native ecosystem, non-invasive plant species that are adapted to site conditions and climate can be considered if there are no native species available that would meet design intent. The following attributes should be considered in determining whether plants are appropriate for the site: cold hardiness, heat tolerance, salt tolerance, soil moisture range, plant water use requirements, soil volume requirements, soil pH requirements, sun/shade requirements, pest susceptibility, and maintenance requirements.” (Sustainable Sites Initiative’s *Guidelines and Performance Benchmarks*²) Both native and non-native plants selected should embody these attributes.

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, or consist of, native and/or non-invasive species and non-noxious species only. The project shall minimize disturbance of native species.

Requirement PD-18.1

1 – 3 points. Vegetation Planning and Selection

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

TABLE PD-18.1.A. VEGETATION PLANNING AND SELECTION

Requirement	Points	Feature	Minimum Requirements
PD-18.1a	1	Long-term vegetation planning	Have an integrated vegetation management plan to maintain the project and/or 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.
PD-18.1b	1	Vegetation to replace or enhance structures	Use non-invasive species for snow fences, sight screens, or other otherwise constructed items (vegetation for more than 50% of the project need for snow fences, sight screens to meet this requirement) and/or use non-invasive species to enhance the aesthetics of structural features, such as retaining walls and noise walls.
PD-18.1c	1	Invasive species prevention during construction	Bring only equipment free of dirt, mud, and organics into sensitive sites, such as wetlands, prairies, and water bodies. Have a written plan for the inspection and cleaning of vehicles to prevent the unintentional spread of invasive species during construction.
PD-18.1d	2	Native species	<ul style="list-style-type: none"> Plants or seed with a variety of native plant species only. (Non-invasive and non-noxious plants transplanted from impact areas within the project limits may be used.) Use five or more native species in plantings to increase biodiversity and native habitat for wildlife. Selection of native species shall be appropriate for the context of the project. Salvage rare plants and retain existing vegetation where possible. Reuse native plants salvaged from other projects. Eradicate all existing invasive and noxious plant species or, in cases where eradication is impossible, implement an invasive species management plan.

Requirement PD-18.2

1 – 3 points. Maintenance and Irrigation

Implement one or more of the features in Table PD-18.2.A. Points for features are cumulative if project has more than one feature; however, Requirement PD-18.2 shall not exceed a total of three points.

TABLE PD-18.2.A. VEGETATION MAINTENANCE

Requirement	Points	Feature	Minimum Requirements
PD-18.2a	1	Non-mechanical maintenance	No mowing or other mechanical means of maintenance is planned or required for long-term vegetation maintenance.
PD-18.2b	1	No long-term irrigation	No irrigation is planned or needed after the plant establishment period.
PD-18.2c	1	Non-potable water for irrigation	Use captured rainwater, gray water, captured stormwater, non-potable water conveyed by a public agency, and /or other context-appropriate non-potable water (both in the plant establishment period and beyond) for irrigation needs.
PD-18.2e	1	Reduction in use of fertilizers, insecticides, and herbicides	Appropriately use only fertilizers and pesticides (herbicides, insecticides, fungicides) acceptable in USDA Organic farming. No use of synthetic fertilizers or synthetic pesticides during the construction and plant establishment period.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. EPA, Level III and IV Ecoregions of the Continental United States website, http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm
2. The Sustainable Sites Initiative, *Guidelines and Performance Benchmarks* (2009), <http://www.coconino.az.gov/documentcenter/view/5469>
3. USDA, National Invasive Species Information Center's website, <http://www.invasivespeciesinfo.gov/index.shtml>
4. USDA, Introduced, Invasive, and Noxious Plants website, <http://plants.usda.gov/java/noxiousDriver>
5. FHWA, *Federal Highway Administration Guidance on Invasive Species* (August 10, 1999), http://www.environment.fhwa.dot.gov/ecosystems/wildlife/inv_guid.asp
6. USNA, *Invasive Plants* (2008), <http://www.usna.usda.gov/Gardens/invasives.html>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

7. USDA, *Introduced, Invasive, and Noxious Plants*, <https://plants.usda.gov/java/noxiousDriver>
8. FHWA, *Roadside Use of Native Plants*, http://www.environment.fhwa.dot.gov/ecosystems/vegmgmt_rdsduse.asp

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.
5. An integrated vegetation management plan covering the long-term maintenance of vegetation (including irrigation, fertilizer and pesticide use, mechanical maintenance, and control of invasive species.)

PD-19: Reduce, Reuse and Repurpose Materials

1-12 points

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 addition of new features or technology to an older or existing facility. For INVEST purposes, a project would include retrofit components in order to reinforce 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 12 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. FHWA’s *ACTION Pavement Preservation Definitions Memo*¹ defines pavement preservation as "a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations."

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 required thickness of a new pavement or processes that incorporate existing pavement structures into new pavement structures. Points are awarded per Table PD-19.2.A based on the percentage of pavement area treated. The area treated is calculated based on the entire area of existing pavement materials that are preserved or reconstructed.

Soil stabilization methods may include the use of geosynthetics (geogrids and fabrics) to reduce the thickness of aggregate required for stabilization of subgrade; the use of geosynthetics to reduce the thickness of aggregate above the geosynthetics that would have been required for structural support when subgrade soils are susceptible to pumping and base course intrusion; the use of portland cement and/or cementitious by-product materials for soil stabilization for pavement construction, if it can be demonstrated that this process will reduce the use of natural aggregate (virgin aggregate or material hauled from off-site source) use for stabilization; other chemical stabilization; and fractured slab techniques, including crack-and-seat, and rubblization.

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*](#)². 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 (as long as the existing elements meet the performance requirements of the new use). 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, cycle path track, 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.

Pavement to be repurposed shall not be processed or moved in any way; it shall remain in-place. 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 requirements:

- **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.

Requirement PD-19.7

1 point. Recycling and Reuse Plan

Develop and implement a project-specific plan for the innovative reuse of waste materials other than the methods listed in PD-19.1 through PD-19.6.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, *ACTION Pavement Preservation Definitions Memo*, <http://www.fhwa.dot.gov/pavement/preservation/091205.cfm>
2. FHWA, *Bridge Preservation Guide*, <http://www.fhwa.dot.gov/bridge/preservation/guide/guide.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 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.
4. Recycling and Reuse Plan.

PD-20: Recycle Materials

1-10 points

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, Reuse and Repurpose 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, Reuse and Repurpose 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, Reuse and Repurpose 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, Reuse and Repurpose 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 10 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 from the project and be recycled onsite or offsite and returned or recycled materials can originate from an offsite source. However, no points are awarded for removing paving materials from the project and sending them offsite to be recycled for another project(s).

Points are awarded based on the origin of the source material and location of recycling activities as well as the Average Recycled Content (ARC) per the following calculation and using Tables PD-20.1.A or PD-20.1.B (on the next page) as follows below.

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

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) WHEN ORIGINATING FROM PROJECT AND RECYCLED ONSITE

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

TABLE PD-20.2.B. POINTS FOR AVERAGE RECYCLED CONTENT (PERCENT BY WEIGHT OR VOLUME OF MATERIALS) WHEN ORIGINATING FROM ONSITE AND RECYCLED OFFSITE OR ORIGINATING OFFSITE

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

1-2 points. Reuse of Sub-base Granular Material

Reuse the subbase granular material of existing pavement elements as subgrade embankment or as part of the new subbase during construction of the proposed new pavement structure.

Points are awarded based on the percentage of pavement area for which sub-base material was reclaimed and reused compared to the entire area of existing pavement materials as shown in Table PD-20.3.A.

TABLE PD-20.3.A. POINTS AWARDED FOR REUSE OF SUB-BASE GRANULAR MATERIAL

Percentage Pavement Area Recycled	Points Awarded for Sub-base Reused
50–74%	1
75–100%	2

Requirement PD-20.4

1 point. Recycle Minor Structural Elements

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

In order to achieve credit, the minor structural elements must be moved and reused onsite or provided to the agency's Maintenance & Operations group specifically for reuse. 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.

Requirement PD-20.5

2 points. Salvage or Relocate Buildings

Salvage or move a building instead of demolishing it.

Resources

None referenced.

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. Documentation showing the origin and processing location of RAP or RCA.
4. A calculation that shows the percentage of luminaires, signal poles, and sign structures reused.
5. A payment clause or item for salvaging and relocating a building.

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

1-7 points

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 have reduced potential for rutting, 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 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

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 seven points.**

Requirement PD-22.1

1-5 points. Long-Life Pavement Design

Long-life 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 AASHTO's *Guide for Design of Pavement Structures, 4th Edition with 1998 Supplement*¹ or the process described in AASHTO's *Mechanistic-Empirical Pavement Design Guide, Interim Edition: A Manual of Practice*².

One of the following scores applies:

- **0 points.** No long-life pavement is used, it does not meet the minimum requirements of this criterion, or it does not meet the minimum quantities described below.

- **1 point. Bus Pull-outs.** Design at least 95 percent of the total new or reconstructed pavement surface area dedicated to bus pullouts to meet long-life pavement design criteria with specific bus axel loads considered. The length of the bus pullout designed should, at a minimum, include all pavements subject to turning and deceleration forces.
- **2 points. Dedicated or Primary Bus Lanes.** Design at least 75 percent of the total new or reconstructed pavement surface area for dedicated or primary bus lanes to meet long-life pavement design criteria with specific bus axel loads considered. Compute the total surface area of all trafficked lanes dedicated to buses and show that, at a minimum, 75 percent of that area is designed for long-life. Include stripe-to-stripe lane widths, including intersections.
- **5 points. Regularly Trafficked Lanes.** 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 incidental paved areas in the computation.

Requirement PD-22.2

5 points. Increase Asphalt Concrete Pavement Density

Design and specify 100 percent of the total new or reconstructed asphalt pavement for regularly trafficked lanes using materials and technologies to achieve a field construction density of 94 percent of maximum theoretical density. The density at construction must represent the in-place density after the asphalt mixture has been compacted with the rollers, but prior to opening the roadway to traffic.

Compute the total asphalt pavement quantity of all trafficked lanes and show 100 percent of the quantity is designed and specified using materials and technologies to meet this requirement. Do not include drainage layers, permeable base course, asphalt treated permeable base (ATPB), open graded surface course, surface friction course, and other permeable designed layers of asphalt pavement in the computation. Do not include shoulders, medians, sidewalks, and other incidental paved areas in the computation.

Requirement PD-22.3

2 point. Leverage Pavement Smoothness Incentive

Leverage a performance-based pay incentive for pavement smoothness targeting a pavement ride quality of 58.5% or better. Alternatively, the specifications may require that the contractor meet this ride quality goal without providing a pay incentive (mandatory performance).

Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, *Guide for Design of Pavement Structures*, 4th Edition with 1998 Supplement (1993, 1998), https://bookstore.transportation.org/item_details.aspx?id=374
2. AASHTO, *Mechanistic-Empirical Pavement Design Guide*, Interim Edition: A Manual of Practice (2008), https://bookstore.transportation.org/item_details.aspx?ID=1249

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 indicating the total percentage of trafficked lane pavement surface areas designed for long-life.
2. The project owner's formally recognized, adopted, and documented pavement design procedure.
3. Documentation showing long-life pavement was designed using a minimum 20- or 40-year service life (per the appropriate requirements above).
4. Documentation showing long-life pavement was designed and specified using materials and technologies to achieve a construction field density of 94 percent of maximum theoretical density (per the appropriate requirements above).

PD-23: Reduced Energy and Emissions in Pavement Materials

1-3 points

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) may earn 3 points, however, this criterion shall not exceed a total of 3 points.**

Requirement PD-23.1

1-3 points. Asphalt Production

Use low-energy material for at least 50 percent of the total projects asphalt material. One of the following scores may meet this requirement:

- **Requirement PD-23.1a**

1-3 points. Warm Mix Asphalt (WMA)

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 hot mix asphalt (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 temperature reduction.

Use the highest point value achieved from only one of the following options:

- **0 points.** Warm Mix Asphalt is not used.
- **1 point.** Use Warm Mix Asphalt. Reduce the mixing temperature of HMA by a minimum of 30°F from that recommended as the mixing temperature by the asphalt binder supplier.
- **2 points.** Use Warm Mix Asphalt. Reduce the mixing temperature of HMA by a minimum of 40°F from that recommended as the mixing temperature by the asphalt binder supplier.
- **3 points.** Use Warm Mix Asphalt. Reduce the mixing temperature of HMA by a minimum of 50°F from that recommended as the mixing temperature by the asphalt binder supplier.

OR

- **Requirement PD-23.1b**

3 points. Asphalt Production Using Energy and Fuel Saving Technologies

Burn recycled oil, waste materials, or natural gas; or use other energy and fuel saving technologies in asphalt production 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 energy or fuel saving 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](#)¹.

OR

- **Requirement PD-23.2b**

3 points. Cement Production Using Fuel Saving Technologies

Burn recycled oil, waste materials, natural gas, or other fuel saving technologies in cement production 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 saving technologies that can be shown to reduce the normal petroleum fuel usage by 25 percent.

OR

- **Requirement PD-23.3c**

3 points. Cement Production Using Limestone Additive

Use blended cement using a minimum 3 percent ground limestone addition. Per Advanced Concrete Pavement Technology's (ACPT) [TechBrief: Blended and Performance Cements](#)² the use of 5 percent ground limestone in cement is permitted by ASTM C150 (and AASHTO M 85), which reduces the cement clinker in concrete and ultimately reduces the carbon footprint.

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](#)³. Carbon footprint and embodied energy shall be calculated using the [Athena EcoCalculator](#)⁴.

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 Certified Sustainable Concrete Plant \(Silver\)](#)⁵.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. EPA National Energy Performance Energy Rating System,
https://www.energystar.gov/ia/business/healthcare/natl_energy_rating_system.pdf
2. Advanced Concrete Pavement Technology (ACPT), TechBrief: Blended and Performance (2011),
<http://www.fhwa.dot.gov/pavement/concrete/pubs/hif11025/index.cfm>
3. National Ready Mixed Concrete Association's (NRMCA), Sustainable Concrete Plant Guidelines (2011),
<http://www.nrmca.org/sustainability/Certification/SCP%20Guidelines%20Version%201.1.pdf>
4. Athena EcoCalculator, <http://www.athenasmi.org/our-software-data/ecocalculator/>
5. NRMCA Certified Sustainable Concrete Plan (Silver),
<http://www.nrmca.org/sustainability/certification/plantcertification.asp>

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: Permeable Pavement

1-2 points

Goal: Improve flow control and quality of stormwater runoff through use of permeable pavement technologies.

Sustainability Linkage

Permeable pavements primarily have environmental benefits to the natural and built environment.



Background and Scoring Requirements

Background

Using permeable pavement is a low-impact development technique that can be used as part of a roadway stormwater management plan.

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

- **“Permeable,” “porous” or “pervious”** are used interchangeably to describe a pavement structural system that has more voids than a conventional paved surface such as concrete or asphalt. As a result, both infiltration and evaporation are allowed as water passes through the pavement section.
- **“Permeable pavements”** include, but are not limited to, porous asphalt pavement, pervious concrete pavement, or permeable block pavers.
- **“Secondary pavement areas”** shall include all pavements that are not intended for high speed traffic or heavy trucks. Appropriate uses would include parking lots, alleys, access roadways, sidewalks, bike lanes, multi-use paths, and shoulders. However shoulders planned for future trafficked uses through widening should be excluded (for example, shoulders to become mainline lanes or shoulders used for shoulder-running buses).

Scoring Requirements

Prerequisite PD-24.1P

0 points. Include Maintenance Plan

The project must include a maintenance plan for permeable pavements (or a design memo justifying why one is not necessary).

Prerequisite PD-24.2P

0 points. Exclude Sanded and Sealed Areas

Permeable pavements must not be placed in areas where sand may be used for snow and ice control or where the pavement will be sealed (during project or in the future).

Requirement PD-24.1

1-2 points. Permeable Pavement

One of the following scores may apply:

- **1 point.** Use permeable pavement to treat at least 50% of the secondary pavement areas on the project.
- **2 points.** Use permeable pavement to treat at least 75% of the secondary pavement areas on the project.

Resources

None referenced.

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.
2. Technical memoranda or reports.

PD-25: Construction Environmental Training

1 point

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

Implementation of regulatory permits and related training, including a Stormwater Pollution Prevention Plan (SWPPP) may be included in an Environmental Awareness Training Program, but does not meet the following requirements on its own.

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, assigned regulatory agency staff, 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, which includes names of attendees, topic, dates, and location of training.

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. 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.

Resources

None referenced.

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

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 and establishes a materials hauling plan to make efficient use of backhauls, maximizing efficiency, and minimizing the number of “empty” trucks.
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.

Resources

None Referenced.

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

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.

Resources

None referenced.

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

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](#)¹.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Technical Guidance on Price Adjustment Clauses for Quality, (January 24, 1992), <https://www.fhwa.dot.gov/programadmin/contracts/coretoc.cfm?CFID=33464143&CFTOKEN=9fa197a0851235dc-B80B3D78-B1F2-8>

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

1-4 points

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 (e.g., asphalt, concrete)
- Milling , 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 Contractor 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.

Requirement PD-29.3

1 point. Haul Excess Materials Directly to other Projects for Recycling

Reduce lifecycle transport costs and impacts by coordinating and transporting suitable excess excavated material that cannot be used within the project limits to offsite projects where it will be reused. Only projects that transport materials directly to specific project sites are eligible for this credit, non-specific stockpiling sites for future recycling are excluded.

Resources

None referenced.

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.

PD-30: Low Impact Development

1-3 points

Goal: Use low impact development stormwater management methods that reduce the impacts associated with development and redevelopment and that mimic natural hydrology.

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

Also see PD-08: Stormwater Quality and Flow Control Low.

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’s [Low Impact Development website](#)¹ 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

Requirement PD-30.1

1-3 points. Use Effective BMPs

Use effective BMPs or stormwater management techniques that mimic natural hydrology to treat pollutants. To calculate the points earned for this scoring requirement, follow Steps 1 through 3 below:

- Step 1** Table PD-30.3.A on the next page identifies BMPs considered most effective for specific target pollutants. If the project uses one of these BMPs, go to step 2 to calculate how many points are earned.

TABLE PD-30.1.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

- Step 2** Calculate the Target Impervious Surface Area Treated as a percentage of added impervious surface area). For retrofit projects, use Table PD-30.1.B to calculate the equivalent value to use for Target Impervious Surface Area.

TABLE PD-30.1.B. RETROFIT PROJECTS – CALCULATING EQUIVALENT TARGET IMPERVIOUS SURFACE AREA TREATED

Existing Impervious on Project (acres)	% of Existing Impervious Area Treated	Equivalent Target Impervious Surface Area Treated (% of Added)
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%

Step 3 Use the Target Impervious Surface Area Treated that was calculated in Step 2 in Table PD-30.3.C to determine the points earned for this scoring requirement.

TABLE PD-30.3.C. POINTS EARNED FOR EFFECTIVE BMPS BASED ON TARGET IMPERVIOUS SURFACE AREA TREATED

(Step 1)	(Step 2)	(Step 3)
Effective BMP/Infiltration/LID Used?	Target Imp. Surface Area Treated (% of Added)	Points Earned
Yes	101%–125%	2
	125% +	3

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. Environmental Protection Agency, Low Impact Development website, <http://water.epa.gov/polwaste/green/>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

2. NCHRP, *Report 565: Evaluation of Best Management Practices for Highway Runoff Control* (2006), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_565.pdf
3. Environmental Protection Agency, Low Impact Development Literature Review, <http://water.epa.gov/polwaste/green/upload/lid.pdf>
4. NCHRP, *Report 792: Long-Term Performance and Life-Cycle Costs of Stormwater Best Management Practices* (2014), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_792.pdf
5. FHWA, Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring website, https://www.environment.fhwa.dot.gov/Env_topics/water/ultraurban_bmp_rpt/index.aspx

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

PD-31: Infrastructure Resiliency Planning and Design

1-12 points

Goal: Respond to vulnerabilities and risks associated with current and future hazards (including those associated with climate change) to ensure transportation system reliability and resiliency.

Sustainability Linkage

Designing 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, providing energy savings from long-lasting investments, and reducing effects of vehicle travel on climate changes.



Background and Scoring Requirements

This criterion, PD-31: Infrastructure Resiliency Planning and Design, is related to SPR-16: Infrastructure Resiliency (Regional) and SPS-16: Infrastructure Resiliency (State).

Background

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

- **“Adaptation”** is adjustment in natural or human systems in anticipation of or response to a changing environment in a way that effectively uses beneficial opportunities or reduces negative effects.
- **“Climate Change”** refers to any significant change in the measures of climate lasting for an extended period of time. Climate change includes major variations in temperature, precipitation, or wind patterns, among other environmental conditions, that occur over several decades or longer. Changes in climate may manifest as a rise in sea level, as well as increase the frequency and magnitude of extreme weather events now and in the future.
- **“Extreme Weather Events”** can include significant anomalies in temperature, precipitation and winds and can manifest as heavy precipitation and flooding, heatwaves, drought, wildfires and windstorms (including tornadoes and tropical storms). Consequences of extreme weather events can include safety concerns, damage, destruction, and/or economic loss. Climate change can also cause or influence extreme weather events.
- **“Extreme Events”**, for the purposes of this criterion, refers to risks posed by climate change and extreme weather events. The definition does not apply to other uses of the term nor include consideration of risks to the transportation system from other natural hazards, accidents, or other human induced disruptions.¹
- **“Greenhouse Gas (GHG) Emissions”** are gases emitted, in this case, mostly by vehicles engaged in activities to construct or use the transportation facility. These gases absorb and emits radiation within the thermal infrared range and contributes to the greenhouse effect. Greenhouse gases greatly affect the temperature of the Earth and are the primary source of climate change.
- **“Preparedness”** means actions taken to plan, organize, equip, train, and exercise to build, apply, and sustain the capabilities necessary to prevent, protect against, ameliorate the effects of, respond to, and recover from climate change related damages to life, health, property, livelihoods, ecosystems, and national security.

- **“Resilience”** or resiliency is the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.

Climate Change Effects on Transportation Infrastructure

The U.S. Global Change Research Program’s 2014 Report, *Climate Change Impacts in the United States*¹ summarizes 4 Key Messages related to transportation infrastructure and climate changes:

1. The impacts from sea level rise and storm surge, extreme weather events, higher temperatures and heat waves, precipitation changes, Arctic warming, and other climatic conditions are affecting the reliability and capacity of the U.S. transportation system in many ways.
2. Sea level rise, coupled with storm surge, will continue to increase the risk of major coastal impacts on transportation infrastructure, including both temporary and permanent flooding of airports, ports and harbors, roads, rail lines, tunnels, and bridges.
3. Extreme weather events currently disrupt transportation networks in all areas of the country; projections indicate that such disruptions will increase.
4. Climate change impacts will increase the total costs to the nation’s transportation systems and their users, but these impacts can be reduced through rerouting, mode change, and a wide range of adaptive actions.”

Scoring Requirements

Requirement PD-31.1

2 points. Address Climate Change in Project Development

Incorporate consideration of climate change at a project-specific level in project development and environmental reviews.

Requirement PD-31.2

1-6 points. Incorporate Future Climate Change Effects in the Design Process or the Design

One of the following scoring requirements may apply; PD-31.2a and PD-31.2b are not cumulative.

- **Requirement PD-31.2a**

3 points. Incorporate Future Consideration of Climate Change Effects in the Design Process

Incorporate and document consideration of the effects of climate change in the design process.

For example, when designing a bridge over a water body, a project analysis might consider future climate change effects, such as rising storm water levels. However, the owner may decide that there is an acceptable factor of safety already included in the design, that the potential impacts are acceptable or can be mitigated, or that the cost to make changes is more significant than the risks of the effects pose.

One of the following scores applies:

- **0 points.** Climate change effects are not considered in the design process.
- **1 points.** Climate change effects are qualitatively considered in the design process.
- **3 points.** Climate change effects are quantitatively considered in the design process.

OR

- **Requirement PD-31.2b**

4 or 6 points. Incorporate Future Consideration of Climate Change Effects into the Design

Based on a project-specific identification of hazards, and assessment of risks and vulnerabilities resulting from those hazards, incorporate additional design efforts above and beyond requirements and regulations to address the vulnerabilities identified. The U.S. Global Change Research Program's 2014 Report, *Climate Change Impacts in the United States*¹ lists additional design actions as "Adaptive Strategies to Reduce Impacts" and describes that actions may include, but are not limited to: retrofitting pavements, stormwater drainage facilities, structures and other infrastructure; relocating facilities to avoid impacts; upgrading design of stormwater drainage facilities above and beyond what is required to mitigate changing weather patterns; designing new pavements, structures and other infrastructure to higher standards than is typically required by design requirement or regulation; or designing protection of existing infrastructure. Some examples of design changes include:

- **Alignment and Grade** – For example, raising the grade of a roadway above levels required in current regulations to address higher flood levels resulting from climate changes.
- **Stormwater Drainage System** – For example, increasing the capacity of conveyance and detention facilities to address higher flood levels resulting from climate changes.
- **Pavement Structures** – For example, designing pavements to withstand the effects of heat waves resulting from climate changes.
- **Bridge Structures** – For example, designing bridge piers to withstand the effects of scour or storm surges resulting from more intense flooding events.
- **Tunnels and other Structures** – For example, designing tunnels or sign structures to withstand the effects of more intense weather or seismic events than is required.

Agencies can use FHWA's 11-step process for engineering transportation assets to be more resilient to climate impacts and the associated tools that were developed under *Phase II of the Gulf Coast Study*^{2,3}. This process describes consideration of multiple alternatives and cost benefit analysis of designed infrastructure.

One of the following scores applies:

- **0 points.** No design changes are required to accommodate future climate change effects or no changes are incorporated in the design.
- **4 points.** Design changes are incorporated in the design of one design discipline (e.g. bridges, pavements, drainage, etc.).
- **6 points.** Design changes are incorporated in the design of more than one design discipline (e.g. bridges and pavements, drainage and bridges, etc.).

Requirement PD-31.3

4 points. Mitigate Climate Change and Extreme Weather Effects

Mitigate the effects of GHG emissions through design efforts above and beyond requirements and regulations. Some examples of strategies meeting this requirement, include, but are not limited to:

- Incorporating transportation system and operational efficiencies by optimizing the design, construction, operation, and use of transportation networks. The strategies range from anti-idling ordinances to traffic management to congestion pricing. The objective of this group of strategies is to reduce the energy use and

GHG emissions associated with a given unit of passenger or freight travel (e.g., person-miles, vehicle-miles, or ton-miles of travel).

- Reduce travel activity by reducing growth in vehicle-miles traveled. The objective of this group of strategies is to influence travelers' activity patterns, thereby reducing total travel, shifting travel to more efficient modes, increasing vehicle occupancy, or otherwise taking actions that reduce energy use and GHG emissions associated with personal travel.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. U.S. Global Change Research Program, *Climate Change Impacts in the United States* (2014), <http://nca2014.globalchange.gov/downloads>
2. FHWA, *U.S. DOT Gulf Coast Study Phase 2*, http://www.fhwa.dot.gov/environment/climate_change/adaptation/case_studies/gulf_coast_study/engineering_and_tasks/task32.pdf and http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/
3. FHWA, *U.S. DOT Gulf Coast Study Phase 2 (Tools)*, http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/index.cfm#l2

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

4. FHWA, *FHWA Order 5520: Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events* (2014), <http://www.fhwa.dot.gov/legisregs/directives/orders/5520.cfm>
5. FHWA, *Integrating Climate Change into the Transportation Planning Process* (2008), https://www.fhwa.dot.gov/environment/sustainability/energy/publications/integrating_climate_change/index.cfm
6. FHWA, Climate Adaptation Website, http://www.fhwa.dot.gov/environment/climate_change/adaptation/
7. FHWA, Vulnerability Assessment Framework Website, http://www.fhwa.dot.gov/environment/climate_change/adaptation/adaptation_framework/
8. TRB, *E-C152: Adapting Transportation to the Impacts of Climate Change*, <http://onlinepubs.trb.org/onlinepubs/circulars/ec152.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 or more of the following documentation sources (or equal where not available):

1. Contract documents including plans and specifications showing designed infrastructure.
2. Design documentation showing design above and beyond requirements and regulations was performed to specifically address the effects of GHG emissions and climate changes.

PD-32: Light Pollution

1-3 points

Goal: To safely illuminate roadways while minimizing unnecessary and potentially harmful illumination of the surrounding sky, communities, and habitat.

Sustainability Linkage

Reducing lighting pollution benefits both the natural and human environment.

Background and Scoring Requirements

Background

Roadway lighting is an essential component of safe roadway design. However, in addition to useful light that illuminates the roadway, light can be emitted upward directly from existing light fixtures, or reflect from the roadway surface, both of which contribute to sky glow. Light from overhead fixtures can “trespass” and illuminate surfaces and areas other than the roadway, including private property and or natural areas. Mismanaged lighting can alter the appearance of a dark sky; eclipse natural starlight; disrupt the feeding, sleeping, mating, and migration cycles of wildlife; and disrupt the growth cycles of plants. However, in many cases, careful lighting design can provide safe driving conditions while minimizing wasted light and adverse lighting effects.

The purpose of this criterion is to promote the management of Backlight, Uplight, and Glare (BUG) using prescribed Backlight, Uplight, and Glare ratings to evaluate luminaire optical performance related to light trespass, sky glow, and high angle brightness control. For the purposes of this criterion, the key terms are defined as follows:

- **“Backlight”** refers to the light directed in back of mounting pole.
- **“Glare”** is the sensation produced by luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted causing annoyance, discomfort, or loss in visual performance and visibility.
- **“Glare ratings”** refer to the amount of light emitted from the luminaire at angles known to cause glare.
- **“Light trespass”** is the effect of light that strays from the intended purpose and becomes an annoyance, a nuisance, or a detriment to visual performance.
- **“Lighting boundary”** is located at the edge of the roadway plus any adjacent features intended to be lit, such as sidewalks, bikepaths, multi-use paths, etc. It does not include adjacent areas to be lit for private purposes such as parking lots or car dealerships.
- **“Lighting Zone”** is the lighting zone type being modelled based on characteristics of the natural environment, including, but not limited to, flora, fauna and humans as described by the Illuminating Engineering Society of North America (IES).
- **“Roadway or Highway lighting”** is defined as lighting provided for freeways, expressways, limited access roadways, and roads on which pedestrians, cyclists, and parked vehicles are generally not present. The primary purpose of roadway or highway lighting is to help the motorist remain on the roadway and help with the detection of obstacles within and beyond the range of the vehicle's headlights.
- **“Sky glow”** refers to the brightening of the night sky that results from the reflection of radiation (visible and non-visible), scattered from the constituents of the atmosphere (gaseous molecules, aerosols, and particulate matter), in the direction of the observer.



- **“Street lighting”** is defined as lighting provided for major, collector, and local roads where pedestrians and cyclists are generally present. The primary purpose of street lighting is to help road users identify obstacles, provide adequate visibility of pedestrians and cyclists, and assist in visual search tasks, both on and adjacent to the roadway.
- **“Uplight”** refers to or the light directed above the horizontal plane of the luminaire.

Lighting Zone (LZ)

The IES defines the lighting zones shown in Table PD-32.0.A.

TABLE PD-32.0.A LIGHTING ZONES

Lighting Zone (LZ)	Zoning Considerations	Recommended Uses or Areas
LZ0	Undeveloped areas within national parks, state parks, forest land, rural areas, and other undeveloped areas	Should be applied to areas in which permanent lighting is not expected and when used, is limited in the amount of lighting and the period of operation. LZ0 typically includes undeveloped areas of open space, wilderness parks and preserves, areas near astronomical observatories, or any other area where the protection of a dark environment is critical. Special review should be required for any permanent lighting in this zone. Some rural communities may choose to adopt LZ0 for residential areas.
LZ1	Developed areas of national parks, state parks, forest land, and rural areas.	Pertains to areas that desire low ambient lighting levels. These typically include single and two family residential communities, rural town centers, business parks, and other commercial or industrial/ storage areas typically with limited nighttime activity. May also include the developed areas in parks and other natural settings.
LZ2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use, and residential mixed-use areas.	Pertains to areas with moderate ambient lighting levels. These typically include multifamily residential uses, institutional residential uses, schools, churches, hospitals, hotels/motels, commercial and/or businesses areas with evening activities embedded in predominately residential areas, neighborhood serving recreational and playing fields and/or mixed use development with a predominance of residential uses. Can be used to accommodate a district of outdoor sales or industry in an area otherwise zoned LZ1.
LZ3	All areas not included in LZ0, LZ1, LZ2, or LZ4.	Pertains to areas with moderately high lighting levels. These typically include commercial corridors, high intensity suburban commercial areas, town centers, mixed use areas, industrial uses and shipping and rail yards with high night time activity, high use recreational and playing fields, regional shopping malls, car dealerships, gas stations, and other nighttime active exterior retail areas.

Lighting Zone (LZ)	Zoning Considerations	Recommended Uses or Areas
LZ4	High activity commercial districts in major metropolitan areas as designated by the local jurisdiction.	Pertains to areas of very high ambient lighting levels. LZ4 should only be used for special cases and is not appropriate for most cities. LZ4 may be used for extremely unusual installations such as high density entertainment districts, and heavy industrial uses.

Source: IES

BUG Rating System

*Fundamentals of Lighting – Addenda #1 BUG Ratings – Backlight, Uplight, and Glare (ref. TM-15 and addenda)*¹, published by IES, makes the evaluation and selection of outdoor luminaires fast, easy and complete. Added to TM-15 as an addenda, the BUG stands for “Backlight”, “Uplight” and “Glare”, each describing one of the three types of stray light that escape from a lighting fixture as defined above.

The BUG Rating System divides the sphere around a luminaire into zones, assigning B, U, and G values according to expected environmental impact for each type of light trespass. It takes into account uplight shielding, glare shielding and backlight shielding as well as limiting lamp lumens to values appropriate for the lighting zone. Once the lowest BUG Ratings have been established, the System provides tables of acceptable values against which any luminaire having photometric data can be evaluated.

Scoring Requirements

The following scoring requirements are cumulative.

Requirement PD-32.1

1 point. Uplight Design

Do not exceed the luminaire uplight ratings shown in Table PD-32.1.A, based on the specific light source installed in the luminaire, as defined in [IES TM-15-11, Addendum A](#)².

TABLE PD-32.1.A. MAXIMUM UPLIGHT RATINGS

	Lighting Zone				
	LZ0	LZ1	LZ2	LZ3	LZ4
Allowed uplight ratings	U0	U1	U2	U3	U4

Requirement PD-32.2

1 point. Backlight Design

Do not exceed the luminaire backlight ratings shown in Table PD-32.2.A (based on the specific light source installed in the luminaire), as defined in [IES TM-15-11, Addendum A](#)², based on the mounting location and distance from the lighting boundary.

TABLE PD-32.2.A. MAXIMUM BACKLIGHT RATINGS

Luminaire Mounting	Lighting Zone				
	LZ0	LZ1	LZ2	LZ3	LZ4
> 2 mounting heights from lighting boundary	B1	B3	B4	B5	B5
1 to 2 mounting heights from lighting boundary and properly oriented	B1	B2	B3	B4	B4
0.5 to 1 mounting height to lighting boundary and properly oriented	B0	B1	B2	B3	B3
< 0.5 mounting height to lighting boundary and properly oriented	B0	B0	B0	B1	B2

Requirement PD-32.3**1 point. Glare Design**

Do not exceed the glare ratings shown in Table PD-32.3.A, based on the specific light source installed in the luminaire, as defined in [IES TM-15-11, Addendum A²](#).

TABLE PD-32.3.A. MAXIMUM GLARE RATINGS

	Lighting Zone				
	LZ0	LZ1	LZ2	LZ3	LZ4
Allowed glare ratings	G0	G1	G2	G3	G4

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. IES, *Fundamentals of Lighting – Addenda #1 BUG Ratings – Backlight, Uplight, and Glare* (ref. TM-15 and addenda), <https://brownep.files.wordpress.com/2014/01/ies-fol-addenda-1-bug-ratings.pdf>
2. IES, *TM-15-11 Addendum A*, <https://www.ies.org/wp-content/uploads/2017/03/TM-15-11BUGRatingsAddendum.pdf>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

3. International Dark Sky Association, *Specifier Bulletin for Dark Sky Applications* (2009), Volume 2: Issue 1, http://www.aal.net/content/resources/files/BUG_rating.pdf
4. LEED, *REQS801-0: Bug rating method*, <http://www.usgbc.org/credits/reqs801-0>
5. U.S. Department of Energy, *LED Application Series: Outdoor Area Lighting* (June 2008), http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/outdoor_area_lighting.pdf
6. IES, *TM-15-11: Luminaire Classification System for Outdoor Luminaires + Addendum A*, <https://www.ies.org/store/technical-memoranda/luminaire-classification-system-for-outdoor-luminaires/>

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 the plans and specifications required BUG compliant or equivalent fixtures.
2. Illumination design documentation showing that lighting was required for this project to meet safety requirements, that the types of lighting fit the context of the roadway and that, if the illumination levels were reduced, that safety was not compromised.

PD-33: Noise Abatement

1-5 points

Goal: Reduce traffic noise impacts to surrounding communities and environments.

Sustainability Linkage

The reduction of noise benefits both the human and natural environment. Therefore, this criterion supports the environmental and social principles of the triple bottom line.



Background and Scoring Requirements

Background

The objective of this criterion is to consider options for reducing traffic noise. Evaluating noise impacts is required per the Agency's governing Noise Study and Abatement Policy, however, there are elements of noise management that can provide opportunities for sustainable practices. Noise levels can be reduced by altering the source of the noise (engine and exhaust and tire/pavement interaction) or by protecting the receptors. The most common method of reducing noise, and the only method eligible for Federal-aid highway funding as a noise abatement measure, is compliance with 23 CFR 772 and the highway agency's noise policy/procedures. Compliance with 23 CFR 772 and the highway agency's noise policy/procedure typically results in the construction of a noise barrier, but can also include traffic management measures, alteration of horizontal and vertical alignments by suppressing or moving the roadway further away from the noise receptors, acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise, or noise insulation of Activity Category D land use facilities. Another methods to reduce noise levels is by altering pavement type or surface characteristics. While the pavement itself may be Federal-aid reimbursable, the pavement as a noise abatement measure is not Federal-aid reimbursable.

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 five points.**

Requirement PD-33.1

2 points. Specialized Noise Barrier Construction

Construct one or more of the following specialized noise barriers on the project to provide noise abatement. Noise barriers must comply with the Agency's governing Noise Study and Abatement Policy.

- Construct a new noise barrier using recycled materials.
- Re-use an existing noise wall previously constructed within the project limits. Over 75% of the existing noise wall material needs to be re-used to be considered.
- Construct an earthen berm using over 80% of excavated soils generated from within the project limits and/or corridor.

Requirement PD-33.2

2 points. Incorporate Traffic System Management Techniques to Reduce Existing Noise Levels

On projects where noise sensitive receptors have been identified, reduce traffic noise by implementing one or more of the following traffic management options:

- Roadway geometry design or traffic control elements that develop free-flow traffic
- Speed limit reductions
- Signage for prohibiting air braking
- Coordinated signals
- Use of roundabouts

Requirement PD-33.3

2 points. Provide a Buffer Zone for Adjacent Noise Sensitive Receptors

Utilize one of the following approaches to provide a noise buffer zone:

- Selection of an alternative that is not within close proximity to noise sensitive receptors or compared to other alternatives has the least amount of noise impacts.
- Shift of the alignment within the right-of-way or adjustment of right-of-way to move the roadway away from noise sensitive receptors.
- Coordination with local officials to create or preserve compatible land uses adjacent to the roadway."

Requirement PD-33.4

1-3 points. Design Quiet Pavements

Design and specify the total new or reconstructed pavement surface area for regularly trafficked lanes of pavement with a pavement type or surface characteristics designed to reduce the noise from the tire/pavement interaction. The On-board Sound Intensity (OBSI) measurement for the pavement type or surface characteristic should not exceed the maximum noise levels listed in Table PD-41d.A for each posted speed limit range. Credit earned for each posted speed range varies based on the percentage of trafficked pavement area that is designed to meet the corresponding maximum noise level. When calculating the trafficked area, do not include shoulders, medians, sidewalks, maintenance and access roads, or other paved areas outside of the travelled way.

TABLE PD-33.4.A. TESTING SPEEDS AND MAXIMUM AVERAGE OBSI NOISE LEVELS

Posted Speed Limit	Maximum Noise Level	Minimum Percentage Trafficked Area		
		1 point	2 points	3 points
55 mph or more	98 dBA	20%	40%	60%
30 to 54 mph	90 dBA	40%	60%	80%

Pavement sections with posted speeds less than 30 mph do not qualify for this criterion.

Requirement PD-33.5

1 point. Provide Plantings or Sight Screen to Separate Receptors from Roadway

Construct a vegetative barrier a minimum of 100 feet thick, a minimum of 20 feet high with 100% density.

Resources

None referenced.

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. Pavement design documentation showing pavement sections to be constructed or reconstructed and their associated surface material type, surface areas, demonstrating that the design was intended to be quiet in accordance with the requirements of this criterion.
2. A calculation to indicate the total percentage of trafficked lane pavement surface areas surfaced with quiet pavement.
3. Design documentation and construction documents showing implemented features.
4. Design studies, including Noise and/or Traffic; and alternatives analysis documentation.

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: Reduce, 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 or similar document 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.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. ICLEI - Local Governments for Sustainability, Sustainability Planning Toolkit, http://portal.hud.gov/hudportal/documents/huddoc?id=20399_iclei_sustainabil.pdf
2. ICLEI - Local Governments for Sustainability, Tools website, <http://www.iclei.org/activities/resources/tools.html>
3. US DOT, Our Sustainability Efforts website, <http://www.dot.gov/mission/sustainability/our-sustainability-efforts-0>

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

Renewable energy is generated from natural processes that are continuously replenished as opposed to fossil fuels which are depleting resources. Some sources of renewable electrical energy include sunlight, geothermal heat, wind, tides, and flowing water.

Renewable Energy Certificates (RECs)

The [Green Power Partnership website](#)¹ by the Environmental Protection Agency (EPA) explains that “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 and offers 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.”

Note that purchasing RECs is typically more expensive than purchasing unsourced electricity.

How to Buy Renewable Electrical Power

The EPA’s [Green Power Partnership website](#)¹ further explains that “all grid-tied renewable-based electricity generators produce two distinct products, physical electricity and RECs. At the point of generation, both product components can be sold together or separately, as a bundled or unbundled product. In either case, the renewable generator feeds the physical electricity onto the electricity grid, where it mixes with electricity from other generation sources. Since electrons from all generation sources are indistinguishable, it is impossible to track the physical electrons from a specific point of generation to a specific point of use.

As renewable generators produce electricity, they create one REC for every 1000 kilowatt-hours (or 1 megawatt-hour) of electricity placed on the grid. If the physical electricity and the associated RECs are sold to separate buyers, the electricity is no longer considered “renewable” or “green.” The REC product is what conveys the attributes and benefits of the renewable electricity, not the electricity itself.

RECs serve the role of laying claim to and accounting for the associated attributes of renewable-based generation. The REC and the associated underlying physical electricity take separate pathways to the point of end use (see diagram). As renewable generators produce electricity, they have a positive impact, reducing the need for fossil fuel-based generation sources to meet consumer demand. RECs embody these positive environmental impacts and convey these benefits to the REC owner. “

Certifying and Tracking RECs

Renewable resources shall be as defined by the [Green-e Energy National Standard](#)² or an equivalent source and shall be tracked per one of the certificate tracking systems, such as WREGIS, ERCOT, NARR, PJM GATS, M-RETS, NEPOOLGIS, MIRECS, or NC-RETS. The EPA has more information on tracking systems on their [Green Power Partnership website](#)¹.

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 requirements:

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 that require electricity including, but not limited to: lighting, ITS, signals, signage, maintenance and operations sites and buildings, and rest area building and sites. 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 requirements:

- **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 Representative or Committee

Employ a representative or 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 requirements:

- **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**

Additional 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.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. EPA's Green Power Partnership website, <http://www.epa.gov/greenpower/index.htm>
2. Green-e, Green-e Energy National Standard, http://www.green-e.org/getcert_re_stan.shtml#standard

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

3. EPA's *Guide to Purchasing Green Power* (2010), https://www.epa.gov/sites/production/files/2016-01/documents/purchasing_guide_for_web.pdf
4. US Department of Energy's website, <https://www.energy.gov/>

5. U.S. Department of Energy Office of Energy Efficiency & Renewable Energy's website, <http://energy.gov/eere/office-energy-efficiency-renewable-energy>.
6. EPA's Green Power Partnership's *Renewable Energy Certificates (RECs)*, <https://www.epa.gov/greenpower/renewable-energy-certificates-recs>

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

Reducing fossil fuel consumptions 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 AASHTO's [Equipment Management Technical Service website](#)¹.

Scoring Requirements

Requirement OM-03.1

2 or 4 points. Set Fuel Reduction Goals

Set goals for fuel use reduction (primarily fossil fuels) 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 by the agency for either light-duty fleet or for heavy-duty and off-road equipment. Or, goals are set for light-duty and/or heavy-duty fleet for the agency by an executive board or other governing entity and no additional goals are developed by the agency.
- **4 points.** Goals are set by the agency 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). The plan may be comprised of multiple documents or a consolidated single document. Some examples of reduction actions include:

- **Higher efficiency and Alternate energy vehicles.** The purchase of vehicles powered by such alternative fuels as electricity, propane, natural gas, E-85, or biodiesel can result in lower greenhouse gas emissions. Hybrid electric and other high efficiency vehicles can reduce fossil fuel use and greenhouse gas emissions.

- **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. See the [EPA website](#)² for types of idling reduction technologies and strategies.
- **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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, Equipment Management Technical Service website, <http://www.emtsp.org/>
2. EPA, *Learn About Idling Reduction Technologies (IRTs) for Trucks and School Buses*, <https://www.epa.gov/verified-diesel-tech/learn-about-idling-reduction-technologies-irts-trucks-and-school-buses>

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: Reduce, 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:

- **“Office waste material”** 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).
- **“Operations and Maintenance Waste Material”** is waste from roadway maintenance and operations activities. Depending on the organization and how goals are set and implemented, this may include office waste materials generated as part of operations and maintenance activities. 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.
- **“Reduce”** refers to the process of intentionally implementing actions that reduce the amount of materials that are needed to perform a function or activity. For example, many companies have campaigns to reduce the amount of printing and/or increase double-sided printing to reduce their paper consumption.
- **“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 & Demolition Recycling Association’s [Find a C & D Recycler website](#)¹ provides links to a variety of localities that offer construction and demolition waste recycling services.

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 Reduce, Recycle and Reuse.

Requirement OM-04.1

2 or 4 points. Set Reduce, Recycle, and Reuse Goals

Set goals for operation and maintenance waste material reduction, reuse, and recycling. These goals do not need to be included in a formal Reduce, Recycle and Reuse (3R) plan; they could be part of a Comprehensive Internal Sustainability Plan (see OM-01) or Environmental Management Plan.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** Goals are set for either office waste materials or operations and maintenance waste materials.
- **4 points.** Goals are set for both office waste materials and operations and maintenance waste materials.

Requirement OM-04.2

2 or 4 points. Develop a Reduce, Reuse, and Recycle Plan

Develop a documented plan (could be multiple documents) that outlines how the 3R goals set in Requirement OM-04.1 will be accomplished. The plan should describe the agency's proposed 3R 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) or Environmental Management Plan.

Some potential 3R measures include, but are not limited to:

- Management organization and roles and responsibilities related to management of waste streams.
- Keeping accurate records and retaining all waste handling invoices and receipts.
- Locating recycling receptacles in all facilities and offices to encourage waste reduction of basic materials and small items.
- Clearly labeling 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.
- Providing 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.
- Providing training to workers to educate them on 3R and the specifics of the efforts being made to reduce waste.
- Creating an incentive or recognition plan for workers to engage actively in recycling efforts of personal trash that rewards positive and successful behavior.
- Hiring an experienced waste transport company to manage site waste and monitor waste streams for unacceptable materials.
- Providing 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.
- Identifying 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.
- Proper handling of waste to minimize negative environmental impacts. This could include management of waste including engine oil, asphalt, concrete, and other industrial waste to avoid soil and water contamination.

One of the following scores applies:

- **0 points.** No plan is developed, or the plan is not linked to the goals set in Requirement OM-04.1.
- **2 points.** A plan is developed for either office waste materials or operations and maintenance waste materials.
- **4 points.** A plan is developed for both office waste materials and operations and maintenance waste materials.

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.** Progress is not measured, or it is measured and not compared to performance goals set in Requirement OM-04.1.
- **2 points.** Waste streams are tracked for either office waste materials or operations and maintenance waste materials.
- **4 points.** Waste streams are tracked for both office waste materials and operations and maintenance waste materials.

Requirement OM-04.4

3 points. Demonstrate Sustainable Outcomes

To earn credit for this scoring requirement, the agency must have a 3R Plan as described in 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 are reduced or go to waste, reuse, or recycling and show that progress has been made toward the stated goals.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. Construction & Demolition Recycling Association, Find a C & D Recycler, <https://cdrecycling.org/directory/>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

2. EPA, *Reduce, Reuse, Recycle website*, <http://www2.epa.gov/recycle>
3. EPA, *Resources for Businesses, States, and Local Governments*, <http://www2.epa.gov/recycle/resources-businesses-states-and-local-governments>
4. Green Highways Partnership, *Home page of website*, <http://www.greenhighwayspartnership.org/index.php>
5. Industrial Resources Council, *Home page of website*, <http://www.industrialresourcescouncil.org/>

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 requirements:

- **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's *Strategic Highway Safety Plans: A Champion's Guide to Saving Lives*¹ 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.** Conduct 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's *Strategic Highway Safety Plans: A Champion's Guide to Saving Lives*¹) 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.

Metropolitan or regional agencies safety performance evaluations can be conducted as part of metropolitan or regional agency participation in the development of the state SHSP (refer to the FHWA's *Strategic Highway Safety Plans: A Champion's Guide to Saving Lives*¹ and other SHSP-related resources).

- **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):

Set safety performance metrics that are 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. Where applicable, these should be consistent with the metrics in the SHSP that also reflects prevailing trends in the region.

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

- **Requirement OM-05.2a**

1-2 points. Set Safety Goals and Targets

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. Depending on the structure and needs of the agency, this could be one plan or a set of consolidated plans from differing geographies or levels of governance (headquarters, district, etc.); however to achieve points for this scoring requirement, all geographies of the agency must be included.

Scoring is based on the following, cumulative requirements. The first requirement 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) are aimed at reducing the overall severity of crashes rather than the frequency of crashes; and (ii) 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**

At least 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 a similar program 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. See the TRB's [Report on PlanSafe](#)².

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 account 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*³ (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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, *Strategic Highway Safety Plans: A Champion's Guide to Saving Lives*, <http://safety.fhwa.dot.gov/safetealu/guides/guideshsp040506/guideshsp040506.pdf>
2. TRB, Report on PlanSafe, <http://www.trb.org/Main/Blurbs/163790.aspx>
3. AASHTO, Highway Safety Manual, https://bookstore.transportation.org/collection_detail.aspx?ID=135

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.

For the purposes of this criterion, the following definitions apply:

- **"Commitments"** – Any agreed-upon obligations to avoid, minimize, or compensate for a social, economic, or environmental impacts resulting from planning activities, an environmental review process such as NEPA, design efforts, or permitting.
- **"Compliance"** – Conforming to environmental laws, regulations, standards, and other requirements such as permits to operate and/or maintain a project or facility.
- **"Environmental Mitigation"** – Environmental Mitigation activities means strategies, policies, programs, actions, and activities that, over time, will serve to avoid, minimize, or compensate for (by replacing or providing substitute resources) the impacts to, or disruption of, elements of the human and natural environment associated with the implementation of a transportation project, plan, or system. Examples of the human and natural environment include neighborhoods and communities, homes and businesses, cultural resources, parks and recreation areas, wetlands and water sources, forested and other natural areas, agricultural areas, endangered and threatened species, and the ambient air.

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 all regulatory and non-regulatory commitments that apply to the development work and additional properties, which may include items such as the following:

- 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 requirements:

- **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 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 requirements. The first requirement 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.

Resources

None referenced.

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

Background

The intent of this criterion is to leverage an agency's Pavement Management System (PMS) to incorporate sustainability considerations into decision-making, rather than to require that using the PMS will always result in the selection of a sustainable pavement solution.

Scoring Requirements

Requirement OM-07.1

1 point. Develop a Pavement Management System and Collect Data

The agency has a 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. There is no requirement that the PMS be a singular, computerized system; however, the PMS shall be a system of coordinated processes and tools that accomplish the functions of this criterion. The PMS should be based on the AASHTO *Pavement Management Guide, 2nd Edition*¹ and should include:

1. an up-to-date inventory;
2. a condition assessment;
3. yearly estimate of the annual budget needed to maintain and preserve the eligible infrastructure assets at the condition level established and disclosed by the government.
4. prioritization of projects needing maintenance and rehabilitation;
5. a method to determine the impact of funding decisions; and
6. a feedback process.

Note, the first three functions are requirements of [Statement 34 of the Governmental Accounting Standards Board \(GASB 34\)](#)². 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 requirements:

- **Requirement OM-07.2a**

1 point. Track Using Common Metrics

Track overall network condition using common metrics that supports GASB 34 requirements. 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 requirements:

- **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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, *Pavement Management Guide, 2nd Edition (2012)*
https://bookstore.transportation.org/Item_details.aspx?id=2024
2. Governmental Accounting Standard Series, *Statement 34 of the Governmental Accounting Standards Board* (June 1999), <http://www.gasb.org/cs/>
3. FHWA, *Towards Sustainable Pavement Systems: A Reference Document* (January 2015),
<https://www.fhwa.dot.gov/pavement/sustainability/hif15002/hif15002.pdf>

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*¹. 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:

1. Collecting, processing, and updating data;
2. Predicting deterioration;
3. Identifying alternative actions;
4. Predicting costs;
5. Determining optimal policies;
6. Performing short- and long-term budget forecasting; and
7. 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 requirements.

- **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. Report Operational Limits

Report any bridges that are in service with posted weight limits or have functional limitations. This also applies in situations where bridge service loading has been reviewed and no posted limits or functional limitations apply.

- **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 (OM-08.2a, OM-08.2b, and OM-08.2c) 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 requirements:

- **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.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, *Guidelines for Bridge Management Systems*,
https://bookstore.transportation.org/item_details.aspx?id=343

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

2. FHWA, Asset Management website, <http://www.fhwa.dot.gov/asset/>

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 to optimize the management of maintenance. The MMS provides managers with processes, tools, and data necessary to make decisions 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*¹ (GMMS). The following definitions from the GMMS apply:

- **"Maintenance Management"** – refers to all 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. Incorporate 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 workscheduling.
- **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 automated vehicle and connected vehicle technologies, such as GPS, weather information systems, surface temperature measuring devices, on-board freezing point and ice-presence detection systems, salinity measuring devices, visual and multi-spectral sensors, traffic speed, crash reporting, etc. to provide input information to the MMS and leverage MMS outputs to maintenance vehicles to optimize operations and maintenance activities.

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 the integration of additional, specific features listed below (see GMMS for more definition). Scoring is based on the following, cumulative requirements:

- **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 requirements. The first requirement 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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, *Guidelines for Maintenance Management Systems*,
https://bookstore.transportation.org/item_details.aspx?id=413

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 highway infrastructure (paved roadway surfaces, bridges, tunnels, roadsides, and their appurtenance facilities) last longer and perform better by undertaking preservation and 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 footprint.

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). These Management Systems feed into an Asset Management Plan that assists in applying the right treatment to the right infrastructure element at the right time to optimize performance.

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, strategies, 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 and Tunnels
- Stormwater system, including LID features
- Other infrastructure facility elements

Additional assets that may be included:

- Shoulders and sidewalks
- Slopes, rock-fall, and slope protection
- Vegetation
- Accessory 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**2-7 points. Sustainable Maintenance and Operations**

Scoring is based on the following, cumulative requirements.

- **Requirement OM-10.2a**

3 points. Fund RMP Activities

For the fiscal year evaluated, appropriate funding is allocated to accomplish all preventative maintenance, routine maintenance and repair activities included in the RMP and annual work plan.

- **Requirement OM-10.2b**

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-10.2c**

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.

Requirement OM-10.3**2 or 4 points. Include Performance Measures, Monitor, and Demonstrate 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 requirements. The first requirement must be accomplished to earn the second.

- **Requirement OM-10.3a**

2 points. Include Performance Measures

Plan includes performance measures that can be used to monitor the effects of plan implementation on highway preservation and maintenance. Metrics should focus on preventative maintenance, routine maintenance, and repairs and should be aligned with the agency's sustainability goals. 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-10.3b**

2 additional points. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after performance metrics in OM-10.3a are established and how measurable advancement towards stated goals.

Resources

None referenced.

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.

Scoring Requirements

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.

If an agency is evaluating only a specific geography then that entire geography must be covered in order to take credit for the following scoring requirements. If evaluating agency-wide, all geographies must be covered by a combination of plans in order to take credit.

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 requirements. The first requirement 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 requirements. The first requirement 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 requirements:

- **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, standard operating procedures for maintenance crews could include non-idling procedures for noise and air quality control, sustainable waste management, sustainable materials procurement and use, or pollution prevention procedures.

- **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).

Resources

None referenced.

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 a road weather management program (including snow and ice control) 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

Intelligent Transportation Systems (ITS) solutions are included in OM-13: Transportation Management and Operation, including techniques for information dissemination and traffic control strategies, and are not duplicated in this criterion. Technologies related to infrastructure surveillance, monitoring and prediction; and response and treatment strategies are included in this criterion.

Background

FHWA's [Road Weather Management Website](#)¹ explains that "adverse weather conditions have a major impact on the safety and operation of our Nation's roads, from signalized arterials to Interstate highways. Weather affects driver behavior, vehicle performance, pavement friction, and roadway infrastructure. Weather events and their impacts on roads can be viewed as predictable, non-recurring incidents that affect safety, mobility and productivity. Weather affects roadway safety through increased crash risk, as well as exposure to weather-related hazards. Weather impacts roadway mobility by increasing travel time delay, reducing traffic volumes and speeds, increasing speed variance (i.e., a measure of speed uniformity), and decreasing roadway capacity (i.e., maximum rate at which vehicles can travel). Weather events influence productivity by disrupting access to road networks, and increasing road operating and maintenance costs."

Determining the most sustainable approaches to Road Weather Management requires a balance of best practices with impacts. For instance, providing an improved level-of- service (LOS) for the roadway during weather events must be balanced with the environmental impacts associated with the resulting increase in materials applied. Materials used to treat snow and ice can harm adjacent flora and fauna and leach into nearby bodies of water and negatively impact plant and animal habitats. The use of these materials to improve LOS during weather events must be weighed against potential impacts. The development of plans and best practices included in this criterion requires a balance of these trade-offs based on the goals of the individual agency.

Scoring Requirements

Requirement OM-12.1

2-4 points. Road Weather Management Program

- **Requirement OM-12.1a**

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 impacts 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. One of the following scores applies:

0 points. The agency does not have an RWMP.

1 point. The agency has multiple RWMP documents that cover all geographies and weather types within the agency (may be separated by geography, weather type, etc.)

2 points. The agency has single, consolidated RWMP document that covers all geographies and weather types within the agency.

- **Requirement OM-12.1b**

2 additional points. Address Long-term Weather Changes in RWMP

The RWMP developed in requirement OM-12.1a addresses weather events based on long-term predictions and trends, rather than historical weather data only. Anticipated impacts to operations and maintenance based on long-term weather/climate changes should be developed consistently with the approaches discussed in SP-16: Infrastructure Resiliency, including Hazard Identification, Vulnerability Assessment and Risk Assessment and should be updated on an established evaluation and update cycle.

Requirement OM-12.2

2-3 points. Set Goals and Monitor Progress

To earn points for this scoring requirement, the agency must have a Road Weather Management Plan as described in scoring requirement OM-12.1. If the RWMP contains multiple documents, each document must include the following requirements. Scoring is based on the following, cumulative requirements. The first requirement 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 the goals set in requirement OM-12.2a for at least one year after goal establishment and show measurable advancement towards stated goals.

Requirement OM-12.3

1-2 points. Implement a Road Weather Information System

Road 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 are used to maintain awareness of current conditions and to feed into roadway models, and they allow the operator to make the best decisions about which actions to take. For example, it enables a maintenance manager to decide 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 Dynamic Message Signs (DMS) or 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 implements a RWIS in select areas identified, but has not implemented a system agency-wide.

2 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.) and shares the data with the NWS.

Requirement OM-12.4

1-2 points. Implement the Standards of Practice or Standard Operating Procedure (SOP) For Weather-Related Issues

Scoring is based on the following, cumulative requirements. The first requirement 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 treatment 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

1-2 points. Implement a Maintenance Decision Support System

Deploy 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 RWIS 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's MDSS is based on roadside RWIS.
- **2 points.** The agency has MDSS processes that are based on both roadside RWIS and vehicle mounted sensing technologies.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Road Weather Management Website, <http://www.ops.fhwa.dot.gov/weather/index.asp>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

2. FHWA, *An Introduction to Standards for Road Weather Information Systems (RWIS): Siting Standards, Calibration Standards, Communications Standards* (2002), <http://www.standards.its.dot.gov/Content/documents/rwis-standards.htm>
3. FHWA, *Best Practices for Road Weather Management* (2012), <http://ops.fhwa.dot.gov/publications/fhwahop12046/fhwahop12046.pdf>
4. FHWA – RITA, *Road Weather Management Performance Measures – 2017 Update*, <https://ops.fhwa.dot.gov/publications/fhwahop17048/ch2.htm>
5. WSDOT, *Road Weather Information Systems: Enabling Proactive Maintenance Practices in Washington State* (2002), <http://www.wsdot.wa.gov/research/reports/fullreports/529.1.pdf>
6. NCHRP, *Benefit/Cost Study of RWIS and Anti-icing Technologies* (2001), <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1459>
7. NCHRP, *Test Methods for Evaluating Field Performance of RWIS Sensors* (2006), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w87.pdf
8. Prepared by Montana DOT for FHWA, *Recommendations for Winter Traction Materials Management on Roadways Adjacent to Bodies of Water* (2004), https://www.mdt.mt.gov/other/webdata/external/research/docs/research_proj/traction/final_report.pdf
9. NCHRP, *Report 526: Snow and Ice Control: Guidelines for Materials and Methods* (2004), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_526.pdf

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 strategies.

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 congestion and 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

This criterion, OM-13: Transportation Management and Operations, covers the management and operations (M&O) of existing infrastructure through the use of Intelligent Transportation Systems (ITS). Other related criteria that also include ITS strategies include:

- OM-03 Vehicle Fuel Efficiency and Use – includes ITS strategies to reduce fuel usage of fleet vehicles;
- OM-07: Pavement Management System – includes ITS strategies to inventory and manage pavement assets;
- OM-08: Bridge Management System – includes ITS strategies to inventory and manage bridge assets;
- OM-11: Traffic Control Infrastructure Maintenance – includes the preservation and maintenance of permanent traffic control, ITS, and safety devices;
- OM-12: Road Weather Management Program – includes ITS strategies to monitor weather, manage events, and efficiently operate and maintain the transportation system during weather events; and
- OM-14: Work Zone Traffic Control – includes ITS strategies related to M&O related temporary traffic control

For the purposes of INVEST, ITS strategies are included in specific topical criteria first, and more general solutions are included in OM-13.

Background

The intent of this criterion is to encourage the use of available technologies to actively manage and operate the existing roadway infrastructure, alleviating 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), and non-recurring events (special events, work zones, weather-related events, etc.).

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

- **“Intelligent Transportation Systems (ITS)”** are advanced applications that provide innovative services relating to different modes of transport and traffic management and enable system users to be better informed and make safer, more coordinated, and 'smarter' use of technology-based transportation networks.

- **“ITS Architecture”** defines how systems functionally operate and the interconnection of information exchanges that must take place between these systems to accomplish transportation services. An architecture is functionally oriented and not technology-specific which allows the architecture to remain effective over time. It defines "what must be done," not "how it will be done."
- **“ITS Standards”** define an architecture of interrelated systems that work together to deliver transportation services.
- **“National ITS Architecture”** provides a common framework for planning, defining, and integrating ITS. It defines the functions that must be performed by subsystems, where these functions reside (e.g., field, traffic management center, in vehicle), the interfaces and architecture flows to/from the subsystems, and the communications requirements for the architecture flows. It is a mature product that reflects the contributions of a broad cross-section of the ITS community (e.g., transportation practitioners, systems engineers, system developers, technology specialists).

Scoring Requirements

The strategies included in the following scoring requirements will vary in size and scope depending on the needs of the agency. The strategies could be comprised of a combination of various documents that cover M&O 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 documents in aggregate and respond according to the majority of their practices.

Requirement OM-13.1

2 points. Conduct Enhanced or Expedited Compliance

The agency takes steps or measures beyond (enhanced) or faster than (expedited) 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, Real Time Traveler Information, and the Manual on Uniform Traffic Control Devices. Examples of measures that enhance compliance include adopting demand management strategies, such as congestion pricing strategies and high-occupancy toll (HOT) lanes, which are encouraged but not required under the Congestion Management Process. Enhancements might also include programs that encourage transit use and ridesharing.

Requirement OM-13.2

1-6 points. Include Operation-Based Strategies and Programs

The agency has in place system-wide strategies, for enhancing the mobility and safety of the existing roadway network. These strategies increase user level of service and roadway capacity, and decrease collisions and their effects on mobility. Strategies include ITS functions and the programs in place to implement and support their use. Information about ITS functions that can be used to support these strategies can be reviewed at the FHWA Office of the Assistant Secretary for Research and Innovative Technology (OST-R) Intelligent Transportation Systems Joint Program Office’s [Application Area Website](#)¹. Table OM-13.2.A shows the ITS application areas and ITS functions available for this criterion.

Utilize one or more ITS functions, as listed in Table OM-13.2.A, in support of the application areas listed. Points are awarded based on how many application areas are supported system-wide (or in a majority of areas identified as relevant). Multiple ITS functions in one application area do not achieve additional points. Points for supporting application areas are cumulative; however, this criterion **shall not exceed a total of six points**.

To determine points, it is important to review the definition of the application areas, the function, and the technology. The application areas are defined on the aforementioned ITS [Application Area Website](#)¹. To better understand the function and technologies, select the application area name, then, on the ITS Taxonomy page for that application area, select the desired function or technology. At the top of each page that describes a particular function or technology, there is a "What is this?" description. This defines the function or technology being scored. For example, the technology labeled "HOV Facilities" within the Lane Management function, is described as "Sensors detecting the traffic conditions support the use of dynamic message signs and moveable barriers (e.g., gates) to control the operation of HOV facilities." Therefore, points are not provided for merely having HOV facilities, but utilizing ITS to monitor and control the facilities. In addition, the implementation of ITS functions included in Table OM-13.2.A will vary in size and scope depending on the needs of the agency; while a particular function or technology itself may be utilized, it may not be used fully in all possible ITS application areas; ensure this is reflected correctly in determining points.

The implementation of technologies to support M&O strategies may vary from test projects, to regional improvements, to statewide implementation both as applicable/relevant and as the agency is rolling-out or testing specific technologies. Some technologies may have greater relevance to urban areas or rural areas and vice versa. For the purposes of evaluating this criterion, the agency should consider whether the technologies are ***implemented in a majority of the relevant areas.***

TABLE OM-13.2.A ITS TECHNOLOGIES (CONTINUED ON NEXT PAGE)

Requirement	Points	Application Area	Functions (If Itemized, Shown Technologies ONLY)
OM-13.2a	1	Arterial Management	Information Dissemination (In-Vehicle Systems) Lane Management Surveillance (Infrastructure) Traffic Control (Adaptive Signal Control*, Bicycle and Pedestrian**, Special Events, Variable Speed Limits)
OM-13.2b	1	Freeway Management	Information Dissemination (In-Vehicle Systems) Lane Management Ramp Control (Ramp Closures) Special Event Trans. Management Surveillance (Infrastructure)
OM-13.2c	1	Crash Prevention & Safety	Animal Warning* Bicycle Warning Highway-Rail Crossing Warning* Pedestrian Safety**
OM-13.2d	1	Road Weather Management	Information Dissemination (Dynamic Message Signs) Traffic Control Strategies
OM-13.2e	1	Roadway Operations & Maintenance	Asset Management (Infrastructure Management) Information Dissemination (Internet/Wireless/Phone)
OM-13.2f	1	Transit Management	Information Dissemination
OM-13.2g	1	Traffic Incident Management	Surveillance & Detection (Detectors, Imaging/Video)
OM-13.2h	1	Electronic Payment and Pricing	Pricing Toll Collection

Requirement	Points	Application Area	Functions (If Itemized, Shown Technologies ONLY)
OM-13.2i	1	Traveler Information	En-Route Information Information Dissemination Pre-Trip Information (511, Internet/ Wireless/Phone, Kiosks)
OM-13.2j	1	Information Management	Data Archiving
OM-13.2k	1	Commercial Vehicle Operations	Safety Assurance Security Operations
OM-13.2l	1	Intermodal Freight	Freight-Highway Connector System

* Earns points in rural applications only. Not considered “above and beyond” in an urban setting.

** Points are not earned for “Countdown” WALK/DON'T WALK signals; as they are not considered “above and beyond.”

Requirement OM-13.3

2 points. Compliance with National ITS Architecture

Tailor the National ITS Architecture to create a “regional” ITS Architecture based on agency- specific needs. The regional ITS Architecture should consist of functions within ITS elements and architecture flows that interconnect each of the ITS elements in the region (and with ITS elements outside the region). For more information, visit FHWA’s OST-R ITS Joint Program Office’s [ITS Standards Program website](#)².

Requirement OM-13.4

2 points. Integrate M&O Strategies into Design

Integrate a system (such as design policies, procedures, and strategies) to ensure the needs of M&O strategies are fully considered in roadway infrastructure design. Consider M&O strategies during systems planning, project selection, and project design to maximize their potential and limit the need to retrofit roadways to meet M&O strategies. Retrofitting roadways is usually less cost effective and more likely to force the need for design exceptions than meeting the needs of M&O strategies during the design phase. For more information, visit the FHWA’s Office of Operations’ [Designing for Transportation Management and Operations: A Primer website](#)³.

Requirement OM-13.5

2-3 points. Set Goals and Monitor Progress

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

- **Requirement OM-13.5a**

2 points. Establish Safety and Mobility Performance Metrics

Establish performance metrics specific to the operational system that is relevant to the implementation of ITS, including at least one metric related to safety, one related to mobility, and one related to integration of M&O strategies into design. Examples include travel times, incident response times, and incident frequency.

- **Requirement OM-13.5b**

1 additional point. Monitor Progress and Demonstrate Sustainable Outcomes

Monitor progress towards goals for at least one year after goal establishment using the performance measures established in OM-13.5a and show measurable advancement towards stated goals.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA Office of the Assistant Secretary for Research and Innovative Technology (OST-R) Intelligent Transportation Systems Joint Program Office Application Area Website,
<https://www.standards.its.dot.gov/LearnAboutStandards/ApplicationAreas>
2. FHWA Office of the Assistant Secretary for Research and Innovative Technology (OST-R) Intelligent Transportation Systems Joint Program Office, ITS Standards Program Website,
<http://www.standards.its.dot.gov/LearnAboutStandards/NationalITSArchitecture>
3. FHWA Office of Operations, *Designing for Transportation Management and Operations: A Primer*,
<http://ops.fhwa.dot.gov/publications/fhwahop13013/ch1.htm#s11>

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 website](#)¹ 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 website](#)².

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 requirements. The first requirement must be accomplished to earn the second.

- **Requirement OM-14.2a**

2 points. Establish Performance Metrics for Work Zone Traffic Control

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 or dis-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 timelines in design-build contracts only.
- **3 points.** The agency routinely includes the use of innovative contracting to encourage contractors to reduce and optimize construction timelines 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.

Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, Work Zone Process Review Toolbox website, http://ops.fhwa.dot.gov/wz/prtoolbox/pr_toolbox.htm
2. FHWA, WZTC Self-Assessment website, https://ops.fhwa.dot.gov/wz/decision_support/self-assess.htm

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.

Innovative Criterion

IN-01: Innovative Criterion Information.....IN-01

Innovative Criterion

IN-01: Innovative Criterion Information.....IN-01

XX-IN-##: [Insert Title Here]

points

Goal: [Provide the goal of the criterion. Describe the overall intent of the criterion in a statement that reflects the larger concept.]

Sustainability Linkage

[Describe why this innovative criterion achieves a sustainable result by describing how it affects the triple bottom line principles (Social, Environmental, and Economic). Only benefits considered primary and secondary are described; tertiary and other ancillary benefits may be evident but are not included in this description.]



Affected Triple Bottom Line Principles

- ☐ Environmental
- ☐ Social
- ☐ Economic

Background and Scoring Requirements

Innovative Criteria Rules and Disclaimers

[This section describes a few basic requirements/rules that apply to innovative criteria; delete from the final criterion write-up.]

1. Only one topic is allowed per innovative criterion.
2. No sub-requirement scoring is allowed for innovative criteria.
3. Points assigned to innovative criteria must be a whole number, no fractions of points may be used.
4. Table XX-IN-##.A shows the maximum points per innovative criterion, the maximum innovative criteria allowed per scorecard, and the maximum cumulative points for all innovative criteria for a given scorecard. For example, a PD scorecard may have one three-point innovative criterion or it may have three one-point innovative criteria, or one two-point criterion and one one-point criterion. However, whichever combination of innovative criteria are used, the total of the innovative criteria may not exceed 3 points.

Table XX-IN-##.A Maximum Points and Innovative Criteria per Scorecard

	SPR Module	SPS Module	PD Module	OM Module
Max. Points/Innovation	5	5	3	5
Max. Innovations/Scorecard	3	3	3	3
Max. Points/All Innovations	10	10	6	10

5. With the submittal of an innovative criterion, FHWA reserves the right to:
 - a. Share your criterion on the INVEST website. (The agency name will be shared, but name and contact information of the person who submitted the criterion will NOT be shared on the website)
 - b. Elect to review and provide feedback on your criterion, but is not obligated to do so.
 - c. Adopt any or all of the innovative criterion into future versions of INVEST.
6. While use of the INVEST website is private, and information about projects/programs and scores is not available to FHWA or other users, if a user selects to submit an innovative criterion, the information provided within that submittal is not considered private. The purpose of this is to ensure that points received for

innovations are carefully considered by users and to provide a “forum” for innovative ideas and methods to be shared among transportation practitioners. The scoring for the remainder of the project/program stays private; only the information pertaining to the innovative criterion is shared. Users can choose to share the scoring for their project/program, if desired, through the submittal of a case study or criterion example; go to FHWA’s [Case Studies webpage](#)³ for more information.

Criterion Template Directions

[Narrative instructions to the user are shown in square brackets throughout this document. They should be deleted in the final criterion.]

[This section provides directions for completing this template; delete from the final criterion write-up.]

1. Download this criterion template from FHWA’s [INVEST Innovative Criteria webpage](#)¹ to aid in writing and developing the innovative criterion. Follow the guidelines written within this template and adhere to the format provided. Use the existing INVEST criterion for examples of formatting and numbering.
2. In the header at the top of this criterion, give the criterion a **Criterion Identifier** and **Title**. The identifier should follow the format XX-IN-##. With XX specifying the module in which the criterion is being proposed (PD, OM, SPS, or SPR); IN for “innovative”; and ## serving as the sequential numbering of innovative criteria for your program or project. For example, if a project is being evaluated has two innovative criteria, their criterion identifiers would be PD-IN-01 and PD-IN-02. See number 6 for guidance on the number of innovative criteria and maximum points permitted per module and type of scorecard.
3. Fill in the **Goal** section by answering the question, “what is goal of this criterion as it relates to transportation projects and sustainability?”
4. Fill in the **Sustainability Linkage** section by describing how the innovation is sustainable.
5. Under the Graphic labelled, “**Affected Triple Bottom Line Principles**”, put a check mark in the primary and secondary principles affected by this innovation. This should clearly match the Sustainability Linkage text. Once submitted and accepted, FHWA will update the graphic as appropriate.
6. In the **Background** section:
 - a. List any related INVEST criteria.
 - b. Define any key or technical terms that may be unknown or ambiguous to a transportation professional or that may require a more precise definition with respect to the innovative criterion.
 - c. Describe the applicable regulations, standards and conventions that apply to the criterion and specifically state how this innovation meets the above and beyond requirement.
 - d. Include a description of information relevant to all of the requirements or information that will help transportation professionals understand the scoring requirements.
 - e. Mention any resources and how they are useful in this section.
7. In the **Scoring Requirements** section:
 - a. Only one scoring requirement may be used per innovative criterion proposed.
 - b. Clearly title the requirement using a present tense verb plus short description, e.g. Install Wind Powered Luminaire.

- c. Assign a number of points to the innovation. Use the existing INVEST criteria for reference. The number of points achieved should be representative of the sustainability impact and duration of the best practice (not the effort, cost, or uniqueness of the best practice).
 - d. Describe the requirement completely, clearly, and concisely. Make sure the description helps clarify how the innovation is different from existing INVEST criterion and how the “above and beyond” requirement is to be met.
 - e. Add a table of any data necessary.
8. Summarize referenced and additional resources in the **Resources** section. Within the text refer to the Publisher (or author), hyperlink and italicize the title of the document or hyperlink a website resourced, show a date of publication in parenthesis and include the URL to the document, if available. Insert a superscript number after the title and use that numbering in the Resources section below. The numbering of resources shall be sequential within the criterion. Refer to existing INVEST criterion for format.
 9. In the **Scoring Sources** section, list places where the reviewer can look to determine if the innovative criterion has been met.
 10. When the criterion or all innovative criteria are complete for the project or program being evaluated, go to FHWA’s [INVEST Innovative Criteria Submittal webpage](#)² to submit the innovative criterion/criteria to FHWA. All innovative criteria for a project/program should be submitted together. The submittal page includes information necessary for submittal, this includes key information about the innovative criterion needed for scoring, the project/program name, the name and contact information of the person submitting the criterion/criteria, and the name and contact information of the agency or organization submitting the criterion/criteria. The name and contact information of the person submitting the criterion/criteria will not be published on the website.
 11. Once the innovative criteria for a project have been submitted along with the required submittal information, the points for the innovative criteria will be added to the applicable program/project score and the innovative criteria will be available to view on the program/project scorecard page. Periodically, FHWA will review the innovative criteria submitted and may choose to publish them on the website.

Background

[This section describes the background of the innovative criterion; replace with text specific to the innovation proposed.]

This criterion is related to the following INVEST criteria:

- SPR-01: Integrated Planning: Land Use and Economic Development (Regional)
- SPS-01: Integrated Planning: Land Use and Economic Development (State)
- PD-01: Economic Analysis
- OM-01: Internal Sustainability Plan

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

- **“Above and Beyond”** refers to best practices that are in addition to what is typically required by standard or regulation, or by conventional practice for similar projects.
- **“Best Practices”** are sustainable techniques, methods, practice, processes, or materials.

- **“Emerging Technology”** is a best practice that has not yet been tested and proven effective or feasible for wide-spread adoption or application.
- **“Innovative”** refers to a new and unique method, practice, or solution that is not already addressed in INVEST. If the points earned by employing the best practice can earn points elsewhere within the existing INVEST criteria, this does not satisfy the definition of “innovative.”
- **“Sustainable”** means contributing to one or more of the triple bottom line principles.

A Best Practice selected to be submitted as an innovative criterion should be considered to be innovative or an emerging technology AND should also be “above and beyond” regulations, standards and conventional practice. Many criteria within INVEST are results-based, meaning the results are measured rather than the method itself. This is intentional as to allow practitioners ample leeway for obtaining sustainable results. Keep this in mind when determining whether a best practice is indeed innovative.

Scoring Requirements

[This section describes the scoring requirements of the innovative criterion; replace with text specific to the innovation proposed.]

Requirement XX-IN-##.1

points. Description of Scoring Requirement

[Describe the requirement.][Insert relevant tables using the following format. Tables should be labelled Table XX-IN-##.1.A, where A is a single letter designating the table, assigned sequentially from A to Z.]

Table PD-IN-01.1.A Clear and Concise Table Description

	Column Header 1*	Column Header 2	Column Header 3	Column Header 4
Row Descriptor 1	Data	Data	Data	Data
Row Descriptor 2	Data	Data	Data	Data

* Footnote any relevant information below the table. A second table within this requirement should be given the table identifier of “Table PD-IN-01.1.B.”

Resources

[This section provides a brief bibliography of resources referenced or relevant to the innovative criterion; replace with text specific to the innovation proposed.]

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. FHWA, INVEST Innovative Criteria webpage, <http://www.sustainablehighways.org/innovative>
2. FHWA, Life-Cycle Cost Analysis Primer (2002), <http://isddc.dot.gov/OLPFiles/FHWA/010621.pdf>

Additional Resources

The following resources provide information on this criterion topic in addition to the sources directly referenced:

3. FHWA, INVEST webpage, <http://www.sustainablehighways.org>

Scoring Sources

[This section indicates where an evaluator can look for information to score this innovative criterion; replace with text specific to the innovation proposed.]

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. List possible documentation sources, such as calculations and reports.
2. Documentation of techniques and underlying assumptions.
3. Documentation that will validate the score selected for the criterion.

