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Visual Impact Assessment Mitigation Strategies Research

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16. Abstract

The main objective was to assemble a framework for writing effective visual impact mitigation measures for adverse visual resource impacts and preparing design guidelines. This included strategies to implement National Environmental Policy Act (NEPA) visual impact mitigation commitments through transportation project planning, design, construction, and maintenance. FHWA Region 8 recommended adapting FHWA "SMART" (Specific, Measurable, Attainable, Realistic and Tangible) concepts as a tool to inform the development of more effective visual impact mitigation measures and design guidelines.

Implementation

Once a framework was developed to evaluate the existing visual mitigation writing process using SMART criteria, the team contacted and invited landscape architects representing four state DOTs and the US Forest Service to contribute to this research by providing examples of VIA reports (case studies) and participating in interviews with CDOT. To facilitate the composition of mitigation strategies, the team recommended using guidance tools, including work flowcharts and a Mitigation Planning Checklist, to organize, develop, and write effective mitigation measures.

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1. INTRODUCTION

The Colorado Department of Transportation (CDOT) is developing a Statewide Visual Resource Program, which includes a detailed review of the 2015 Federal Highway Administration (FHWA) *Guidelines for the Visual Impact Assessment of Highway Projects* (VIA Guidelines). As a part of this development process, CDOT landscape architects are researching approaches for developing more effective mitigation measures for adverse visual resource impacts, including strategies used by CDOT, other departments of transportation (DOT), and the US Forest Service (USFS). The team also reviewed Bureau of Land Management (BLM) and National Park Service (NPS) methodologies for managing visual resources.

This research focuses on creating a framework for writing effective visual impact mitigation measures and preparing design guidelines. This includes strategies to implement National Environmental Policy Act (NEPA) visual impact mitigation commitments through transportation project planning, design, construction, and maintenance. As suggested by FHWA Region 8, CDOT is adapting FHWA "SMART" concepts as a tool for informing the development of more effective visual impact mitigation measures and design guidelines.

The goals of this visual impact assessment (VIA) mitigation research include:

- Improving strategies to effectively mitigate adverse visual impacts through the NEPA process;
- Applying FHWA "SMART" criteria to better articulate NEPA commitments and other federal regulations; and
- Documenting new approaches to writing effective mitigation, along with innovative mitigation strategies.

All VIA examples and Guidance Manuals have been provided electronically to CDOT so that information can be accessed by CDOT's Visual Resource Committee.

A key resource for the team was the recently updated *Federal Lands Memorandum of Understanding* (MOU) developed among the BLM, CDOT, FHWA, and USFS (CDOT et al., 2016). The MOU consolidates landscape, aesthetics, and visual references available from each involved agency. Recommendations for new approaches for developing effective mitigation measures for adverse visual impacts emerged through this research process.

2. RESEARCH FRAMEWORK

The team developed a research framework that set up an evaluation process using SMART criteria. The overall concept of applying SMART criteria to visual impact mitigation encompasses commitments that are "specific, measurable, attainable, realistic, and tangible." SMART criteria for visual impact mitigation are defined as:

- **Specific (S)** to the landscape character, viewers, and visual quality of the environment that would be adversely affected, and what is going to be accomplished;
- **Measurable (M)** compensation for the visual impact, by replacing or providing substitute resources or environments, in coordination with communities and regulatory agencies;
- **Attainable (A)** mitigation strategies that are technically practical and within standard engineering principles;
- **Realistic (R)** to the community and regulatory agencies, as well as financially feasible; and
- Provides **tangible (T)** aesthetic considerations to the transportation project delivery process, through design, construction, and maintenance.

The first step involved building a matrix to integrate NEPA mitigation measures, with SMART criteria, as a tool for developing effective and successful mitigation measures for adverse visual impacts, as shown in **Table 1**. FHWA *Guidelines for the Visual Impact Assessment of Highway Projects* (2015) outlines mitigation strategies for adverse visual impacts, as well as concepts for creating beneficial impacts through opportunities to enhance or improve visual quality. SMART criteria represent a tool for developing effective NEPA mitigation commitments that are financially feasible and result in aesthetic design elements in the project delivery process. **Table 1** organizes SMART in two parts:

- Focus on mitigation of adverse visual impacts, through Specific and Measurable strategies
- Focus on future potential project design and delivery through Attainable, Realistic, Tangible strategies

Table 1. Framework for Effective Visual Impact Mitigation

Visual Impact	Mitigation Measure Strategies		SMART Criteria for Effective Mitigation[1]	
			Focus on Mitigation of Adverse Visual Impacts	Focus on Design and Delivery of Commitments
Adverse Visual Impacts	Avoidance and Minimization	• "Avoid or minimize" visual impacts through project planning; alternatives analysis; realignments; screening; or aesthetic treatment approaches.	**Specific:** • Proposed measure targets affected visual resources, including visual character, viewers and visual quality. **Measurable:** • Measure establishes context-sensitive visual resource compensation, with community and agency coordination.	**Attainable:** • Agency commitments are practicable and standard. **Realistic:** • Agency commitments are likely acceptable and economically feasible. **Tangible:** • Aesthetic design commitments conceivably could be incorporated into construction documents. • Aesthetic mitigation includes potential design, implementation, and maintenance strategies.
	Rectification	• "Rectify or repair" visual impacts by rehabilitating or restoring adversely affected resource(s).		
	Compensation	• "Compensate" for visual impacts by replacing or providing substitute resources.		

[1]SMART Criteria: S = Specific, M = Measurable, A = Attainable, R = Realistic, T = Tangible

2.1 SMART Criteria Applications

The following describes applications of SMART criteria to visual impact mitigation. These criteria are tied primarily to FHWA *Guidelines for the Visual Impact Assessment of Highway Projects* (2015).

Specific Visual Impact Mitigation Criteria

To be **Specific**, mitigation measures should be context-sensitive and target impacts on the visual resources that would be adversely affected by the proposed action, within the Area of Visual Effect (AVE). Visual mitigation measures should establish strategies for effectively avoiding, minimizing, or compensating for impacts on the visual character of the landscape, viewers, and visual quality of the AVE.

The following criteria are used to evaluate the effectiveness of mitigation measures for adverse impacts specific to the visual character, viewers, and visual quality of natural, cultural, and project environments; including elements that establish the public identity and image of communities.

S1. Mitigation criteria for adverse impacts to *visual character*

Adverse visual impacts may result when the form, line, color, texture, scale, and/or materials of project elements are **incompatible** with the visual character of landscape units and community environments within the AVE due to:

- The **visual contrast** of the project with the visual character of the natural, cultural and project environments (landforms, geologic features, vegetation, water features, and development patterns)
- Altering the overall ***memorability*** or ***vividness*** of natural landscapes within the AVE; or the public identity/image of community environments.

Mitigating adverse impacts on **visual character** should include measures to avoid, minimize, rectify, or compensate for the project's visual contrast to the natural, cultural, and project environments within landscape units, as well as community image and sense of place.

S2. Mitigation criteria for adverse impacts to *viewers*

Adverse impacts on ***viewers*** may result from contrasting project elements due to:

- ***Viewer exposure***: Proximity, extent, and duration of views to travelers and neighbors within sensitive viewsheds. The greater the exposure, the more viewers will be concerned about visual impacts.
- ***Viewer awareness:*** *Attention, focus*, and *exposure* to contrasting project elements. Heightened awareness of changes within viewsheds typically requires specific mitigation strategies to achieve visual compatibility.
- ***Distance zones and visibility***: The visual dominance of the project is tied to the distance from the viewer and visual screening. Distance zones are defined, as follows.
  - *Foreground (Fg)*: 0.25 to 0.5 mile from the viewer
  - *Middleground (Mg)*: Extends from the Fg zone to 3 to 5 miles from the viewer
  - *Background (Bg)*: Extends from the Mg zone to the limit of visibility

Mitigating adverse impacts on **viewers** should include measures to avoid, minimize, rectify, or compensate for the project's visual contrast to specific viewer groups, viewpoints, and viewsheds.

S3. Mitigation criteria for adverse impacts to *visual quality*

Adverse impacts on **visual quality** may result from changes to values that viewers place on the *natural harmony*, *cultural order*, and *project coherence* of landscapes within the AVE.

Mitigating adverse impacts on **visual quality** should include measures to avoid, minimize, rectify, or compensate for the project's visual contrast with the composition and vividness of landscape units.

Measurable Visual Impact Mitigation Criteria

If effective mitigation of adverse visual impacts is not possible to achieve through avoidance or minimization measures, other **measurable** strategies must be developed to **compensate** for impacts on visual character, viewers, and visual quality.

Compensation measures may replace or create substitute resources associated with the:

- Visual quality of the natural, cultural, and project environments
- Viewing experience of project neighbors
- Viewing experience of travelers

Visual impact compensation should measurably contribute to the visual quality of natural, cultural, and project environments.

Attainable Visual Impact Mitigation Criteria

To be **attainable**, visual impact mitigation strategies should be technically practical and grounded within standard engineering principles.

Realistic Visual Impact Mitigation Criteria

To be **realistic**, visual impact mitigation strategies should be supported by stakeholders and communities, acceptable to regulatory agencies, and financially feasible.

Tangible Visual Impact Mitigation Criteria

Tangible mitigation strategies should include short-term construction-related aesthetic considerations, as well as long-term aesthetic design concepts that can be incorporated into design for project delivery. Aesthetic design elements should be included in project design plans and specifications. Aesthetic design guidelines create opportunities to establish consistency and provide a connection with the design process.

2.2 Visual Impact Assessment Evaluation Template

The second step in building the research framework was to organize the format for evaluating mitigation measures provided in selected VIA studies provided by participating agencies. Using the framework for effective mitigation displayed in **Table 1**, the team organized a standardized VIA Evaluation Template for documenting the relationships among types of adverse visual impacts, mitigation strategies, and SMART criteria as shown in **Table 2.**

The VIA evaluation template format includes the following research elements:

- Project name and agency
- Brief descriptions of adverse visual impacts and mitigation measures
- Impact and mitigation categories to establish a searchable database of mitigation strategies
- Application of SMART mitigation criteria:
  - Mitigation of adverse visual impacts (Specific and Measurable)
  - Design and delivery of mitigation commitments (Attainable, Realistic and Tangible)
- Observations
  - The evaluation process includes observations for establishing more comprehensive mitigation strategies
- Legends
  - Categories for types of proposed project improvement impacts visual mitigation categories
  - Effectiveness evaluations

Table 2. Visual Impact Assessment Evaluation Template

VIA Project	Impact & Mitigation Code	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Visual Impacts ⟷				Focus on Design and Delivery of Commitments			
		Specific			Measurable	Attainable	Realistic	Tangible	
Visual Impacts and Mitigation Measures		S1: Visual Character	S2: Viewers	S3: Visual Quality					
Visual Impact Description									
Mitigation Measures									
1.									
2.									
3.									

Legends			
Impact Category Code (See Appendix C)	E = Earthwork FS = Fill Slopes CS = Cut Slopes	R = Roadways GR = Guardrails RC = Rock cuts	V = Vegetation clearing L = Lighting RW = Retaining walls
Mitigation Strategy Code	1= VIA policy-level mitigation measure	2 = Visual resource planning-level mitigation measure	3 = Prescriptive-level mitigation measure
Effectiveness	x = mitigation measure statement connects with SMART criteria		

2.3 Visual Impact Assessment Mitigation Research Approach

The evaluation of VIA mitigation strategies included the following steps:

1. Review each selected VIA report. The team summarized each VIA to frame up the context for adverse visual impacts and mitigation measures. These summaries included descriptions of the VIA methodology, visually sensitive resources, and adverse visual impacts.
2. Populate a VIA evaluation template with the types of adverse visual impacts and associated mitigation measures. Apply standardized codes to each visual impact and mitigation measure so that it can be tracked and reviewed for future VIA consideration and recommendation (see **Table 2** legend for examples).
   - Develop a standardized list of codes for types of visual impacts based on general categories of project effects (see **Appendix C** for a comprehensive list).
   - Establish codes to categorize patterns of mitigation strategies, including:
     - **Mitigation Strategy 1**: VIA policy-level mitigation measure

       This mitigation category addresses the relationship of visual impact mitigation to other federal laws and programs that have been recognized for their connections to scenic values,

including the National Historic Preservation Act, Sections 4(f) and 6(f); state environmental laws; and local government plans, policies, and ordinances.

This mitigation category also applies to compliance with federal land management of visual resources, including USFS and BLM.

- **Mitigation Strategy 2**: Visual resource planning-level mitigation measure

  This mitigation category applies VIA terminology to articulate:

  - Context-sensitive strategies to avoid, minimize, or compensate for adverse impacts on the visual character, viewers, and scenic quality of the landscape, within natural, cultural, and project environments (FHWA, 2015; USFS, 1996; and BLM, 1984).
  - The terminology often used to address the mitigation of impacts on the visual character of the landscape includes techniques to reduce levels of visual contrast to form, line, color, texture, and scale of landforms, vegetation, water, and structures.
  - Mitigation of project visibility and impacts on viewers (travelers and neighbors) may identify strategies for project elements to blend in and establish visual compatibility and to repeat patterns form, line, color, texture, and scale within viewsheds of specific viewpoints, viewers, and distance zones.

- **Mitigation Strategy 3**: Prescriptive-level mitigation measure

  This mitigation category prescribes specific techniques to mitigate visual impacts and may include references to established engineering standards and principles, erosion control, site restoration, and aesthetic guidelines or specifications.

3. Evaluate how well the written mitigation measure statement directly connects with individual SMART criteria. **Table 2** provides a matrix format for conducting this evaluation. The patterns associated with responsive mitigation strategies to the SMART criteria will indicate their effectiveness to address adverse visual impacts and establish a path for aesthetic considerations in project delivery.
4. Summarize mitigation effectiveness, including observations, trends, and suggestions for developing and writing more comprehensive measures.

3. AGENCY CONTACTS AND RESEARCH

The team began by contacting landscape architects from the California Department of Transportation (Caltrans), Maryland Department of Transportation (MDOT), Minnesota Department of Transportation (MNDOT), and Oregon Department of Transportation (ODOT); as well as those from the White River National Forest and Region 2 of the USFS. The first step included sharing background information on the CDOT research scope of work, scheduling interviews, and gathering examples of VIA technical reports for review. **Chapter 4** provides a summary of the VIA evaluations, and **Chapter 5** provides a summary of the DOT and USFS interviews. The table in **Appendix A** identifies contact information and tracks all communication with each agency. **Table 3** identifies the documentation that each agency provided for review.

All VIA examples and Guidance Manuals have been provided electronically to CDOT so that information can be accessed by CDOT's Visual Resource Committee.

3.1 State Departments of Transportation Guidance

In addition to federal agency guidance, several state DOTs have developed their own VIA mitigation processes or guidelines. The following subsections summarize Caltrans, MDOT, and MNDOT guidelines for VIA practice.

California Department of Transportation

Caltrans has approximately 260 landscape architecture professional positions, including a combination of licensed landscape architects and unlicensed landscape associates or landscape specialists/technicians. Caltrans created a comprehensive statewide VIA training program based on the FHWA *Visual Impact Assessment for Highway Projects* (1988) in collaboration with Craig Churchward. Caltrans has used this training extensively in California across all Caltrans districts, as well as with local agencies, to prepare practitioners for conducting a consistent and standardized level of VIAs. According to the Caltrans VIA website, "departmental policy requires that VIAs be performed by licensed landscape architects whether for internally or externally developed projects." Caltrans VIAs must be prepared at the appropriate level for every project, with effective and defensible visual impact mitigation measures, using a metrics-based value system to quantify visual impacts.

The Caltrans online VIA training consists of a VIA Preparation Questionnaire to determine the level of VIA and presents a comprehensive online training series consisting of a three-module slide presentation. Mitigation is covered in Module 3B, Lesson 14, which provides a series of slides on the following topics:

- Incorporating commitments
- Mitigation concepts
- Mitigation issues
- Enhancement opportunities

Caltrans VIA manual resources, and online training are referenced at: http://www.dot.ca.gov/design/lap/landscape-design/via/.

Maryland Department of Transportation

MDOT landscape architects work within an interdisciplinary team planning environment, centered on a Context Sensitive Solutions (CSS) approach, with extensive community and agency involvement. The MDOT *Landscape Design Guide* (http://www.roads.maryland.gov/Index.aspx?PageId=25) provides comprehensive guidance for project development, design, and implementation.

Minnesota Department of Transportation

MNDOT created a *Visual Quality Manual* (MNDOT, 2010) outlining a six-step VIA process. Central to the VIA mitigation process is an interdisciplinary collaborative mitigation design process, and a visual simulation and animated program, which was initiated during the St. Croix River project. Through an interactive alternatives analysis process, the St. Croix project became a model for community, interdisciplinary, and interagency collaboration that served to streamline the project delivery and permitting process.

Table 3. Visual Impact Assessment Data Gathering

Agency	Contacts	Visual Impact Assessments and Guidance Manuals
Caltrans Interviewed May 15 and May 30, 2018	Elbert Cox, Supervising Landscape Architect (Headquarters) Lara Justine, Senior Landscape Architect (Headquarters) Bob Carr, Landscape Architect (District 5)	• *Visual Impact Assessment of the Proposed Highway1Widening Project: Hurricane Point to Rocky Creek*, December 2015 • *Visual Impact Assessment of the CURE and Tree Removal Project, Monterey County California*, November 2013 • *Visual Impact Assessment of the Proposed Old Creek Bridge Retrofit Project*, March 2017 • *Visual Impact Assessment of the Proposed Pfeiffer Canyon Bridge Replacement Project*, March 2017 • *Visual Impact Assessment Highway 101 High Occupancy Vehicle Lane Project, Santa Barbara County, Carpinteria and Santa Barbara*, October 2011 • *Visual Impact Assessment, Aspen Fales Shoulder Widening Project,* Mono County, California, April 2016 • *Visual Impact Assessment, Mathilda Avenue Improvements at SR 237 and US 101 Project,* May 2016 • *Visual Assessment Memo and Scenic Resource Evaluation Pedestrian Improvements: Highway 135, Santa Maria, California,* October 2017 • *Visual Impact Assessment Training, Lesson 14, Mitigation*
MDOT Interviewed May 17, 2018	Margot Bartosh, Assistant Chief, Landscape Architecture Division	• *I-270 Intercounty Connector in Frederick County, Maryland EIS,* Affected Environment and Environmental Consequences sections • *Landscape Design Guide*, MDOT State Highway Administration 2016 • *Preferred Plant List,* MDOT State Highway Administration 2018
MNDOT Interviewed May 29, 2018	David Larson, Environmental Planning and Design Supervisor Todd Clarkowski, PE	• *Final Environmental Impact Statement and Section 4(f) Evaluation for the New St. Croix River Crossing*, 1995 • *St. Croix River Crossing Project Supplemental Draft EIS*, Chapter 7, Visual Impact Analysis, August 2004 • *Visual Quality HPDP/Scoping/Subject Guidance*, August 2010 • St. Croix River Crossing Project *Visual Quality Manual Addendum Final Submission*, 2010 • St. Croix River Crossing Project, *Visual Quality Manual*, January 2007 • *Visual Quality, Process for Visual Impact Assessment,* MDOT, 2010

Agency	Contacts	Visual Impact Assessments and Guidance Manuals
ODOT Interviewed May 22, 2018	Robert Marshall, Program Coordinator	• VIA Memorandum for US 26: Little Pine Creek, October 2017 • I-5: South Jefferson to US 20: Final Visual Resources Technical Memo, April 2014 • VIA Memorandum for Fossil Heritage Trail Project, June 2017 • Draft VIA Memorandum for US 97: Biggs Junction Spanish Hollow Creek and Trout Creek Bridges, April 2017
US Forest Service Interviewed May 23, 2018	Daniel Cressy, Regional Landscape Architect Donna Graham, WRNF Landscape Architect	• *Environmental Assessment Finding of No Significant Impact: Buford New Castle Project*, February 2017 • *Visual Impact Assessment CO FLAP SUM91(1) Fremont Pass Recreation Path*, March 2018 • *Environmental Assessment State Highway 9 Iron Springs Alignment, South of Frisco (Milepost 93 to Milepost 95)*, April 2014 • Appendix A22, Visual Resources Technical Memorandum for the State Highway 9 Iron Springs Alignment Environmental Assessment, April 2014 • *Environmental Assessment, Upper Fryingpan Vegetation Management Project*, July 2017 • *Landscape Aesthetics, A Handbook for Scenery Management (SMS)*, Forest Service, 1995 • *Scenery Management System, Appendix J, Recommended SMS Refinements*, Forest Service, 2007
CDOT Working Sessions	Michael Banovich, Landscape Architecture Section Manager Greg Fischer, Landscape Architect Susan Suddjian, Landscape Specialist	• *6th Avenue Parkway Extension Environmental Assessment*, 2016 • *US 40, Berthoud Pass East Environmental Assessment, Clear Creek County/Arapaho National Forest*, Colorado, 1997 • *Environmental Assessment State Highway 9 Iron Springs Alignment, South of Frisco*, April 2014 • *East of Wolf Creek Pass Environmental Assessment*, 1998

3.2 Federal Agency Guidance

The team researched federal agency VIA mitigation guidance provided by FHWA, USFS, and BLM.

Federal Lands Memorandum of Understanding

A key resource for the team was the recently updated Federal Lands MOU developed among the BLM, CDOT, FHWA, and USFS (CDOT et al., 2016). The stated purpose of the Federal Lands MOU is to "establish procedures for coordinating activities affecting the state transportation system and lands administered by U.S. Forest Service / BLM within the State of Colorado." This MOU has created a collaborative relationship between major federal land holding agencies within the state to work toward the common good for transportation development projects, including preserving and enhancing the important visual resources of Colorado. The MOU relates to activities affecting the state transportation

system, USFS's National Forest System Lands, and BLM's National System of Public Lands in the State of Colorado. The MOU consolidates landscape, aesthetics, and visual references available from each involved agency. Appendix A-3 contains project-specific design protocols to support the USFS and BLM management planning standards and guidelines for visual and scenic quality. The MOU can be accessed using the following link: https://www.codot.gov/programs/environmental/documents/federal-lands-mou-2016/view.

Federal Highway Administration

The FHWA 2015 VIA Guidelines provide context for standard NEPA requirements for VIA mitigation for adverse impacts. Chapter 7, Mitigation Phase, defines types of mitigation (avoidance, minimization, and compensation) and presents a concept for developing effective mitigation measures for adverse impacts. The Guidelines provide examples of types of approaches to use in mitigating visual impacts related to natural, cultural, and project environments. The examples suggest starting with project standards and specifications already in place, such as the AASTHO *Green Book*, 2011.

For this research study, the team has organized mitigation elements within a SMART criteria framework. Building from the FHWA 2015 VIA Guidelines, the SMART mitigation study continues to expand on the approaches to the mitigation development process, starting with a mitigation planning process.

The concept of mitigation planning is also included in the earlier FHWA 1988 VIA Guidelines. Toward this end, the 1988 guidance recommends "to ensure the full realization of any mitigation actions, the highway agencies must coordinate environmental assessment activities with subsequent design, construction, and maintenance phases of highway development." These guidelines suggest developing mitigation objectives to avoid, minimize, or compensate for changes to landscape character, viewers, and visual quality as a part of the mitigation planning process.

US Forest Service

The USFS principles of scenery management are imbedded in a chronological history of research and publication of guidance manuals dating back to the 1960s. Through the team's VIA interview process, Region 2 and White River National Forest landscape architects recommend that mitigation measures should include a statement of how the desired outcome can be incorporated into project design (see **Chapter 5**).

The USFS *Agriculture Handbook 701*, *Landscape Aesthetics: A handbook for Scenery Management* (1996) documents the process used to inventory and analyze scenery in a national forest. *Scenery Management System, Appendix J*, USFS 2007, provides recommendations to clarify, refine, and extend an ecological approach to scenery management. Scenic stability is introduced in Appendix J as an approach for assessing the vulnerability of valued landscape scenery to changes based on ecological sustainability.

The USFS *National Forest Landscape Management, Volume 2, Chapter 4: Roads* (Agriculture Handbook 483, 1977), provides approaches for integrating roads into the forest landscape to avoid and minimize visual impacts.

Bureau of Land Management

The *Visual Resource Inventory* (BLM Manual Handbook 8410-1, 1986a) and *Visual Contrast Rating* (BLM Manual Handbook 8431-1, 1986b) combine to provide comprehensive guidance related to visual resource management, impact assessment, and mitigation of improvements on public lands administered by the BLM. Handbook 8431-1 (1986b) includes examples of design techniques for mitigating visual impacts related to avoiding, retaining, minimizing, and reducing the visual contrast of project elements to the form, line, color, texture, scale, and space associated with landforms, vegetation, water, and structures. The guidance describes steps in the Visual Contrast Rating process, including criteria for

evaluating visual contrast levels, with illustrations of visual contrast to form, line, color, texture, scale, and three-dimensional space.

The BLM Manual Handbook 8431-1 (1986b) provides a detailed "toolkit" for describing and mitigating visual changes based on the concept of visual contrast between the proposed project and existing visual resources. It also provides a sample list of design techniques for mitigating visual impacts.

The BLM publication *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands* (2013) includes an extensive section on mitigation planning. This publication can be accessed from http://blmwyomingvisual.anl.gov/docs/BLM_RenewableEnergyVisualBMPs_LowRes.pdf).

Chapter 6. Common Elements, of the *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands* (2013) covers BMPs for 10 topics: mitigation planning, siting and design, structure design and materials selection, materials surface treatment, lighting, avoiding disturbance, soils and erosion management, vegetation management, reclamation, and "good housekeeping."

The following mitigation planning BMPs address issues concerning visual impact analysis and mitigation:

- Ensure that qualified individuals conduct and review impact analyses and mitigation plans;
- Use appropriate methods and data for visual impact assessment and mitigation planning and design;
- Incorporate stakeholder input into the siting and design and mitigation planning processes;
- Thoroughly assess existing and potentially affected visual resources;
- Consult the applicable visual resource impact (VRI) and visual resource management (VRM) class designations;
- Develop spatially accurate and realistic photo simulations of project facilities;
- Develop a decommissioning and site reclamation plan;
- Develop a visual resource impact monitoring and mitigation compliance plan;
- Hold a preconstruction meeting to coordinate the mitigation strategy;
- Discuss visual mitigation objectives with equipment operators; and
- Use offsite mitigation.

The BLM Wyoming State Office developed a comprehensive federal agency Visual Resource Clearinghouse website that provides stakeholders with access to key information and documents relating to visual resource management programs for inventories, impact assessments, and mitigation at http://blmwyomingvisual.anl.gov/.

National Park Service

The NPS is developing a Visual Resource Program (VRP) to address visual resource issues. The VRP is a comprehensive inventory, planning, and visual resource management assistance program. The VRP includes four components: Visual Resource Inventory (VRI), Planning, Technical Assistance, and Policy and Guidance. The VRP is a systematic approach to describing views, assessing scenic quality, risk of changes to views; protecting visual resources; and mitigating potential impacts of proposed projects and land management actions. The NPS VRI process is described in *Documenting America's Scenic Treasures: The National Park Service Visual Resource Inventory* (Sullivan and Meyer, 2016).

4. EVALUATION OF DEPARTMENT OF TRANSPORTATION AND FOREST SERVICE VISUAL IMPACT ASSESSMENTS

Once the evaluation framework was set and the team had received VIA report submittals shared by Caltrans, MDOT, MNDOT, ODOT, and USFS, the team conducted a detailed review of each VIA document listed in **Table 3**. The team selected VIAs that included mitigation measures for adverse visual impacts that would best represent the goals and objectives of this research project. The team conducted the VIA mitigation evaluations by applying the evaluation template shown in **Table 2.** Results of the SMART criteria evaluations are provided in **Appendix B** and summarized below.

This assessment evaluated DOT and USFS VIAs and design guidelines based on SMART criteria for developing the foundation for writing effective visual impact mitigation strategies. Steps in the VIA evaluation process included:

- Reading each document;
- Populating the evaluation template with mitigation measures;
- Assigning impact types and interpreting mitigation strategies (policy, planning, or prescriptive);
- Evaluating how well mitigation measures connect with the goals of the SMART criteria; and
- Developing observations about what was achieved and how they could better achieve the goals of SMART mitigation criteria.

Following the VIA reviews and mitigation evaluations, the team interviewed landscape architects to share observations and discuss VIA practices. **Chapter 5** summarizes each agency interview, followed by recommendations in **Chapter 6**.

Overviews of the agency VIA mitigation evaluations are documented below, with an emphasis on selected case studies. These are followed by a summary of the trends and patterns observed in the agency VIA evaluations included in **Appendix B**.

4.1 California Department of Transportation

Caltrans headquarters landscape architects Elbert Cox and Lara Justine submitted eight VIAs representing a diversity of proposed highway projects in California, including:

- *Visual Impact Assessment of the Proposed Highway1 Widening Project: Hurricane Point to Rocky Creek,* December 2015
- *Visual Impact Assessment of the CURE and Tree Removal Project, Monterey County California,* November 2013
- *Visual Impact Assessment of the Proposed Old Creek Bridge Retrofit Project,* March 2017
- *Visual Impact Assessment of the Proposed Pfeiffer Canyon Bridge Replacement Project*, March 2017
- *Visual Impact Assessment Highway 101 High Occupancy Vehicle Lane Project, Santa Barbara County, Carpinteria and Santa Barbara*, October 2011
- *Visual Impact Assessment, Aspen Fales Shoulder Widening Project, Mono County, California*, April 2016
- *Visual Impact Assessment, Mathilda Avenue Improvements at SR 237 and US 101 Project*, May 2016
- *Visual Assessment Memo and Scenic Resource Evaluation Pedestrian Improvements: Highway 135, Santa Maria, California*, October 2017

Case Study

The evaluation team selected the Highway 101 High Occupancy Vehicle (HOV) lane VIA as the Caltrans case study. This VIA evaluated a diversity of alternatives and provided extensive mitigation strategies (see the SMART evaluation details in **Appendix B**).

This project proposes to widen approximately 12 miles of US Highway 101 in Santa Barbara County to three lanes in each direction, between the cities of Carpinteria and Santa Barbara. The visual impacts of three build alternatives and a no-build alternative were evaluated. This VIA applies the guidance set out in the *Visual Impact Assessment for Highway Projects* (FHWA, 1988), which is the current practice for Caltrans VIAs.

Local planning policies and the California Coastal Commission protects visual resources of Route 101 through coastal Santa Barbara County. Caltrans convened a Visual Evaluation Team of nine interagency participants, representing the City of Carpinteria, the City of Santa Barbara, Santa Barbara County, Santa Barbara County Council of Governments, and Caltrans. The Visual Evaluation Team numerically rated the extent of visual change that would result from the project alternatives, using photo simulations, a site video, and project maps.

Caltrans landscape architects concluded that even with the implementation of the mitigation measures included in the VIA, extensive visual impacts would remain, regardless of the alternative. An Aesthetic Design Advisory Committee is developing aesthetic guidelines with interested parties in the local communities.

The Highway 101 HOV lane VIA recommends 26 mitigation measures to reduce the visual impacts as seen from highway travelers and the surrounding communities. These mitigation measures address visual changes resulting from traffic management systems, lighting, median barriers, guardrails, retaining walls, sound walls, permanent stormwater prevention measures, vegetation removal, bridge modifications, fences, signs, and utilities.

The Highway 101 HOV lane VIA mitigation measures include multiple strategies to avoid and minimize adverse visual impacts and to compensate for losses. The mitigation measures are comprehensive in scope, addressing the complex elements of the proposed project through the following approaches:

- There are combinations of planning-level and prescriptive-level approaches to avoid or compensate for the visual impacts of structural elements, including sound walls, median barriers, drainage structures, bridge modifications, lighting, traffic management systems, and signage.
- Approaches include aesthetic treatment of the form, line, color, texture, scale, and architectural relief of structural project elements so that they blend in with the setting.
- There is considerable emphasis on preserving and transplanting existing trees.
- New landscaping is prescribed adjacent to sound walls and retaining walls.
- Vegetation planting measures stress retaining views of the Pacific Ocean.

See **Section 6.3** for selected mitigation measures included in the Highway 101 HOV lane VIA.

4.2 Maryland Department of Transportation

MDOT's Assistant Chief Landscape Architect, Margo Bartosh, with the Landscape Architecture Division of the Office of Environmental Design, provided CDOT with the following VIA-related materials for review:

- Visual resource sections from the *Maryland Route 200, Intercounty Connector (ICC) Environmental Impact Statement*, 2005
- *MDOT Landscape Design Guide,* 2016
- *MDOT Preferred Plant List.* 2018

Case Study

The team selected the Maryland Route 200 ICC project as the case study due to the diversity of impact types and mitigation strategies (see the SMART evaluation details in **Appendix B**). The ICC is an 18.8-mile six-lane tolled freeway, connecting I-370 in Montgomery County to US 1 in Prince George's County. The final segment of this controversial project was completed in 2014. This highway was first proposed in the 1950s as part of an Outer Beltway for Washington, DC. Other parts of the Outer Beltway were later cancelled, but the ICC remained on transportation master plans. Environmental mitigation and aesthetics were major components of the project implementation, involving context-sensitive planning and design. The MDOT *Landscape Design Guide* includes a chapter on CSS that emphasizes stakeholder involvement in the design process.

The ICC VIA recommends a package of 12 mitigation measures to reduce the visual impacts as seen from highway travelers and the surrounding communities. These mitigation measures address visual changes resulting from construction, earthwork, guardrails, hardscape, roadway, structures (bridge/culverts), vegetation, and wall structures.

The ICC VIA mitigation measures represent a mix of policy-level, planning-level, and prescriptive-level strategies. The overall framework for ICC mitigation measures focuses on the following strategies to offset visual impacts in consultation with the communities:

- Creating Aesthetic Design Guidelines with concepts and illustrations for visual screening;
- Increasing compatibility with the surrounding environment through design standards and context-sensitive solutions that are in keeping with an overall corridor theme;
- Contributing to visual unity by including thematic patterns, colors, architectural features, and gateway designs; and
- Enhancing existing visual character by using materials and design techniques that blend with the surrounding area.

See **Section 6.3** for selected mitigation measures included in the ICC VIA.

4.3 Minnesota Department of Transportation

MNDOT's Chief Landscape Architect, David Larson submitted the following documents related to the St. Croix River Crossing project VIA and the MNDOT Visual Quality Manual (VQM) to CDOT for review:

- *Final Environmental Impact Statement and Section 4(f) Evaluation for the New St. Croix River Crossing (FEIS)*, 1995
- *St. Croix River Crossing Project Supplemental Draft EIS (SDEIS)*, Chapter 7, Visual Impact Analysis, August 2004
- *St. Croix River Crossing Project, Visual Quality Manual*, (VQM), January 2007
- *St. Croix River Crossing Project Visual Quality Manual Addendum Final Submission*, 2010
- *Visual Quality, Process for Visual Impact Assessment*, 2010

Case Study

The team selected the1994 New St. Croix River Crossing FEIS as the MNDOT case study, including the role of the VQM (see the SMART evaluation details in **Appendix B**). The VIA methodology follows MNDOT's *Visual Quality, Process for Visual Impact Assessment* (MNDOT, 2010). The MNDOT landscape architects played a strategic role in the development and success of the St. Croix River Crossing Project. This 6.7-mile highway project is centered on the crossing of St. Croix River National Scenic Riverway, between Stillwater and Oak Park Heights, Minnesota, and Houlton, Wisconsin. Early planning for the controversial crossing of the St. Croix River began in the 1960s. The project gained a positive

direction in the late 1990s, with the formation of a collaborative stakeholder process, which included applying visual simulations and animation during the development of alternatives.

MNDOT's focus on visual resources provided a unifying element throughout the extended NEPA process, including the development of alternatives, decision-making, and regulatory compliance. The FEIS was competed in 1995, followed by a SDEIS in 2004, and a Supplemental FEIS in 2007. Due to the importance of visual resources, the *St. Croix River Crossing Project VQM* was developed in conjunction with the Supplemental FEIS between 2004 and 2006.

The team also evaluated the role of the VQM in achieving compliance with key federal regulatory requirements linked to the project area's visual quality and cultural values, including Section 7(a) of the Wild and Scenic Rivers Act, Section 4(f) of the US DOT Act, and Section 106 of the National Historic Preservation Act.

The VQM defines the selected design theme "Organic" and the resulting concept with these descriptors:

- *The parts look as if they were found in nature, or shaped by natural forces.*
- *The vertical pier forms are reed-like; the girders are rounded and tapered like bones or tree branches; and walls, barriers and railings are curved and blended into the larger forms.*
- *Transitions are gradual and smooth; edges are soft and curved; and colors are unified and natural expressions of their materials.*

Maintaining these values was the basis for evaluations and aesthetic alternative design recommendations for the structural bridge elements. The project received an ACEC 2018 Engineering Excellence Award and was recognized as a model for environment stewardship.

The *New St. Croix River Crossing FEIS* (MNDOT, 1995) includes mitigation for visual changes resulting from bridges, roadways, and signs.

The St. Croix River Crossing VIA mitigation measures represent a mix of policy-level and planning-level strategies. Each mitigation measure is written in a complete and context-sensitive manner, incorporating references to the setting and describing the intent of each mitigation measure, with supporting visual simulations. Mitigation measures provide visual context with landscape character, viewers, and visual quality. They establish effective strategies to community issues, including forming an interdisciplinary "Design Review Committee" with stakeholders, and developing "Gateway Concept Guidelines."

See **Section 6.3** for selected mitigation measures included in the St. Croix River Crossing VIA.

4.4 Oregon Department of Transportation

ODOT's Landscape Architect, Robert Marshall, Office of Roadside Development, submitted the following VIAs for team review:

- VIA Memorandum for US 26: Little Pine Creek, October 2017
- I-5: South Jefferson to US 20: Final Visual Resources Technical Memo, April 2014
- VIA Memorandum for Fossil Heritage Trail Project, June 2017
- Draft VIA Memorandum for US 97: Biggs Junction Spanish Hollow Creek and Trout Creek Bridges, April 2017

Case Study

The team selected the I-5: South Jefferson to US 20: Final Visual Resources Technical Memo (ODOT, 2014) as the case study, with a focus on the visual impact mitigation measures (see the SMART evaluation details in **Appendix B**).

The VIA analysis followed the FHWA method summarized in *Visual Impact Assessment for Highway Projects* (1988). The project is located along an approximately 5-mile stretch of I-5 in Linn County and includes widening I-5 to six lanes (up to eight lanes in the future) with interchange improvements.

The visual impact mitigation measures in the *I*-5: South Jefferson to US 20: Final Visual Resources Technical Memo address visual changes resulting from structured roadway elements, vegetation, lighting, sound walls, vehicle light-glare, and construction.

The VIA includes eight planning-level mitigation measures to minimize adverse visual impacts and to enhance the aesthetic characteristics of the Build Alternative that would be developed during detailed design phases, with implementation through an Aesthetic Advisory Committee.

Mitigation measures represent a mix of planning-level and prescriptive-level strategies. The mitigation measures are brief in scope and could be more effective by including additional context to locations and viewers.

See **Section 6.3** for selected mitigation measures included in the I-5 VIA.

4.5 US Forest Service

White River National Forest Landscape Architect, Donna Graham submitted the following VIAs for team review:

- *Environmental Assessment Finding of No Significant Impact: Buford New Castle Project,* February 2017
- *Visual Impact Assessment CO FLAP SUM91(1) Fremont Pass Recreation Path*, March 2018
- *Environmental Assessment State Highway 9 Iron Springs Alignment, South of Frisco (Milepost 93 to Milepost 95)*, April 2014
- Appendix A22, Visual Resources Technical Memorandum for the State Highway 9 Iron Springs Alignment Environmental Assessment, April 2014
- *Environmental Assessment, Upper Fryingpan Vegetation Management Project*, July 2017
- *Landscape Aesthetics, A Handbook for Scenery Management (SMS)*, 1995
- *Scenery Management System*, Appendix J, Recommended SMS Refinements, 2007

Case Study

The team selected the *Environmental Assessment, Upper Fryingpan Vegetation Management Project* (USFS, 2017*)* as the case study, focusing on the issue of vegetation management and how clear cuts would change scenery (see the SMART evaluation details in **Appendix B**).

The project evaluates design features to lessen or avoid potential negative effects associated with the implementation of forest clear cuts by following guidelines from the *White River National Forest Land and Resource Management Plan*, 2002. The 10 mitigation measures for the Upper Fryingpan Vegetation Management Plan provide a comprehensive mitigation package to avoid and minimize adverse effects on scenery resulting from vegetation management practices. Elements of the mitigation measures include strategies to avoid or reduce the visual contrast of vegetation to the form, line, color, texture of clearing, and construction debris.

The mitigation measures are written in a comprehensive manner and represent a mix of planning-level and prescriptive-level strategies, including references to types of impacts and detailed descriptions of mitigation strategies.

See **Section 6.3** for selected mitigation measures included in the Upper Fryingpan VIA.

4.6 Colorado Department of Transportation

Parallel to the mitigation research process for VIAs from other DOTs and the USFS, the team reviewed several CDOT VIAs, with assistance from CDOT's librarian, Jessica Wetherby. CDOT selected candidates for SMART mitigation evaluations VIAs listed in **Table 3** to represent a range of projects within the urban front range and western slope context:

- *6th Avenue Parkway Extension Environmental Assessment*, 2016
- *US 40, Berthoud Pass East Environmental Assessment*, 1997
- *I-70 Mountain Corridor Programmatic Environmental Impact Statement*, 2011
- *Twin Tunnels Environmental Assessment*, 2012
- *Highway 9 Iron Springs Alignment Environmental Assessment*, 2014
- *East of Wolf Creek Pass Environmental Assessment*, 1998

Case Study

The team selected the *Highway 9 Iron Springs Alignment Environmental Assessment* (CDOT, 2014) as a case study due to the organization and diversity of mitigation strategies (see the SMART evaluation details in **Appendix B**).

SH 9 improvements between Frisco and Breckenridge include realigning approximately 1.3 miles of existing SH 9 just south of the Town of Frisco, Colorado, and establishing improved trail connection and an underpass. Agency coordination included representatives from CDOT headquarters, the White River National Forest, Summit County, the towns of Breckenridge and Frisco, and local stakeholders.

Reference material to conduct visual quality studies included FHWA's *Visual Impact Assessment for Highway Projects* (1988) and the USFS *Landscape Aesthetics—A Handbook for Scenery Management* (1995).

Mitigation measures focus on strategies to reduce strong levels of contrast to the visual character of the landscape, views both to and from SH 9, and key observation points. An inventory of 16 high-priority viewpoints included mapping and characterization of landscape visibility and distance zones.

The visual impact mitigation measures in the *Highway 9 Iron Springs* VIA address visual changes resulting from cut and fill earthwork, roadway realignment, rock cuts, and vegetation clearing.

The visual impact analysis is based on the degree of visual contrast of the No Action and Proposed Action alternatives on significant views from 16 priority viewpoints. The assessment evaluates the ability of the No Action and Proposed Action alternatives to meet Scenic Integrity Objectives based on levels of visual contrast.

Mitigation commitments are tied to CDOT's CSS process, to Aesthetic Study and Design Guidelines established through the SH 9 EIS, and to continued coordination with the USFS. Mitigation measures emphasize maintaining a natural-looking appearance and enhancing the visual character of SH 9.

Mitigation measures represent a mix of planning-level and prescriptive-level strategies. Views of new retaining walls from both Dillon Reservoir and the new bike path include substantial native planting material. The mitigation measures are brief in scope and provide planning level strategies to avoid, minimize, or compensate for adverse visual impacts.

See **Section 6.3** for selected mitigation measures included in the SH 9 VIA.

5. INTERVIEWS

This CDOT SPR-funded study was conducted in response to an FHWA request to evaluate SMART criteria for VIAs in respect to other state DOTs and federal agency VIA procedures and practices.

Tim Tetherow of FHU, in collaboration with CDOT Landscape Architects Mike Banovich, Greg Fischer, and Susan Suddjian, developed a template using SMART criteria and applied this template to sample VIA projects submitted by the interviewees, as well as to selected CDOT projects. These filled in templates of their own example projects were then submitted for review to the interviewees, along with sample CDOT projects for review and discussion.

Table 4 identifies the five agencies that were interviewed to discuss the VIA processes and procedures in their jurisdictions. All interviewees expressed interest in this study and shared the successes and challenges of their respective VIA procedures and experiences. Each agency was provided a common list of topics to guide the interview discussions, as shown in **Table 5**.

Table 4. Agency Interviews

	Agency	Interview Location	Interview Date
MDOT MARYLAND DEPARTMENT OF TRANSPORTATION	Maryland Department of Transportation (MDOT)	FHU Office Teleconference	May 17, 2018
Oregon Department of Transportation	Oregon Department of Transportation (ODOT)	FHU Office Teleconference	May 22, 2018
USFS	US Forest Service (USFS)	CDOT Mountain Residency	May 23, 2018
mn DEPARTMENT OF TRANSPORTATION	Minnesota Department of Transportation (MNDOT)	CDOT Headquarters Teleconference	May 29, 2018
Caltrans	California Department of Transportation (Caltrans)	A preliminary Caltrans teleconference presented SMART mitigation concept	May 15, 2018
		FHU Office Teleconference	May 30, 2018

Table 5. Visual Impact Assessment Mitigation Research Interview Discussion Topics

VIA Practices

- Level of NEPA process for VIA applications (EIS, EA, CatEx, PEL, Complete Streets, local agency projects)
- Statewide visual resources applications, Corridor Aesthetic Guidelines
- Scope of VIA methodologies: FHWA guidelines and/or other federal VIA methodologies (USFS, BLM, NPS, other)

Focus on Developing Mitigation Strategies for Adverse Impacts

- Development of specific mitigation strategies to avoid, minimize, or compensate for adverse visual impacts
- Types of adverse impacts typically included in mitigation strategies:
  - Landscape character (natural, cultural/urban, and project/highway corridor environments)
  - Viewers (traveler and neighbor view corridors, viewpoints, and visibility)
  - Visual quality
  - Historic resources protected under Section 106
  - Section 4(f) and 6(f) resources
- Involvement of federal, state, and local agencies, and stakeholders in the mitigation planning process

Focus on Design and Delivery of Mitigation Commitments

- Interface with Design Guidelines
- Coordination of mitigation commitments with the design process
- Tracking and documenting the completions of mitigation commitments throughout the project delivery process

Case Studies

- Lessons learned from SMART criteria evaluations

5.1 California Department of Transportation

California is ecologically, regionally, and culturally diverse. Proposed transportation projects in California often face legal challenges. Therefore, Caltrans landscape architects have developed standardized VIA practices that are clearly defined and measurable so that they can be consistently applied. Comprehensive VIA analysis and documentation, and effective mitigation strategies are necessary to satisfy state and federal environmental regulations, using systems that can withstand litigation.

In addition to NEPA compliance requirements for federally funded projects, all Caltrans projects must also adhere to California's state environmental laws through the California Environmental Quality Act (CEQA). Caltrans has developed a standardized statewide process, which is managed for continuity through the Landscape Architecture Program at Headquarters. Caltrans provides comprehensive training through an online slide presentation and through classes. VIA practices must satisfy a myriad of federal, state, and local policies, regulations, ordinances, standards, and guidelines associated with NEPA, CEQA, California Coastal Act, other state and federal jurisdictional regulations, and city and county environmental ordinances.

Caltrans developed their current VIA practices in collaboration with Craig Churchward, based on the previous 1988 FHWA VIA Guidelines, before the FHWA 2015 VIA Guidelines were released. The VIA process consists of clear training and measurable methods implemented by Caltrans landscape architects statewide, with consistent and legally defensible results. The VIA process framework, based on FHWA *Visual Impact Assessment for Highway Projects* (1988), is quantitative and measurable. Defined metrics establish consistency to support projects through public review and avoid litigation. Caltrans landscape architects are the primary preparers of VIA documents.

Caltrans VIA mitigation strategies for adverse visual impacts are largely oriented toward prescriptive measures for addressing visual impacts. Caltrans landscape architects found value in the SMART

Template, especially regarding expanding the mitigation measures to include a broader context to improve policy and planning level concepts and to facilitate defensibility.

Mitigation commitments tied to design guidelines for the project are selectively applied and borne out of project necessity. One of the primary values of this approach is to facilitate community acceptance and build public trust.

Caltrans mitigation measures typically require coordination with a Caltrans landscape architect and a Caltrans biologist during design and construction.

5.2 Maryland Department of Transportation

The MDOT Office of Environmental Design, Landscape Architecture Division, consists of approximately nine landscape architects. MDOT has a practice of incorporating a CSS process into its collaborative planning and design process, which has been developed over the past two decades. Current practice incorporates CSS into an imbedded collaborative design process that includes professionals from various disciplines working directly with the design team from the start of the project.

MDOT indicates that they do not prepare many VIAs as a practice; rather, they follow an integrated CSS approach to enhance visual resources. Due to the unique nature of the rich historical and cultural resources in Maryland, cultural resource regulations often drive project design. The aesthetic elements of Section 106 and 4(f) regulations are central to their planning and design process.

Involving Architectural Historian, Anne Bruder, in the planning and design process establishes a direct connection between visual resources and Section 106 resources and regulations.

MDOT submitted a large transportation project for team consideration: the Inter County Connector (ICC), a controversial project associated with the Washington, DC beltway.

The interview revealed that most of their projects are of much smaller size, but they typically consist of significant historical and cultural resources that are often affected by transportation development design plans. Over the past 20 years, the Division has been immersed in many projects that have been proposed on historic sites of national significance. A result of this project experience has been the recognition and practice of an interactive and a collaborative approach to project design and delivery. Currently, landscape architects and historical experts strive to work in tandem with the project design team to avoid, minimize, and compensate for visual and historic impacts. Trial and error over the years has contributed to the shared understanding that a collaborative effort from the start of the design process can often avoid unnecessary conflicts later in regard to permitting, public acceptance, and overall project success.

Maryland has several Scenic Byways, 19 of which have Corridor Management Plans for maintaining scenic values. These incorporate local regulations through a collaborative internal and coordinated interagency process for project approval.

VIA mitigation strategies for addressing adverse visual impacts include conducting a cultural resources review.

Maryland has developed a statewide *Landscape Design Manual, State Highway Administration* (2016), which is on the MDOT website at http://www.roads.maryland.gov/Index.aspx?PageId=25. Chapter 6 of the *Landscape Design Manual* explains the purpose of the CSS process:

> Context sensitive solutions is a collaborative, interdisciplinary approach to developing and implementing transportation projects, involving all stakeholders to ensure that transportation projects are in harmony with communities and preserve and enhance environmental, scenic, aesthetic and historic resources while enhancing safety and mobility.

Context Sensitive Solutions: Chapter 6 of the *Landscape Design Manual* is organized by:

- Social Context: Community Stakeholder Involvement
- Environmental Context
- Regional Context: Rural, Suburban, Urban
- Cultural Context: Cultural and Historical Resources
- Highway Context: Scale, Design Speed and Volume

5.3 Minnesota Department of Transportation

MNDOT follows the Visual Quality Manual (VQM) six-step process but has not yet incorporated the 2015 FHWA guidelines. The scope and concept of the FHWA 2015 VIA Guidelines were developed from the MNDOT VQM (2010) system by Craig Churchward. MNDOT has about eight landscape architects. MNDOT VIA mitigation strategies for adverse visual impacts include integrating mitigation into the VIA process through community involvement in collaborative design alternative analysis.

Using multiple visualization techniques, such as video, animations, and/or photo simulations, has been instrumental from the beginning of MNDOT's VIA practice to convey design ideas to the public, stakeholders, and regulatory agencies. Stakeholder involvement is key to project success. Through interactive visualization presentations, MNDOT engages community and stakeholders in a collaborative and innovative design process, which has been successful in engaging public and stakeholder project acceptance and permitting. MNDOT VIA mitigation strategies for adverse visual impacts include integrating mitigation into the VIA process through community involvement in collaborative design alternative analysis. Key elements in the MNDOT process include:

- Establishing a Visual Quality Committee and complying with the Municipal Consent Law
- Using collaborative mitigation development techniques (Avoidance, Minimization, Compensation)
  - Integrating the VIA process into community involvement and collaborative design in alternatives analysis
  - Following VQM / Aesthetic Design Manual / Maintenance Manual
  - Illustrating techniques for mitigating adverse impacts
- Applying a "Cost Participation Percentage" – Visual Quality Management Item

The design and delivery of mitigation commitments are tracked throughout project design, construction, and maintenance.

5.4 Oregon Department of Transportation

ODOT has three landscape architects who work within the Office of Roadside Development. The Roadside and Development landscape architects are involved with projects throughout design, construction, and maintenance, in coordination with the Geo-environmental Department. Because the Pacific Northwest is characterized by a high degree of precipitation, the landscape architect's role focuses on roadside development, erosion control, and stormwater management projects, which emphasize the use of native vegetation.

Aesthetic improvements, such as increasing the number of flowering native plant species in their seed mixes, have become important in their projects. Recent efforts to modify labor-intensive traditional maintenance practices include reducing heavy mowing in favor of a more naturalized appearance. Design, aesthetic, and safety improvements include rock cuts, staining, glare screens, color selection for guardrail and signs, and living snow fences. The ODOT VIA examples include visual resource technical memos

following FHWA 2015 Guidelines, and a VIA technical report that followed the FHWA 1988 VIA Guidelines.

5.5 US Forest Service

The USFS performs visual impact analysis for proposed projects on their lands using the Scenic Management System (SMS). USFS Region 2 Landscape Architect Daniel Cressy and White River National Forest Landscape Architect Donna Graham highlighted the current scenery management focus on landscape change, resulting from human and natural sources. The relationship between scenery and the degree of ecosystem change is characterized by the term "Scenic Stability," which addresses long-term scenic changes through ecosystem dynamics. Colorado's USFS region landscape architects also highlighted the trends toward increased recreational travel on Forest Service roadways. Driving for pleasure is consistently rated in transportation studies as one of the most highly valued recreational activities by the public.

USFS VIA practices include:

- After 10 years of applying the SMS, USFS landscape architects incorporated an ecological-based "Scenic Stability" approach to scenery management.
- The relationship between scenery and related aspects of the ecosystem is characterized by the term "Scenic Stability." Scenic Stability addresses how ecosystem dynamics will affect the long-term stability of the valued scenery and its attributes. Some landscapes are more vulnerable to change than others, and the management of lands needs to accommodate the ecological change over time. Examples include dynamic forest systems, water bodies, etc.
- The USFS landscape architects are exploring opportunities for developing collaborative "ecological intervention" to maximize design opportunities for a project.

USFS VIA mitigation strategies for adverse visual impacts include:

- Articulating the desired condition in the mitigation measure and mitigation strategies should address steps needed to create the desired condition.
- Recognizing that integrity objectives should not be considered a "strain on the project," but rather as a process for identifying planning opportunities.

Design and delivery of mitigation commitments include the following:

- An important consideration is softening road transitional areas into mountainous forest terrain, to create a forest transition, with clearings that create viewing opportunities.
- Graphic representation of mitigation measures is important to conveying mitigation strategies and guiding projects toward better design solutions.
- Mitigation measures can influence the design process. This can be a "paradigm shift" for project proponents and may require a mental adjustment to view scenic integrity and mitigation measures as design opportunities rather than as project constraints.

6. RECOMMENDATIONS AND IMPLEMENTATION STRATEGIES

The goals and objectives of this SMART mitigation research study were first explored through development of a "SMART Mitigation Template" to evaluate VIAs for effective mitigation measures, as outlined in **Chapter 1**. Concurrently, landscape architects representing four state DOTs and USFS landscape architects were invited to contribute to this research by providing examples of VIA reports and participating in interviews with CDOT (see **Chapters 2 and 3**). The agency VIA mitigation strategies were evaluated for their effectiveness relative to SMART criteria, as described in **Chapter 4**. An interview with each agency landscape architecture team was held to exchange information about each agency's VIA practices, approaches for developing mitigation measures, and observations related to the case studies (see **Chapter 5**). The agency landscape architects expressed interest in the SMART mitigation study, enthusiastically participated, and offered continued communication. Interviews with each agency landscape architecture team were conducted throughout May 2018.

An important study goal is to document new approaches to writing effective mitigation measures, along with developing innovative mitigation strategies. Just as the principles for SMART criteria (Specific, Measurable, Attainable, Realistic and Tangible) can be used as an evaluation tool to validate the effectiveness of visual impact mitigation, they can also be used as guidance for developing effective mitigation measures. Toward this goal, SMART criteria provide a positive framework, or a "blueprint," for organizing, developing, and writing visual impact mitigation measures.

Sections 6.1 and 6.2 present recommendations for organizing and composing visual impact mitigation measures. **Section 6.3** provides selected agency VIA mitigation measures viewed as examples of effective mitigation strategies based on SMART criteria.

6.1 Mitigation Planning

To facilitate the preparation of mitigation measures, the team developed a **Mitigation Planning Checklist** to assist preparers in getting started. The overall checklist is organized into three columns:

- The first column lists factors to consider in visual impact mitigation measures, including:
  - Mitigation foundation steps, including guidance for characterizing project-related visual impacts and for establishing mitigation goals
  - Accounting for applicable regulations
  - Applying collaborative mitigation preparation approaches, including the involvement of an interdisciplinary team, and engaging agency and stakeholder involvement
  - Developing concepts for preparing effective mitigation measures, including recommendations for structuring and organizing mitigation measures, as well as illustrating mitigation strategies
- The second column provides space for VIA preparers to populate with mitigation approaches and content.
- The third column provides a "SMART" checklist for tracking and incorporating Specific, Measurable, Attainable, Realistic, and Tangible approaches to visual impact mitigation.

See **Table 6** for an example of the Mitigation Planning Checklist.

Table 6. Mitigation Planning Checklist

Factors to Incorporate into Visual Impact Mitigation Measures Consult with Federal Lands MOU if the project involves US Forest Service or BLM easements (2016)		Developing Approaches and Content for Mitigation Statements (Based on Project VIA / Proposed Action)	SMART (Specific, Measurable, Attainable, Realistic, Tangible) Checklist for Effective Mitigation					
			Focus on Mitigation of Adverse Impacts			Focus on Design and Delivery		
			S		M	A	R	T
			Avoidance	Minimization	Compensation	Within standard engineering principles	Realistic and financially feasible	Aesthetics in project design and delivery
Mitigation Foundation	**Characterize Visual Impacts** • *Identify* elements of the proposed action (e.g., rock cuts) affecting visual resources • *Describe* how visual resources are affected (e.g., visual contrast, changes to viewsheds) ▪ ***Visual character*** (Natural, Cultural, and Project Environments) changes to Form, Line, Color, and Texture ▪ ***Viewers*** (Travelers and Neighbors) Reference specific viewers, visibility and distance zones (foreground, middleground, background) ▪ ***Visual Quality*** (Natural Harmony, Cultural Order, and Project Coherence) Reference landscape units for context							
	Establish Mitigation Goals • **Type of Mitigation**: Avoid, minimize, compensate • **Level of Mitigation Strategy:** Policy (1), Planning (2), Prescriptive (3) • **Intent of Mitigation**: What is the desired outcome / intent (e.g., create visual compatibility, reduce visual contrast, establish a theme) • **Timing of Mitigation:** Construction (C), Maintenance (M), Project Life (P)							

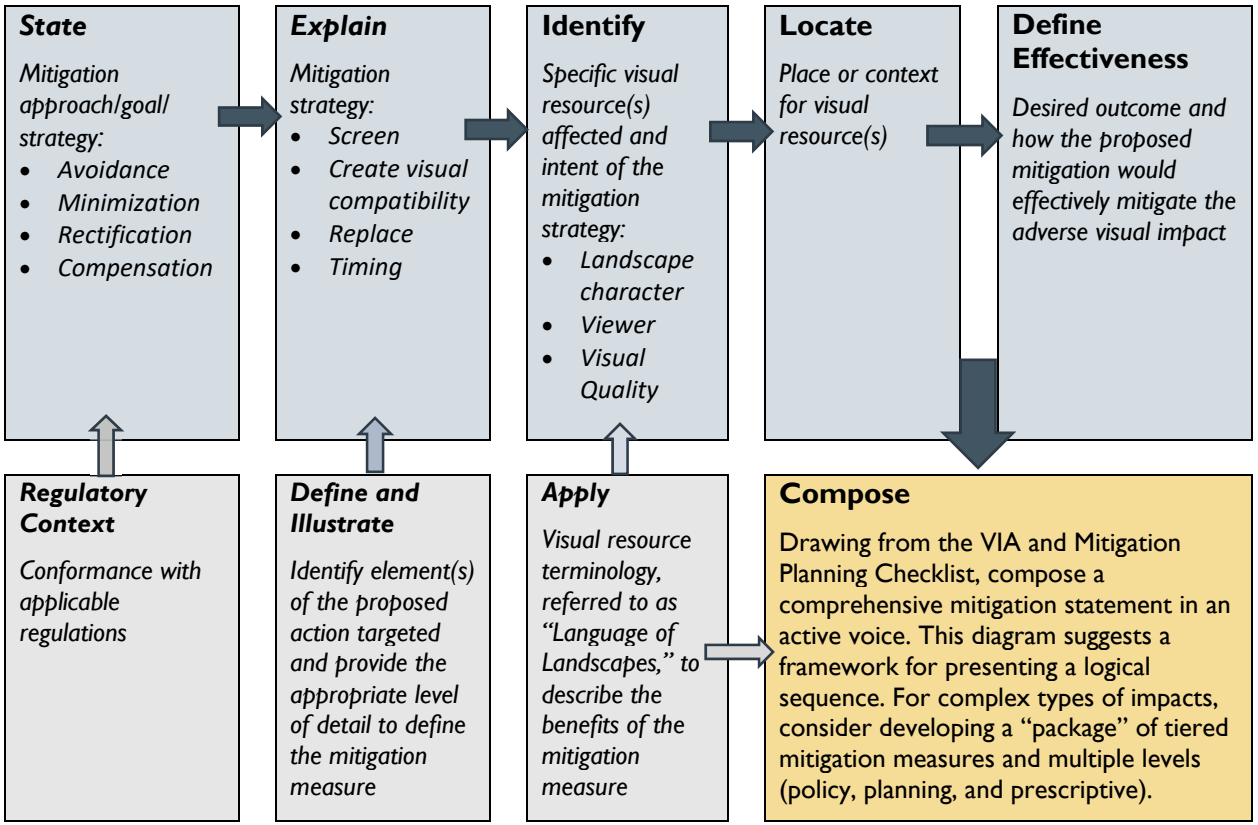
	Factors to Incorporate into Visual Impact Mitigation Measures Consult with Federal Lands MOU if the project involves US Forest Service or BLM easements (2016)	Developing Approaches and Content for Mitigation Statements (Based on Project VIA / Proposed Action)	SMART (Specific, Measurable, Attainable, Realistic, Tangible) Checklist for Effective Mitigation					
			Focus on Mitigation of Adverse Impacts			Focus on Design and Delivery		
			S		M	A	R	T
			Avoidance	Minimization	Compensation	Within standard engineering principles	Realistic and financially feasible	Aesthetics in project design and delivery
Regulatory	**Establish Regulatory Context** • Account for applicable federal, state, and local guidelines							
Collaborative Approach	**Use an Interdisciplinary Team Approach** • Incorporate an interdisciplinary approach to developing visual resource mitigation • Involve resource specialists (landscape architects, biologists, historians, etc.) to collaborate with the design team • Involve agencies as appropriate							
	Involve Stakeholders • Establish a collaborative VIA process – For complex or controversial impacts, consider a Collaborative Community-based group mitigation committee (Aesthetic Design Committee, Alternatives Development Committee, etc.). May necessitate developing aesthetic design guidelines							

	Factors to Incorporate into Visual Impact Mitigation Measures Consult with Federal Lands MOU if the project involves US Forest Service or BLM easements (2016)	Developing Approaches and Content for Mitigation Statements (Based on Project VIA / Proposed Action)	SMART (Specific, Measurable, Attainable, Realistic, Tangible) Checklist for Effective Mitigation					
			Focus on Mitigation of Adverse Impacts			Focus on Design and Delivery		
			S		M	A	R	T
			Avoidance	Minimization	Compensation	Within standard engineering principles	Realistic and financially feasible	Aesthetics in project design and delivery
Preparing Mitigation Measures	**Structure and Organize Mitigation Measures** • Develop complementary groups or packages of mitigation measures • Identify groups/packages of measures that address complex visual impacts • Recommend consultation with landscape architects and appropriate resource specialists as a strategy							
	Illustrate Visual Impact Mitigation Measures • Create visualization of mitigation measures • Develop visual simulations, graphics, diagrams, or cross sections to illustrate project mitigation measures.							

6.2 Composing Mitigation Measures

Figure 1 identifies the process that the team developed to demonstrate how to compose a mitigation measure.

Figure 1. Framework for Mitigation Measures



6.3 Examples of Effective Mitigation Measures

From the research of selected VIAs provided by state DOTs, USFS, and CDOT, the team found diversity in the approaches each agency took to develop mitigation measures for adverse visual impacts. The following represent examples of effective mitigation strategies. See **Appendix B** for the complete VIA mitigation evaluations for the projects identified below.

Caltrans Highway 101 High Occupancy Vehicle Lane Visual Impact Assessment

Level 1 VIA Policy-level Mitigation Measures

11. Locate any new signage such that it minimizes view blockage of the Pacific Ocean.

21. Include historically successful plant species throughout the corridor.

25. Preserve existing Memorial Oaks to the greatest extent feasible, respective of the selected project alternative.

Level 2 Visual Resource Planning-level Mitigation Measures

6. Modify existing bridge structures to reflect the visual character of the existing structures in terms of materials, color, style, and existing human scale of the area.

8. If new traffic management system elements such as radar, cameras, and other equipment are added to the project, locate all visible components in the least obtrusive locations possible and use colors that will reduce visibility.

Level 3 Prescriptive-level Mitigation Measures

3. Include clear panels along the top portions (starting at approximately 10 feet or less above the ground) of proposed sound walls in Summerland at the following locations:
    - Along northbound Highway 101, from the beginning of the northbound Evans Avenue off-ramp to the Evans Avenue undercrossing (Station 337+00 to Station 343+00).
    - Along northbound Highway 101, from approximately 50 feet west of the beginning of the Evans Avenue northbound on-ramp to approximately 500 feet west of the beginning of the Evans Avenue northbound on-ramp (Station 351+00 to Station 357+00).

14. Make all areas where existing ramps and other paved surfaces are removed suitable for planting. Remove all paving and base material, rip or scarify the earth, and place topsoil.

23. Design all permanent Stormwater Prevention measures to visually fit with the ornamental or natural landscaped roadsides. Swales, ditches, and basins should appear as natural as possible. Built structures should be architecturally treated, colored, or hidden from view with planting. Minimize the use of fencing. If fencing is required, minimize its visibility by darkening or using a low-visibility material.

Caltrans Mathilda Avenue Improvements at SR 237 and US 101 Project

Level 1 VIA Policy-level Mitigation Measures

1. Implement aesthetic treatments on bridge barriers, sound walls, and retaining walls. Incorporate architectural treatment on new bridge barriers, sound walls, and the visible side of retaining walls.

Level 2 Visual Resource Planning-level Mitigation Measures

2. Restore highway planting. Provide a restored highway landscape within the interchanges of SR 237 and US 101 with Mathilda Avenue. Using a cohesive highway planting design, including additional plantings in areas not directly affected by project construction, to ensure that replacement plantings are integrated with the existing landscape to meet community expectations. Provide a plant establishment period of three (3) years to ensure that new plantings mature.

Level 3 Prescriptive-level Mitigation Measures

4. Apply minimum lighting standards. Design all artificial outdoor lighting and overhead street lighting to have the minimum impact on the surrounding environment. Design measures that reduce light pollution will use the technologies available at the time of project design to allow the highest potential reduction in light pollution. Include measures such as using downcast, cut-off type fixtures that are shielded and that direct the minimum necessary light only toward objects requiring illumination.

5. Minimize fugitive light from portable sources used for construction. At a minimum, the construction contractor shall minimize project-related light and glare to the maximum extent feasible, given safety considerations. Use color-corrected halide lights. Operate portable lights at the lowest allowable wattage and height and raise to a height no greater than 20 feet. Screen and direct all lights downward toward work activities and away from the night sky, highway users, and highway neighbors, particularly residential areas, to the maximum extent possible. Minimize the number of nighttime lights used to the greatest extent possible.

Maryland Department of Transportation Intercounty Connector Visual Impact Assessment

Level 1 VIA Policy-level Mitigation Measure

1. Configure the road, landscaping, retaining walls, and noise barriers in a manner that would make the facility less noticeable. Detailed analysis and design for visual screening would occur for all the Build Alternatives. A sample cross section illustrating buffer landscaping is included, and other configuration concepts are in the Draft Aesthetic Design Guidelines for Section Engineering Teams.

2. Develop design standards for the overall facility that would increase its compatibility with the surrounding environment.

   ICC Draft Aesthetic Design Guidelines have been developed to provide general guidance in developing a cohesive highway facility using context-sensitive solutions and techniques. These guidelines generally define the overall visual goals and objectives and provide guidance on designing general highway elements to stay in keeping with an overall corridor theme and with sensitivity to the surrounding environment. These goals are based on principles of accessibility, efficiency, safety, functionality, maintainability, environmental stewardship, and visual character. The goals include:

   - Creating a safe, attractive, and efficient controlled-access highway
   - Developing a controlled-access highway design with visual continuity throughout the corridor and with sensitivity to the surrounding landscapes
   - Developing cost-effective, buildable, and maintainable design solutions
   - Minimizing or avoiding community separations introduced by highway construction
   - Minimizing or avoiding environmental impacts and providing mitigation and enhancement measures

- Protecting and enhancing the environmental quality of the study area and treading lightly on the land (e.g., minimizing disturbances to the environment)
- Integrating existing and planned bicycle and pedestrian facilities to the extent practical"

Level 2 Visual Resource Planning-level Mitigation Measures

The characteristics that would contribute to visual unity include thematic patterns, colors, architectural features. and gateway designs. For both Build Alternatives, these elements would enhance existing visual character by using materials and design techniques that blend with the surrounding area. The design guidelines include:

3. Use decorative finishes on publicly visible highway features in keeping with the overall highway theme and surrounding vernacular.

7. Maintain open vista over landscape where possible by framing viewsheds with landscape plantings.

Level 3 Prescriptive-level Mitigation Measures

10. In instances where hardscape elements are used (i.e., retaining walls, overpasses, box culverts, riser structures, etc.) in publicly visible areas, allow rustic finishes such as timber, staining, or formlining.

Minnesota Department of Transportation New St. Croix River Crossing Visual Impact Assessment

Level 1 VIA Policy-level Mitigation Measures

RC1. The greatest visual impacts caused by the proposed project will be to neighbors who view the addition of a new bridge in the river valley adversely. A four-lane bridge cannot be hidden from view. If the project is constructed, adverse impacts to many residential and recreational neighbors cannot be avoided. To minimize adverse impacts to neighbors, the state and federal agencies charged with administrating the scenic and recreational aspects of the river have requested that the bridge's competition with the natural landscape be minimized. They have requested that the bridge be lower than the bluffs, with the least number of piers in the water, that conventional design details be included that make the bridge more compatible with the river environment, and that bluffs cuts and disturbance be minimized. "

Level 2 Visual Resource Planning-level Mitigation Measures

RC3. The preferred alignment minimizes cutting into the bluff by using an existing ravine. The preferred profile minimizes conflict with the natural landscape by keeping the bridge elevation below the ridge. The DOTs have reduced the number of piers in the water to eight locations. The DOTs have established a "Design Review Committee" involving a bridge architect, structural engineers, and local interests to address visual impacts and design detailing of the proposed bridge, including "gateway concept" guidelines for the Minnesota and Wisconsin approaches. The committee would provide input on design elements such as pier design and surface treatments; retaining wall designs; and bridge color, rail type, and lighting.

Level 3 Prescriptive-level Mitigation Measures

WA2: Mitigation for visual impacts will also involve planting. The existing landscape is barren of perennial vegetation since most of the proposed highway is traversing existing farm fields. Planting the roadside with native grasses, flowers, and woody plants would create an inviting entrance into the state. The overpass with STH 35, the interchange with County Road E, and the intersection with existing STH 64 could be planted to announce western Wisconsin and Houlton to travelers from

the west and the St. Croix River to travelers from the east. The school should also be adequately planted with vegetation, particularly near playgrounds so that the view to the highway is softened.

Oregon Department of Transportation Interstate 5 Visual Impact Assessment

Level 1 VIA Policy-level Mitigation Measures

7. Form an Aesthetic Advisory Committee during the design phase of implementation of the proposed improvements.

Level 2 Visual Resource Planning-level Mitigation Measures

4. Vegetate road embankments to blend and integrate the roadway into the surrounding landscape and to create a sense of continuity with the surrounding community.

8. Explore design options for potential sound attenuation wall treatments that create a gateway to the City of Albany that are aesthetically pleasing in line, color, pattern, and/or texture.

US Forest Service Upper Fryingpan Visual Impact Assessment

Level 2 Visual Resource Planning-level Mitigation Measures

1. Openings in the canopy should have a natural appearance with uneven edges rather than straight lines where possible. When possible, coordinate with adjacent property owners to soften the edges of cutting units. The shape should be an irregular pattern like the existing natural openings and should avoid straight-line edges, especially along adjacent property and roadless area boundaries. The edges of the treatment units should be varied and random to soften and blend with the native vegetative mosaic. Favor existing healthy dominant trees such as Aspen and woody shrubs to shape the edges of areas where materials are to be removed. Blend with natural landscape features such as natural meadows or openings and rock outcrops when possible. This will create free form vegetative shapes that mimic natural patterns. Make clearing edges irregular and freeform, feathering and undulating edges where possible.

6. Where possible, place landings in existing openings, unless doing so would adversely affect other resources. If an existing opening cannot be used, clearing size and form of the landings should mimic that of surrounding vegetative mosaic as seen from middleground and background views (distances greater than 0.5 mile). The shape of landings should be an irregular pattern like the existing natural openings and should avoid straight-line edges.

Level 3 Prescriptive-level Mitigation Measures

3. Remove from sight root-wads created by the harvest activities that are visible in the foreground within 50 feet of open system roads and trails. Do not use root-wads to close roads and landings that are within 50 feet of open system roads.

4. Stumps should be 12 inches high or less. Within 15 feet of forest system trails, stumps should be cut 4 inches or less.

Colorado Department of Transportation SH 9 Visual Impact Assessment

Level 1 VIA Policy-level Mitigation Measures

2. During final design, address the visual compatibility of the project with surrounding landscapes, including the consideration of design strategies.

Level 2 Visual Resource Planning-level Mitigation Measures

4. Use roadside plantings, slope molding, and careful selection of color and texture to reduce contrast. Locate plant groupings in areas most visible to the motorist to make the best use of limited plant material quantities. Design all groupings so that they visually extend the existing landscape.

Colorado Department of Transportation Wolf Creek Pass Visual Impact Assessment

Level 1 VIA Policy-level Mitigation Measures

To accommodate safety improvements including clear zone, sight distance, shoulders, and improvements to the alignment, certain areas require rock cuts. These rock cuts would affect the existing landscape character to improve sight distance and horizontal geometry. Improved sight distance would increase the motorist's variety of feature views and scenery. Locations of rock cuts include the "Narrows" and adjacent to Fun Valley.

1. Use rock cuts to accommodate a widened roadway section to improve sight distance. The extent and depth of the existing rock formations would allow this widened roadway concept without detrimentally affecting the visual quality. The intent is to maintain these geologic features where possible.

Level 2 Visual Resource Planning-level Mitigation Measures

2. Have a structural geologist analyze rock cut locations before final design/construction. Complete the final cut faces to produce a form and texture consistent with the existing visual condition. Transition cut areas up and down station from the main rock area to blend in with the natural terrain. Replace plant material randomly in varying sizes to revegetate disturbed zones in a “native” application. Note areas currently located in drainages and design provisions for drainage accordingly.

Level 3 Prescriptive-level Mitigation Measures

3. Use blasting or ripping to complete rock cuts and excavations. Identify natural fracture planes to produce a natural appearing finished cut face.

6.4 Recommendations for Future Visual Impact Assessment Research

Based on the findings documented in this report, CDOT identified recommendations for additional VIA mitigation-related research, to develop improved strategies for implementing visual impact mitigation commitments through the design, construction, and maintenance of transportation projects. Recommendations include:

- Conducting project life cost-benefit analyses to understand the relative design, construction, and maintenance costs of implementing visual mitigation commitments. Investigations could include the use of surveys and other large data sources to establish the value to project neighbors and travelers for avoiding, minimizing, rectifying, or compensating for visual impacts. This research topic could also include illustrating the positive influences of aesthetic mitigation and design guidelines on selected projects in a “story-board” format, through NEPA, design, and construction phases.
- Researching effective and innovative tools for tracking mitigation commitments through the design, construction. and maintenance of the project delivery process.
- Identifying the opportunities and constraints to applying contemporary and innovative visualization technologies, as well as the management and implementation challenges.

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APPENDIX A. CDOT VISUAL IMPACT ASSESSMENT MITIGATION INTERVIEW PLANNING

Agency	Agency Contact	Contact Information	Communication
Caltrans	**Elbert Cox** *Supervising Landscape Architect* **Lara Justine** *Senior Landscape Architect*	**California Department of Transportation** **Landscape Architecture Program** 1120 N Street MS 28 Sacramento, CA 95814 **Phone:** (916) 654-6200 **Email:** elbert.cox@dot.ca.gov	• 02/26/18: Called and left Elbert Cox a message. • 02/27/18: Talked to Elbert and he said that Caltrans would like to participate with CDOT. • 03/15/18: Sent information package. • 03/22/18: Made follow-up phone call. • 04/3/18: Received 7 VIA examples from Lara Justine, Caltrans. • 04/18/18: Had follow-up phone conversation with Lara Justine about the scope of the research and planning for an interview. • 04/27/18: Sent invitation for Caltrans interview to Elbert Cox, Lara Justine, and Robert Carr. • 05/10/18: Sent materials for May 15 interview: CDOT VIA Research Process and SMART Evaluation Templates for Hurricane Point and US 395 Aspen Fales VIAs). • 05/15/18: Conducted phone interview with Caltrans. • 05/16/18: Sent out invitation for second Caltrans interview on May 30. • 05/30/18: Conducted second Caltrans interview.
Maryland DOT	**Margot Bartosh** *Assistant Chief Landscape Architecture Division*	**Maryland Department of Transportation** **Office of Environmental Design** 707 North Calvert Street, C-303 Baltimore, MD 21202 **Phone:** (410) 545-8622 Email: mbartosh@sha.state.md.us	• 01/31/18: Called Margot to introduce the VIA mitigation research program and discuss MDOT's participation. • 02/05/18: Received Margot's call and discussed the CDOT research program. • 02/05/18: Received email indicating MDOT's interest and support. • 03/15/18: Sent information package and received a positive email confirmation. • 04/15/18: Sent Margot an email requesting an MDOT VIA example. • 04/19/18: Upon Margot's suggestion, contacted Christie Bernal (410-545-5659) for additional information (left a message for Christie on April 20). • 04/02/18: Exchanged emails on logistics to get started. • 04/27/18: Sent an email with suggested interview dates. • 05/01/18: Margot sent the Inter County Connector (ICC) EIS. • 05/10/18: Sent Margot materials for the May 17 interview. • 05/17/18: Conducted MDOT interview.

Agency	Agency Contact	Contact Information	Communication
MNDOT	***David Larson*** *Environmental Planning and Design Supervisor*	**Minnesota Department of Transportation** **Office of Environmental Stewardship** 395 John Ireland Blvd Mail Stop 386 St. Paul MN 55155-1800 **Phone:** (651) 366-4637 **Email:** david.larson@state.mn.us	• 02/26/18: Called David, received a voice mail expressing interest, and left a follow-up message. • 03/15/18: Sent information package. • 03/22/18: Follow-up phone call with David to set up an interview with MNDOT. • 04/16/18: Sent an email requesting a MNDOT VIA example. • 04/17/18: Received an email from David regarding a MNDOT VIA example. • 4/27/18: Sent an email with interview date options. • 4/30/18: Received confirmation for an MNDOT interview on May 31. • 05/01/18: Received an email requesting a shift to May 29. Todd Clarkowski, St. Croix Crossing Project Coordinator, to also participate. Email included links to the St Croix Crossing Project: https://www.doi.gov/ocl/s-1134, http://www.dot.state.mn.us/metro/projects/stcroix/. • 05/09/18: Received three emails with the following materials: ▪ FEIS and Section 4(f) Evaluation for the New St. Croix River Crossing between Minnesota & Wisconsin ▪ St. Croix River Crossing Project Supplemental Draft EIS – Visual Impact Analysis ▪ St. Croix River Crossing Visual Quality Manual ▪ St. Croix River Crossing Project Visual Quality Manual Addendum • 05/21/18: Received the following information: ▪ Link to Highway Project Development Process (HPDP): http://www.dot.state.mn.us/planning/hpdp/ ▪ Visual Quality PDF from the HPDP subject guidance list • 05/29/18: Conducted MNDOT interview.
Utah DOT	**Rod Hess** *Senior Landscape Architect*	**Utah Department of Transportation** **Phone: (**801) 830-9589 **Email**: rhess@utah.gov	• 01/31/18: Called Rod and left message regarding interest in having UDOT participate in the VIA mitigation research program. • 02/26/18: Called to talk to Rod. He was interested in participating. • 03/15/18: Sent information package. • 03/22/18: Follow-up phone call with Rod to discuss logistics. • 04/16/18: Sent a follow-up email on setting up an interview. • 04/17/18: Rod responded regarding UDOT's approach to VIAs and indicated that UDOT does not have any contemporary VIAs to provide for the CDOT research effort.

Agency	Agency Contact	Contact Information	Communication
Oregon DOT	**Robert Marshall** *Program Coordinator*	**Oregon Department of Transportation** **Roadside Development and Erosion Control** **Phone:** (503) 986-3512 **Email:** Robert.R.MARSHALL@odot.state.or.us	• 02/26/18: Called and left a message regarding CDOT's interest in including ODOT in the VIA mitigation research program. • 03/01/18: Received an email from Robert indicating that ODOT would participate in the research process. • 03/15/18: Sent information package. • 04/19/18: Received four VIA examples from ODOT. • 04/30/18: Sent invitation with interview dates. • 05/16/18: Confirmed May 22 interview date. • 05/22/18: Conducted ODOT interview.
USFS	**Donna Graham** *WRNF Landscape Architect*	**White River National Forest** 900 Grand Avenue Glenwood Springs, CO 81601 **Phone: (**907) 945-3263 **Email:** dlgraham@fs.fed.us	• 04/19/18: Called Donna (sent a follow-up email) to introduce the scope of the VIA research. Donna was very interested and suggested including Daniel Cressy, Region 2 LA (303-275-5012). • 04/20/18: Contacted Daniel for FS participation and followed up with an email. • 04/23/18: Received 7 FS VIA reports from Donna. • 04/27/18: Set up a meeting date on May 23 at the Mountain Residency. • 05/23/18: Conducted FS meeting.
	Daniel Cressy *Regional Landscape Architect*	**Forest Service** **Rocky Mountain Region** 1617 Cole Blvd Bldg. 17 **Phone: (**303) 275-5012 **Email:** dcressy@fs.fed.us	

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APPENDIX B. VISUAL IMPACT ASSESSMENT MITIGATION EVALUATIONS

VIA MITIGATION STRATEGIES RESEARCH

COLORADO DEPARTMENT OF TRANSPORTATION

June 2018

SH 9 Iron Springs VIA Visual Impact Mitigation Measures CDOT	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
Adverse Visual Impact: New highway elements and change to visual character—Visual contrast between construction elements and the landscape **Mitigation Measures:**									The overall package of mitigation measures is targeted to address specific types of visual impacts. There is a range of mitigation strategies, including policy, planning and prescriptive-level categories. The project is in a forested area where vegetation contributes to the scenic integrity of the area and supports other vital resources. Views of new retaining walls from both Dillon Reservoir and the new bike path were key to the introduction of a substantial amount of native planting material.
1. Harmonize improvements and new highway elements introduced in Developed Recreation Complexes (Management Prescription area 8.21) within the USFS with the natural setting and be consistent with the White River National Forest Plan (USFS, 2002) to the extent possible.	**R1**	x		x	x	x	x	x	
2. During final design, address the visual compatibility of the project with surrounding landscapes, including the consideration of design strategies.	**R1**	x			x	x	x	x	
Adverse Visual Impact: Public views of and from SH 9—Strong contrast created by cut and fill in the landscape **Mitigation Measure:**									
3a. Use site grading to blend the disturbance into the existing topography to achieve a natural appearance, as much as practicable, and minimize cuts and fill.	**CF2**	x			x	x	x	x	
3b. Design new rock cut slopes to blend with existing rock formations.	**RC2**	x			x	x	x	x	
3c. If needed, add coloring, such as rock staining, to reduce the contrast between new cuts and existing rock faces.	**RC2**	x			x	x	x	x	
3d. Use a variety of native plant material in revegetation efforts to ensure long-term establishment and success.	**VC2**	x			x	x	x	x	
Adverse Visual Impact: Views of East and West underpass structures from the bikeway—Moderate to Strong visual scale and contrast between new element forms and the landscape **Mitigation Measure:**									
4. Use roadside plantings, slope molding, and careful selection of color and texture to reduce contrast. Locate plant groupings in areas most visible to the motorist to make the best use of limited plant material quantities. Design all groupings so that they visually extend the existing landscape.	**VC2**	x			x	x	x	x	
Adverse visual impact: Views from Buzz Saw Nordic Trail, Dickey Day Parking Lot, bikeway along Dillon Reservoir, Blue River Arm, and Sapphire Point of old SH 9—Reduction in contrast with landscape due to relocation of SH 9; greater solitude and enhanced visual character. **Mitigation Measure:**									
5. Remove excess SH 9 pavement from the abandoned roadbed, as much as practicable, and restore the disturbed area with native seeding.	**C2**				x	x	x	x	
Adverse Visual Impact: View of Dillon Placer Mine from the proposed SH 9—Very Strong (C-T-H) contrast in form, line, color, and texture between the new highway and landscape. **Mitigation Measure:**									
6. CDOT and the State Historic Preservation Officer have agreed that archival documentation and interpretive signage are appropriate mitigation under Section 106, per the Memorandum of Agreement executed January 2014.	**IS1**			x	x	x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
C = Construction
CF = Cut and Fill Earthwork
IS = Interpretive Signage
R = Roadway
RC = Rock Cuts

Legend for Mitigation Measure Categories:
1 = VIA policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measures
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery.

US 160 East of Wolf Creek Pass EA (MP 177 - 181) Visual Impact Mitigation Measures CDOT	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific			Measurable	Attainable	Realistic	Tangible	
		S1:Landscape Character	S2:Viewers	S3:Visual Quality					
Adverse Visual Impact: Rock Cuts To accommodate safety improvements, including clear zone, sight distance, shoulders, and improvements to the alignment, rock cuts were required in certain areas. These rock cuts would affect the existing landscape character to improve sight distance and horizontal geometry. Improved sight distance would increase the motorist's variety of feature views and scenery. Locations of rock cuts include the "Narrows" and adjacent to Fun Valley. **Rock Cut Mitigation Measures:**									**Rock cut mitigation measures** 1, 2, and 3 provide a range of strategies to minimize and compensate for the visual impact of rock cuts to the natural landscape character, viewsheds from US 160, and visual quality of the natural environment setting. Measure 1 establishes a goal to maintain the character and visual quality of the existing rock formations. Measure 2 outlines a framework for planning rock cuts, revegetation, and drainage restoration within the disturbance areas in a manner that would reduce visual contrast and blend in with the adjacent landscape setting. Measure 3 describes techniques for achieving aesthetic mitigation for rock cuts. **Recomendations**: These mitigation measures could reference strategies for repeating the form, line, color, texture, pattern, and scale of the affected landscape features to reduce visual contrast and for sustaining or restoring the existing landscape character and scenic attractiveness, consistent with the applicable guidance provided in *Landscape Aesthetics A Handbook for Scenery Management* (USFS, 1995). Mitigation measures could be referenced to Landscape Segments.
1. Use rock cuts to accommodate a widened roadway section to improve sight distance. The extent and depth of the existing rock formations would allow this widened roadway concept without detrimentally affecting the visual quality. The intent is to maintain these geologic features where possible.	**RC1**	x	x	x					
2. Rock cut locations would be analyzed by a structural geologist before final design/construction. Complete the final cut faces to produce a form and texture consistent with the existing visual condition. Transition cut areas up and down station from the main rock area to blend in with the natural terrain. Replace plant material randomly in varying sizes to revegetate disturbed zones in a “native” application. Note areas currently located in drainages and design provisions for drainage accordingly.	**RC2**	x		x	x	x	x	x	
3. Use blasting or ripping to complete rock cuts and excavations. Identify natural fracture planes to produce a natural appearing finished cut face.	**RC3**	x				x	x	x	
Adverse Visual Impact: Cut and Fill Visual changes could occur in areas where a new or an expanded roadway requires reconfiguration of landform and grade. Cut/fill slopes would be required to accommodate climbing lanes and cureves straighten to improve sight distance. Major cut/fill areas are located throughout the "Narrows" and adjacent to Fun Valley.									
Cut Slope Mitigation Measures:									
4. Complete slope modifications in “cut” areas in a manner that accentuates foreground views. Achieve visual variety by undulating finished grades. Create pockets for native plane material and large contiguous areas of native grasses. Rock outcroppings would remain exposed where possible.	**CS2**	x	x	x	x				**Slope cut mitigation measures** 4, 5, and 6 focus on strategies to establish naturalized cut slopes adjacent to US 160 that would enhance foreground views. Measure 4 sets planning strategies for slope modifications to create diversity and visual variety associated with landforms, vegetation, and outcroppings. Measure 5 focuses on drainage restoration, and Measure 6 provides techniques for recreating naturalized talus zones. These measures reference the use of standard erosion control approaches, constructability, and meeting safety requirements, while achieving a visually enhanced foreground setting. Measure 7 offers strategies to integrate standard retaining wall concepts into cut slopes in a manner that the form, line, and color of wall systems would blend in with the terrain and include opportunities for enhancement by establishing terraced with planting spaces.
5. Reestablish and revegetate overland drainages with native materials. Erosion control measures would include, but not be limited to, rock rip-rap and control matting.	**CS3**	x			x	x	x	x	
6. Grade aAreas in talus zones and stockpile excavation. Upon final grading acceptance, distribute and machine grade stockpiled material to resemble the existing visual appearances in areas that are constructible and pose no safety issues.	**CS3**	x			x	x	x	x	
7. Upslope “cut” conditions may require retaining walls. In these locations, terrace or step walls to allow planting areas. Meet access and sufficient widths to accommodate maintenance activities. Wall materials are proposed as poured in place concrete or precast units, mechanically stabilized earth, reinforced earth, or binwalls, which would be color stained upon completions.	**RW3**				x	x	x	x	

US 160 East of Wolf Creek Pass EA (MP 177 - 181) Visual Impact Mitigation Measures CDOT	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific			Measurable	Attainable	Realistic	Tangible	
		S1:Landscape Character	S2:Viewers	S3:Visual Quality					
Fill Slope Mitigation Measures:									**Fill slope mitigation measures** 8 and 9 are specific to avoidance or minimization of impacts to riparian and creek zones and establish naturalized edges through revegetation and rock placement. Use of standard erosion control measures and rock placement are referenced. **Recomendations**: These mitigation measures could reference strategies for repeating the form, line, pattern, and scale of landforms in the affected landscape features to reduce visual contrast. Mitigation measures could be referenced to
8. Fill areas are located predominantly in riparian or creek zones. Sensitivity in these locations compounded with minimum horizontal widths, in many areas, prohibit earth fills at reasonable slopes. Areas of fill in excess of the angle of repose for that material would receive a retaining system. Transitions at these locations may be abrupt and may include native rock placement to mitigate encroachment and erosion potential. Revegetation of plantings and erosion control blankets would be included where necessary and practical. Where practical or feasible, native rocks and boulders consistent with adjacent existing locations would be located to accentuate simulated ridges, draws, and transitions to existing grades.	**FS3**	x			x	x	x	x	
9. Where possible, divert drainage areas along the roadway edges and discharge down station at existing slopes. Compact and top the diversion drainage channels with native rock material. Roll back, round, and reseed edges. Rip-rap and overseed downslope channels.	**FS3**	x			x	x	x	x	
Adverse Visual Impact: Vegetation Clearing **Mitigation Measures: Selective Tree Clearing**									**Selective tree clearing mitigation measures** describe strategies for visual enhancement of the landscape character and scenic attractiveness of forest edges and scenic viewsheds. **Recommendations**: These mitigation measures could reference strategies for enhancing viewsheds, by repeating the size, shape, edge effect, color, and pattern of natural openings common to the landscape character, consistent with the applicable guidance provided in *Landscape Aesthetics A Handbook for Scenery Management* (USFS, 1995). Mitigation measures could be referenced to Landscape Segments.
10. Clear existing trees, both evergreen and deciduous, to accommodate the proposed cross section. To avoid a “wall” effect, remove random trees beyond the clearing line to transition the vegetation height and density at the edge. Before this activity, have a Forest Service representative identify tree line and removals. This approach allows new plantings of varying size/height trees to establish a natural edge.	**V3**	x			x	x	x	x	
11. In areas where existing nominal vegetation is proposed to be thinned to provide enhanced scenic views, the site would be evaluated by a Forest Service Representative.	**V2**	x	x	x	x				
Mitigation Measures: Revegetation									
12. Derive the plant palette for revegetation from tree, shrub, and grass species existing in the corridor. Pay special attention to exposure; realize the success and vitality of existing plantings in respect to north/south facing orientation.	**V2**	x			x				
13. Because soil stabilization is of concern, use drilled methods, such as a "stapled" netting or fabric or hdyro seeder with tackifier to reseed all replanted/revegetation operations. Apply topsoil with amended pH values matching existing conditions, mulch, and sprayed tackifier.	**V3**				x	x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
E = Earthwork
FS = Fill Slope
CS = Cut Slope
RC = Rock Cuts
V = Vegetation
RW = Retaining Wall

Legend for Mitigation Measure Categories:
1 = VIA policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measures
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery.

VIA MITIGATION STRATEGIES RESEARCH

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

June 2018

Highway 101 High Occupancy Vehicle Lane Project EA On Route Santa Barbara County, California Visual Impact Mitigation Measures Caltrans	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific			Measurable	Attainable	Realistic	Tangible	
		S1: Landscape Character	S2: Viewers	S3: Visual Quality					
RECOMMENDED MITIGATION AND MINIMIZATION MEASURES The following measures would reduce the project's visual impact as seen from Highway 101 and the surrounding communities. The following measures would be to mitigate the urbanizing effect of the project caused primarily by the additional highway lanes, the reduction of highway landscaping, and the construction of sound walls. Even with implementing the measures listed below, extensive visual impacts would remain regardless of the project alternative. The following mitigation measures, combined with proposed project features such as replacement landscaping and aesthetic treatments to walls, would lessen the adverse visual change to the corridor. However, because of the inherent alteration of scale, increase of hard surface, and loss of vegetative character, substantial adverse visual impacts would remain.									The recommended mitigation measures are in addition to the proposed replacement landscaping and aesthetic treatments to walls. These mitigation measures are comprehensive in scope, addressing individual project elements. **Recommendations:** Many mitigation measures classified as prescriptive could be improved by stating the overall intent or desired outcome, to more effectively connect with project design and delivery. The scope of the policy and planning-level mitigation measures could be broadened to include context-sensitive information, including references to the visual resources (landscape character, viewers, and visual quality) that are adversely affected. Mitigation measures could also reference the associated landscape unit(s) to establish visual context.
1. For all sound walls, include aesthetic treatment such as texture and/ or color appropriate for the setting.	**SW2**	x			x				
2. Do not install sound walls in Summerland at the following locations: • Along northbound Highway 101, from approximately 200 feet west of Greenwell Road to the Summerland Fire Station (Station 313+00 to Station 332+50). Highway 101 High Occupancy Vehicle Lane Project 147 • Along northbound Highway 101, from approximately 0.2 mile east of Greenwell Road to approximately Greenwell Road (Station 296+50 to Station 310+00). • Along Highway 101, from the Evans Avenue undercrossing to the Evans Avenue northbound on-ramp (Station 343+00 to Station 350+50). • Along northbound Highway 101, from the beginning of the Evans Avenue northbound on-ramp to approximately 50 feet west of the beginning of the Evans Avenue northbound on-ramp (Station 350+50 to Station 351+00).	**SW1**					x	x	x	
3. Include clear panels along the top portions (starting at approximately 10 feet or less above the ground) of proposed sound walls in Summerland at the following locations: • Along northbound Highway 101, from the beginning of the northbound Evans Avenue off-ramp to the Evans Avenue undercrossing (Station 337+00 to Station 343+00). • Along northbound Highway 101, from approximately 50 feet west of the beginning of the Evans Avenue northbound on-ramp to approximately 500 feet west of the beginning of the Evans Avenue northbound on-ramp (Station 351+00 to Station 357+00).	**SW3**				x	x	x	x	
4. For all proposed concrete median barriers, include coloring and/or texturing appropriate for the setting.	**MB2**	x			x				
5. Design drainage structures visible from public areas so that they visually blend in with the setting as much as possible.	**DR2**	x	x		x				
6. Modify existing bridge structures to reflect the visual character of the existing structures in terms of materials, color, style, and the existing human scale of the area.	**B2**	x			x				
7. Use open style bridge railing on all new or modified bridge structures.	**B3**				x	x	x	x	
8. If new traffic management system elements such as radar, cameras, and other equipment are added to the project, locate all visible components in the least obtrusive locations possible and use colors that will reduce visibility.	**TMS3**		x		x	x	x	x	
9. If the project causes the relocation of existing overhead utilities, place the utilities underground if feasible.	**U3**				x	x	x	x	
10. Incorporate aesthetic treatments and design into all new bridge structures, for example, textured surfaces, architectural relief, and color application.	**B3**				x	x	x	x	
11. Locate any new signage such that it minimizes view blockage of the Pacific Ocean.	**S1**		x		x				
12. Remove redundant and unnecessary existing highway signage and, where allowable, relocate signs to improve views of the Pacific Ocean.	**S3**		x		x	x	x	x	

Highway 101 High Occupancy Vehicle Lane Project EA On Route Santa Barbara County, California Visual Impact Mitigation Measures Caltrans	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
13. Carefully place the poles, height, and positon of luminaries and use shielded lenses, where feasible, for all new lighting to minimize excess light and glare.	**L3**				x	x	x	x	
14. Make all areas where existing ramps and other paved surfaces are removed suitable for planting. Remove all paving and base material, rip or scarify the earth, and place topsoil.	**VC3**	x			x	x	x	x	
15. Preserve existing trees and shrubs to the greatest extent possible.	**VC1**	x							
16. Transplant existing palm trees that would be affected by the project to other areas within the project.	**VC3**	x			x	x	x	x	
17. Include planting with all sound walls to the greatest extent possible.	**VC3**				x	x	x	x	
18. Include planting with all retaining walls to the greatest extent possible.	**VC3**				x	x	x	x	
19. New landscaping should not block views of the Pacific Ocean.	**VC1**		x						
20. Planting with the potential of becoming skyline trees should be used as much as possible without blocking views of the Pacific Ocean.	**VC2**	x	x		x				
21. Include historically successful plant species throughout corridor.	**VC1**				x				
22. For all aesthetic planting, use larger container size plant material. Plant trees from minimum 15-gallon containers.	**VC3**				x	x	x	x	
23. Design all permanent stormwater prevention measures to visually fit with the ornamental or natural landscaped roadsides. Swales, ditches, and basins should appear as natural as possible. Built structures should be architecturally treated, colored, or hidden from view with planting. Minimize the use of fencing. If fencing is required, minimize its visibility by darkening or using a low-visibility material.	**STW3**	x	x	x	x	x	x	x	
24. Do not use unclad galvanized chain link for access denial fencing along the southbound on-ramp at Los Patos Way along the local street side of existing businesses.	**F3**				x	x	x	x	
25. Preserve existing Memorial Oaks to the greatest extent feasible, respective of the selected project alternative.	**VC1**	x		x		x	x	x	
26. Propogate all new oak trees planted as part of this Memorial Oak tree mitigation measure from the existing Memorial Oak trees.	**VC3**	x		x	x	x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
B = Bridges
DR = Drainage
F = Fences
MB = Median Barriers
S = Signage
STW = Storm Water
SW = Sound Walls
TMS = Traffic Mgt Systems
U = Utilities
VC = Vegetation Clearing

Legend for Mitigation Measure Categories:
1 = VIA policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measure
X = Mitigation statements that effectively connect with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated effectively into project design and delivery.

Mathilda Avenue Improvements at SR 237 and US 101 Project
Santa Clara County, California, 2016

Visual Impact Mitigation Measures
Caltrans

	Impact and Mitigation Categories	SMART Mitigation Criteria: Focus on Mitigation of Adverse Impacts: Specific: S1: Landscape Character	S2: Viewers	S3: Visual Quality	Measurable	Focus on Design and Delivery: Attainable	Realistic	Tangible	Observations
Avoidance, minimization, and/or mitigation measures have been identified and can lessen visual impacts caused by the project. Also, including aesthetic features in the project design previously discussed can help generate public acceptance of a project. This section describes additional avoidance, minimization, and/or mitigation measures to address specific visual impacts. These will be designed and implemented with concurrence of the District Landscape Architect. **The following measures to avoid or minimize visual impacts will be incorporated into the project:**									
1. **Implement aesthetic treatments on bridge barriers, sound walls, and retaining walls**. Incorpate architectural treatment on new bridge barriers, sound walls, and the visible side of retaining walls.	**RW1**		x		x	x	x	x	
2. **Restore highway planting.** Provide a restored highway landscape within the interchanges of SR 237 and US 101 with Mathilda Avenue. Use a cohesive highway planting design, including additional plantings in areas not directly affected by project construction, to ensure that replacement plantings are integrated with the existing landscape to meet community expectations. Provide a plant establishment period of three (3) years to ensure that new planting matures.	**LR2**	x	x	x	x	x	x	x	
3. **Incorporate bioretention basins in planting design.** Integrate the design of bioretention basins with the overall highway planting design, using techniques such as landform grading and/or incorporating varied plant materials.	**WQ3**				x	x	x	x	
4. **Apply Minimum Lighting Standards**. Design all artificial outdoor lighting and overhead street lighting to have minimum impact on the surrounding environment. Design measures that reduce light pollution will use the technologies available at the time of project design to allow the highest potential reduction in light pollution. Include measures such as using downcast, cut-off type fixtures that are shielded and that direct the minimum necessary light only toward objects requiring illumination.	**L3**		x		x	x	x	x	
5. **Minimize fugitive light from portable Ssurces used for construction**. At a minimum, the construction contractor shall minimize project-related light and glare to the maximum extent feasible, given safety considerations. Use color-corrected halide lights. Operate portable lights at the lowest allowable wattage and height and raise to a height no greater than 20 feet. Screen and direct all lights downward toward work activities and away from the night sky, highway users, and highway neighbors, particularly residential areas, to the maximum extent possible. Minimize the number of nighttime lights used to the greatest extent possible.	**C3**		x			x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
C = Construction
L = Lighting
LR = Landscape Restoration
RW = Retaining Walls
WQ = Bioretention Basins

Legend for Mitigation Measure Categories:
1 = VIA policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measure
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery.

VIA MITIGATION STRATEGIES RESEARCH

MARYLAND DEPARTMENT OF TRANSPORTATION

June 2018

I-270 Intercounty Connector in Frederick County, Maryland Visual Impact Mitigation Measures MDOT	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific			Measurable	Attainable	Realistic	Tangible	
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality					
In keeping with the purpose of the overall study, which is to provide an environmentally sensitive, safe, efficient, and attractive multimodal highway, mitigation to offset visual impacts would be developed in consultation with the communities. The visual and aesthetic mitigation under consideration for the proposed Build Alternatives include two basic strategies.									The mitigation planning strategies and aesthetic design guidelines establish a comprehensive package. The following summarize observations and recommendations in context to the SMART mitigation approach: **Corridor 1**: The proposed roadway profile in the Longmead Community is lowered in the landform throughout most of the section to reduce the visual and noise impacts on the adjacent community. Several communities, schools, and parks would be affected visually from development of Corridor 1. Much of Corridor 1 consists of green space or open space. The greatest visual impacts would result from the extensive clearing of forested areas and grading required for the proposed ROW that would alter the land adjacent to the proposed Corridor. Along with the change to the land and foliage, the change for the communities that surround the ICC interchanges would be substantial in some areas. Proposed bridge heights have been set at high elevations to reduce direct impacts on natural resources and to reduce the visual impacts on park users. Many of these structures would be located at heights that would be screened by tree canopies. **Corridor 2**: West of MD 97 and east of I-95, Corridor 2 would be identical to Corridor 1 and would have the same visual impacts. Corridor 2 has not been part of the Counties' Master Plans; subsequently, development in Corridor 2 has not been planned to accommodate the facility. Therefore, development patterns do not reflect a planned corridor. For this reason, there would be fragmentation of communities with more residences in close proximity to Corridor 2. Although the proposed roadway would be
1. Configure the road, landscaping, retaining walls, and noise barriers in a manner that would make the facility less noticeable. Detailed analysis and design for visual screening would occur for all the Build Alternatives. A sample cross section illustrating buffer landscaping is included, and other configuration concepts are in the Draft Aesthetic Design Guidelines for Section Engineering Teams.	**RI**	**X**	**x**	**x**	**x**	**X**	**X**	**X**	
2. Develop design standards for the overall facility that would increase its compatibility with the surrounding environment. ICC Draft Aesthetic Design Guidelines have been developed to provide general guidance in developing a cohesive highway facility using context-sensitive solutions and techniques. These guidelines generally define the overall visual goals and objectives and provide guidance on designing general highway elements to stay in keeping with an overall corridor theme and with sensitivity to the surrounding environment. These goals are based on principles of accessibility, efficiency, safety, functionality, maintainability, environmental stewardship, and visual character. The goals include: • Creating a safe, attractive, and efficient controlled-access highway • Developing a controlled-access highway design with visual continuity throughout the corridor and with sensitivity to the surrounding landscapes • Developing cost-effective, buildable, and maintainable design solutions • Minimizing or avoiding community separations introduced by highway construction • Minimizing or avoiding environmental impacts and providing mitigation and enhancement measures • Protecting and enhancing the environmental quality of the study area and treading lightly on the land (e.g., minimizing disturbances to the environment) • Integrating existing and planned bicycle and pedestrian facilities to the extent practical	**RI**	**X**			**x**	**X**	**X**	**X**	

I-270 Intercounty Connector in Frederick County, Maryland Visual Impact Mitigation Measures MDOT	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
The characteristics that would contribute to visual unity include thematic patterns, colors, architectural features, and gateway designs. For both Build Alternatives, these elements would enhance existing visual character by using materials and design techniques that blend with the surrounding area. The design guidelines include:									screened, the visual character of the communities would be negatively altered due to the number of residences displaced by Corridor 2 and the close proximity of several schools and residences not displaced. **Recommendations**: Describe aesthetic approaches to retain the Corridor's visual character by repeating the form, line, color, texture, and patterns of the landscape features; referencing foreground and middleground viewsheds; and emphasizing landscape preservation of the landscape visual quality. Provide any reference to conformance with local planning policies for preserving the scenic quality of the route.
3. Use decorative finishes on publicly visible highway features in keeping with the overall highway theme and surrounding vernacular.	**R2**	X	X	X	X	X	X	X	
4. Avoid or minimize community separations introduced by highway construction.	**C2**					X	X	X	
5. Provide plant buffers to screen incompatible views between visually sensitive areas.	**VC2**	X	X	X	X	X	X	X	
6. Provide streetscape enhancements in keeping with the local vernacular on service roads and community streets that will be included as part of the ICC study.	**R2**	X	X	X	X	X	X	X	
7. Maintain open vista over landscape where possible by framing viewsheds with landscape plantings	**VC2**		X		X	X	X	X	
8. Provide reforestation plantings adjacent to existing forest tracts and use species composition native to the area.	**VC3**	X	X		X	X	x	X	
9. Limit hardscape elements to areas where only necessary to accommodate environmental avoidance, minimization, and stewardship features.	**HS2**					X	X	X	
10. In instances where hardscape elements are used (i.e., retaining walls, overpasses, box culverts, riser structures, etc.) in publicly visible areas, allow rustic finishes such as timber, staining, or formlining	**HS3**	X	X		X	X	X	X	
11. Limit park and forest impacts by reducing the roadway footprint to the minimum extent practical.	**R2**					X	X	X	
12. Integrate ornamental planting and landscape buffering along the highway.	**VC2**				X	X	X	X	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
C = Construction-related
HS = Hardscape
R = Roadways
VC = Vegetation Clearing

Legend for Mitigation Measure Categories:
1 = VIA Policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measures
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery.

VIA MITIGATION STRATEGIES RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION

June 2018

New St. Croix River Crossing Final EIS 1994 Visual Impact Mitigation Measures Minnesota Department of Transportation	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
The Minnesota Approach **Impacts on Visual Quality:** *Scale of Impact on Visual Resources.* The scale of the impact on visual resources will be minor in this segment. Although much of the existing scene will be altered, the alterations are visually superficial. Improvements will be made to the existing four-lane expressway. The signal controlled intersections will be upgraded with wider approaches and additional turn lanes. Service roads will be improved by reconfiguration and widening.									The VIA process, visual resource criteria, and mitigation details evolved from the FEIS in 1994 to the Visual Quality Manual in 2007. **Final Environmental Impact Statement VIA** The VIA for the 1994 FEIS organizes the visual resource inventory, impact assessment, and mitigation measures in three parts: Minnesota Approach, St. Croix River Crossing, and Wisconsin Approach. Visual impacts are organized by viewers and visual quality. Mitigation measures provide visual context and address community issues with solutions, including forming an interdisciplinary "Design Review Committee" with stakeholders and developing "Gateway Concept Guidelines." **Supplemental Final Environmental Impact Statement** Between 2004 and 2006, FHWA, Mn/DOT, WisDOT, and the Stakeholder Group developed a SFEIS for the St. Croix River Crossing Project. The SFEIS formalizes the development of a Preferred Alternative Package that establishes the basic project elements—the highway and river crossing location/alignment, highway design classification(s), river crossing bridge type, future use of the existing river crossing (the Stillwater Lift Bridge), pedestrian/bicycle trails, and other mitigation and design elements that will offset the adverse historic and environmental impacts identified for the project. Visual resources of the project area were divided into three types: natural, cultural, and highway. Visual impacts in this chapter use the concept of "viewer-groups." Using this term allows the potentially affected population to be divided by their assumed visual concerns and preferences into manageable groups. The main division is between neighbors, those people who would have views of the transportation facility, and travelers, those people who would have views from the transportation facility. The SFEIS and previous studies established that visual quality is a critical part of the project. Completion of the SFEIS, design, and construction requires review and action from federal, state, and local agencies. Some of the key federal regulatory requirements linked to the project area's visual quality and cultural values include Section 7(a) of the Wild and Scenic Rivers Act, Section 4(f) of the U.S. DOT Act, and Section 106 of the National Historic Preservation Act.
Extent of Impact on Viewers: The extent of the impact on viewers will be widespread because this project will affect large numbers of neighbors and travelers.									
Value of Impact on Visual Quality: The value of the impact will be judged by how well it maintains or improves the existing visual quality. Since the existing visual quality is not distinctive, the project has the potential to be beneficial if mitigation and enhancement features can be identified during the design phase of this project.									
Minnesota Approach Visual Impact Mitigation: **MA1.** Improvements that identify this segment of highway as a gateway into historic downtown Stillwater and the St. Croix National Scenic Riverway would allow the commercial development to differentiate itself from similar developments in the metropolitan region. These improvements could be incorporated into the final design for the project through the installation of plantings, architectural features, and signage identifying the area as the "Gateway to the Lower St. Croix National Scenic Riverway" in highway areas closer to the river. Travelers would benefit from identifying the area as the approach to Stillwater and the Lower St. Croix National Scenic Riverway and from clarified, safer traffic movements that would allow the traveler to enjoy the view more and concentrate less on maneuvering through the area.	**GW1**	x	x	x	x	x	x	x	
MA2. The DOTs have established a "Design Review Committee" involving a bridge architect, structural engineers, and local interests to address visual impacts and design detailing of the proposed bridge, including development of "gateway concept" guidelines for the Minnesota approach. These guidelines would include suggestions on how to create an identity that recognizes its proximity to the national scenic river and historic Stillwater.	**B1**	x		x	x	x	x	x	
The River Crossing ***Impacts on Visual Quality:*** *Scale of Impact on Visual Resources.* A new river crossing would have a substantial impact on visual resources. It would add a large new constructed resource of the highway environment to the existing scene. On the Wisconsin side, it would superimpose a massive constructed object onto a relatively natural bluff/ravine environment. On the Minnesota side, the bridge would replace the majority of a residential neighborhood with a highway corridor.									
Extent of impacts on Viewers: A new crossing would have widespread impacts on viewers. It would dramatically alter the views of the natural environment for many residential and recreational neighbors. It would also create a dramatic new perspective of the cultural and natural environments for travelers crossing the river.									

New St. Croix River Crossing Final EIS 1994 Visual Impact Mitigation Measures Minnesota Department of Transportation	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific			Measurable	Attainable	Realistic	Tangible	
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality					
Value of Impacts on Visual Quality: Most residential and recreational neighbors would not like a new bridge disrupting the views they have come to expect. Some of those neighbors will also object to the increased presence of the built environment that a new bridge represents. For most residential and recreational neighbors, therefore, a new crossing would adversely affect the visual quality of the existing scene. This would include those who visit the Minnesota scenic overlook, located in the immediate vicinity of the proposed bridge. Some viewers, however, may appreciate the juxtaposition of the bridge on the river valley, visually connecting the relatively built Minnesota environment with the relatively natural Wisconsin bluffs.									**Visual Quality Manual** The St. Croix River Crossing Visual Quality Manual, published in 2007, is also tied to a Section 106 Amended Memorandum of Agreement (MOA), executed among the following signatories; FHWA, U.S. Army Corps of Engineers, Advisory Council on Historic Preservation (ACHP), and Minnesota and Wisconsin State Historic Preservation Officers (SHPOs), as well as other concurring parties. The MOA contains several stipulations aimed at the protection and preservation of cultural resources found throughout the St. Croix River Crossing Project area (see Chapter 8). MOA Stipulation II.C directs Mn/DOT and WisDOT to develop a VQM and to develop the visual design concepts and recommendations with assistance from design and cultural resource professionals working in cooperation with a Visual Quality Review Committee (VQRC). See Section 1.3 for information about the VQRC. The MOA requires the development of the VQM consistent with the following principles: 1. Develop a controlling vision that identifies and reinforces links between the historic properties and natural resources. 2. Avoid, minimize, and/or mitigate adverse effects on historic properties (avoidance is preferable). 3. Minimize the impact of the new bridge on the Lower St. Croix Scenic Riverway and, in particular, on vistas from the St. Croix Overlook-South and from the Stillwater Cultural Landscape District. 4. Minimize the impact of project lighting on the St. Croix Valley and on historic properties. 5. Minimize the visual impact of signage on the Lower St. Croix Valley and on historic properties. **Visualization and Graphics** Each phase of the St. Croix visual resource assessment and design guideline process applies the use of diagrams, graphics, and simulations to communicate visual mitigation and aesthetic design concepts. 6. Incorporate opportunities to provide comprehensive educational and interpretive information about the Lower St. Croix National Scenic Riverway's natural resources and historic properties.
Commercial neighbors in downtown Stillwater may have an ambivalent reaction to a new bridge from a visual perspective. Although those who depend on river views may concur with residents and recreationists who dislike the bridge, many would appreciate the improvement in visual character that will result in downtown Stillwater due to decreased traffic congestion. Most downtown business owners, employees, and customers, consequently, view a new bridge as having a beneficial impact. Industrial neighbors are less likely to be concerned with the visual impacts of a new river crossing.									
Travelers, commuters, haulers, and tourists would generally view a new bridge as having a beneficial impact. Their method of traveling through the river valley would change from the existing entry down into and back out of the valley to a rapid passing over the valley. Some commuters, haulers, and tourists would appreciate the increase in viewing distance offered by a new higher bridge. Travelers who choose to go into downtown Stillwater would also appreciate the reduction of congestion in the historic downtown district.									
River Crossing Visual Impact Mitigation: **RC1.** The greatest visual impacts caused by the proposed project will be on neighbors who view the addition of a new bridge in the river valley adversely. A four-lane bridge cannot be hidden from view. If the project is constructed, adverse impacts on many residential and recreational neighbors cannot be avoided. To minimize adverse impacts on neighbors, the state and federal agencies charged with administrating the scenic and recreational aspects of the river have requested that the bridge's competition with the natural landscape be minimized. They have requested that the bridge be lower than the bluffs, with the least number of piers in the water, that conventional design details be included to make the bridge more compatible with the river environment, and that bluff cuts and disturbance be minimized.	**B1**	x	x	x	x	x	x	x	
RC2. The proposed design attempts to meet these requests. The new bridge will be designed to minimize visual conflict with the river valley. As suggested by public input, the DOTs will use a conventional bridge design with haunched girders (as shown in the schematic below) to minimize, to the extent possible, the competition for visual attention with the natural environment.	**B2**	x	x	x	x	x	x	x	
RC3. The preferred alignment minimizes cutting into the bluff by using an existing ravine. The preferred profile minimizes conflict with the natural landscape by keeping the bridge elevation below the ridge. The DOTs have reduced the number of piers in the water to eight locations. The DOTs have established a "Design Review Committee" involving a bridge architect, structural engineers, and local interests to address visual impacts and design detailing of the proposed bridge, including "gateway concept" guidelines for the Minnesota and Wisconsin approaches. The committee would provide input on design elements such as pier design and surface treatments; retaining wall designs; and bridge color, rail type, and lighting.	**B2**	x	x	x	x	x	x	x	

New St. Croix River Crossing Final EIS 1994 Visual Impact Mitigation Measures Minnesota Department of Transportation	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
RC4. Figures 4-3 and 4-4 provide computer simulations of the proposed bridge style in the existing corridor as viewed from the bluff and the river, respectively. These simulations are included in response to comments on the Draft EIS, in which the commenters expressed a desire to see a representation of the extent of visual impact that would result from bridge construction. It should be noted that these simulations do not necessarily reflect the final design details for the proposed bridge but do demonstrate the proposed form and location.	**B2**	x	x	x	x	x	x	x	
RC5. The resource agencies have also requested that the existing lift bridge be removed if a new bridge is constructed. However, neither the Preferred Alternative nor any other Build alternatives would physically impact the existing lift bridge. Because the lift bridge is listed on the National Register of Historic Places, it is protected by Section 4(f) and Section 106 and cannot be removed in conjunction with this project if there exists a feasible and prudent alternative to removal. Section 6.0 of the Final 4(f) Evaluation for the LSCNSR provides a more detailed discussion of this issue.	**B1**								
RC6. The ravine in Wisconsin and other disturbed areas will be replanted as part of this project to mitigate for adverse visual impacts on the river valley resulting from disturbance during construction. Naturally occurring plant species will be used to the greatest extent possible in the restoration plantings.	**VC2**	x			x	x	x	x	
RC7. New state entrance signs and signs announcing entrance to the Lower St. Croix National Scenic Riverway will be installed in Minnesota and Wisconsin. These signs will provide additional visual emphasis for the transitions the travelers experience on the highway	**S1**		x		x	x	x	x	
Wisconsin Approach The visual resources of the Wisconsin Approach corridor for the Preferred Alternative, i.e., the area east of the Wisconsin bluffs, are primarily those associated with an agricultural landscape: rolling terrain, fields, scattered woodlands, farm houses and farm buildings adjoining a widely spaced network of roads. A major highway, STH 35, delineates the farmland from the woodlands that flank the river.									
Impacts on Visual Quality: *Scale of Impact on Visual Resources.* Converting the natural environment into a highway environment will substantially change the views that the existing neighbors have of the corridor area. Travelers' views will change from the existing experience of traveling through Houlton to traveling through a pastoral landscape with views to Houlton.									
Extent of Impacts on Viewers: The proposed highway routing will affect mostly travelers since they make up the largest percentage of the viewing population. Neighbors will also be affected. The largest concentration of neighbors is at the elementary school located approximately 305 meters (1,000 feet) from the proposed corridor. In the remainder of the corridor area, there are relatively few neighbors with views to the corridor.									

New St. Croix River Crossing Final EIS 1994 Visual Impact Mitigation Measures Minnesota Department of Transportation	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
Value of Impacts on Visual Quality: The value of the impact will be judged by how well it maintains or improves the existing visual quality. The existing visual quality of the agricultural landscape is highly esteemed by those people familiar with it. These people will most likely find the project to be a negative impact due to the intrusion of a built highway environment on the existing rural environment. Travelers will probably enjoy the improved views of the rural landscape and the view back to the community of Houlton.									
Wisconsin Approach Visual Impact Mitigation: **WA1.** Adverse impacts on this relatively undeveloped environment cannot be avoided if the project is constructed. Adverse impacts will be minimized and compensated for by creating a highway whose alignment and profile are sensitive to the existing terrain. In some cases, however, the layout follows farm field lines to minimize impacts on farm operations.	**R2**	x				x	x	x	
WA2. Mitigation for visual impacts will also involve planting. The existing landscape is barren of perennial vegetation since most of the proposed highway is traversing existing farm fields. Planting the roadside with native grasses, flowers, and woody plants would create an inviting entrance into the state. In particular, the overpass with STH 35, the interchange with County Road E, and the intersection with existing STH 64 could be planted to announce western Wisconsin and Houlton to travelers from the west and the St. Croix River to travelers from the east. The school should also be adequately planted with vegetation, particularly near playgrounds, so that the view to the highway is softened.	**VC3**	x	x		x	x	x	x	
WA3. In addition, the DOTs have established a "Design Review Committee" involving a bridge architect, structural engineers, and local interests to address visual impacts and design detailing of the proposed bridge, including development of "gateway concept" guidelines for the Wisconsin approach. These guidelines would include suggestions on how to create an identity for the area that recognizes its proximity to the national scenic river.	**B1**	x	x	x	x	x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
B = Bridges
GW = Gateway
R = Roadways
S = Signage
VC = Vegetation Clearing

Legend for Mitigation Measure Categories:
1 = VIA policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measures
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery.

VIA MITIGATION STRATEGIES RESEARCH

OREGON DEPARTMENT OF TRANSPORTATION

June 2018

I-5: South Jefferson to US 20 Visual Resources Technical Memo Linn County, Oregon	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
Recommended Avoidance, Minimization and Mitigation Measures Visual impacts can be avoided and lessened through the following best management practices and design approaches. Specific actions to minimize adverse visual impacts and to enhance the aesthetic characteristics of the Build Alternative would be developed during detailed design phases. **The following list includes suggested measures:**									The VIA provides a comprehensive and systematic evaluation of visual impacts. Landscape units, key viewpoints, and visual simulations establish a framework for evaluating visual changes. Mitigation recommendations are developed around concepts of best management practices and design approaches, with implementation through an Aesthetic Advisory Committee. The range of mitigation categories focuses on "policy" and "planning-level" strategies to avoid and minimize visual impacts. **Recommendations:** Mitigation measures could better focus on impacts on the visual resources of the project area by referencing specific landscape units and viewpoints.
1. Apply consistent design types, textures, materials, and colors to structures and roadway elements (e.g., guardrails, retaining walls) and surrounding areas throughout the project area.	**ST2**	x			x	x	x	x	
2. Avoid and minimize the removal of vegetation (e.g., large old trees) to the area necessary for construction and staging activities.	**VC2**	x				x	x	x	
3. Revegetate disturbed areas.	**VC2**								
4. Vegetate road embankments to blend and integrate the roadway into the surrounding landscape and create a sense of continuity with the surrounding community.	**VC2**	x	x	x	x	x	x	x	
5. Where feasible, vegetate medians within the freeway corridor to provide a glare screen between opposing lanes of traffic.	**G2**		x		x	x	x	x	
6. Use directional lighting when feasible to minimize nighttime glare to surrounding areas.	**G2**		x		x	x	x	x	
7. Form an Aesthetic Advisory Committee during the design phase of implementation of the proposed improvements.	**PI1**				x	x	x	x	
8. Explore design options for potential sound attenuation wall treatments that create a gateway to the City of Albany that are aesthetically pleasing in line, color, pattern and/or texture.	**SW2**	x	x	x	x	x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
G = Vehicle Light Glare
PI = Project Implementation
ST = Structures
SW = Sound Walls
VC = Vegetation

Legend for Mitigation Measure Categories:
1 = VIA Policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measures
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery

VIA MITIGATION STRATEGIES RESEARCH

UNITED STATES FOREST SERVICE

June 2018

Freemont Pass Recreation Path VIA Federal Highway Administration, Central Federal Lands Highway Division Summit County, Colorado	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific			Measurable	Attainable	Realistic	Tangible	
		S1: Landscape Character	**S2**: Viewers	**S3**: Visual Quality					
Mitigation commitments to reduce the visual contrast of project elements and temporary construction impacts include the following:									
1. Pedestrian bridge overpass approach railing will be timber post and rails.	**B3**				x	x	x	x	The proposed mitigation measures are comprehensive in scope and include a range of policy, aesthetic planning, and prescriptive-level categories. **Recommendations:** The overall scope of the "prescriptive-level" mitigation measures would be more effective if there were references to the elements of landscape character, viewers, and visual quality that these mitigation strategies are targeted to address.
2. All structural steel components of the pedestrian bridge overpass will be weathering steel, with the exception of the stay-in-place deck forms that would be visible only directly under the bridge.	**B3**		x		x	x	x	x	
3. Wire fabric fencing used for the pedestrian bridge overpass railings will be painted or Natina stained a similar "weathering steel" color as the bridge.	**B2**				x	x	x	x	
4. All exterior exposed faces of piers and abutments will be given a simulated stone masonry surface treatment (formliner). Pattern will be Dayton Superior Colonial Drystack or approved equal.	**B3**				x	x	x	x	
5. All exposed structural concrete in piers, abutments, deck slab, and curbs will be integrally colored Rustic Brown (Davis color #6058, or approved equal).	**B3**				x	x	x	x	
6. A seed mix will be selected in coordination with CDOT and USFS. The seed mix will include locally native vegetation types, suitable for the climate and soil conditions.	**VC2**	x			x	x	x	x	
7. Revegetation efforts will mimic the spacing and density of adjacent vegetation.	**VC2**	x			x	x	x	x	
8. Wetland impacts will be revegetated with appropriate native plants to mimic adjacent habitats.	**VC2**	x			x	x	x	x	
9. Onsite native material, such as rocks, soil, and stumps, will be reused onsite.	**B2**	x			x	x	x	x	
10. To the extent practicable, grading and slope work around the pedestrian bridge overpass abutments will be blended into the existing landscape to mimic a natural form.	**B2**	x			x	x	x	x	
11. Coordination with CDOT, USFS, and other stakeholders will continue through the final design process.	**IAC1**	x	x	x		x	x	x	
12. CFLHD will coordinate with the Top of the Rockies Board to ensure design elements are consistent with the corridor management plan.	**IAC1**	x	x	x		x	x	x	
13. CFLHD will continue to incorporate elements of the Top of the Rockies National Scenic & Historic Byway Design Guidelines as applicable.	**IAC1**	x	x	x		x	x	x	
14. Trail and Wayfinding Markers should be at a modest pedestrian scale and have minimal impact within the landscape.	**S2**	x	x	x	x	x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
B = Bridges
IAC = Interagency Coordination
S = Signage
VC = Vegetation Clearing

Legend for Mitigation Measure Categories:
1 = VIA policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measures
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery.

Upper Fryingpan Vegetation Management Project White River National Forest Colorado	Impact and Mitigation Categories	SMART Mitigation Criteria							Observations
		Focus on Mitigation of Adverse Impacts				Focus on Design and Delivery			
		Specific							
		S1: Landscape Character	**S2:** Viewers	**S3:** Visual Quality	Measurable	Attainable	Realistic	Tangible	
Mitigation Measures Applicable to All Project Alternatives and Options									
1. Openings in the canopy should have a natural appearance with uneven edges rather than straight lines where possible. When possible, coordinate with adjacent property owners to soften the edges of cutting units. The shape should be an irregular pattern like the existing natural openings and should avoid straight-line edges, especially along adjacent property and roadless area boundaries. The edges of the treatment units should be varied and random to soften and blend with the native vegetative mosaic. Favor existing healthy dominant trees, such as aspen, and woody shrubs to shape the edges of areas where materials are to be removed. Blend with natural landscape features such as natural meadows or openings and rock outcrops, when possible, to create free-form vegetative shapes that mimic natural patterns. Make clearing edges irregular and free-form, feathering and undulating edges where possible.	**VC2**	x			x	x	x	x	The proposed project was developed with site-specific directions for implementation, called design features, to lessen or avoid potential negative effects associated with implementation. In addition to design features, the proposal would follow forest-wide standards and guidelines from the White River National Forest Land and Resource Management Plan, 2002. The 10 mitigation measures for the Upper Fryingpan Vegetation Management Plan provide a comprehensive mitigation package to avoid and minimize adverse effects on scenery resulting from vegetation management practices. Elements of the mitigation measures include strategies to avoid or reduce the visual contrast of vegetation to the form, line, color, and texture of clearing and construction debris. **Recommendations:** Add references to some of the specific types of impacts related to landscape types/character, specific viewers/viewpoints/use areas, and visual quality. This would help to more directly connect mitigation measures to types of adverse impacts.
2. Face unit boundary paint away from open system roads or remove or "black out" after treatment activities are completed.	**PC2**				x	x	x	x	
3. Remove from sight root-wads created by the harvest activities that are visible in the foreground within 50 feet of open system roads and trails. Do not use root-wads to close roads and landings that are within 50 feet of open system roads.	**CD3**		x		x	x	x	x	
4. Stumps should be 12 inches high or less. Within 15 feet of forest system trails, stumps should be cut 4 inches or less.	**CD3**		x		x	x	x	x	
5. Remove slash piles in units 108, 109, and 111 through burning or by using as biomass within 5-years following unit closure. After completion of pile burning, scatter blackened logs and stumps back into harvest units or remove them to create visual diversity.	**CD2**	x		x	x	x	x	x	
6. Where possible, place landings in existing openings unless doing so would adversely affect other resources. If an existing opening cannot be used, clearing size and form of the landings should mimic that of surrounding vegetative mosaic as seen from middleground and background views (distances greater than 0.5 mile). The shape of landings should be an irregular pattern like the existing natural openings and should avoid straight-line edges.	**VC2**	x	x	x	x	x	x	x	
7. When constructing temporary roads or any grading, avoid excessive cut/fill slopes. Vary cut/fills to blend with the adjacent terrain and leave in a roughened condition to facilitate revegetation. Stabilize fills and reestablish the natural drainage configuration to the degree possible.	**E2**	x			x	x	x	x	
8. Remove all equipment and construction debris (man-made debris and trash, including old culverts) caused by timber operations from the site at sale completion.	**CD3**				x	x	x	x	
9. Where feasible, when constructing skid trails, avoid creating straight-line corridors when the skid trails connect with open system roads and trails. Rehabilitate any skid trails to reduce the color contrast of the exposed soil by randomly scattering and spreading slash or replacing scraped material. Cover exposed bare soil with adjacent organic material.	**CD2**	x			x	x	x	x	
10. Do not leave unnatural appearing rings of trees adjacent to openings. Remove any painted trees that leave a strip along meadow edges, along with the other timber in the clearcut before the end of the sale.	**PC3**	x		x	x	x	x	x	

Legend for Specific Criteria:
S1 = Landscape Character
S2 = Viewers
S3 = Visual Quality

Legend for Adverse Impact Categories:
CD = Construction/Debris
E = Earthwork
PC= Paint Color
VC = Vegetation Clearing

Legend for Mitigation Measure Categories:
1 = VIA policy-level mitigation measure
2 = Visual resource planning-level mitigation measure
3 = Prescriptive-level mitigation measures
X = Effective mitigation statement that connects with SMART criteria for mitigating adverse visual impacts. Includes concepts that can be incorporated into project design and delivery.

APPENDIX C. VISUAL IMPACT CATEGORIES

VISUAL IMPACT CATEGORIES

A = Art
B = Bridges
C = Construction-related
CD = Construction/Debris
CF = Cut and Fill Earthwork
CS = Cut Slopes
DR = Drainage
E = Earthwork
F = Fences
FS = Fill Slopes
G = Vehicle Light Glare
GR = Guardrails
GW = Gateway
H = Historic
HS = Hardscape
IAC = Interagency Coordination
IS = Interpretive Signage
L = Lighting
LR = Landscape Restoration
MB = Median Barrier
P = Pedestrians
PC = Paint Colors
PI = Project Implementation
PU = Pedestrian Underpasses
R= Roadways
RA = Realignment
RC = Rock Cuts
RW = Retaining Walls
S = Signage
ST = Structures
STW = Storm Water
SW = Sound Walls
TMS = Traffic Mgt Systems
U = Utilities
VC = Vegetation Clearing
WL = Wildlife
WQ = Bioretention Basins