


CORRIDOR PLAN

US 395, West US 50, SR 28, SR 207 and SR 431 landscape and aesthetics corridor plan

NEVADA DOT

UNLV
LANDSCAPE ARCHITECTURE & PLANNING RESEARCH

US 50 FROM THE CALIFORNIA STATE LINE TO 6 MILES EAST OF DAYTON

US 395 FROM TOPAZ LAKE TO THE CALIFORNIA STATE LINE AT BORDER-TOWN

STATE ROUTES 28, 207, AND 431

DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill

December 15, 2006

MESSAGE FROM THE GOVERNOR OF NEVADA

On June 6, 2002, the Nevada Department of Transportation adopted as policy, *Pattern and Palette of Place: A Landscape and Aesthetics Master Plan for the Nevada State Highway System*. The second phase of planning is complete. The Landscape and Aesthetics Corridor Plan represents a significant step forward for the Landscape and Aesthetics program created by the Master Plan because it involves local public agencies and citizens in the planning process. Now, Nevada's highways truly represent the State and its people. The Corridor Plan will be the primary management tool for use in guiding funding allocations, promoting appropriate aesthetic design, and providing for the incorporation of highway elements that uniquely express Nevada's landscape, communities, and cities, as well as its people. The State considers this Corridor Plan to be a major accomplishment for the future of Nevada highways.

MESSAGE FROM THE DIRECTOR OF NDOT

NDOT is responsible for ensuring that landscape and aesthetics are an integral part of the design in building and retrofitting our highway system. This Landscape and Aesthetics Corridor Plan for US 395, US 50, SR 28, SR 207, and SR 431 in Northern Nevada helps realize our vision for the future appearance of our highways. The plan will provide the guidance for our own design teams, and it will help Nevada's citizens participate in formulating context-sensitive solutions for today's transportation needs. Together, we will ensure our highways reflect Nevada's distinctive heritage, landscape, and culture.

ENDORSEMENT

This Corridor Plan has been reviewed by the following groups and agencies. Endorsement means agreeing in principle with the opportunities and recommendations identified within agency jurisdiction.

City of Carson City
Carson City Convention and Visitors Bureau
Carson City Parks and Recreation Department
Carson City Public Works Department
Carson City Regional Transportation Commission
City of Reno
City of Reno Community Development Department
Dayton Area Chamber of Commerce
Dayton Valley Natural Resources Conservation District
Douglas County
Douglas County Community Development Department
Federal Highway Administration
Gardeners Reclaiming Our Waysides
Incline Village General Improvement District
Keep Truckee Meadows Beautiful
League to Save Lake Tahoe
National Pony Express Association
Nevada Arts Council
Nevada Association of Counties
Nevada Bicycle Advisory Board
Nevada Commission on Tourism
Nevada Department of Conservation and Natural Resources, Division of State Lands
Nevada Department of Cultural Affairs
Nevada Department of Wildlife
Nevada Division of Forestry
Nevada Division of State Parks
Nevada Land Conservancy
Nevada League of Cities
Nevada State Historic Preservation Office
North Lake Tahoe Resort Association
Northern Nevada Development Authority
Regional Transportation Commission of Washoe County, Nevada
Reno-Sparks Chamber of Commerce
Reno-Sparks Convention & Visitors Authority
Reno-Sparks Indian Colony
Scenic Nevada
Sierra Club, Toiyabe Chapter
Tahoe Regional Planning Agency
The Nature Conservancy, Nevada Chapter
Town of Gardnerville
Town of Minden
Town of Silver Springs
Truckee Meadows Community College
Truckee Meadows Regional Planning Agency
University of Nevada, Reno, Environmental and Resource Science Department
U.S. Bureau of Land Management
U.S. Forest Service
U.S. Forest Service, Region IV, Humboldt-Toiyabe National
U.S. Forest Service, Region V, Lake Tahoe Basin Management Unit
Washoe County
Washoe County Public Works Department
Washoe County Regional Parks and Open Space
Washoe Tribe

ACKOWLEDGEMENTS

State Transportation Board

Kenny C. Guinn (Chairman)	Governor
Lorraine Hunt	Lt. Governor
George Chanos	Attorney General
Steve Martin	Controller
Caesar Caviglia	Member
Tom Gust	Member
Jim Thornton	Member

STTAC (Statewide Transportation Technical Advisory Committee)

Audrey Allan	Vincent Guthreau
Tom Brady	Sig Jaunarajs
Steve Bunnell	Mara Jones
Denis Cederburg	Charlie Kajkowski (Vice-Chair)
Daryl Crawford	Clara Lawson
Keyth Durham	Patrick Pittenger
Paul Enos	Marc Reynolds (Chair)
Jon Ericson	Jonna Samsom
David Fraser	Bruce Turner
Debra Goodwin	Steve Weaver
Laurie Ann Grimes	

Technical Review Committee

Andrew Soderborg	Ed Peck	Marie Berry
Anthony Smokey	Ellis Antunez	Mary Fischer
Becky Stock	Greg Hill	Mary Ann McAuliffe
Bryant Smith	Greg Novak	Melanie Mucha
Candy Duncan	Harry York	Pam Wilcox
Carl Ruschmeyer	Jan Miller	Patrick Geurts
Carol Nicholson	Jeff Foltz	Paul Tueller
Carolyn Poissant	Jenny Scanland	Rebecca Ossa
Charles Emmett	Jenny Welsh	Richard Staub
Charles McNeely	Jim Mallery	Roger Van Alyne
Christi Cakiroglu	Jim Park	Sandi Stanio
Colin West	Joe Pomroy	Scott Fahrenbruch
Coy Peacock	John Friedrick	Scott Nebesky
Dan Kaffer	John Hitchcock	Scott Sisco
Dan Greytak	John Christopherson	Shelly Aldean
Daniel Cressy	Jon Paul Harries	Steve Cooke
Darrel Cruz	Katherine Landreth	Steve Weaver
Darrell Bender	Katy Singlaub	Steve Chilton
Daryl Peterson	Keith Norberg	Summer Chandler
Dave Pulliam	Kelly Langdon	Susan Boskoff
Dave Ziegler	Larie Trippet	Susan Stead
David Fraser	Larry Friedman	Thomas Lumpkin
David Reis	Leslie Burnside	Vern Krahn
Dennis Ghiglieri	Marc Reynolds	Wanda Batchelor
Donald Naquin	Marchon Miller	
Doug Smith	Marie Bresch	

Nevada Department of Transportation

Rand Pollard - Assistant Chief of Road Design Engineer
Lucy Joyce-Mendive - Landscape Architect Supervisor
Janice Ellis - Assistant Landscape Architect
Ron Blakemore - Former Landscape Architect Supervisor

University of Nevada Las Vegas Landscape Architecture and Planning Research Office

Mark Elison Hoversten - Professor, FASLA, AICP
Susan Jones - Research Associate, ASLA
Brian Pugh - Research Assistant, ASLA

Consultant Team

Design Workshop

Richard W. Shaw - Principal, FASLA
Steve Noll - Principal, ASLA
Stephanie Grigsby - Associate, ASLA
Kristofer Johnson - Landscape Designer
Eric Roverud - Landscape Designer
Laura Miller - Landscape Designer
Christopher Walsh - Landscape Designer
Elizabeth Scott - Landscape Designer, ASLA
Anna Gagne - Planner
Julie McGrew - Landscape Designer
Devon Morgan - Graphic Designer
Lisa McGuire - Graphic Designer
Rebecca Leonard - Planner
Nino Pero - Website Designer
Kelan Smith - Environmental Graphics
Dori Johnson - Executive Assistant
Jen Tarbet - Project Specialist

PLACES

Barbara Santner - Landscape Architect and Planner, ASLA, AICP
Kathie Brinkerhoff - Landscape Designer
Susan Leuscher - Landscape Architect in Training

Sand County Studio

James Sipes - Landscape Architect and Digital Database Development, ASLA

JW Zunino

Jack Zunino - Principal, FASLA
Geoffrey Schafler - Project Manager, ASLA

CH2MHill

Cindy Potter - Civil Engineer, Principal, P.E.

USER'S GUIDE

- Refer to the section beginning on page 1.5 to understand **softscape and hardscape treatments types.**
- Refer to the section beginning on page 2.4 to understand how the corridor is organized into **highway zones**.
- Refer to sections two through five beginning on page 2.13 to understand the theme and design objectives for each **landscape design segment**.
- Refer to pages 2.18, 2.29, 2.41 and 2.52 for **design interpretation**.
- Refer to the section beginning on page 3.2 for **design guidelines**.
- Refer to page 3.23 to view base and accent **color palettes**.
- Refer to pages 3.41 - 3.46 to view the **plant palettes** for each softscape treatment type.
- Refer to the section beginning on page 4.14 for the **description of funding and costs.**
- Refer to the section beginning on page 4.16 for **project priorities**.

EXECUTIVE SUMMARY

This plan establishes the vision for the landscape and aesthetics of the US 395, West US 50, SR 28, SR 207, and SR 431 corridor. The vision synthesizes historic, current, and future conditions into a comprehensive guide to improve the visual appearance of the highway corridors through communities, rural landscapes, and scenic environments.

The first chapter of this report provides an introduction to the NDOT Landscape and Aesthetics program. It describes the mechanism by which corridor design will be managed, a description of programs and elements that influence highway aesthetics, and a summary of background information gathered and analyzed.

Chapter Two describes the process through which sections of the highway were categorized into highway zones and divided into distinct landscape design segments: Great Basin Forest, Capital Crossroads, Lake of the Sky, and Edge of the Sierra. A description of the theme and design objectives presents examples of the appropriate design aesthetic for each segment. Additionally, maps and sections of the landscape design segments provide detail regarding the location of specific projects and the desired level of aesthetic treatment.

Chapter Three begins by outlining an approach to the design process. This process highlights the necessity of integrating landscape and aesthetics at the beginning of every project. Design guidelines are also included in the third chapter to provide the framework for improving the aesthetics of existing, new, and retrofit highway projects. They are written statements of recommended methods to meet the segment's design objectives. The guidelines, accompanied by concept diagrams, sketches, or photographs, demonstrate ways in which to achieve the design intent.

Chapter Four summarizes the cost implications associated with the improvements proposed by this Corridor Plan. Cost estimates are included for both preliminary project budgeting as well as ongoing project maintenance. These estimates will inform NDOT in the decision-making process, and help influence budget allocations for the landscape and aesthetics highway improvements.

The remaining chapters provide information that will help readers understand the technical information presented in the document.

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SECTION ONE: Introduction

THE VISION

Nevada has a renewed commitment to landscape and aesthetics for the state's highways. In 2002, the Nevada Department of Transportation (NDOT) adopted the Landscape and Aesthetics Master Plan, raising the bar for context-sensitive design.

> *"We envision a system of state highways that reflect the land and people of Nevada. We believe that Nevada should have highways that are aesthetically pleasing, as well as safe and cost effective. Therefore, no state highway is complete until landscape and aesthetics are considered and addressed."*
>
> Pattern and Palette of Place, 2002, p. 10-11

Today, it is the policy of the State of Nevada to consider landscape and aesthetics in conjunction with other design factors in all transportation projects. Furthermore, NDOT recognizes that successful projects result when local communities, the public, other permitting agencies, and the private sector participate in the planning, design, construction, and maintenance of transportation projects. Partnerships are imperative to ensure Nevada's highway system expresses the unique heritage, culture, and environment of the state and its communities.

Purpose of the Corridor Plan

Based on the vision and recommendations of the Master Plan, the US 395, West US 50, SR 28, SR 207, and SR 431 Landscape and Aesthetics Corridor Plan (Corridor Plan) is one of three plans to address Nevada's western highways (Figure 1). This Corridor Plan establishes the vision for landscape and aesthetics for each highway, synthesizing historic, current, and future conditions to improve the visual appearance of each corridor. The Corridor Plan describes the vision, not the promise, for highway landscape and aesthetic treatments and enhancements. Implementation of the vision will be achieved through the combined efforts of local governments, private citizens, civic groups, and the business community.

As shown in Figure 2, the study area for this Corridor Plan includes US 395 from Topaz Lake to the California state line near Border Town, US 50 from Stateline to the Six Mile Canyon Road intersection east of Dayton, and State Routes 28, 207, and 431 around Lake Tahoe. Lake Tahoe is renowned for its scenic beauty and numerous recreation destinations. As a whole, the corridor is one of the most visually stunning settings in Nevada.

The Corridor Plan identifies major design themes and materials to be used in landscape and aesthetic treatments. It also recommends the level of treatment to be applied to highway features in the corridor, providing a broad cost estimate of treatments, and outlining strategies for funding of construction and long-term maintenance.

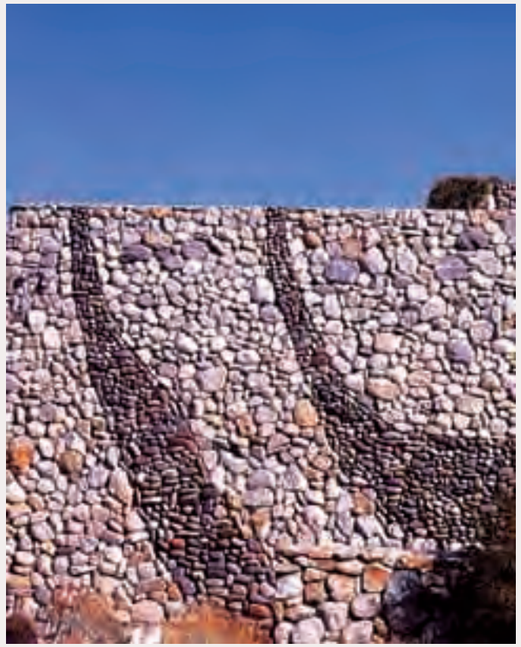
The Corridor Plan is a method for improving the aesthetic qualities of the state's highways, particularly in relation to adjacent cities, communities, and neighborhoods. The Corridor Plan is intended to affect both existing highways as well as future expansion projects. Landscape and aesthetic treatments identified and prioritized in the Corridor Plan may be funded from a variety of sources. As a general rule, up to 3% of total highway construction costs on all new construction and capacity improvements may be allocated to landscape and aesthetic treatments. Funding for the retrofit of landscape and aesthetic improvements to existing highways is based on community partnerships and the opportunity for communities to match State funds with a share of local money, Federal monies, or in-kind contributions. The Corridor Plan is a public/private partnership initiative. This unique initiative is guided by the partnership policy outlined in the NDOT Landscape and Aesthetics Master Plan, which states:

> *"Local communities, the public, other permitting agencies, and the private sector are encouraged to be involved in planning, design, construction, and maintenance of transportation projects to express the unique heritage, culture and environment of the state and its communities."*
>
> Pattern and Palette of Place, 2002, p. 12

Furthermore, NDOT will work with local governments, private citizens, civic groups, and the business community to develop cooperative agreements for funding the design, construction, and maintenance of landscape and aesthetic improvements identified in this Corridor Plan. In locations where recommendations exceed NDOT's normal financial responsibility and the community desires an elevated level of aesthetic treatment, NDOT will engage the community to create partnerships to find additional funding.

Figure 1 *- Corridors for Nevada's Western Highways*

Figure 2 *- Study area for this Corridor Plan (US 395, West US 50, SR 28, SR 207, and SR 431 corridor).*



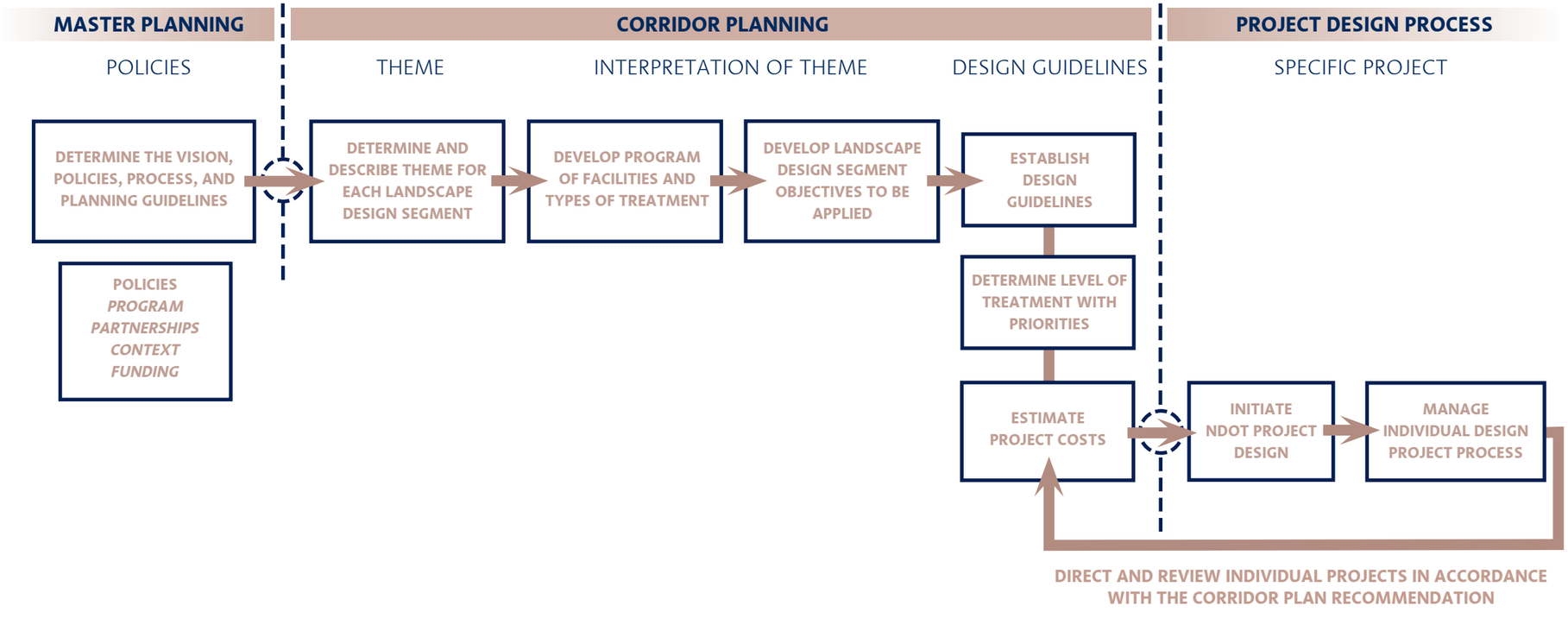
(1) *The Corridor Plan guides the development of project specific design through established design objectives and design guidelines.*

CORRIDOR DESIGN MANAGEMENT

This plan is a useful management tool for designing highway projects because it provides specific recommendations, programs, and a description of the intended result.

The Corridor Plan establishes a theme or central design idea. Projects within each landscape design segment are guided by a theme, associated design objectives, examples that illustrate interpretation of the theme, and a program of facilities with common definitions. Design guidelines, estimated costs, and project priorities establish the viability of the final Corridor Plan. NDOT will use the Corridor Plan, as one of the tools, to manage the design of highway projects. And, prior to designing specific highway projects, NDOT and the design consultant should review the Corridor Plan in order to understand how the project level design fits within a particular landscape design segment. Implementation of the designated treatment levels may depend on partnerships and funding opportunities. Overall, the vision and intent of the themes and treatment levels should be considered as the guide throughout the design process. Figure 3, below, outlines the steps that are necessary in order to achieve a desired outcome for this corridor.

Figure 3 *– Corridor Design Management*



PUBLIC PARTICIPATION

Early and continuous public involvement has been critical to the success of the Landscape and Aesthetics Corridor Plan. For this reason, NDOT fostered extensive public dialogue at every stage of planning and development, engaging communities to develop local support.

The public participation process provided stakeholders with a forum for sharing knowledge of their communities, identifying opportunities for enhancing the landscape and aesthetics of the corridor, creating design objectives and guidelines for highways in their area, and prioritizing prospective projects.

The public participation process ensured:

1. Identification of issues and concerns of each community.
2. A method, strategy, and action plan to address community concerns.
3. Opportunities for the public to express their level of support for the Corridor Plan.
4. Release of full information about the Corridor Plan through public meetings, the Corridor Plan web site, and fact sheets.

The public process involved a multi-layered approach to encourage maximum participation.

- A Technical Review Committee (TRC), composed of a broad range of stakeholders, contributed significant local agency and community knowledge.
- The public was able to identify issues, help establish priorities, ask questions, and provide input at two public meetings.
- A fact sheet was widely distributed to provide general information about the corridor plan.
- The public visited a corridor planning Web Site to learn more about corridor planning activities.
- Individual stakeholder meetings were conducted to ensure that all those who needed to be involved were involved.
- A media relations strategy was developed to encourage even greater participation.

Public participation and community involvement are important components of the planning process because they have helped to ensure that the recommendations outlined in this Corridor Plan reflect the ideas and suggestions of local community members.

(1) *From the inception of the corridor planning process a Technical Review Committee helped to identify issues and opportunities, shape design objectives and guidelines, and establish priorities based on local knowledge.*

(2) *Public workshops were held to inform and gather input from stakeholders and community members.*

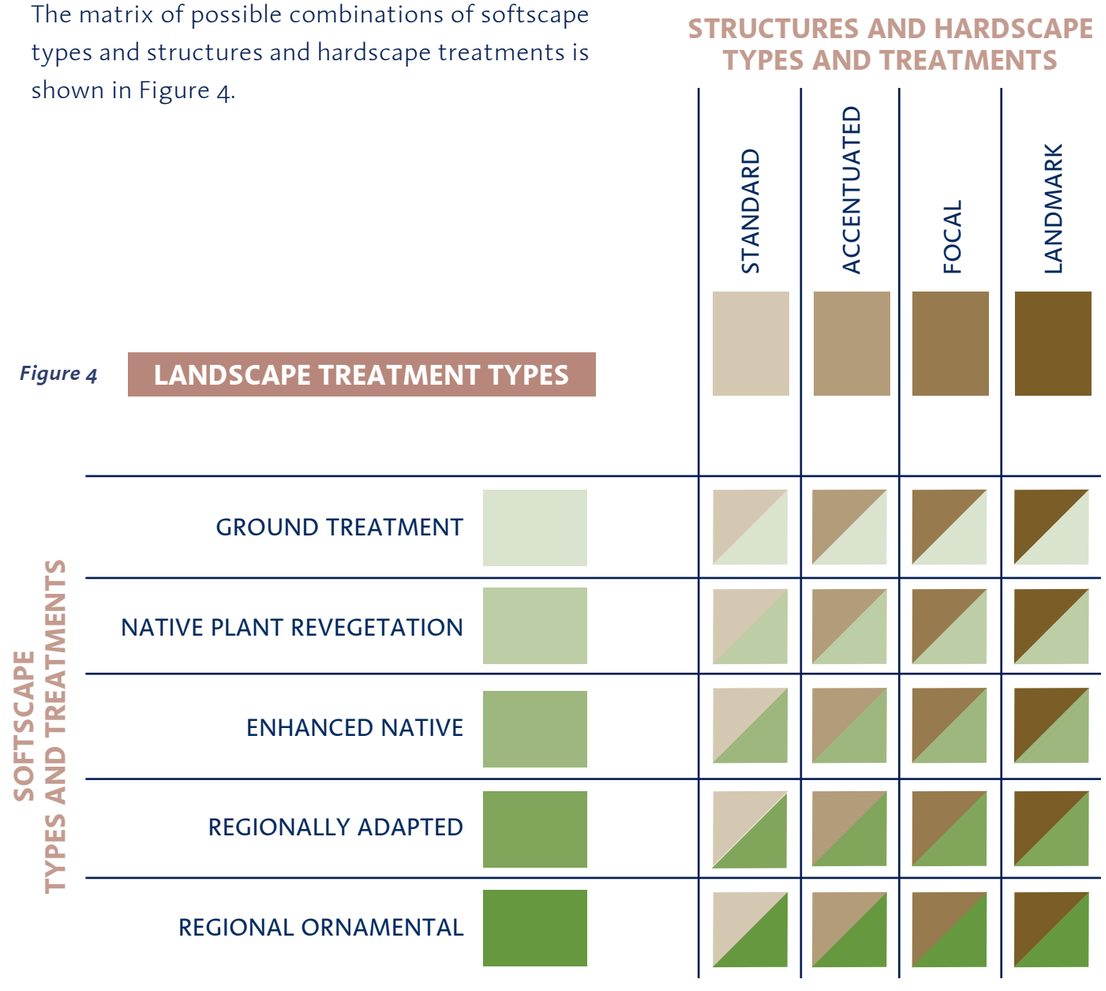
SECTION TWO: Elements of Landscape and Aesthetics

The Elements of Landscape and Aesthetics provide the framework to define the purpose and intent of highway corridor improvements. These elements, described on the following pages, include varying intensities of softscape and hardscape, statewide signage, rest area facilities, native wildflower program, outdoor advertising concepts, scenic byways, anti-litter campaign, and a Main Street Approach. NDOT currently incorporates some of these elements, however, many others are redefined. In some cases, new facility types are established.

LANDSCAPE TREATMENT TYPES

A landscape treatment type includes softscape type and a structures and hardscape type. Every section of NDOT rights-of-way has an associated landscape treatment type to define its design character and maintenance requirements. Softscape treatments vary from a simple ground treatment to more elaborate ornamental plant material. Similarly, structures and hardscape treatments range from standard category to landmark quality. Used in combination, these treatment levels establish the design character within the corridor. The matrix of possible combinations of softscape types and structures and hardscape treatments is shown in Figure 4.

Figure 4 **LANDSCAPE TREATMENT TYPES**



Softscape Types and Treatments

Softscape types and treatments are compositions of plant materials including trees, shrubs, perennials, grasses, and ground treatments. The following descriptions and photographic examples define the specific softscape types that may be utilized in sections of the corridor. Although the treatments require varying levels of irrigation, an overall emphasis has been placed on water conservation. NDOT requires cooperative long-term maintenance agreements with local stakeholders for irrigated landscapes. Plant lists and guidelines are listed in the design guidelines, beginning on page 3.39.

Ground Treatment

Ground treatment along the roadway provides erosion and dust control. This treatment includes uniform applications of rock mulch or variable sizes of stone, combined with textures that match the existing environment. Soil stabilizer may be used in conjunction with these methods. In rural areas, palettes are derived from natural patterns found in playas, foothills, or ephemeral drainages. In urban environments, various forms of aesthetic rock treatment are used to create patterns and textures. Irrigation is not included in this treatment.

Total Cost $1.20 - $1.40/sf L&A Cost: $0.00/sf




Native Plant Revegetation Landscape

A palette of native Great Basin or Sierra Nevada plant materials, including sagebrush and manzanita, should be used to reestablish disturbed areas along the roadway. Primary importance is focused on cultivating native communities such as sagebrush or manzanita. Seedings should be interspersed with mature plantings to establish a plant community character. Plantings should be sparse like natural patterns, and require only temporary irrigation to assure plant establishment. Enriching the soil with mulch and other amendments is required, and preparation techniques include roughening grade for seed siting and amending the soils with mulch and topsoil.

Total Cost: $1.20 - $1.40/sf L&A Cost: $0.00/sf




Note: These photographs are illustrative examples of the softscape types and treatments.

Enhanced Native Landscape

This treatment introduces a greater diversity of plant materials from the Great Basin and Sierra Nevada plant palette. Plants are organized in greater densities, and trees are used to increase vertical diversity. Special ground treatments for drainage and erosion control are included. Drip irrigation is required to assure plant survival.

Total Cost: $1.50 - $1.70/sf L&A Cost: $0.30 - $0.50/sf

Regionally Adapted Landscape

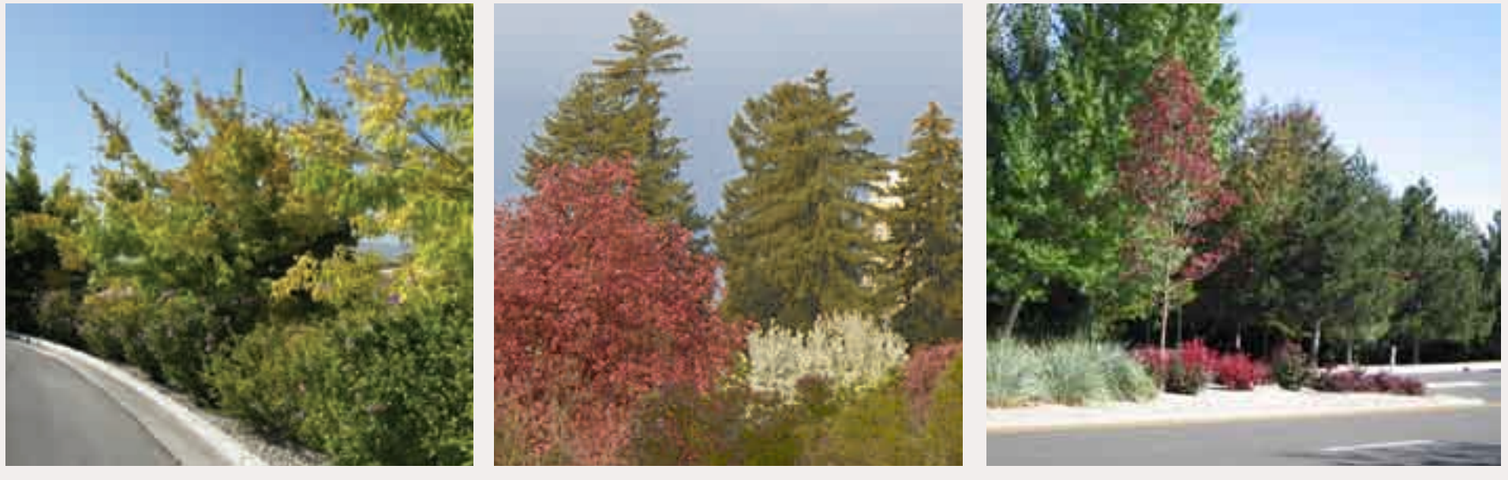
Combinations of Great Basin and Sierra Nevada plants and those from other dry land environments form this landscape palette. A greater density and variety of plant materials are combined to create a layering effect. Trees provide a distinct overstory, while shrubs and perennials form a thick understory. Plants are selected for color, texture, seasonal change, and form. For this landscape type to survive, drip irrigation to individual plants is required.

Total Cost: $2.40 - $2.90/sf L&A Cost: $1.20 - $1.70/sf

Regional Ornamental Landscape

Regional ornamental landscape includes a diversity of plant species, some of which are imported to this region. Ornamental landscape introduces taller and denser plant materials. The regional ornamental landscape includes shade, varieties of form, and color. It provides a dynamic contrast to the arid landscapes of naturally-occurring plant species. In the regional ornamental landscape, vegetation patterns and compositions are designed to reflect aesthetic and cultural qualities. Zoned drip irrigation systems are required.

Total Cost: $3.70 - $6.50/sf L&A Cost: $2.50 - $5.30/sf



Note: These photographs are illustrative examples of the softscape types and treatments.

Structures and Hardscape Types and Treatment

The following classifications define the common language of highway facility design. Bridges, retaining walls, noise walls, pedestrian crossings, pedestrian fencing, railings, barrier railings, lighting, and transportation art are included in these classifications.

Standard Structures and Hardscape

Standard treatment is simple and functional. Color and proportional adjustments improve aesthetic quality. Standard structure design is economical and satisfies vehicle movement requirements. However, it does little to establish design character or place-making. NDOT standards for surface treatment and lighting include painted finishes, fractured fin formliners, and overhead poles with cobra head illumination or high mast area lighting. Regular trash and graffiti removal maintenance programs are necessary.

Total Cost: $115- $120/sf L&A Cost: $0/sf



Accentuated Structures and Hardscape

Corridor pattern design is defined by a unified system of materials and textures. Adding accents and special finishes to built structures facilitates and enhances place-making. These elements can include transportation art and the application of high quality finishes and color to highway structures. Drainage details and water harvesting techniques can be enhanced through the use of decorative rock and contour grading.

Total Cost: $132- $142/sf L&A Cost: $17 - $27/lf




Note: These photographs are illustrative examples of the structures and hardscape types and treatments.

Focal Structures and Hardscape

Focal structures and hardscape treatments facilitate the expression of a specific design character. Structures consist of self-weathering materials, integrated color or textural finishes, and may include detailed formliners on structural surfaces. Patterns consist of a motif-based multi-surface design. Barrier rails utilize custom construction and include designs that are artistically incorporated into the structure, ultimately elevating an engineered form to a work of art. Upgraded lighting elements combine form and function to include lower height standards and decorative elements.

Total Cost: $180- $195/sf L&A Cost: $35 - $80/sf



Landmark Structures and Hardscape

Landmark treatments give attention to unique elements. Extensive design treatments are used on bridge structures, retaining walls, acoustic walls, barrier rails, and pedestrian crossings. Unique form liner treatments on structural surfaces denote the special importance of the place. Subject and composition, combined with placement, denote the importance of transportation art. Elaborate lighting provides special nighttime effects.

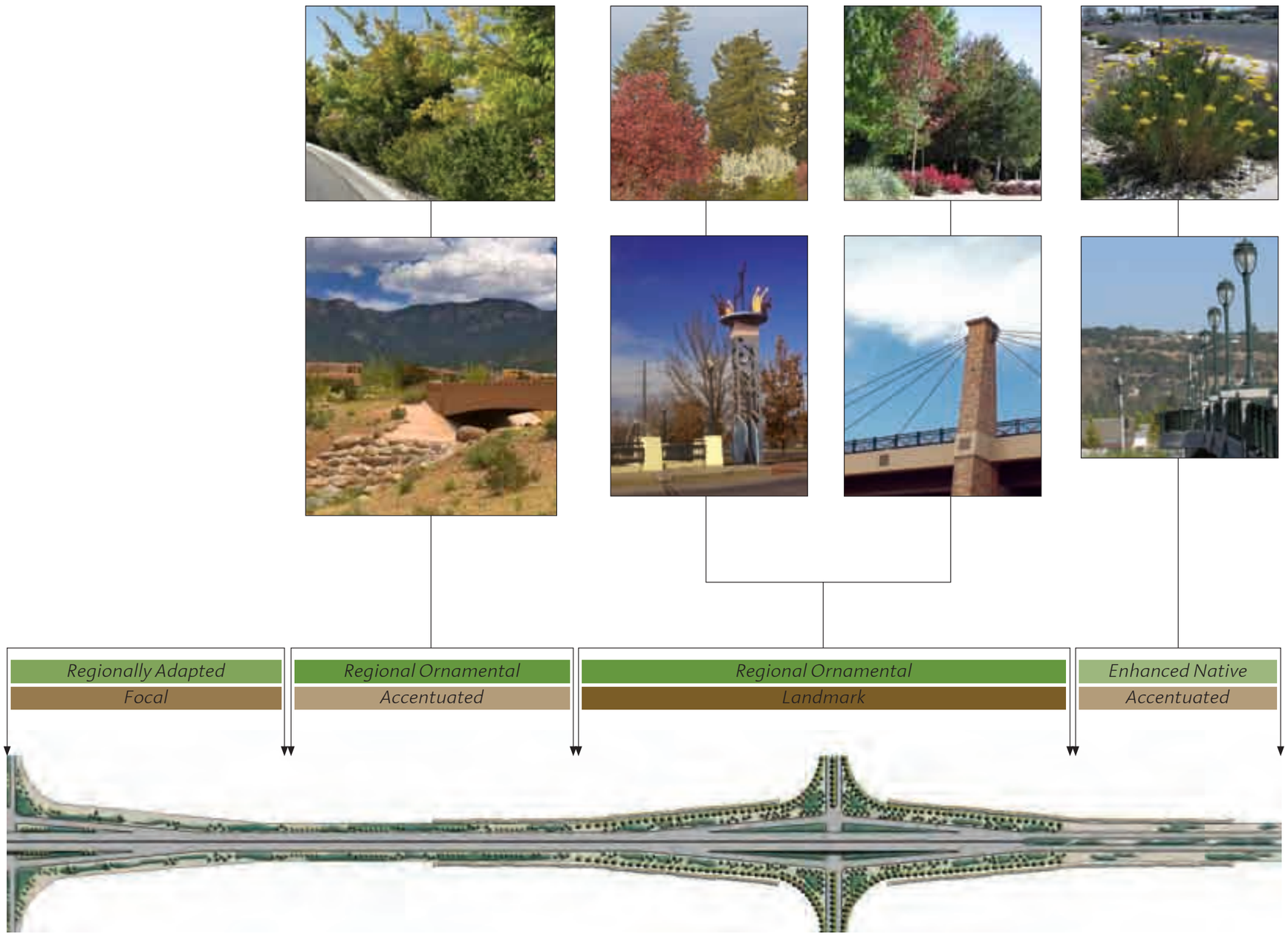
Total Cost: $225- $270/sf L&A Cost: $110 - $155/sf




Note: These photographs are illustrative examples of the structures and hardscape types and treatments.

The following figure illustrates how varying degrees of softscape treatments and structures and hardscape treatments may be appropriately applied over a section of the corridor.

Figure 5 – *Application of Landscape Treatment Types*


Regionally Adapted
Focal
Regional Ornamental
Accentuated
Regional Ornamental
Landmark
Enhanced Native
Accentuated

(1) *Nevada has a variety of special resources of interest to visitors. Interpretation of these features can enhance the appreciation and understanding of the area.*

(2) *Iconic signage clearly directs travelers to unique resources and destinations, such as historic features and ghost towns.*

(3) *The place name sign program may be coordinated with local interpretive efforts and audio programs to increase effectiveness.*

STATEWIDE PLACE NAME SIGN PROGRAM

A statewide place name and point-of-interest sign program better connects people to places.

Benefits of the Program

The state of Nevada is a large geographic area with diverse and oft-hidden features. The sign program will provide clear and consistent direction from the corridors to scenic areas, points-of-interest, historical sites, and local public attractions. Signs will welcome visitors and inform residents. In addition to stimulating local economies, signage will draw attention to these important assets, reaffirming the rich history and physical attributes of the state. The sign program will encourage visitors and residents to better understand the history, culture, and geology of the state.

How the Program Will Work

Utilizing the current Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) as a guide, a family of iconic symbols specific to Nevada will be designed for use on standardized directional and identification signs (see illus. 1 on following page).To ensure uniformity and consistency, the state will implement a policy manual for the signs, referred to as the Nevada Place Name Sign Manual. Program promotion will occur via informational brochures available at welcome centers, specific identification on state maps, and locally-based advertisements. Recognizable icons will demarcate points of interest and directional symbols. FHWA approval for the Statewide Place Name Sign Program is mandatory prior to installation. The program will work in conjunction with "Watchable Wildlife," an organization that utilizes signage and guide books to facilitate wildlife viewing areas. Watchable Wildlife, an existing, separately run program addresses signage for wildlife viewing.

An audio and multimedia interpretative program will be developed with the sign program. This program will provide signage and audio interpretation of Nevada's history and natural features to travelers. In order to ensure the success of the program and reduce the confusion created by multiple programs, it will coordinate with interpretive programs that groups, such as Nevada Silver Trails, are currently completing.

Eligibility

Under a state managed and controlled program, NDOT will establish and approve an initial inventory of categories common to the state, including features specific to each highway corridor. Iconic imagery will be created to represent the general categories. After the initial inventory is confirmed, state and local entities can apply for inclusion based on specific criteria.

Anticipated Categories

Categories for sign icons common to the state of Nevada could include, but are not limited to:

- Nevada historic points/landmarks including cultural resources
- Native American resources
- Mountains
- Rivers
- Sand dunes
- Mining
- Railroads
- Historic downtowns
- Ghost towns
- Emigrant trails
- Wildlife viewing areas

The Design Guidelines, page 3.21, list potential interpretive features and guidelines for icon development.

Associated Cost

The sign program is expected to directly benefit smaller communities and local attractions. Increased tax revenues will give the state a tangible return on its investment. Business partnerships through sponsorships are possible, provided there are partial cost offsets.

Signs Included in the Program

Exit to Area of Interest or Town

This primary sign type is used only on interstates and is included here for informational purposes only. It will be used as an informational listing, located in advance of interstate exits. It will include symbols and descriptions as well as the interstate exit number.

Signs will be post-mounted and use reflective graphics/lettering on a metal panel in accordance with applicable FHWA safety standards. A maximum of four symbols will be used on each sign – one per panel. Concise written descriptions are required to accompany iconic symbols.

Directional Sign on State or County Road

Used primarily along the highway corridors, this secondary sign type provides information for features located on state or county roads and intersections. It will incorporate symbols and a directional arrow (see illus. 2 on following page).

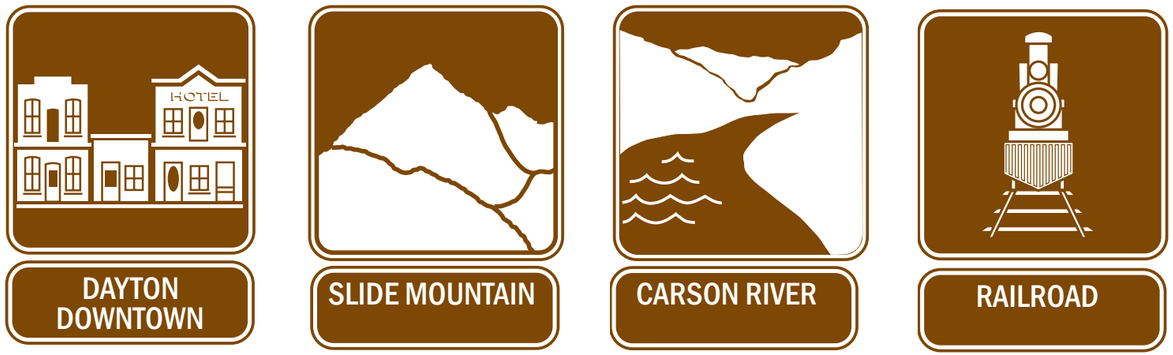
Signs will be post-mounted and use reflective graphics/lettering on a metal panel in accordance with applicable FHWA safety standards. A maximum of four symbols will be used on each sign.

Written descriptions are required to accompany iconic symbols.

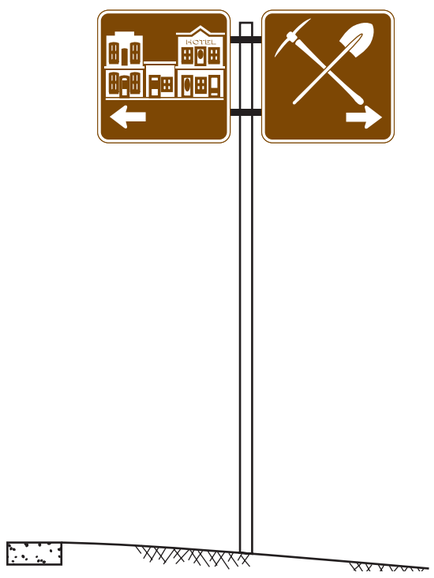
Scenic Overlook or Viewpoint

This sign type will be located prior to pull-offs, including symbols and descriptions as well as the distance to the pull-off (see illus. 3).

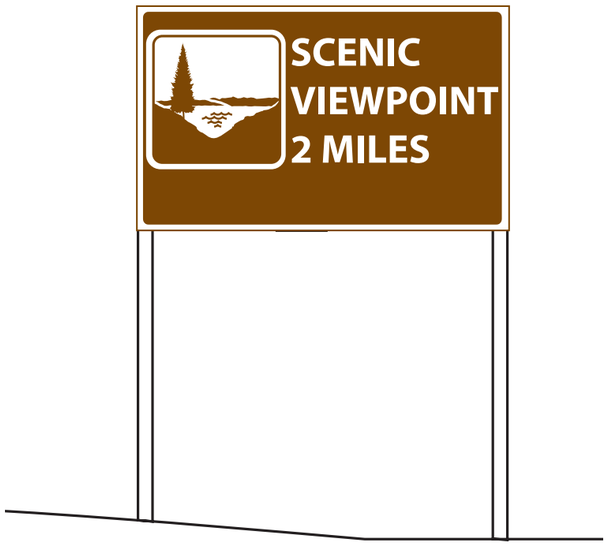
Signs will be post-mounted and use reflective graphics/lettering on a metal panel in accordance with applicable FHWA safety standards. A maximum of two symbols will be used on each sign. Concise written descriptions are required to accompany iconic symbols.



(1) *The Statewide Place Name Sign Program uses a family of iconic symbols specific to Nevada to identify features such as railroads, historic buildings, and geographical points of interest.*



(2) *Directional signs on State or County roads use a family of iconic symbols along with a directional arrow. This type of sign uses a maximum of four symbols.*



(3) *Signs for a scenic overlook or viewpoint use a maximum of two symbols along with the distance to the pull-off.*

ROAD SERVICES PROGRAM

Road services are an important component of any roadway corridor experience. They are even more critical in areas of Nevada where long distances separate developed areas. A complete description of road service facilities and their program components is provided in the Design Guidelines, pages 3.17. These service areas provide travelers with designated spaces to rest, opportunities to interpret history and geography, and discover information about nearby activities and communities.

Two road service facilities of specific importance within the corridor include activity pull-offs and community rest areas. Activity pull-offs provide access to activities adjacent to the highway, and are located in areas where motorists commonly pull over to watch or participate in roadside activities. Activity pull-offs within the Lake Tahoe Basin require particularly innovative design solutions that address complex constraints of narrow rights-of-way, steep terrain, and other TRPA related issues. Agencies within the basin, such as TRPA, may be able to use ideas and concepts from the Corridor Plan to effectively address recreational impacts in the area.

Community rest areas are integrated within the town structure to serve residents and visitors. Community rest areas function like a pocket park or town square, providing a central location for visitors to learn more about local tourism opportunities, piquing their desire to further explore the community. Central locations or areas connected to community centers provide appropriate sites. Partnerships with towns, counties, or other organizations are required to site the facilities outside of the right-of-way.

(4) *Viewpoints provide organized facilities for observing scenic vistas and points of interest.*

(5) *Community rest areas welcome travelers and invite visitors to explore the area. Facilities may be coordinated with existing infrastructure and business locations.*

(1) *The use of naturally-occurring forbs and grasses as part of the Native Wildflower Program emphasizes the area's natural beauty while reducing maintenance requirements, herbicide use, erosion potential, and roadside fire hazard.*

(2) *Outdoor advertising blocks scenic views and reduces the visual quality of the landscape.*

NATIVE WILDFLOWER PROGRAM

Inspired by the notion that native plant species along rights-of-way can enhance the beauty of the land, the FHWA has adopted two programs to promote the use of naturally-occurring forbs and grasses in a particular region, state, or ecosystem. The Surface Transportation and Uniform Relocation Assistance Act (STURAA) of 1987 requires that at least one-quarter of 1% of funds expended for any Federal-aid highway system landscape project be utilized for native wildflower plantings. The second, voluntary program, "Operation Wildflower", promotes the use of native wildflowers through a cooperative relationship between the National Council of State Garden Clubs and State highway agencies.

In addition, the FHWA recognizes that native forbs and grasses can also provide:

- Reduced maintenance requirements for established native plants in comparison with non-native species.
- Reduced roadside fire hazards.
- Reduced use of herbicides when native plants are successfully established.
- Improved erosion control through drought-tolerant species
- Improved relationship between the highway corridor and the regional character of the landscape.

The University of Nevada's revegetation report supports the use of forbs and grasses in highway rights-of-way. Forbs and grasses that are appropriate to specific regions and ecosystems require "little or no maintenance... (and) create defensible space for wildfire along the highway corridors" (Tueller, Post, and Noonan, 2002). As part of the wildflower program, plants that do not create a fire hazard or overly attract wildlife should be utilized.

INVASIVE AND NOXIOUS WEED CONTROL

Invasive species can have devastating effects on a landscape's economic and environmental quality. Invasive species decrease diversity and can outcompete native species. The Nevada State Department of Agriculture maintains a list of noxious weeds that should be contained through a revegetation program along the corridor. The list can be referenced at the following site www.agri.nv.gov/PLANT_NoxWeeds_index.htm.

"Nevada's Coordinated Invasive Weed Strategy", produced by the University of Nevada, also identifies additional species that have the potential to negatively impact Nevada's environmental quality. NDOT's continued coordination with the Nevada Weed Action Committee provides an organized effort for invasive and noxious weed control.

Due to the frequency of invasive weeds along the corridor, control measures are necessary for any new landscape design project. Adhering to best management practices for successful revegetation is a suggested control method. Additional suggested procedures include:

- Tailoring revegetation procedures to specific plant community types.
- Making recommendations for site and soil preparation.
- Including site appropriate revegetative practices.
- Providing for adequate weed maintenance to allow for revegetation establishment.

OUTDOOR ADVERTISING

Outdoor advertising, specifically with billboards, provides businesses, community groups and other organizations the opportunity to inform travelers of various establishments and available services. Billboards can, however, impact the highway's visual quality by obstructing views of scenic features and the natural landscape. As a result, community groups are committed to restricting new signage, and removing existing billboards from areas adjacent to and within their communities.

The Highway Beautification Act

The intent of the Highway Beautification Act (HBA) of 1965 was to control billboard construction along Federal-aid highways and provide methods for removal of billboards that do not conform to state and local ordinances. The law, under Section C, defines effective control of billboards as limiting signage that is visible and intended to be read from the roadway to only include informational and directional signs pertaining to distinctive natural, scenic, or historic attractions; on-site real estate signs; on-site business signs; landmark signs associated with historic, natural, or artistic purposes; and "free coffee" signs promoted by non-profit organizations.

Limitations

In the 40 years since the passage of the HBA, few non-conforming billboards have been removed and many more have been constructed due to exclusions in the law. Enforcement is difficult because Section G of the law requires cities and counties to pay just compensation to owners for billboard removal. Although the federal government is required to contribute 75% of the compensation, many communities do not have the

funds to pay the 25% requirement, and their ability to use local land use controls to restrict construction was removed. Additionally, the federal government has stopped providing money for billboard removal (Brinton, 2001).

A second limitation within the HBA is the allowance for billboards to be constructed in areas zoned commercial and industrial, as well as in unzoned areas with commercial or industrial uses. The provision also acknowledges that the State has authority over the zoning laws. This entitlement allows the State to implement zoning regulations that effectively increase the difficulty of controlling billboards. Communities may specifically zone an area along the highway as commercial, or the outdoor advertising structure may be built on a parcel that has an obscure commercial use.

The third provision allows designated scenic byways to be segmented and excluded from federal control. An amendment to the HBA, passed by Congress with the 1995 National Highway System Designation Act, allows states to exclude portions of a scenic byway that conflict with the state's standards for denoting scenic byways and utilize only local restrictions for billboard control. As a result, areas of lower scenic quality become more unattractive and reduce the overall scenic character of the byway.

Nevada Statutes

Removing billboards in Nevada became more difficult in 2001 due to the Nevada Revised Statute (NRS) 278.0215. The regulation prohibits the use of amortization – a method used by many states – for sign removal. Rather than utilizing the traditional cost approach, it defines the methodology for determining "just compensation" to include property uniqueness as well as income generation from the sign. This cost-prohibitive revision renders sign removal almost impossible.

Although control of outdoor advertising seems daunting, there are regulations that provide restrictions to billboard construction. NRS 405.050 allows counties to deny permits for billboards that may "measurably destroy the natural beauty of the scenery or obscure a view of the road ahead." Additionally, the statutes give the NDOT Director the authority to remove any sign that is a traffic hazard.

The Role of Local Government

Cities and counties have the ability to regulate the location, and to a limited degree, the type of billboard erected within their jurisdiction. Although a state must prove their jurisdictional rights to control outdoor advertising on Indian Reservation lands and have a written statement from the State Attorney General, local governments may coordinate with the Bureau of Indian Affairs to determine a course of action to limit the negative visual impacts of billboards. Design standards that address height, size, color, spacing/frequency, and context are a valuable method for directing outdoor advertising. For example, signs can be relocated if they block visual resources. Material choices and architectural detail can be improved to reduce the visual distinction between the sign and the surrounding environment. Communities can regulate the location of billboards to reduce the scenic impact of billboards and improve visual quality along the state's highways. Important viewsheds and scenic corridors may be designated within the county, and land use regulations can be developed that discourage or prohibit outdoor advertising.

(1) *Methods for controlling outdoor advertising include signage ordinances that restrict the height, size, and location of billboards. The Director of NDOT has the ability to request the removal of any billboard that poses a safety hazard.*

(2) *Outdoor advertising can be framed by natural materials and landscaping and built into the ground in order to limit scenic distractions.*

(3) *Billboards should consider proximity to road, distance between one to the next, distance from the ground, and overall size in order to lessen negative visual impacts.*

(4) *Outdoor advertising should compliment the adjacent environment while informing travelers of services to come.*

(1) *The Lake Tahoe Basin includes several scenic byways. Additional design guidelines using heightened treatment levels have been developed to protect and enhance the area's high visual quality and significance to state tourism.*

(2) *The visual quality of Carson Valley and Washoe Lake could be preserved through the use of a scenic byway designation. Roadway scenic quality can also be regulated with scenic or conservation easements and partnerships between local, state, and federal agencies.*

NEVADA SCENIC BYWAYS DESIGNATION

Nevada's Scenic Byways program was established in 1983. Since then, twenty-one scenic byways have been designated. Three prominent byways are located within the Tahoe Basin and are included in the corridor study: US 50, SR 28, and SR 431 (see Figure 6 on following page). Brochures and information on the roadways are available through the Nevada Commission on Tourism. In addition to the benefits provided by the designation, the roadways are also subject to design standards established by local governing agencies. The Tahoe Regional Planning Agency (TRPA) and Washoe County have drafted roadway design guidelines that will be reflected in the final Corridor Plan.

According to the FHWA, designating a roadway as scenic has several benefits. These benefits include preservation, promotion, pride, partnership, and specifically, the protection of scenic and roadside vistas, and historic buildings. In addition, the Highway Beautification Act of 1965 prohibits the erection of new billboards along designated scenic byways that are inter-state, a part of the National Highway System, or federally-aided primary roads. The National Highway Designation Act of 1995 amends the law to allow segmentation of portions of the byway, particularly if sections of the roadway fail to meet the scenic byway criteria. The segments in question are then controlled by local regulations only, allowing new billboards to be erected, subject to existing state or local controls. Roadway scenic quality can also be regulated with scenic or conservation easements. These easements preserve landscape character and provide the participating entity with a one-time tax deduction equal to the foregone value of the use of the land.

The Nevada Commission on Tourism and the FHWA are responsible for promoting scenic byways. To facilitate an integrated system, tourism-related facilities such as visitor centers, rest areas, and the Place Name Sign Program should maintain coordinated informational materials. Scenic designation increases local awareness about the roadway, attracting volunteers who want to help craft the story of the byway and share in making it a vital component of the community.

Opportunities for Partnerships

Scenic designation can promote and expand public and private partnership opportunities. For example, America's Byways Resource Center provides technical assistance and, together with the FHWA, can provide seminars and workshops to further facilitate the partnering process.

The scenic roadway plan consists of federal, state, and local programs that provide assistance in achieving scenic designation in Nevada.

- The federal BLM Back Country Byways and US Forest Service Scenic Byways plans focus on infrequently traveled paved, unpaved and four-wheel drive roads that access back country or wilderness areas.
- The Nevada Scenic Byways program focuses on year-round accessible roadways. The program identifies, promotes, and protects the state's most exceptional roadways. These byways must provide access to recreational areas or historic sites.
- The Local Tourism Routes program encourages communities to promote special roadways and other modes of travel (like boat, balloon and train rides, bicycling or rafting trips) that are not included under any other programs.

Local groups and agencies nominate and manage scenic byways and local tourism routes. The designation "scenic byway" is reserved for routes approved by NDOT. The State Scenic Byways Committee (comprised of representatives of NDOT, the Nevada Commission on Tourism, the Nevada Division of State Parks, and the US Bureau of Land Management) reviews and suggests approval, however, it is the NDOT Director who makes the final designation. The Nevada Commission on Tourism is responsible for the Local Tourism Route program. It reviews and approves all promotional material to ensure that the "scenic byway" designation is not used for local tourist routes.

Levels of Designations Available

Two levels of scenic byway designation are available: basic and advanced. Byways of both classifications are placed on state tourism maps, in visitor information packages, and in other scenic byway promotional materials. The state prepares and distributes a brochure about the byway. Routes with an advanced designation are eligible for federal and state funds. Advanced designation requires a corridor management plan and a five year re-certification obligation.

Interstate highways have not been included in the state program primarily because encouraging travel on non-interstate routes increases the tourism economic base of rural communities.

Nevada Scenic Designation

The Director of NDOT may establish a "Scenic Designation" for any section of highway right-of-way. The Corridor Plan recommends this occur in areas of high scenic quality, specifically Kingsbury Grade (SR 207), Carson Valley, US 395 adjacent to Washoe Lake, and Jacks Valley Road, to limit the number of billboards and signage that obstructs view.

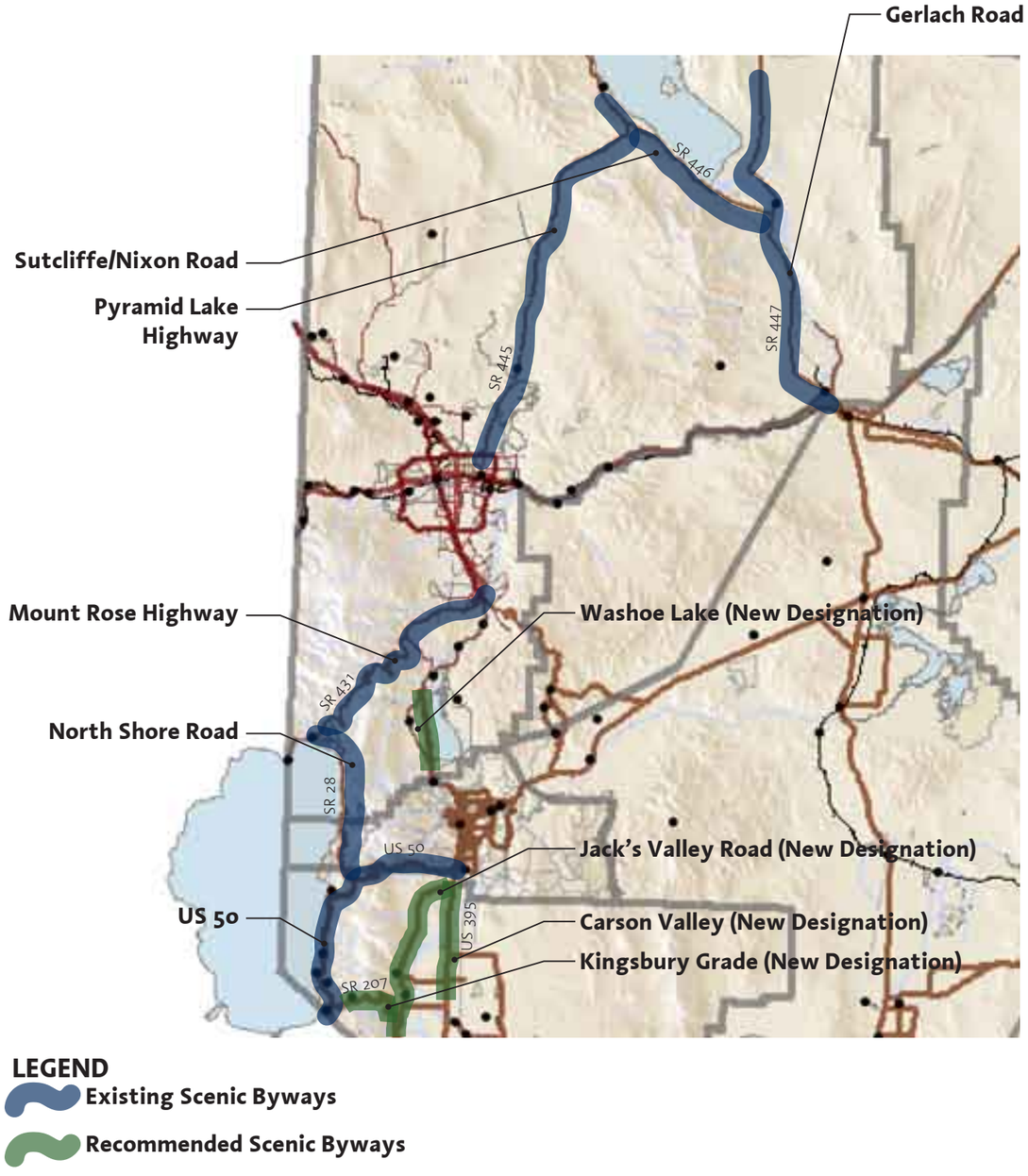


Figure 6 *- Existing and Recommended Nevada Scenic Byways in Northern Nevada*

(1) *Scenic byways should include a specific pictorial graphic that is related to the place, as part of the Statewide Place Name Sign Program.*

(2) *The Director of NDOT makes the final designations for Nevada scenic byways. Scenic byways receive stricter outdoor advertising controls than other highways, including the removal of billboards in some cases.*

(1) *The negative visual impact of litter along the highway significantly effects the motorist's experience. Removing and managing litter along the highways is an important topic of the Corridor Plan.*

(2) *The anti-littering campaign's promotional materials need to grab the attention of motorists and residents. An edgy and provocative campaign will keep the issue of litter very visible to travelers.*

ANTI-LITTERING CAMPAIGN AND SIGNAGE

Fast food containers, bottles, trash bags, and rusty kitchen appliances found alongside the road are distracting and imply general neglect and disregard for the environment. A statewide anti-littering campaign would represent a significant step towards maintaining and improving Nevada's highways. The campaign should be advertised in such a way as to command the attention of residents and travelers. Similar to the "Don't Mess with Texas" anti-littering campaign, this program could become a marketing showpiece for the state of Nevada. The program would be promoted through roadway signage, magazine advertisements, and bumper stickers.

Distribution of campaign materials would be focused at travel-oriented locations such as welcome centers, rest areas, and truck stops. Coupled with promotional materials, an "Adopt-A-Highway" or "Sponsor-A-Highway" program would engage residents of Nevada, encouraging active participation in maintaining clean and beautiful highways. This plan recommends implementing an anti-littering campaign using highly visible signage, easily distributed collateral materials, and an active volunteer clean-up program.

(3) *Highway graphics and signage posted along the highway where trash accumulation is the most significant will be part of the anti-trash program.*

(4, 5, 6) *Examples of anti-littering signage.*

MAIN STREET APPROACH

Vibrant main streets are a critical component of all communities. Rural communities are especially dependant upon vital commercial districts. Bisected and altered by the interstate highway system and suburban sprawl, main streets across America have declined both economically and physically, to a point where they are no longer viable community centers. Vacant buildings and declining businesses often line the highway. In some areas, revitalized commercial districts indicate continued community growth.

Main Street Approach, developed by the National Trust for Historic Preservation, assists in revitalizing the older, traditional business districts while simultaneously preserving the history and character of downtowns. The program combines "historic preservation with economic development to restore prosperity and vitality to downtowns and neighborhood business districts."

The Main Street Approach does not promote a "quick fix." It is a long-term, comprehensive strategy designed to meet local needs and opportunities. The strategy is based on a four-point approach that includes organization, promotion, design, and economic restructuring. It is a volunteer-based program that relies on community support. Volunteers form the governing board and standing committees, and a paid program manager coordinates and supports the operation.

The National Main Street Center, or the local coordinating agency, provides assistance in the form of technical services, networking, training, and information. The Center can provide direct fee-for-service technical assistance to cities and towns, both independently and in conjunction with state and citywide main street programs. Revitalization programs funded largely by local sources are more likely to succeed than those relying solely on state or federal funds. The Main Street Program offers educational sessions related to facilitating local support and generating public and private partnerships. Local involvement in, and coordination with, the program helps communities find solutions that work best for them.

The accomplishments of Main Street organizations are many: improving aesthetics and safety of downtown areas, restoring historic buildings, and revitalizing economic viability. The organization identifies potential economic niches, assists with promotional and fund-raising efforts, supports joint marketing efforts among local businesses, encourages and trains new business owners, and finds grants for facade, streetscape, and landscaping improvements. Reduced vacancy rates, and renovation and restoration in the downtown are a few examples of its results.

Physical improvements are quickly evident. Long-term economic improvements may take up to three years to accomplish. However, the program's impact on communities nationwide is indisputably positive and long-lasting. Communities have experienced net gains in new businesses and job generation, and a surge in local investment. Most importantly, community pride grows as personal involvement in the volunteer-driven program increases.

As an example of the success of this program, seven communities in rural Iowa participated in the program for ten years. On average, each town renovated 97 downtown buildings, gained 24 business starts, and saw $1.6 million in private sector reinvestment.

Anyone can start a Main Street Program in their community. The first step is to contact the statewide coordinating program for support, technical assistance, training, networking, and encouragement. Because Nevada does not currently have a coordinating program, contact should be made with the National Main Street Center in Washington D.C. A self-initiated program may be created without a state program. The National Main Street Center provides contacts to assist in networking with other independent programs and nearby state programs. Communities are welcome to utilize principles and tools from the Main Street Approach regardless of whether they qualify for the program or wish to follow it exactly. The program incorporates historic preservation with community revitalization. Communities like Goldfield, which was recently designated as a National Historic District, now qualify for more assistance through the program. Additional information can be obtained by visiting the Main Street Program's web site at **www.mainstreet.org**.

(1) *Main Street Approach uses street trees and other streetscape enhancements to improve the aesthetics and create a safe environment for pedestrians and motorists. Streetscape plantings, accentuated pedestrian crossings, lighting, and banners create a pedestrian friendly environment and invigorate commercial districts.*

(2) *The Main Street Approach is a long-term, comprehensive strategy designed to meet local needs and opportunities. It is a volunteer-based program that relies on community support.*

Total Increase in Population 2005 to 2026	
Carson City	22,030
Douglas County	15,956
Lyon County	41,0556
Storey County	1,923
Washoe County	189,404

(1) *Population projections per the Nevada State Demographer, 2006.*

Annual Population Estimate for 2005	
Carson City	57,104
Douglas County	50,108
Gardnerville	5,165
Minden	2,983
Lyon County	48,860
Storey County	4,012
Virginia City	938
Washoe County	396,844
Reno	206,735
Sparks	85,618

(2) *Population estimates per the Nevada State Demographer, 2005.*

(3) *The anticipated population growth of urban areas and rural areas such as Douglas County may encourage the continued expansion of residential suburban growth, business park development, and neighborhood commercial uses.*

SECTION THREE: Background Inventory

SOCIAL RESOURCES

Community Settlement Patterns and Growth

Urban Patterns

Northern Nevada's historic settlement is tied to travel and mining. The majority of communities throughout the region are located along the California emigrant trail or were established as a result of the Comstock Lode discovery. Historic downtowns, ranches, and railroads serve as reminders of pioneer days and the era of gold and silver discovery. Although glimpses of the past are still visible through the region's rich heritage, recent and rapid growth and development have left a much more noticeable mark on the landscape.

The corridor passes through a number of counties and cities that have recently experienced significant increases in population. New residents are drawn to Nevada by the high quality of life and the favorable economic conditions, including steady growth in employment opportunities. Service sector jobs, trade, construction, and manufacturing employ the greatest number of people and are experiencing the fastest rate of growth. In addition to these sectors, the Truckee Meadows 2002 Regional Plan outlines that the Greater Reno/Sparks region will encourage and support growth in diversified industries such as clean manufacturing, technology, recreation, eco-tourism, business, and healthcare services.

Trend forecasts indicate continued prosperity for the Reno/Sparks region. Economic diversification, favorable tax climate, and proximity to California have been, and will continue to be, important economic growth factors for the region.

Towns along the corridor range in population from as few as 5,907 people in the City of Dayton to approximately 206,735 in the City of Reno. Though their demographics may, these communities have settlement pattern similarities. In general, the towns and cities within the study area can be classified in one of three categories. Urban areas, such as Carson City and Reno, are host to the region's government and commercial centers. These cities serve as the population and service center for the northern Nevada region. Due to the recent growth in Carson City and the Reno/Sparks area, quiet agricultural communities such as Dayton, Minden and Gardnerville have transformed into rapidly growing bedroom communities. Over the ten year period between 1990 and 2000, Dayton experienced a 166% increase in its population. The final area is the Tahoe region with its dispersed communities and resort atmosphere. Unlike other cities in the corridor study, the greater Tahoe region is gradually experiencing a decrease in primary resident population and an increase in the second home population. In recent years trends indicate that northern Nevada is seeing an increase in second homeowners as people are leaving the area in search of a lower cost of living.

Land Ownership

The State of Nevada contains the highest percentage of federal lands among the contiguous 48 states, almost 83% (BLM, 2000). The Bureau of Land Management (BLM) owns the bulk of the federal lands with small and large in-holdings by other public agencies and private landowners. In northern Nevada, most land is managed by BLM, US Forest Service (USFS), Bureau of Indian Affairs (BIA), and private landowners. Within urban areas, most land is privately owned, with the exception of land within the Lake Tahoe Basin and the mountains visible from the highway, most of which are owned by the USFS. Land ownership patterns in the state have not changed significantly over the last several decades, and this stability in land ownership has provided a level of visual continuity within the state.

Land ownership affects land use and the visual character of the landscape. Public agencies such as BLM and USFS operate under a multiple-use mandate. To the casual observer, a vast majority of the state may appear vacant and wild, but a closer look reveals that much of Nevada is a working landscape. From the highway, evidence of grazing, mining, power generation, and tourism is found on the multiple-use federal lands. Although NDOT's jurisdictional influence over the landscape only extends to the edge of the right-of-way, agreements with other public agencies make it possible for NDOT to develop a common vision that will shape visual character and land use decisions for areas adjacent to the roadway as well.

Implications to the Corridor

The anticipated changes over the next twenty years most likely to influence the corridor include completion of major roadway facilities such as the Carson City Freeway and I-580, anticipated population growth in urban areas such as Carson City and Reno, and continued expansion of bedroom communities. In general, these changes will encourage residential suburban growth, business

park development, and neighborhood commercial uses. However, the changes may also result in excess road capacity along sections of highway that are bypassed. Reduced traffic pressure may eliminate the need for existing travel lanes and thereby allow for improvements such as multi-use trails and planted medians.

Travel and Tourism

Travel Patterns

Northern Nevada is home to many natural and historic treasures. The Nevada Commission on Tourism refers to the area incorporating Reno, Carson City, Dayton, Carson Valley, and Tahoe as the "Reno-Tahoe Territory." Characterized by both the scenic beauty of Lake Tahoe and the mining history which helped to shape Reno and Carson City, the territory offers numerous opportunities for tourism. A majority of tourists within the Reno-Tahoe Territory begin their trips in the Reno/Sparks area due to the presence of the International Airport.

Travel patterns typically include visiting downtown Reno, Lake Tahoe, and the historic mining town of Virginia City. Therefore, some of the region's most heavily traveled roads for tourism include US 395 north to I-80 and south from Reno to Carson City, SR 431 to Incline Village, US 50 from Carson City to Stateline, and SR 341 to Virginia City. Commuters regularly travel the highways from Carson Valley to Reno and Tahoe and from Dayton to the Carson/Reno area.

Overview of Existing Travel Facilities

Highways play an important role in connecting people to their surroundings. Visitor centers, view points, and community signage help travelers understand the natural and cultural features that render a place unique. State highways can improve their role in promoting and facilitating travel to key local, state, and national tourism destinations. For example, it is not easy for travelers to discern the fact that they are driving along a Pony Express route or through the oldest town in Nevada. Signage notifying drivers of upcoming viewpoints can be more consistent. Signs pointing to historic markers can be updated to provide proper direction to the marker, and the sign color can be modified to minimize the impacts of fading. Enhancements should make markers easier to notice and give the driver advance warning of turn-offs. Marker sites should be reviewed as the surrounding development changes in order to minimize signs in obscure and unattractive locations.

Travel and tourism facilities consist of rest areas and information centers. These facilities can provide both traveler services and information regarding historical, cultural, and environmental features in the region, as well as important information about tourist destinations. Only a few highway services (such as formal rest areas, truck stops, and/or pull-outs) accommodate highway travelers along the corridor. The existing facilities can be improved by taking full advantage of an area's unique features and incorporating an enhanced overall design and architectural consistency.

Opportunities to Enhance Travel Facilities

The rest area provided along US 395 near Holbrook Junction is an example of a facility that could incorporate the corridor's history, regional architectural styles, and environmental features. Throughout the corridor an opportunity exists to present a better image of the state through the design and placement of highway facilities that connect people to the places they are visiting.

Rest areas should be planned and designed in a consistent and comprehensive manner. In the vast rural areas of the highway, travelers can suffer from driving fatigue. Rest areas are an important safety element of highway corridors. One rest area located every hour is typical; however, important historical, cultural, and/or natural site features should also serve as criteria for determining specific rest area locations. Major site features to be considered in the location and design of rest areas include topography, views and vistas, vegetation patterns, cultural or historical features, water elements, geological features, wetlands, and other inherent site and environmental qualities. In addition, there is potential for rest areas and/or viewpoints to be located and designed as part of a larger trail or recreation system, such as a gateway to public lands, parks, and other tourist attractions in the region.

Community rest areas can be developed as part of a partnership with the town. These facilities provide services to travelers and encourage visitors to stop in a town, rather than on its outskirts, to rest.

Adequate rest area facilities should include restrooms, picnic area, pet exercise areas, paved parking, fresh drinking water, interpretive exhibits, and local area information. Viewpoints and points-of-interest within the Lake Tahoe Basin should be properly signed in order to allow travelers to locate safe pull-offs. Regional architecture, sensitive to the mountain and Great Basin environments, should be encouraged for all structures and facilities. In addition, where landscaping is implemented, attention to drought tolerant landscape treatments is not only sensible, but essential to the success of highway landscaping.


(1)


(2)


(3)


(4)

(1),(2),(3),(4) *Highways play an important role in connecting people to outdoor recreation opportunities such as skiing, boating, balloon races, and mountain biking.*

(5) *Rest areas should provide a comfortable separation from the highway. Siting should consider views and vistas, vegetation patterns, cultural or historical features, and other site and environmental qualities.*

(1) *The Carson River, visible along much of US 50 from Dayton through the Carson Valley, provides recreation opportunities and contributes to the scenic value of the corridor.*

(2) *Low-water use plant species selected for landscape improvements along roadways help to conserve water. Native vegetation patterns should be used as a reference for landscape design.*

NATURAL RESOURCES

Water Resources

Natural Systems

The primary hydrographic regions underlying the corridor are the Lake Tahoe Basin, the Carson River and Truckee River Basins, and the Western Hydrographic Region. The Lake Tahoe Basin, visible along US 50 near the California state line, is famous for its scenic beauty, clear blue water, and abundant wildlife and recreation opportunities. The Carson River and many small bodies of water and tributaries are visible along much of US 50 from Dayton through the Carson Valley. The Truckee River and its tributaries traverse the eastern Sierra front range from the rim of Lake Tahoe to the river's terminus in Pyramid Lake. Many of the smaller surface water features that are part of this hydrologic system contribute to the scenic value of the corridor, particularly Washoe Lake and the many small creeks that drain eastward from the Sierra Nevada Range. The northern stretch of US 395 from Reno to the California state line crosses the Western Hydrographic Region. This portion of the corridor is characterized by more ephemeral hydrologic features typical of the Great Basin, but also includes Honey Lake, a large shallow lake that serves as a primary water source for small communities in the area.

Much of the corridor lies within the rain shadow of the Sierra Nevada Range. Although the region receives limited rainfall, it benefits from the runoff generated by the substantial precipitation that falls as snow at higher elevations. Most of the runoff is channeled into the Lake Tahoe Basin, however, the Carson River and Truckee River watersheds also receive a portion.

Water Use Regulations

Due to the limited water availability, significant regulations have been implemented to protect existing water resources and water quality. Water resources for the majority of the urban study area are administered by the Reno/Sparks Truckee Meadows Water Authority. The 1997 Regional Water Management Plan indicates that the adequacy of Truckee River water rights to meet future demands of the growing Reno-Sparks area is a constraint to development. Many communities and water districts have landscape ordinances and policies that focus on water conservation. The corridor plan recognizes the need to promote water conservation through design that incorporates low-water use vegetation. NDOT requires interlocal maintenance agreements with communities in order for irrigation to be used on projects.

Vegetation

The Vegetation Community information for this report is based on "Mapping Ecosystems Along Nevada Highways and the Development of Specifications for Vegetation Remediation" completed by the University of Nevada at Reno for the Nevada Department of Transportation. The highways within the corridor are situated in the transition zone between the Great Basin and Sierra Nevada ecological communities. The region is characterized by the north-south and often snow-capped mountain ranges bounding adjacent valleys. Pinyon/juniper/sagebrush plant communities occur at higher elevations and Salt Desert Shrub communities occur at valley floors with sagebrush in between. Generally, the land along the highway is arid, with the exception of agricultural fields, areas where rivers and streams are sustaining pockets of riparian vegetation, and pine/fir forested areas in western Nevada near Lake Tahoe.

Sagebrush is the most prevalent type of vegetation. At low elevations the sagebrush communities are dominated by three varieties; Wyoming Big Sagebrush (*Artemisia tridentata var. wyomingensis*), Basin Big Sagebrush (*Artemisia tridentate tridentate*), and Black Sagebrush (*Artemisia nova*). Upper elevation sagebrush communities occur at 5,800 feet and are dominated by Mountain Big Sagebrush (*Artemisia tridentata var. vaseyana*) with Low Sagebrush (*Artemisia arbuscula*) occurring over ridges and/or passes. Rabbitbrush (*Chrysothamnus spp.*) and Mormon Tea (*Ephedra spp.*) also occur in these plant communities.

Plant communities and native vegetation patterns should be used as a reference for landscape design along the corridor. Understanding these different vegetation community types is critical to the success of revegetation projects associated with highway improvements. Each community has unique soil and hydrologic characteristics that must be considered to ensure successful revegetation.

Wildlife Habitat and Migration

Nevada is home to a diversity of wildlife. Lack of water, combined with extensive federal government landholdings, renders much of rural Nevada as open and undeveloped, providing excellent wildlife habitat for a number of species.

Availability of quality habitat largely determines the abundance and distribution of all wildlife species. Habitat fragmentation occurs because of the spread of human activities, including road construction. By identifying habitat areas adjacent to the highway and wildlife movement corridors, the corridor plan will serve as a tool for reducing vehicular/wildlife conflicts and preserving exist-

ing wildlife resources. Locations along highways where significant collisions occur are prime candidates for wildlife crossing retrofit projects. Future improvement projects should pay particular attention to the location of existing high quality habitat areas to ensure that wildlife crossings and warning signage can be appropriately located. Throughout the Lake Tahoe Basin, particular attention should be given to retrofitting existing highway facilities that have disrupted wildlife corridors.

The species most commonly associated with vehicular/wildlife collisions within the corridor are deer and bear. Road kill data collected for the corridor indicates conflict areas near Holbrook Junction north of Topaz Lake and along US 50 around Dayton. Black bear habitat includes the foothills of the Sierra Nevada Range and other nearby mountains such as the Carson Range. Additionally, the Lake Tahoe Basin has the second highest density of black bears in North America. Crossing signs are located along US 50 to instruct drivers to be aware of potential bear crossings. Deer are common throughout the corridor, and have been shown to consistently cross a stretch of US 395 between Reno and Carson City.

ENVIRONMENTAL CONSIDERATIONS

Mapping of Environmental Features

The landscape of northern Nevada has many special environmental features, including plant communities, rivers, lakes, playas, wildlife, rock outcroppings, cliffs, and mountain ranges. These resources provide opportunities to create viewpoints, preserve natural systems, and enhance wildlife movement corridors.

To assess the environmental features, data was gathered from a variety of sources and analyzed according to its relationship to the corridor highways. Data included in the analysis includes wildlife habitats, lakes and playas, and riparian systems. Additional data obtained from the BLM identifies unique features of significant influence, including: Sand Dunes, Wildlife Refuges, National Conservation Areas, and Areas of Critical Environmental Concern (ACEC). The BLM designated areas as ACEC to preserve areas with unique biological, geological, historical, or scenic features. The boundaries shown are taken from the BLM database.

Wilderness areas and ACEC are specially designated areas that should be carefully considered with all highway construction projects. Stands of pinyon-juniper are unique plant communities that should also be considered as they provide a unique experience along the highway corridor. All stands that are visible from the highway were mapped.

Public agency coordination is essential to maintain environmental and visual quality. Many of the environmental features that should be interpreted or protected are located on land outside of NDOT jurisdiction. Therefore, coordination between public agencies is crucial to creating a cohesive vision that will affect land use decisions, facility placement, and environmental standards utilized on adjacent lands.

The Tahoe Regional Planning Agency (TRPA) is a bi-state regional environmental planning agency charged with protecting the lake and surrounding environment of the Tahoe Basin. The agency adopted environmental quality standards, called thresholds, as well as ordinances to achieve the thresholds. Consistent coordination with the agency is key to developing a comprehensive project that addresses a range of environmental issues in the highly regulated area.

(1) *A unique rock outcropping along US 50 to Lake Tahoe adds visual interest to the corridor. It also influences the type of design features that should be considered for use along the highway.*

(2) *Wild horses and many other wildlife species can be found along the corridor. Agency coordination with the Division of Wildlife is critical to providing appropriate crossing structures.*

CONTINUE ON MAP EC2

Round Hill
Kingsbury
Stateline
Lake Tahoe
US 50
SR 207
Walleys Hot Springs
Minden
Buckeye
Gardnerville
Toler Ave
SR 88
SR 207
Mottsville
SR 756
Sheridan
Dresslerville
Ranchos
Pinenut Rd
US 395
DEER CORRIDOR
DEER CORRIDOR
Nevada
California
BEAR CORRIDOR
Holbrook Junction
Topaz Lake
West Walker River
Bullionville
Artesia Lake
Simpson
Weed Heights
ALT 95
Yerington
Bridge St
Mason
Nordyke
BIDWELL HISTORIC TRAIL
Hudson
SR 824
SR 823
SR 208
Smith
SR 208
Wellington
SR 829
Wassuk Range
Wellington Springs
SR 338
Pine Grove
Douglas County
Lyon County
DEER CORRIDOR
BEAR CORRIDOR

LEGEND

- US 395, West US 50, SR 28, SR 207, and SR 431 Corridor with Mile Markers
- Interstates
- Highways / State Routes
- Local Roads
- Railroads
- Railroads (historic)
- County Line
- Streams / Rivers
- Lakes
- Playas
- Sand Dunes
- Mixed Conifer and Pinyon/Juniper Plant Communities that are Visible from the Highway
- Desert National Wildlife Refuge
- Wildlife Management Area
- Nevada Wilderness Area
- National Conservation Area
- Area of Critical Environmental Concern

WILDLIFE CORRIDORS

- Antelope
- Bear
- Deer

0 1.5 3 6

SCALE: 1 inch equals 3 miles

NORTH

MAP EC1 1.24

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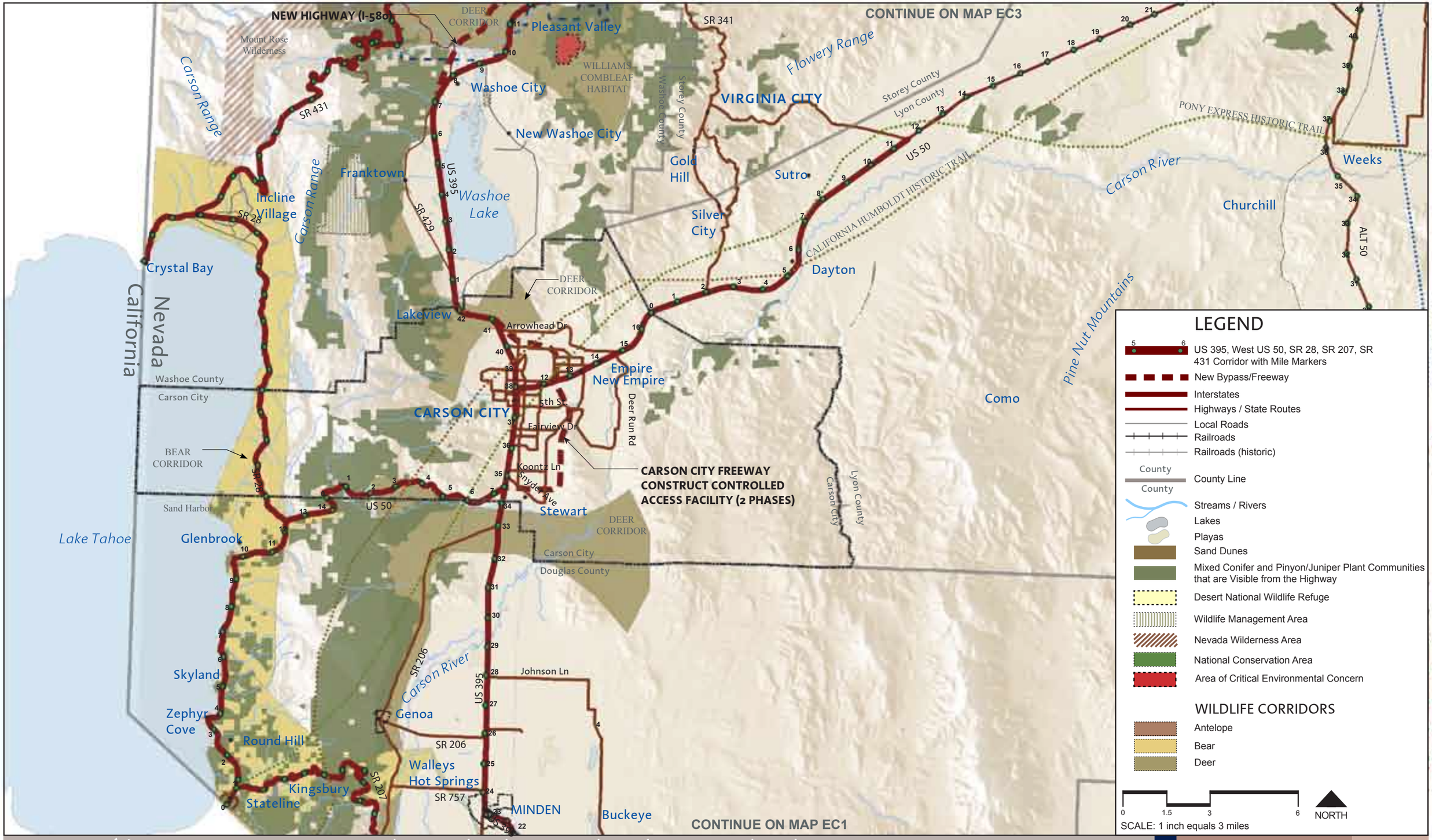
US 395, West US 50, SR 28, SR 207, and SR 431 landscape and aesthetics corridor plan

ENVIRONMENTAL CONSIDERATIONS

TOPAZ LAKE TO MINDEN

UNLV LANDSCAPE ARCHITECTURE & PLANNING PROGRAM

NEVADA DOT



US 395, West US 50, SR 28, SR 207, and SR 431 landscape and aesthetics corridor plan

ENVIRONMENTAL CONSIDERATIONS

MINDEN TO WASHOE VALLEY

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MAP EC2

1.25

DEER CORRIDOR
Petersen Mountain
Hungary Valley
ANTELOPE CORRIDOR
Truckee River
Cold Springs
Border Town
White Lake
Stead
Spanish Springs
Olinghouse
Copperfield
US 395
Golden Valley
SR 445
SR 447
WADSWORTH
CALIFORNIA HUMBOLDT HISTORIC TRAIL
Pah Rah Range
Black Springs
Raleigh Heights
Panther
Sun Valley
PRE-HISTORIC ROCK ART
Fernley
ALT 50
UNION PACIFIC RAILROAD
I-80
SR 650
SR 657
RENO
SPARKS
Truckee River
Patrick
DEER CORRIDOR
Verdi
Mogul
I-80
Virginia St
Mustang
Lockwood
McCarran Blvd
Mount Rose Wilderness
Virginia Range
Washoe County
Storey County
Lyon County
GEOLOGICAL/ BOTANICAL
SR 431
DEER CORRIDOR
Steamboat
US 395
SR 341
NEW HIGHWAY (I-580)
Pleasant Valley
WILDLIFE COMBREAT HABITAT
Washoe City
Stagec
CONTINUE ON MAP EC2

LEGEND

- US 395, West US 50, SR 28, SR 207, SR 431 Corridor with Mile Markers
- New Bypass/Freeway
- Interstates
- Highways / State Routes
- Local Roads
- Railroads
- Railroads (historic)
- County Line
- Streams / Rivers
- Lakes
- Playas
- Sand Dunes
- Mixed Conifer and Pinyon/Juniper Plant Communities that are Visible from the Highway
- Desert National Wildlife Refuge
- Wildlife Management Area
- Nevada Wilderness Area
- National Conservation Area
- Area of Critical Environmental Concern

WILDLIFE CORRIDORS

- Antelope
- Bear
- Deer

0 1.5 3 6

SCALE: 1 inch equals 3 miles

NORTH

MAP EC3 1.26

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US 395, West US 50, SR 28, SR 207, and SR 431 landscape and aesthetics corridor plan

ENVIRONMENTAL CONSIDERATIONS

WASHOE VALLEY TO BORDER TOWN

UNLV

NEVADA DOT

VISUAL RESOURCES

Viewsheds and Distance Zones

Viewshed refers to all areas that are visible from a section of highway. Similar to the boundaries of a watershed, the boundaries of viewsheds are usually high points in the landscape, such as ridges and hills. Viewsheds are determined by analyzing digital elevation models in a Geographic Information Systems (GIS) program. All areas that are visible from the highway are combined to create the viewshed.

Areas within a viewshed are perceived by drivers with varying levels of detail. The detail that a driver perceives is related to the distance between the driver and the feature being observed. Distance zones, including foreground zones, middleground zones and background zones, define the traveler's viewing distances. Distance zones are delineated through a process developed by the USFS that relates the detail and importance of distance to the driver on the highway. Identifying the portions of a viewshed that are most frequently seen helps determine what portions of the landscape are most critical to establishing the highway's visual character and what areas are most sensitive to change.

Foreground Zones

Viewers can perceive details such as forms, lines and colors up to a one-quarter mile distance. Changes to the landscape are most significant within the foreground view because they are most immediate to the viewpoint. This zone can be most easily manipulated through the Landscape and Aesthetic Program, in part because it includes the highway right-of-way.

Middleground Zones

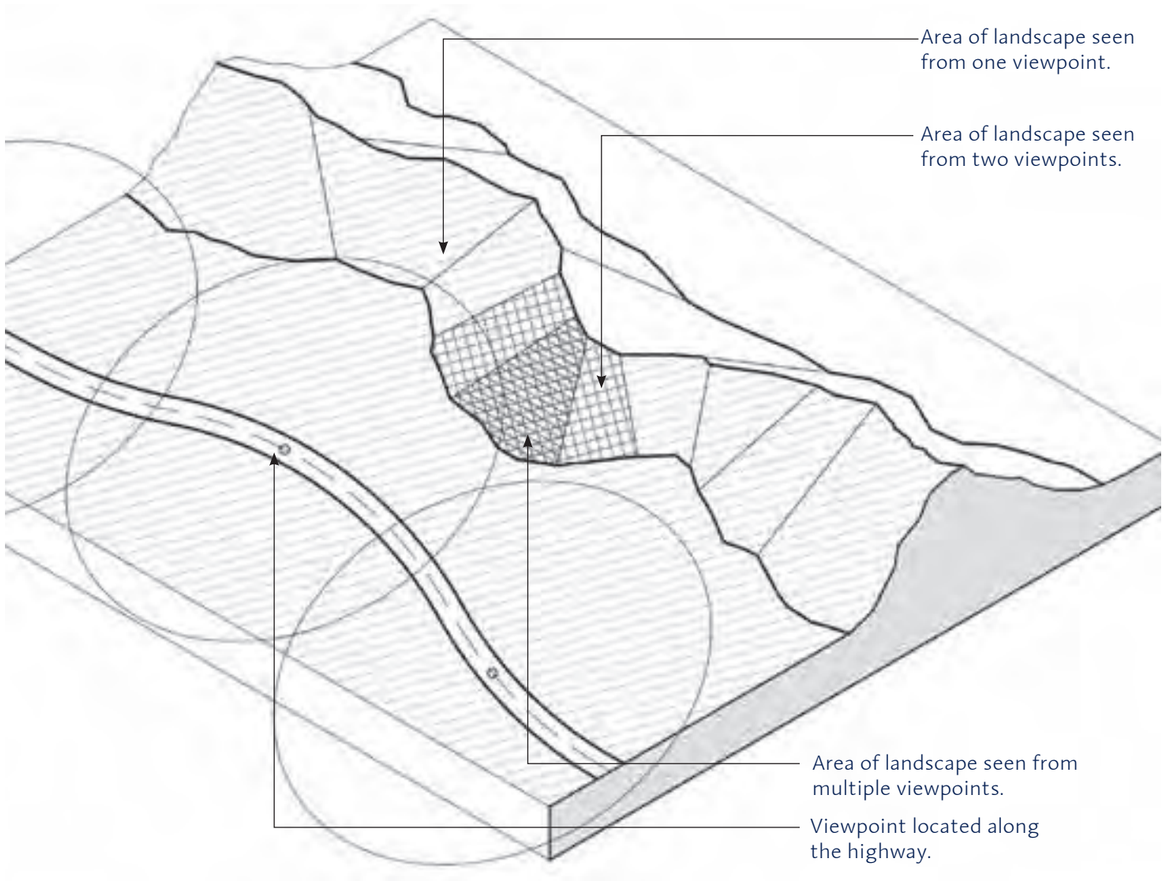
Viewers can perceive details such as forms, lines, and colors in masses located from one-quarter mile to three miles away.

Background Zones

Background is the area beyond the middleground, extending to the horizon or limit of the area that is seen. For this Corridor Plan, the background extends up to 25 miles from the centerline of the highway. Viewers can perceive broad forms, lines, wide valleys, distant hills, and mountains.

Viewshed and Distance Zones Mapping

Viewsheds and distance zones along the corridor are shown on the maps beginning on page 1.29. This analysis sets the foundation for visual quality management along the corridor. Darker shading denotes an area that can be seen most often from points on the highway. These areas usually coincide with landscapes of high visual quality and scenic values such as mountain ranges. Management of these areas through multi-jurisdictional cooperation can protect them from billboards and other land uses that obstruct views and detract from the travel experience.

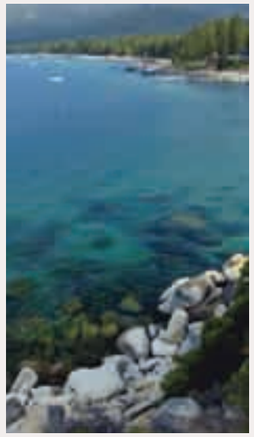


(1) *This illustration describes the concept of a viewshed and how a viewshed analysis is conducted.*

(2) *Viewers perceive details such as forms, lines, and color in the foreground zone. This zone, located up to a 1/4 mile distance from the road is the most easily manipulated because it includes the highway right-of-way.*

(3) *Middleground zones extend from 1/4 mile to 3 miles from the highway. Forms, lines, and color are perceived in masses. Potential development and signage impact these areas.*

(4) *Background zones extend to the limit of area that is seen. Viewers perceive broad forms, wide valleys, and distant mountains.*



(1), (2) *Scenic resources in the Tahoe Basin include the crystal blue water of the lake and the surrounding forests. Unnatural rock cuts negatively influence the visual quality and can affect a roadway's scenic categorization.*

Scenic Resources

The corridor offers some of the most scenic and diverse views found in the state, ranging from highly developed urban areas to dramatic alpine lakes. Spectacular views occur throughout the drive around the Lake Tahoe Basin and over the high mountain passes. The highways also pass through vast agricultural valleys flanked by dramatic mountain vistas, reinforcing the inherent natural and rugged beauty of the area. The combination of scenic and contrasting landscapes creates a memorable impression for visitors, and provides an indelible sense of identity for those who live in the region.

The Tahoe Basin has unique scenic regulations as part of the Scenic Quality Improvement Program established by TRPA. The program divides the roadway into units that are rated by the visual quality of both natural and man-made environments. Criteria such as unity, vividness, variety and intactness are used to evaluate how well a road unit fits within its surroundings. Sections of road that blend with their surroundings are considered to be in scenic attainment. Those not in attainment can upgrade their rating by making improvements outlined by TRPA. As of the summer of 2006, the following units are not in scenic attainment: Spooner Summit and the Casino Area in Stateline. Recommendations for improvement include enhancing roadcuts, replacing oversized, reflective guardrails, and sensitively designing night lighting. (TRPA 2001 Threshold Evaluation)

Visual Analysis

A visual analysis was conducted along the corridor to evaluate the viewsheds and rank them relative to their quality. Scenic resources were identified and highly visible landforms, such as mountain ranges and unique cliffs, were located. Verified through site visits, the visual analysis is shown on Maps VA1-VA3. Areas of highest scenic value include:

- Lake Tahoe and its surrounding mountains offer spectacular vistas within a unique landscape. Views to the lake, combined with filtered views through the forest, enhance the traveler experience. Open meadows and granite outcroppings impart an added scenic interest.
- Portions of Carson Valley southwest of Gardnerville are especially scenic because of the contrast of open ranchlands and high mountains.
- Topaz Lake lies on the California border along US 395. The lake provides scenic interest in contrast to the surrounding arid landscape.
- The Carson Range provides a scenic backdrop and enhances the visual quality of the western side of Washoe Valley.
- The open sagebrush country of Washoe Valley is bounded by the Carson Range. Scenic wetlands and ranchlands enhance the visual setting.
- The Carson Range and Virginia Range west and east of Reno are scenic resources of northern Nevada. Attractive evening shadows accentuate the mountain backdrop.

LEGEND

- US 395, West US 50, SR 28, SR 207, SR 431 Corridor with Mile Markers
- Interstates
- Highways / State Routes
- Major Roads
- Railroads
- Railroads (historic)
- County
- County Line
- County
- Truckee Meadows Service Area Boundary
- City Boundary
- Streams / Rivers
- Lakes
- Playas

VIEWSHEDS

- FOREGROUND DISTANCE ZONE
- MIDDLEGROUND DISTANCE ZONE
- AREAS NOT VISIBLE FROM THE HIGHWAY
- VISIBLE FROM ONE TO SEVERAL POINTS ALONG THE HIGHWAY
- VISIBLE FROM MULTIPLE POINTS ALONG THE HIGHWAY
- VISIBLE FROM LARGE PORTIONS OF THE HIGHWAY

0 1.5 3 6

SCALE: 1 inch equals 3 miles

NORTH

US 395, West US 50, SR 28, SR 207, and SR 431 landscape and aesthetics corridor plan

NEVADA DOT

UNLV

VIEWSHEDS

TOPAZ LAKE TO MINDEN

CONSULTANT TEAM

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JW Zunino & Associates
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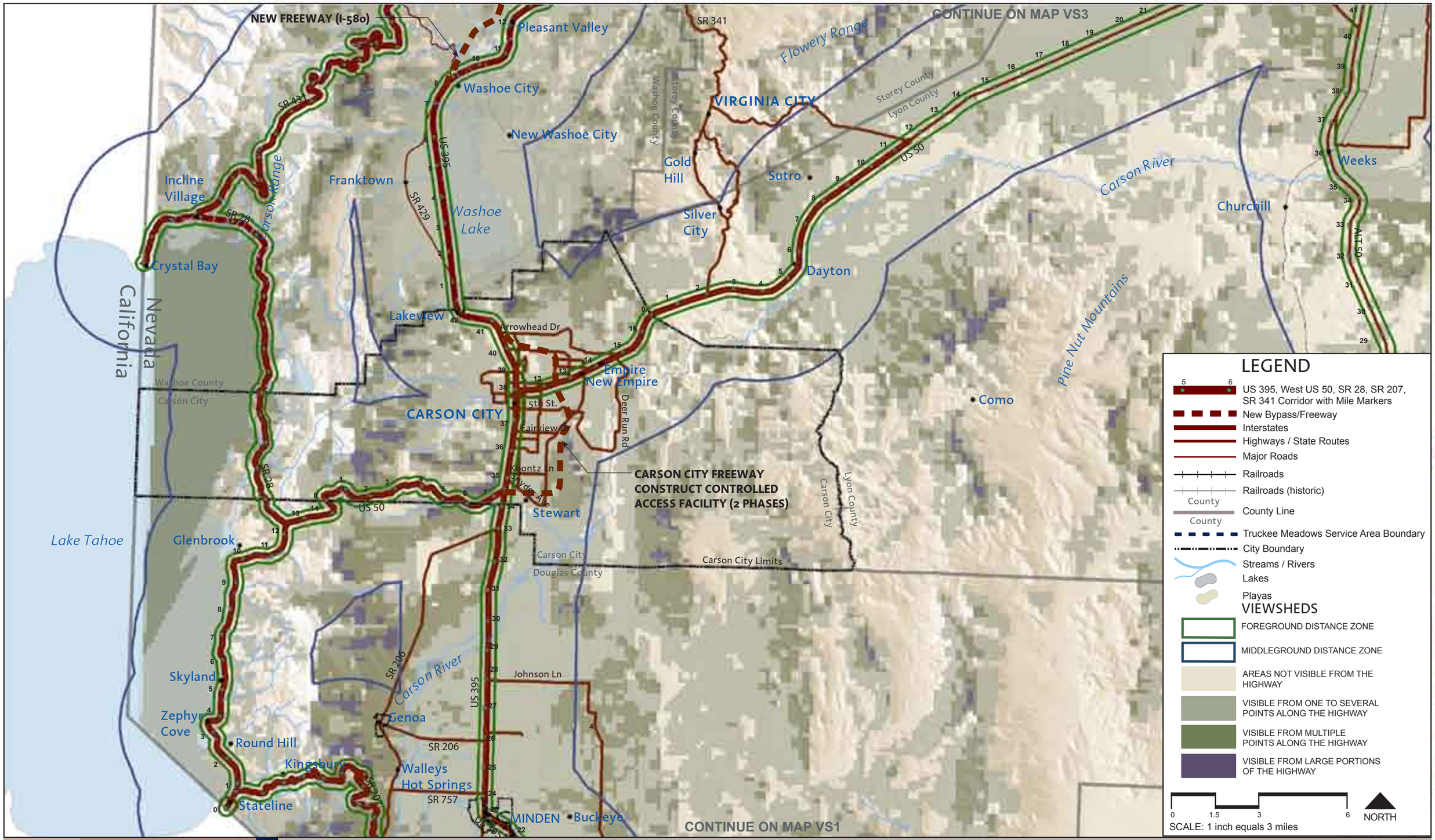
MAP VS1

1.29



MAP VS2

1.30

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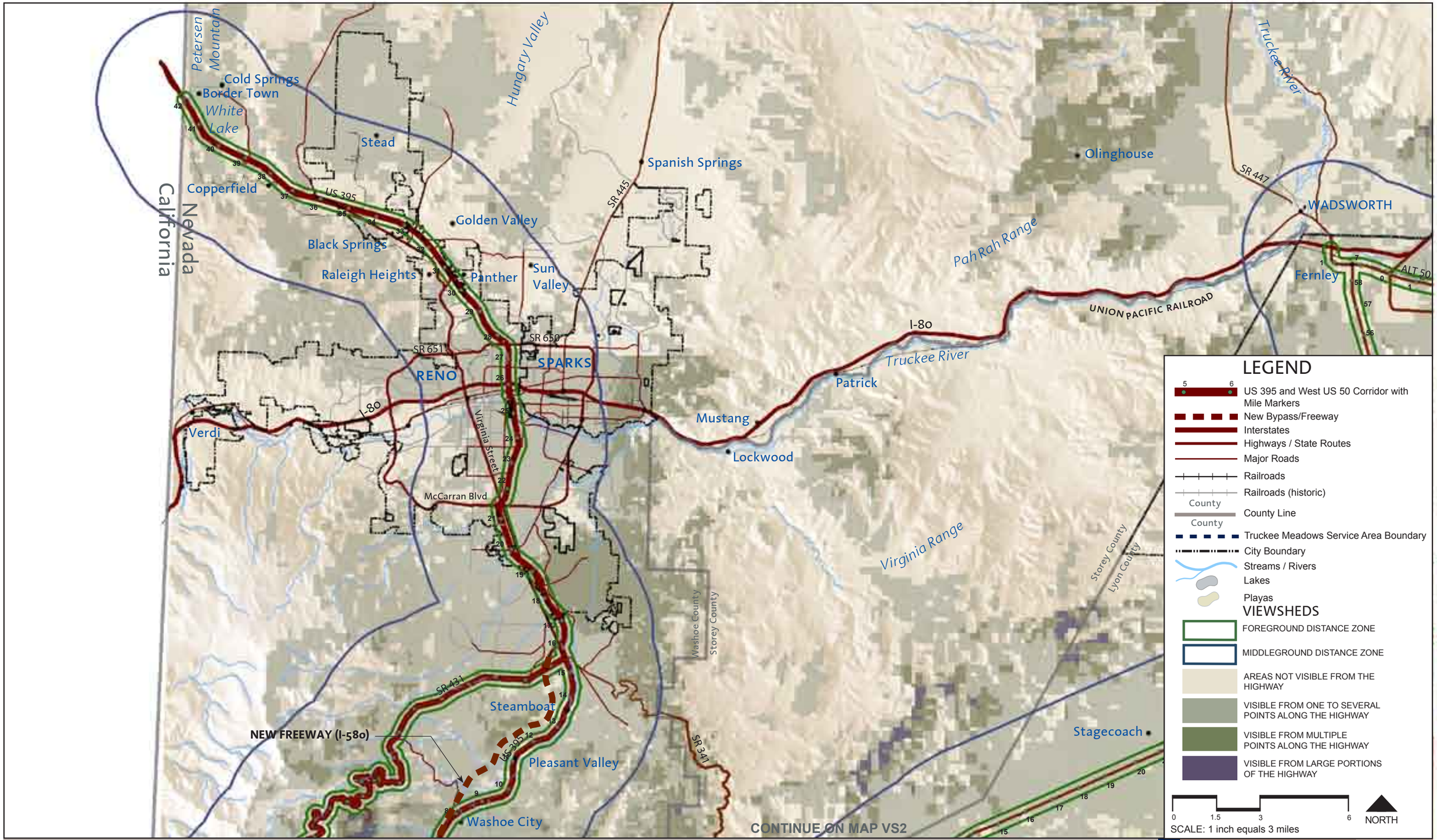
US 395, West US 50, SR 28, SR 207, and SR 431 landscape and aesthetics corridor plan

VIEWSHEDS

MINDEN TO WASHOE VALLEY

UNLV LANDSCAPE ARCHITECTURE & PLANNING RESEARCH

NEVADA DOT



LEGEND

- US 395 and West US 50 Corridor with Mile Markers
- New Bypass/Freeway
- Interstates
- Highways / State Routes
- Major Roads
- Railroads
- Railroads (historic)
- County
- County Line
- County
- Truckee Meadows Service Area Boundary
- City Boundary
- Streams / Rivers
- Lakes
- Playas

VIEWSHEDS

- FOREGROUND DISTANCE ZONE
- MIDDLEGROUND DISTANCE ZONE
- AREAS NOT VISIBLE FROM THE HIGHWAY
- VISIBLE FROM ONE TO SEVERAL POINTS ALONG THE HIGHWAY
- VISIBLE FROM MULTIPLE POINTS ALONG THE HIGHWAY
- VISIBLE FROM LARGE PORTIONS OF THE HIGHWAY

0 1.5 3 6

SCALE: 1 inch equals 3 miles

NORTH

NEVADA DOT

UNLV LANDSCAPE ARCHITECTURE & PLANNING RESEARCH

VIEWSHEDS

WASHOE VALLEY TO BORDER TOWN

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MAP VS3

1.31

CONTINUE ON MAP VA2

Round Hill
Kingsbury
Walleys Hot Springs
Lake Tahoe
Stateline
US 50
SR 207
Buckeye
Minden
Gardnerville
Toler Ave
SR 88
SR 207
Mottsville
SR 756
Pinenut Rd
Sheridan
Dresslerville
Ranchos
US 395
Nevada
California
Artesia Lake
Weed Heights
ALT 95
Yerington
Bridge St
Mason
Nordyke
Simpson
Bullionville
SR 824
Hudson
SR 823
SR 208
Smith
Holbrook Junction
Wellington
SR 829
Wassuk Range
Wellington Springs
West Walker River
SR 338
Topaz Lake
Pine Grove
Douglas County
Lyon County

LEGEND

- US 395, West US 50, SR 28, SR 207, SR 341 Corridor with Mile Markers
- Interstates
- Highways / State Routes
- Major Roads
- Railroads
- Railroads (historic)
- County
- County Line
- City Boundary
- Streams / Rivers
- Lakes
- Playas

VISUAL ANALYSIS

- OUTSTANDING VIEWPOINTS (SAMPLE SYMBOL IS LOOKING NORTH)
- HIGHLY VISIBLE LANDFORMS WITH SCENIC VALUE
- SCENIC OPPORTUNITIES
- AREAS NOT VISIBLE FROM THE HIGHWAY
- MODERATE VISUAL QUALITY
- HIGH VISUAL QUALITY
- HIGHEST VISUAL QUALITY

0 1.5 3 6

SCALE: 1 inch equals 3 miles

NORTH

MAP VA1

1.32

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VISUAL ANALYSIS

TOPAZ LAKE TO MINDEN

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NEW FREEWAY (I-580)

Pleasant Valley

SR 341

CONTINUE ON MAP VA3

Flowery Range

Washoe County

Storey County

Lyon County

Washoe City

New Washoe City

VIRGINIA CITY

Gold Hill

Sutro

US 50

Carson River

Weeks

Churchill

ALT-50

SR 431

US 395

Incline Village

SR 28

Carson Range

Franktown

SR 429

Washoe Lake

Silver City

Dayton

Crystal Bay

California

Nevada

Lakeview

Arrowhead Dr

Empire

New Empire

Deer Run Rd

Pine Nut Mountains

Como

Washoe County

Carson City

CARSON CITY

5th St

Fairview Dr

Koontz Ln

CARSON CITY FREEWAY
CONSTRUCT CONTROLLED
ACCESS FACILITY (2 PHASES)

Snyder Ave

Stewart

Carson City

Lyon County

Lake Tahoe

Glenbrook

Carson City

Douglas County

Carson City Limits

SR 206

Carson River

US 395

Johnson Ln

Skyland

Zephyr Cove

Genoa

Round Hill

SR 206

Kingsbury

Walleys Hot Springs

SR 207

SR 757

Stateline

MINDEN

Buckeye

CONTINUE ON MAP VA1

LEGEND

- US 395, West US 50, SR 28, SR 207, SR 341 Corridor with Mile Markers
- New Bypass/Freeway
- Interstates
- Highways / State Routes
- Major Roads
- Railroads
- Railroads (historic)
- County Line
- City Boundary
- Streams / Rivers
- Lakes
- Playas

VISUAL ANALYSIS

- OUTSTANDING VIEWPOINTS (SAMPLE SYMBOL IS LOOKING NORTH)
- HIGHLY VISIBLE LANDFORMS WITH SCENIC VALUE
- SCENIC OPPORTUNITIES
- AREAS NOT VISIBLE FROM THE HIGHWAY
- MODERATE VISUAL QUALITY
- HIGH VISUAL QUALITY
- HIGHEST VISUAL QUALITY

0 1.5 3 6

SCALE: 1 inch equals 3 miles

NORTH

NEVADA DOT

UNLV

VISUAL ANALYSIS
MINDEN TO WASHOE VALLEY

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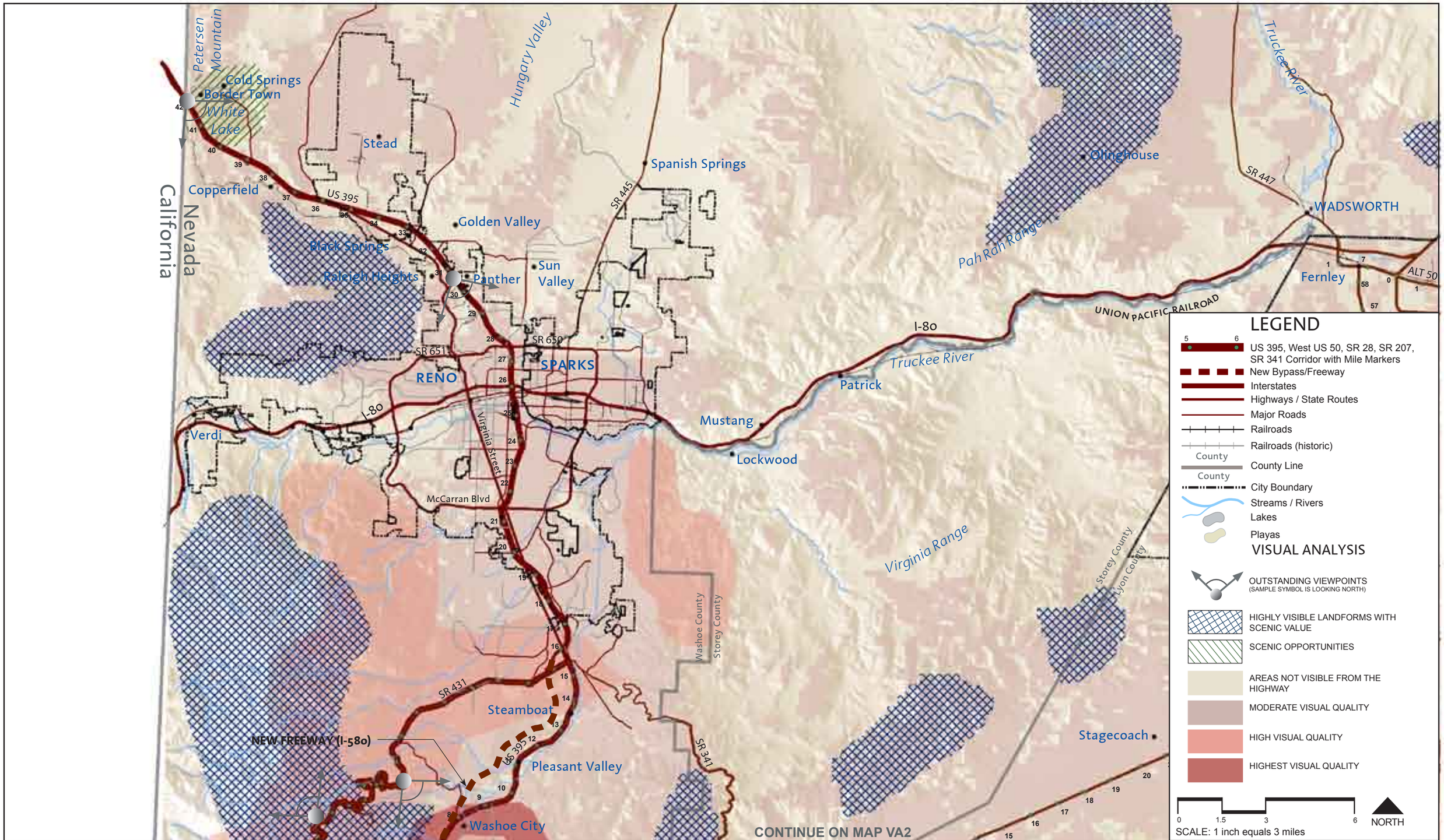
MAP VA2

1.33



LEGEND

- US 395, West US 50, SR 28, SR 207, SR 341 Corridor with Mile Markers
- New Bypass/Freeway
- Interstates
- Highways / State Routes
- Major Roads
- Railroads
- Railroads (historic)
- County Line
- City Boundary
- Streams / Rivers
- Lakes
- Playas

VISUAL ANALYSIS

- OUTSTANDING VIEWPOINTS (SAMPLE SYMBOL IS LOOKING NORTH)
- HIGHLY VISIBLE LANDFORMS WITH SCENIC VALUE
- SCENIC OPPORTUNITIES
- AREAS NOT VISIBLE FROM THE HIGHWAY
- MODERATE VISUAL QUALITY
- HIGH VISUAL QUALITY
- HIGHEST VISUAL QUALITY

SCALE: 1 inch equals 3 miles

NORTH

MAP VA3

1.34

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VISUAL ANALYSIS

WASHOE VALLEY TO BORDER TOWN

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Landscape Design Segments

TABLE of CONTENTS

INTRODUCTION

This chapter establishes the design direction for highway landscape and aesthetics. The chapter is organized into five sections. The first section describes program elements that relate to the highway type under consideration and its surrounding land uses. Sections two through five describe the design objectives associated with each landscape design segment and its theme. These design objectives clarify how the program elements should look.

Figure 7 illustrates the two main categories used to organize highways as they relate to landscape and aesthetics. Information derived from both categories is analyzed to design both the functional aspects and physical form of highway facilities.

General Highway Categories consider factors such as the road type, speed and volume of travel, type of access, and the densities of adjacent land use.

- Goals associated with the general categories represent planning and design ideas that should always be considered for roads with similar functions.

Context-Sensitive Categories consider place specific features – environment, culture, and history.

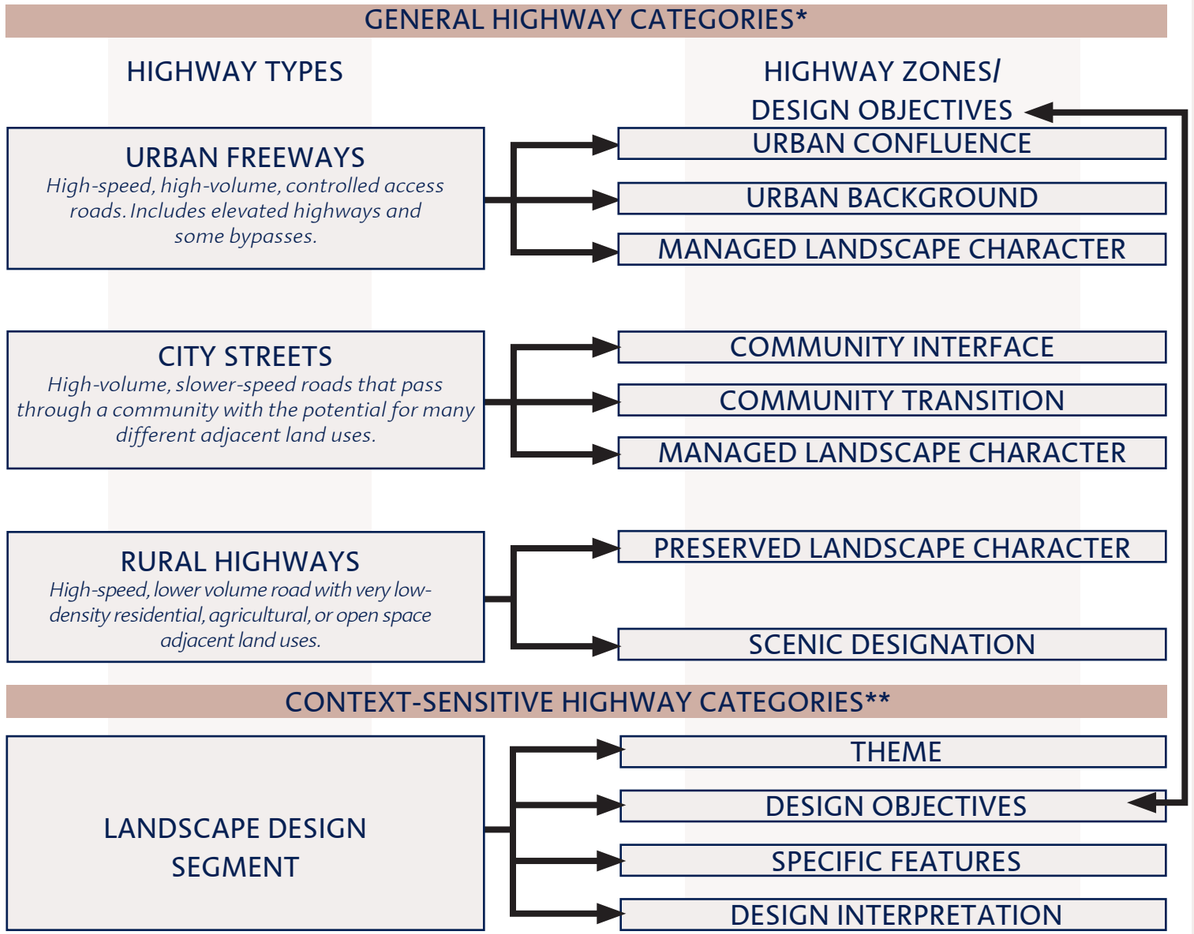
- Goals describe how general design objectives should look.

Section One: Highway Zones/ Design Objectives

The Master Plan organizes road systems into different highway types: urban freeways, city streets, and rural highways. Highway types are categorized according to the type of road, the speed and volume of travel, and the type of access. Each classification may be further divided into highway zones. These categories establish program elements and goals that should always be considered when addressing projects located along roads with similar characteristics (downtowns, transition areas, etc.).

For example, every low-speed road that travels through a downtown area is considered a community interface zone. Within this zone, traffic-calming techniques are appropriate and pedestrian needs dominate. As communities develop and adjacent land uses change, the highway zone associated with the new land use and development can be updated. Figures 9 -11 (pages 2.5, 2.6, and 2.10) illustrate the design objectives associated with the General Highway Categories.

Figure 7 *- Corridor Organizing Elements*



**General: Includes design goals and objectives that should always be considered during the design of a project as it relates to the types of surrounding land uses, development, and street patterns regardless of the landscape design segment in which they are located.*
*** Context-sensitive: Includes themes, design goals and objectives, and projects that relate specifically to the landscape design segment in which they are located. The goals and objectives should be considered in addition to the general goals and objectives.*

COMPREHENSIVE DESIGN CONCEPT

The corridor design concept can be articulated for both rural and urban segments. In rural or predominately undeveloped areas, the highway should blend into the natural landscape. The presence of the road is muted by design interpretations of naturally occurring patterns of geology, vegetation, and soils. The successful emulation of these patterns results in a landscape environment that avoids the distinct separation between road and land that often characterizes rural highways.

In urban areas, the perception of community character is often shaped by the highway's design and its features. This is especially evident when a highway also serves as a community's "Main Street." Creating a coherent visual environment that builds unity in the community fabric is key to the success of the highway system. The highway should consist of a range of landscape treatments that focus attention on important places, reveal community character and information, and blend the roadway with surrounding uses.

Sections Two through Five: Landscape Design Segments

The last four sections describe the design objectives, theme, and specific features associated with each landscape design segment. Landscape design segments organize the highway into areas of similar character based upon elements such as topography, plant communities, and community development. Segments set the major design theme and provide a unifying design concept that is interpreted during individual project design. Figure 8 describes the way in which landscape design segments are used to develop context sensitive designs.

Because landscape design segments relate to place and community character, design objectives express special features that should be considered and describe the appearance of general program elements designated by the highway zone.

Using the Landscape Design Segments

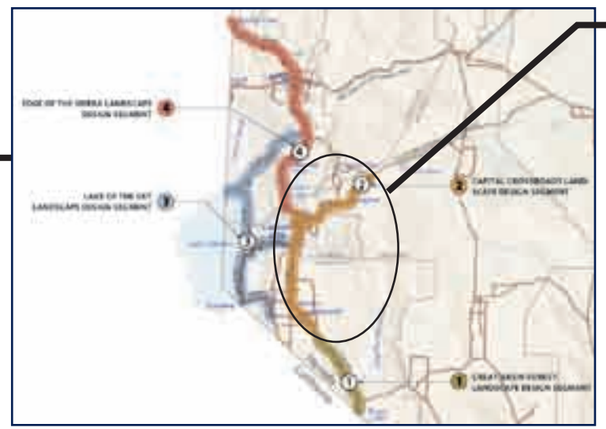
Landscape design segments provide an organizational tool for applying design concepts along the highway. After understanding the project components that may be applied within each highway zone (community interface, managed landscape character, etc.), it is important to understand the theme and design objectives of the segment. These elements describe how the features should look. Design interpretation images provide physical examples of potential projects. Supporting maps, sections, aerial photos, and imagery illustrate the design objectives and appropriate application throughout the corridor.

The segments designated for the Northern Corridor include the Great Basin Forest, Capital Crossroads, Lake of the Sky, and Edge of the Sierra as shown on the following page.

Figure 8 *– Landscape Design Segment Themes, Maps, and Sections*

CONTEXT-SENSITIVE HIGHWAY CATEGORIES

Corridor
A group of highways is evaluated to address a topic such as landscape and aesthetics.



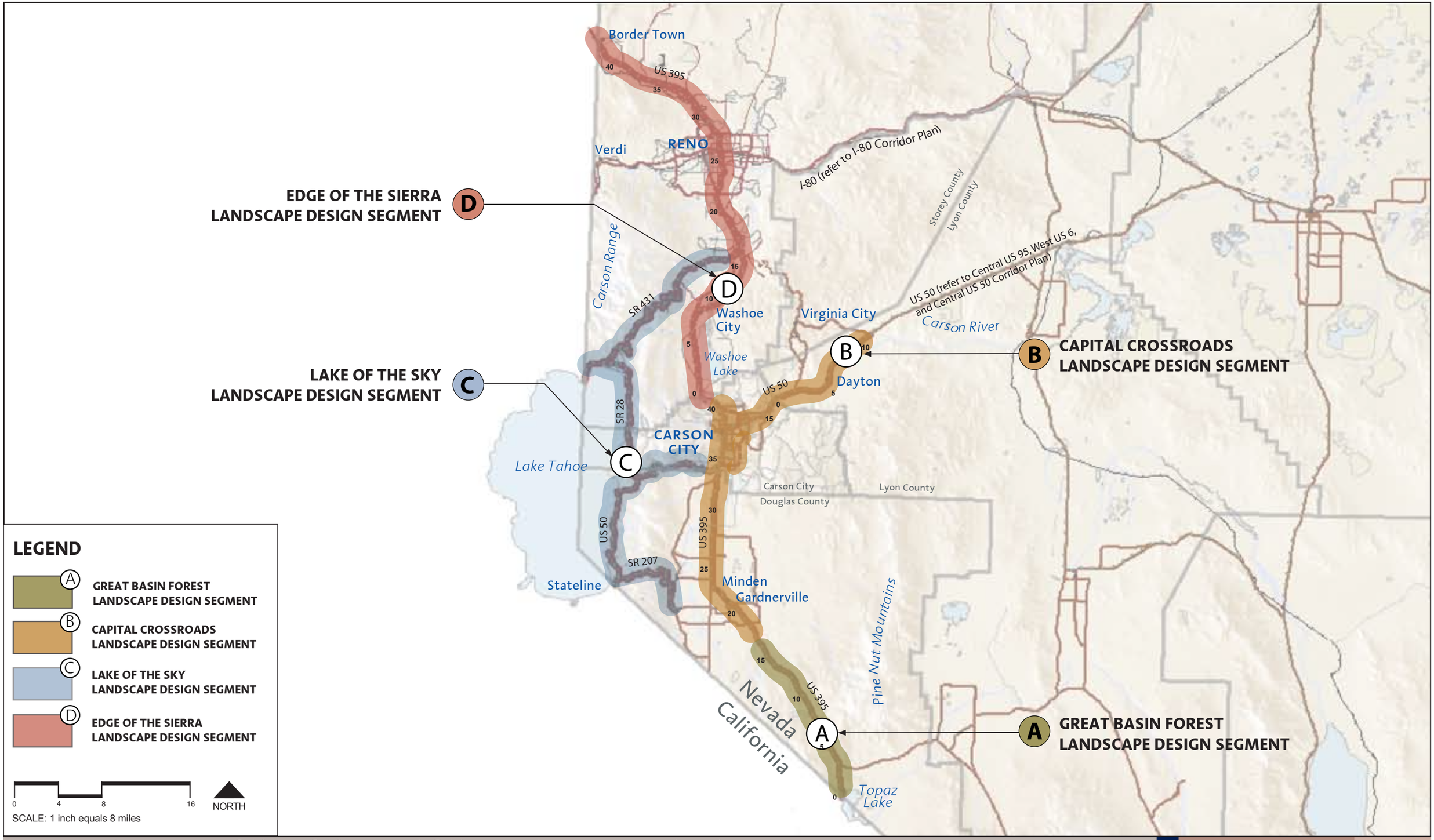
Landscape Design Segments
Sections of the highway are organized according to the surrounding environmental and cultural context. Themes correlate with the segment name and location.

Theme and Design Interpretation
The segment theme describes the vision for how the highway should appear. Images depict how the theme may be interpreted and applied through individual project design.

Specific Features
Potential projects and improvements are identified within the segment. Projects are grouped into six categories – community, travel and tourism, planting, natural resource and wildlife, views and landmark, and roadway practices and structures.

Design Objectives - Plan View
Design objectives and landscape and aesthetic elements are located within the segment.

Design Objectives - Section View
Landscape treatment types and interpretive themes provide additional direction for design objectives and the development of landscape and aesthetic elements.



LEGEND

- A — GREAT BASIN FOREST LANDSCAPE DESIGN SEGMENT
- B — CAPITAL CROSSROADS LANDSCAPE DESIGN SEGMENT
- C — LAKE OF THE SKY LANDSCAPE DESIGN SEGMENT
- D — EDGE OF THE SIERRA LANDSCAPE DESIGN SEGMENT

0 4 8 16

SCALE: 1 inch equals 8 miles

NORTH

US 395, West US 50, SR 28, SR 207 and SR 431 preliminary corridor plan

NEVADA DOT UNLV

LANDSCAPE DESIGN SEGMENTS

TOPAZ LAKE TO BORDER TOWN

CONSULTANT TEAM
DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill

MAP LDS1

2.3

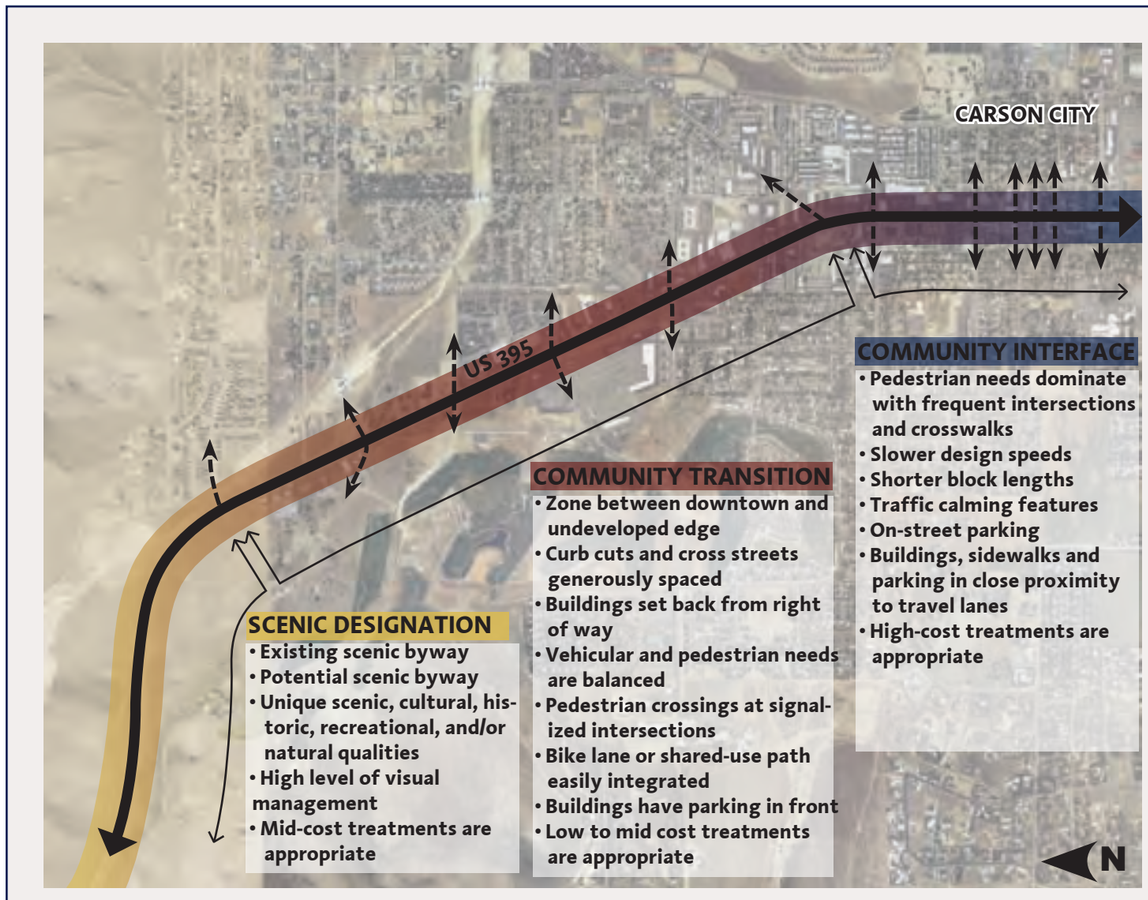
SECTION ONE: Highway Zones

Design objectives form the parameters for landscape and aesthetics along the roadway. The general categories of urban freeways, city streets, and rural highways are illustrated in Figures 9, 10, and 11. The general objectives for city streets are reviewed in Figure 9, followed by a more detailed description of community interface, community transition, and managed landscape character. Rural highways are described beginning on page 2.10 and include more specific information on preserve landscape character and scenic designation zones.

URBAN FREEWAYS

Description

Urban freeways include high-speed, high-volume roadways. The built environment dominates the visual experience, significantly contributing to the driving experience. Only a brief description of urban freeways is provided in this document due to the fact that the majority of road systems described fall into the city streets or rural highways category. The exception includes the Carson City Freeway, I-580, and US 395 through Reno. Design objectives that relate specifically to these highways may be found in the description of the individual landscape design segment. Refer to the Master Plan for additional discussions regarding urban freeways. (*Pattern and Palette of Place,* 2002, p. 38-47)



(1) *Highway zone design objectives are associated with development zones along the roadway. As growth becomes more dense design objectives move from community transition zones to community interface.*

Figure 9 - Urban Freeways – Highway Zones

GENERAL HIGHWAY CATEGORIES: URBAN FREEWAYS – HIGHWAY ZONES

MANAGED LANDSCAPE CHARACTER

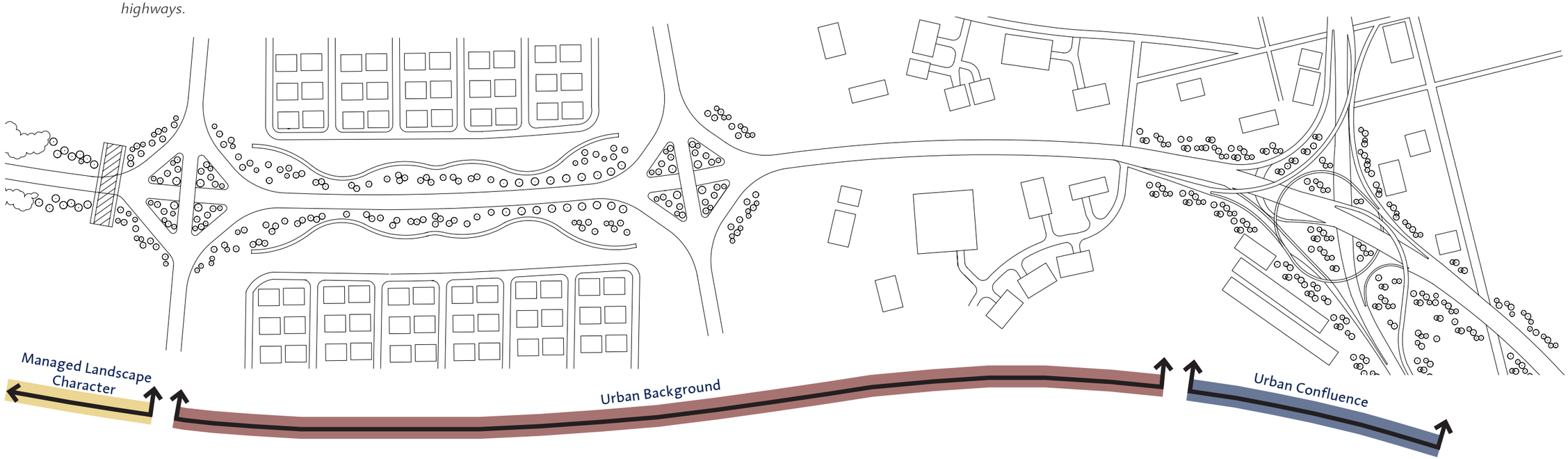
Adjacent Land Uses: Vary from residential to industrial. Located in areas of current growth or planned growth at community edges along interstates or elevated highways.

URBAN BACKGROUND

Adjacent Land Uses: Commercial development along interstates or elevated highways. Noise walls are used in residential areas.

URBAN CONFLUENCE

Adjacent Land Uses: Highly visible location. Use of interchange is of high importance within the state.



MANAGED LANDSCAPE CHARACTER

"Transition Zones" in the Master Plan

- Create a transition from rural to urban character
- Establish gateways into urban areas
- No-cost to low-cost treatments are appropriate

URBAN BACKGROUND

"Urban Zones" in the Master Plan

- Typical urban highway segments
- Consider pedestrian overpasses to connect regional systems
- Utilize a consistent soundwall design
- Emphasize segment design theme at interchanges through art, plants, materials, and signage
- Low- to mid-cost treatments are appropriate

URBAN CONFLUENCE

"High Visibility Zones" in the Master Plan

- High traffic volumes and special character such as casino districts
- Create a distinctive design that complements the design theme
- Utilize special retaining walls and land graphics
- Incorporate complex plantings and artwork
- Mid- to high-cost treatments are appropriate

Figure 10 - City Streets – Highway Zones

GENERAL HIGHWAY CATEGORIES: CITY STREETS – HIGHWAY ZONES

MANAGED LANDSCAPE CHARACTER

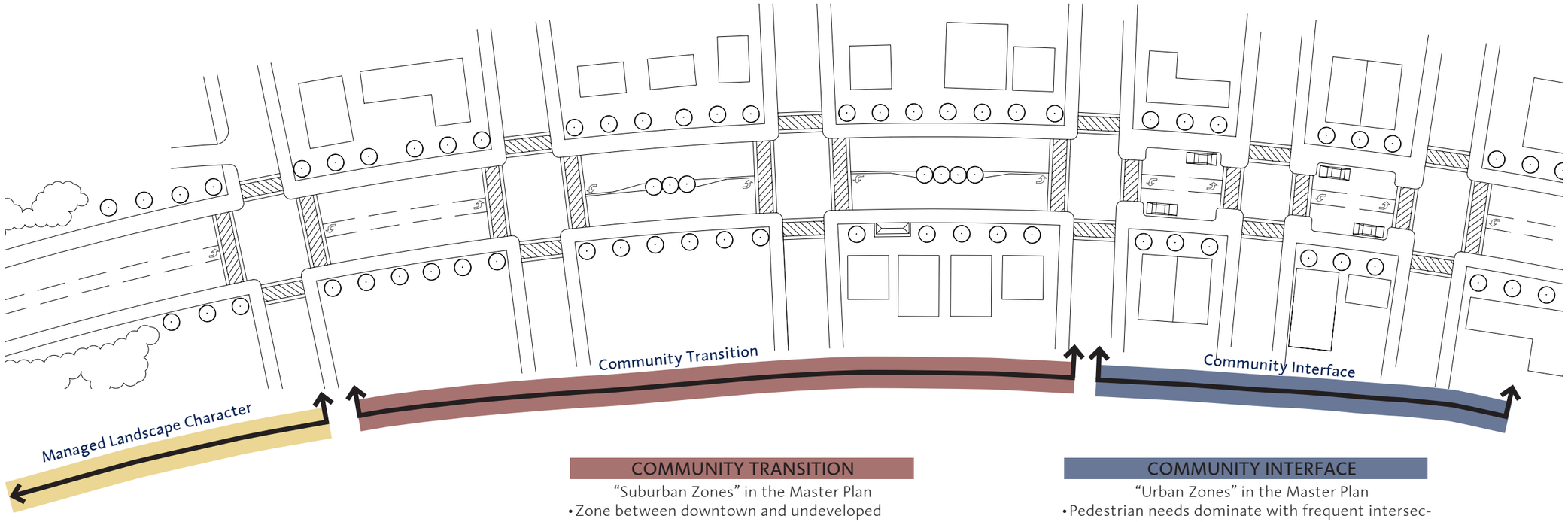
Adjacent Land Uses: Vary from residential to industrial. Located in areas of current growth or planned growth at community edges.

COMMUNITY TRANSITION

Adjacent Land Uses: Range from commercial to residential with larger setbacks. Located between a community's downtown and its undeveloped edges.

COMMUNITY INTERFACE

Adjacent Land Uses: Typically commercial, but may include other uses. Travel speeds are lower with frequent curb cuts and cross streets.



MANAGED LANDSCAPE CHARACTER

"Transition Zones" in the Master Plan

- Areas of growing or planned development
- Indications of potential community expansion in an otherwise natural setting
- Vehicular needs dominate this zone
- Infrequent pedestrian crossings
- Frontage roads are common
- Low-cost treatments are appropriate

COMMUNITY TRANSITION

"Suburban Zones" in the Master Plan

- Zone between downtown and undeveloped edge
- Curb cuts and cross streets generously spaced
- Buildings set back from right of way
- Vehicular and pedestrian needs are balanced
- Pedestrian crossings at signalized intersections
- Bike lane or shared-use path easily integrated
- Buildings have parking in front
- Low- to mid-cost treatments are appropriate

COMMUNITY INTERFACE

"Urban Zones" in the Master Plan

- Pedestrian needs dominate with frequent intersections and crosswalks
- Slower design speeds
- Shorter block lengths
- Traffic calming features
- On-street parking
- Buildings, sidewalks and parking in close proximity to travel lanes
- Mid- to high-cost treatments are appropriate

CITY STREETS

Community Interface

Description

In many communities, highways provide the central point of access to all parts of the community. In small towns, the highway often becomes Main Street, a key component of the community's economic and social vitality. Pedestrian amenities are of primary importance in these areas. The highway must be compatible with pedestrian activities, unifying, not dividing, the town center.

Community interface zones are characterized by lower travel speeds, frequent curb cuts, cross streets, traffic control devices, and increased pedestrian and other non-vehicular traffic. Adjacent land uses are typically commercial, but may include residential areas, schools, parks, and other civic uses. Block lengths are generally shorter, with buildings, sidewalks, and parking in close proximity to the travel lanes.

Program Elements

The primary design objective for community interface zones is the highway's ability to accommodate a variety of town-center activities without reducing its function as a through street. Roadway design in these areas must incorporate traffic calming features that minimize conflicts between pedestrians and vehicles. The following goals establish the approach:

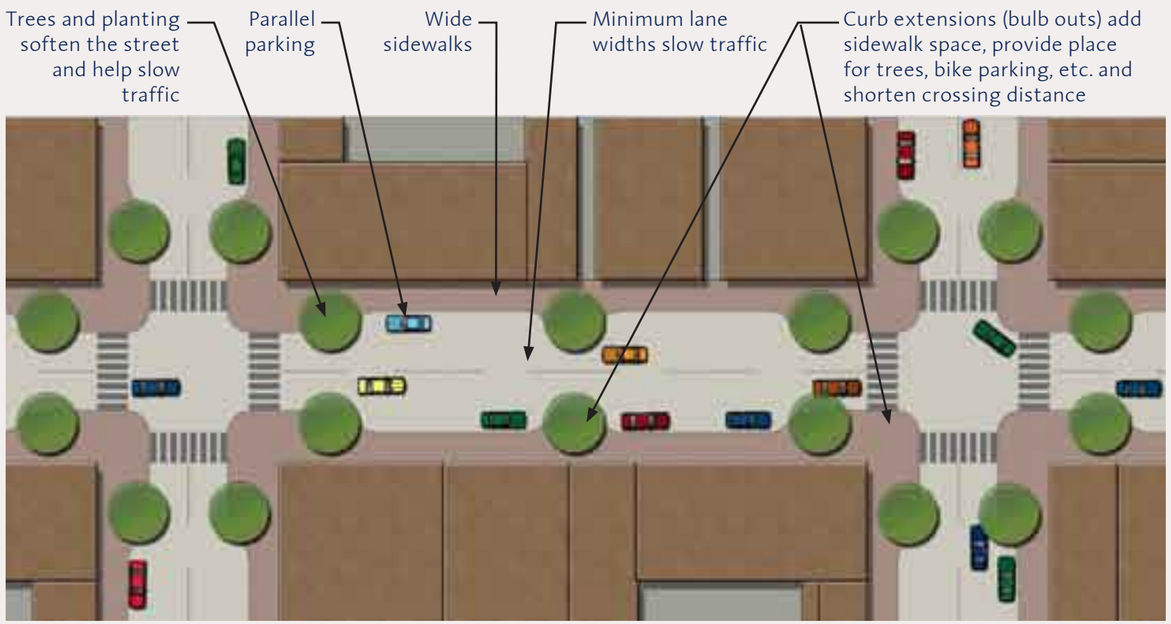
- Manage speed by reducing the appearance of wide roadways. Install raised or planted medians to create pedestrian refuge islands that can double as speed-reduction devices.
- Reduce vehicle-pedestrian conflicts with consolidated curb cuts and planted medians.
- Increase pedestrian safety and reduce cross-

(1) *A 60' right-of-way provides space for on-street parking and widened sidewalks. Streetscaping and pedestrian amenities enliven the downtown area.*

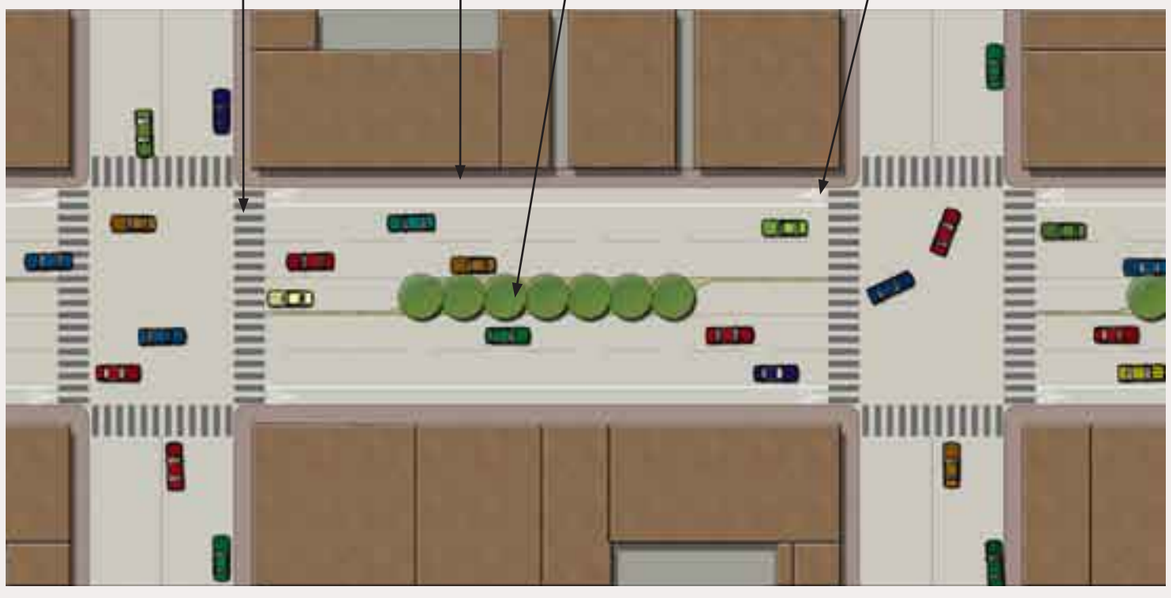
(2) *An 80' right-of-way accommodates dual travel lanes and a planted median. A striped bike lane accommodates cyclists through the community center. Pedestrian amenities may be enhanced with widened sidewalks.*

(3) *The primary design objective for community interface zones is the highway's ability to accommodate a variety of town-center activities without reducing its function as a through street. On-street parking buffers pedestrians from travel lanes and helps slow traffic through town.*

(4) *Incorporating seating areas into the design of pedestrian space enhances the separation from the street.*



(1) *Traffic-calming features such as street tree planting, on-street parking, and curb extensions accentuate downtown community areas.*



(2) *Five lane highways can be softened through raised, planted medians. Roadway design incorporates bike lanes to promote multi-modal transportation through downtown.*

ing distances by combining angle or parallel parking with bulb-outs at crosswalks. Bollards, located at the bulb-outs, a buffer zone separating travel lanes, and angled parking offer additional levels of pedestrian safety. Parallel parking is recommended in areas of limited right-of-way.

- Install pedestrian-activated signals for heavily used mid-block crossings or where the distance between crosswalks exceeds one-quarter mile.

Adding pedestrian-scale amenities within a streetscape also encourages slower travel speeds. The following goals establish the approach:

- Utilize street trees for shade and visual interest.
- Provide lighting that is appropriate in height, style, and intensity.
- Provide signage that is compatible with preferred architectural styles and is visible to pedestrians and vehicles.
- Provide street furnishings, including seating, shelters, trash containers, and wayfinding aids, such as sidewalk inlays.

Clearly marked bike lanes must be incorporated into these stretches of highway. Where on-street parking exists, parallel parking is most compatible with bike lanes, particularly when combined with crosswalk bulb-outs. Where angle parking exists, parking areas must be deep enough to ensure adequate visibility of cyclists. In all cases, it is important to coordinate efforts with local multi-modal transportation plans.

Community Transition

Description

Community transition zones include stretches of highway between the center of a community and its undeveloped edges. These zones provide access to outlying areas of a community and form a buffer between pedestrian-oriented town centers and open stretches of highway on their outskirts. Vehicle needs are balanced with pedestrian needs in these areas. Travel speeds vary, but are generally midway between those in community interface zones and those on open highway. Curb cuts and cross streets are used less frequently than in community interface zones; pedestrian crossings may be present at intersections. Adjacent land uses may be commercial, residential, industrial, or agricultural, but setbacks are typically greater than in community interface zones. Where adjacent uses are commercial, building setbacks commonly consist of large parking lots accessible from the highway.

Program Elements

Design objectives for community transition zones emphasize pedestrian safety in areas that accommodate heavier or higher speed traffic conditions. Objectives for project design include the following goals:

- Provide gateway features to mark the edge of a community. Utilize these opportunities to showcase locally relevant artwork, signage, or plantings.
- Increase visual interest and reinforce reduced speed limits with median landscape treatments.

- Improve pedestrian safety at crosswalks with elements such as refuge islands, signals, improved lighting, and signage.
- Provide separated, shared-use paths in higher speed or heavy traffic areas. Where frontage roads are present, create buffered shared-use paths between the frontage road and highway.
- Require developers to revegetate roadside disturbance to an appropriate level.
- Plant street trees to calm traffic and separate vehicular and pedestrian travel lanes.
- Integrate transit and provide shaded bus stops.

Managed Landscape Character

Description

The managed landscape character zone is distinguished by areas of growing or planned development at community edges. The frequency and density of residential, commercial, or industrial development indicates potential community expansion in an otherwise natural landscape setting. Built elements interrupt the natural environment in a more regular pattern, but without the intensity of urban density.

Program Elements

Objectives for project design include the following goals:

- Emphasize safe pedestrian and bicycle access.
- Provide adequate right-of-way for a separated, shared-use trail.
- Provide regional bike and pedestrian linkages.
- Use earth forms and vegetative materials, instead of sound walls, for acoustic mitigation.
- Identify locations for new wildlife crossings. Manage the corridor to maintain existing crossings and corridors.
- Provide sufficient right-of-way for landscape screening.
- Improve litter control.
- Preserve views of surrounding mountains and scenic vistas.
- Manage outdoor advertising to maximize scenic views and minimize ridgeline obstructions.
- Apply uniform design criteria to blend the roadway with surrounding landscape.
- Revegetate disturbed roadsides.
- Prevent the practice of spreading asphalt millings on road shoulders and promote the use of materials that blend with the natural landscape.

(1) *The potential for streetscape improvements exists in community transition zones, as shown below.*

(2) *Streetscape improvements have the ability to change the character of the roadway and provide a more inviting atmosphere.*

Figure 11 - Rural Highways – Highway Zones

GENERAL HIGHWAY CATEGORIES: RURAL HIGHWAYS – HIGHWAY ZONES

COMMUNITY INTERFACE

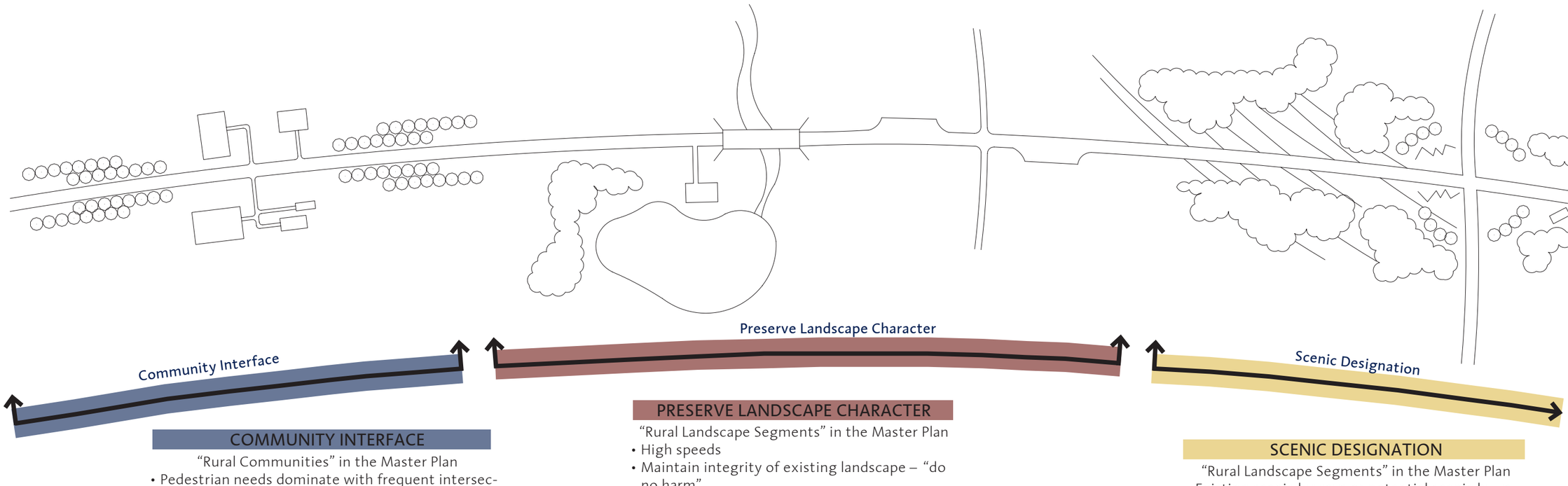
Adjacent Land Uses: Commercial and local community development.

PRESERVE LANDSCAPE CHARACTER

Adjacent Land Uses: Typically includes agricultural or low-density residential. Federal or state land ownership dominates.

SCENIC DESIGNATION

Adjacent Land Uses: Varies from conservation and recreation to significant, historical commercial uses. Includes scenic byways and other portions of the highway that travel through areas of high scenic, cultural, or recreational value.



COMMUNITY INTERFACE

"Rural Communities" in the Master Plan

- Pedestrian needs dominate with frequent intersections and crosswalks
- Slower design speeds
- Shorter block lengths
- Traffic calming features
- On-street parking
- Buildings, sidewalks and parking in close proximity to travel lanes
- Mid- to high-cost treatments are appropriate

PRESERVE LANDSCAPE CHARACTER

"Rural Landscape Segments" in the Master Plan

- High speeds
- Maintain integrity of existing landscape – "do no harm"
- Agriculture or low-density residential development
- Native vegetation and landforms dominate views
- Low-cost treatments are appropriate

SCENIC DESIGNATION

"Rural Landscape Segments" in the Master Plan

- Existing scenic byways or potential scenic byway
- Located along rural highways, city streets, and urban freeways
- Unique scenic, cultural, historic, recreational, and/or natural qualities
- High level of visual management
- Low- to mid-cost treatments are appropriate

RURAL HIGHWAYS

Preserve Landscape Character

Description

Landscape character is best preserved in rural highway design. In rural areas, roadside development consists of agricultural uses or low-density residential. The potential for significant future growth appears to be low. Land ownership is dominated by Federal or State entities such as the USFS or Nevada Division of State Parks (NDSP). Built elements and human interventions are sparsely distributed throughout the landscape. Native vegetation, geologic features, and landforms, dominate the views.

Program Elements

Objectives for project design include the following goals:

- Utilize existing native vegetation to preserve the aesthetic integrity of the roadside.
- Preserve scenic views and viewsheds from the highway.
- Restrict outdoor advertising in scenic locations. Coordinate with local jurisdictions to prevent billboards from obstructing scenic views. Promote outdoor advertising requirements.
- Provide pedestrian and bicycle access to recreation destinations.
- Incorporate a separated, shared-use trail within the right-of-way.
- Incorporate the Place Name Signage program and audio interpretation (radio transmission) at areas with significant historical or natural features.
- Partner with federal and state agencies to coordinate the Corridor Plan with long-term planning.
- Blend the highway alignment with existing topography in order that structures may also blend into the surrounding landscape.
- Re-grade, stain, and revegetate rock cuts to blend with the adjacent hillside.
- Prevent degradation of surrounding landscape. Minimize vegetation removal during construction and maintenance practices.
- Prevent the practice of spreading asphalt millings on road shoulders. Use materials that blend with the natural landscape.
- Revegetate disturbed highway areas with native seed mix or salvaged plant materials where possible.
- Identify locations for new wildlife crossings and opportunities for improvements to existing wildlife crossings.
- Screen or visually blend maintenance facilities from roadway.
- Improve litter collection along the corridor.
- Provide activity pull-offs along the highway for recreation area access and pull-over traffic.

Scenic Designation

Description

Scenic designation includes existing and proposed scenic byways where scenic, cultural, historic, recreational, and/or natural qualities dominate the highway landscape. Facilities in these areas require the highest level of management and should incorporate enhanced treatment levels and a higher level of detail. Designation is based on scenic preservation, visual management, and access to recreational opportunities.

Program Elements

Objectives for project design include the following goals:

- Preserve existing view corridors.
- Protect scenic areas by prohibiting structures that obscure views.
- Incorporate a separated, shared-use trail within the right-of-way.
- Provide rest areas that serve a diversity of purposes, including access to recreational opportunities, trailheads, and stopping points along shared-use trails.
- Limit vegetative clearing to the extent feasible. Allow for safety considerations and vehicle recovery within the clear zone. Minimize vegetation removal during construction and maintenance practices.
- Reduce the number of superfluous signs.
- Minimize the visual distraction of reflectors. Allow reflector components to blend with the background while maintaining the effectiveness of the reflector.
- Create structures that blend with the landscape by incorporating interesting textures and earth-tone colors.
- Preserve downhill trees to screen the roadway from off-site locations.
- Align highway to blend facilities into the surrounding landscape.
- Re-grade, stain, and revegetate rock cuts to blend with the adjacent hillside.
- Revegetate disturbed highway areas with native seed mix or salvaged plant materials where possible.
- Locate signage for scenic viewpoints at least 600’ prior to entry. Provide screening for safety and enhanced visual quality.
- Reduce glare of traffic signs by painting the backsides.
- Provide barrier systems that define the travel corridor but do not dominate the setting. Barrier systems should become an integral part of the roadway and surrounding landscape.
- Identify locations for new wildlife crossings and opportunities for improvements to existing wildlife crossings.
- Screen or visually blend maintenance facilities from roadway.
- Incorporate the Place Name Signage program at locations with significant historical or natural features. Integrate interpretative elements throughout the corridor.
- Form partnerships with federal and state agencies to coordinate the long-term planning measures for the Corridor Plan.

(1) *Scenic byways and highways through areas of high visual quality warrant special design treatments equal to their natural setting.*

SECTION TWO: Great Basin Forest

THEME

The Great Basin Forest design segment provides entry to Nevada along US 395 from the south. It is marked by Topaz Lake and surrounding mountain vistas. Stretching from the state line to Carson Valley, this rural section of US 395 is characterized by pinyon-juniper forests and rock outcroppings with views to the Sierra Mountains.

The gateway to the state creates an important impression and introduces the state to visitors. Overlooking Topaz Lake and mountains beyond, the gateway utilizes rustic materials and simple architectural forms to capture the essence of the rural and scenic landscape. Subtle colors derived from the surrounding pinyon-juniper forest help to blend the facility with its environment.

The Great Basin Forest Corridor rises over the Sierra foothills before dropping back into the Carson Valley. Preserving the rural and rugged character of the landscape will ensure that visitors continue to be impressed by this stretch of eastern Sierra highway.

DESIGN SEGMENT OBJECTIVES

The Great Basin Forest design segment runs from the California state line at Topaz Lake to the southern edge of Carson Valley. Design objectives include enhancing the sense of community in Topaz Lake and preserving the visual quality of the roadway through the pinyon-juniper forests. The following objectives have been established specifically for this segment.

Preserve Landscape Character

- Preserve scenic views of Topaz Lake.
- Coordinate with Douglas County to improve the visual quality of the roadside. Partner with community to screen or relocate cluttered and unattractive development adjacent to the roadway.
- Utilize pinyons and junipers as part of landscape palette.
- Provide a statewide gateway monument at the California-Nevada border. Utilize signage that both welcomes and thanks travelers. Coordinate signage with the surrounding landforms and vegetation. Consider bi-state cooperation opportunities.
- Relocate existing pull-off to an appropriate viewpoint of Topaz Lake. Buffer viewpoint from the highway's travel lanes. Create a pleasant facility for travelers.
- Provide gateway viewpoint at the California/Nevada state line that offers views of the lake and travel information regarding tourism opportunities within Nevada. Incorporate rough-hewn timbers, stone, and dark earth-tone colors in the design.
- Incorporate Bidwell Trail interpretation into road service facilities.

(1) *Great Basin Forest (Segment A) key map.*

(2) *Preservation of landscape character can be achieved through the use of pinyons and junipers as part of the roadside revegetation.*

CONTINUE ON MAP B1

A1

Visual Gateway to Carson Valley

15

US 395

10

5

0

GREAT BASIN FOREST LANDSCAPE DESIGN SEGMENT

Preserve Landscape Character

Statewide Gateway Location

Nevada

California

Pine Nut Mountains

Holbrook Junction

Topaz Lake

Antelope Valley

BIDWELL HISTORIC TRAIL

West Walker River

Wellington

SR 824

SR 823

SR 208

Smith

SR 208

SR 829

SR 338

Douglas County

Lyon County

Lyon County

Mineral County

Pine Grove Hills

LEGEND

GREAT BASIN FOREST LANDSCAPE DESIGN SEGMENT

Preserve Landscape Character

Landscape and Aesthetics Element

Key Highway Intersection

Existing Regional Trail

0 1.5 3 6

NORTH

SCALE: 1 inch equals 3 miles

MAP A1

2.14

DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill

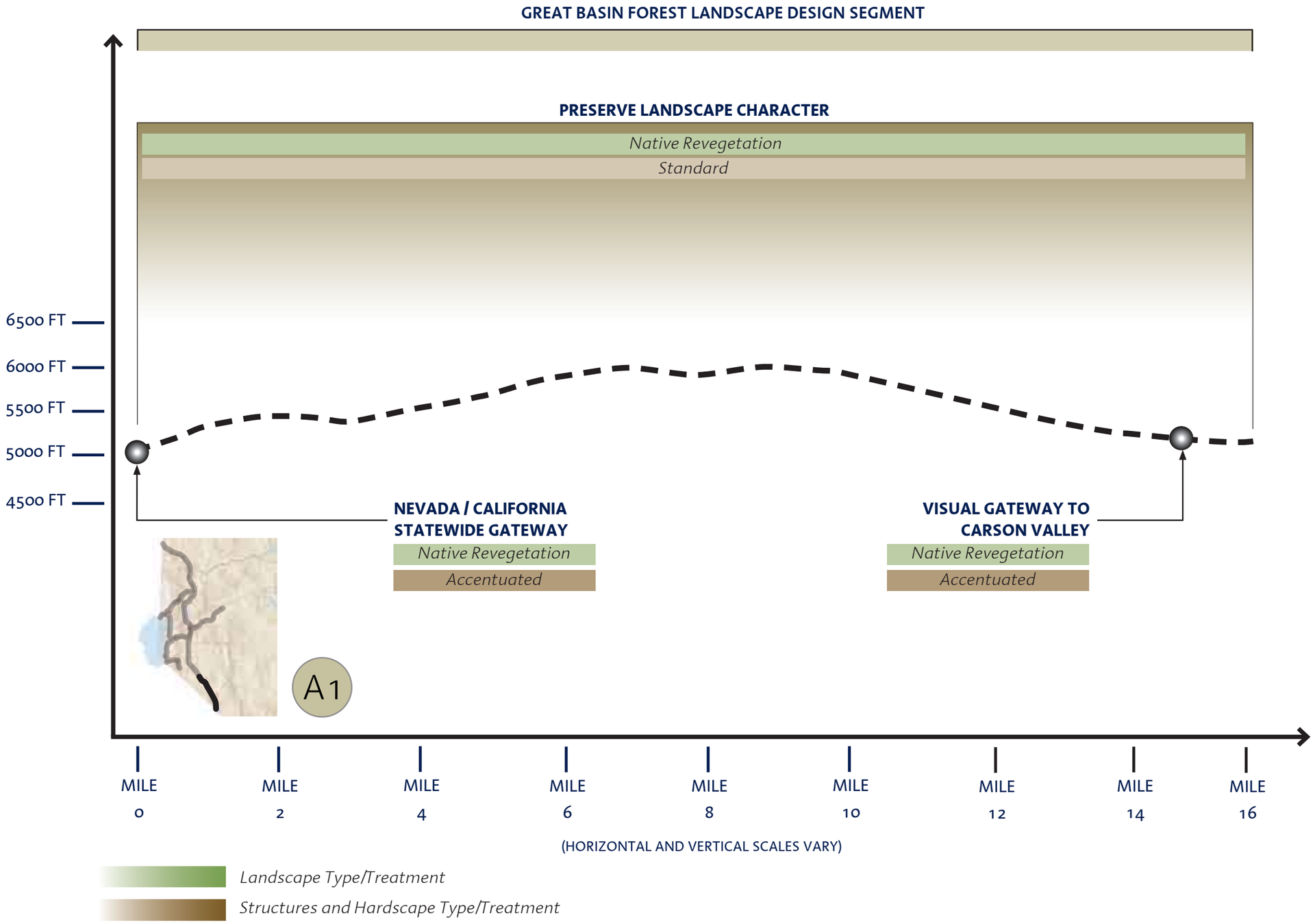
CONSULTANT TEAM

GREAT BASIN FOREST – DESIGN OBJECTIVES

US 395: TOPAZ LAKE TO DOUGLAS CO. MM 16

UNLV LANDSCAPE ARCHITECTURE & PLANNING RESEARCH

NEVADA DOT



ELEMENTS

Preserve Landscape Character

1. Incorporate separated shared-use path from Gardnerville to Topaz Lake.
2. Identify wildlife crossing opportunities.
3. Maintain aesthetic integrity of landscape.
4. Work with Bureau of Indian Affairs to mitigate billboards.

Nevada/California Statewide Gateway

1. Mark entry and exit.
2. Provide viewpoint at entry.
3. Incorporate rough hewn timbers.
4. Interpret Native American history.
5. Create viewpoint to overlook Topaz Lake.

Visual Gateway to Carson Valley

1. Establish entry to and exit from Carson Valley.
2. Provide a simple architectural feature of local stone and regional character.

GREAT BASIN FOREST – LONGITUDINAL SECTION

US 395: TOPAZ LAKE TO DOUGLAS CO. MM 16

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PLACES
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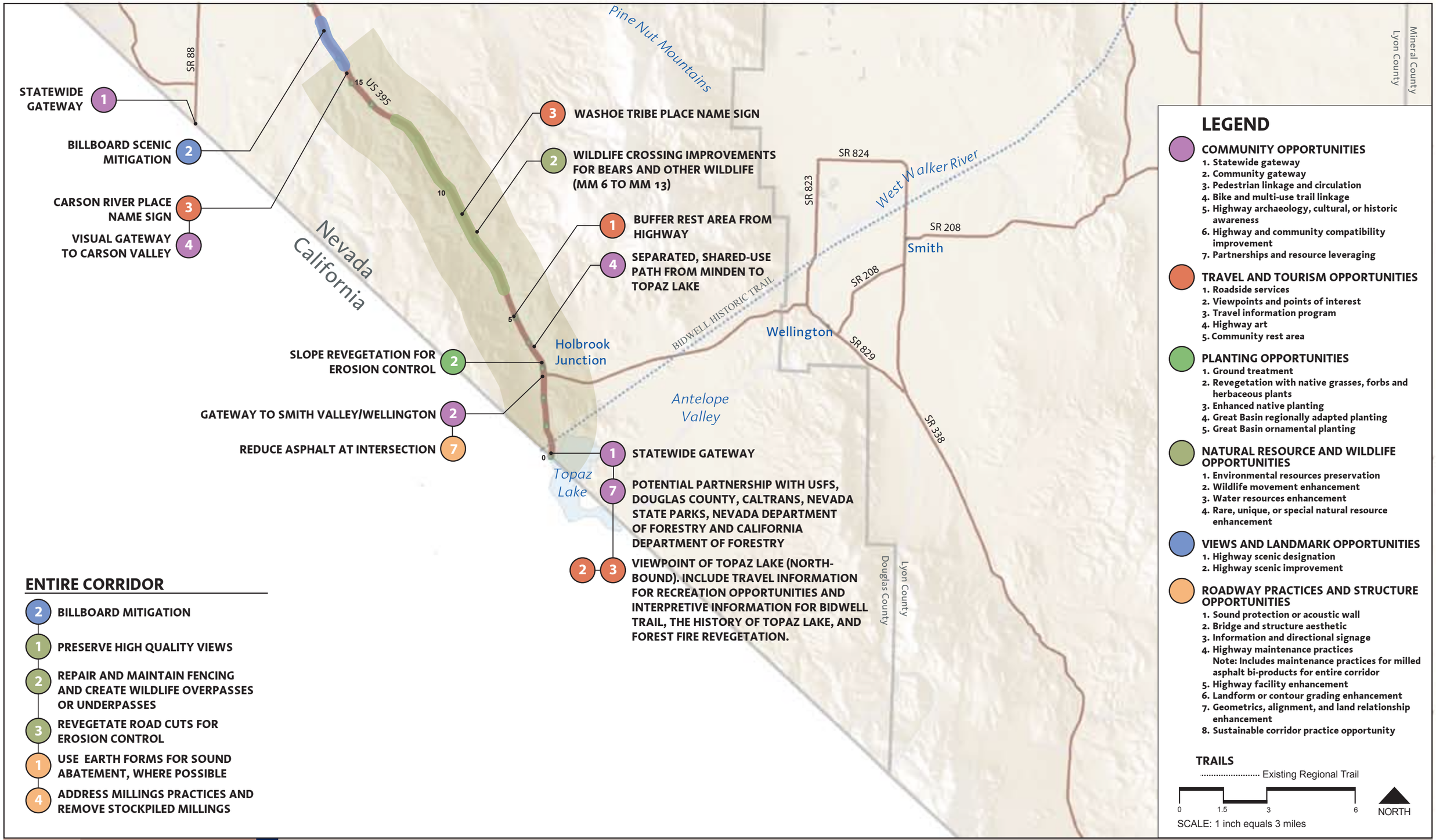
CH2MHill



ENTIRE CORRIDOR

- 2 BILLBOARD MITIGATION
- 1 PRESERVE HIGH QUALITY VIEWS
- 2 REPAIR AND MAINTAIN FENCING AND CREATE WILDLIFE OVERPASSES OR UNDERPASSES
- 3 REVEGETATE ROAD CUTS FOR EROSION CONTROL
- 1 USE EARTH FORMS FOR SOUND ABATEMENT, WHERE POSSIBLE
- 4 ADDRESS MILLINGS PRACTICES AND REMOVE STOCKPILED MILLINGS

LEGEND

COMMUNITY OPPORTUNITIES
1. Statewide gateway
2. Community gateway
3. Pedestrian linkage and circulation
4. Bike and multi-use trail linkage
5. Highway archaeology, cultural, or historic awareness
6. Highway and community compatibility improvement
7. Partnerships and resource leveraging

TRAVEL AND TOURISM OPPORTUNITIES
1. Roadside services
2. Viewpoints and points of interest
3. Travel information program
4. Highway art
5. Community rest area

PLANTING OPPORTUNITIES
1. Ground treatment
2. Revegetation with native grasses, forbs and herbaceous plants
3. Enhanced native planting
4. Great Basin regionally adapted planting
5. Great Basin ornamental planting

NATURAL RESOURCE AND WILDLIFE OPPORTUNITIES
1. Environmental resources preservation
2. Wildlife movement enhancement
3. Water resources enhancement
4. Rare, unique, or special natural resource enhancement

VIEWS AND LANDMARK OPPORTUNITIES
1. Highway scenic designation
2. Highway scenic improvement

ROADWAY PRACTICES AND STRUCTURE OPPORTUNITIES
1. Sound protection or acoustic wall
2. Bridge and structure aesthetic
3. Information and directional signage
4. Highway maintenance practices
   Note: Includes maintenance practices for milled asphalt bi-products for entire corridor
5. Highway facility enhancement
6. Landform or contour grading enhancement
7. Geometrics, alignment, and land relationship enhancement
8. Sustainable corridor practice opportunity

TRAILS

Existing Regional Trail

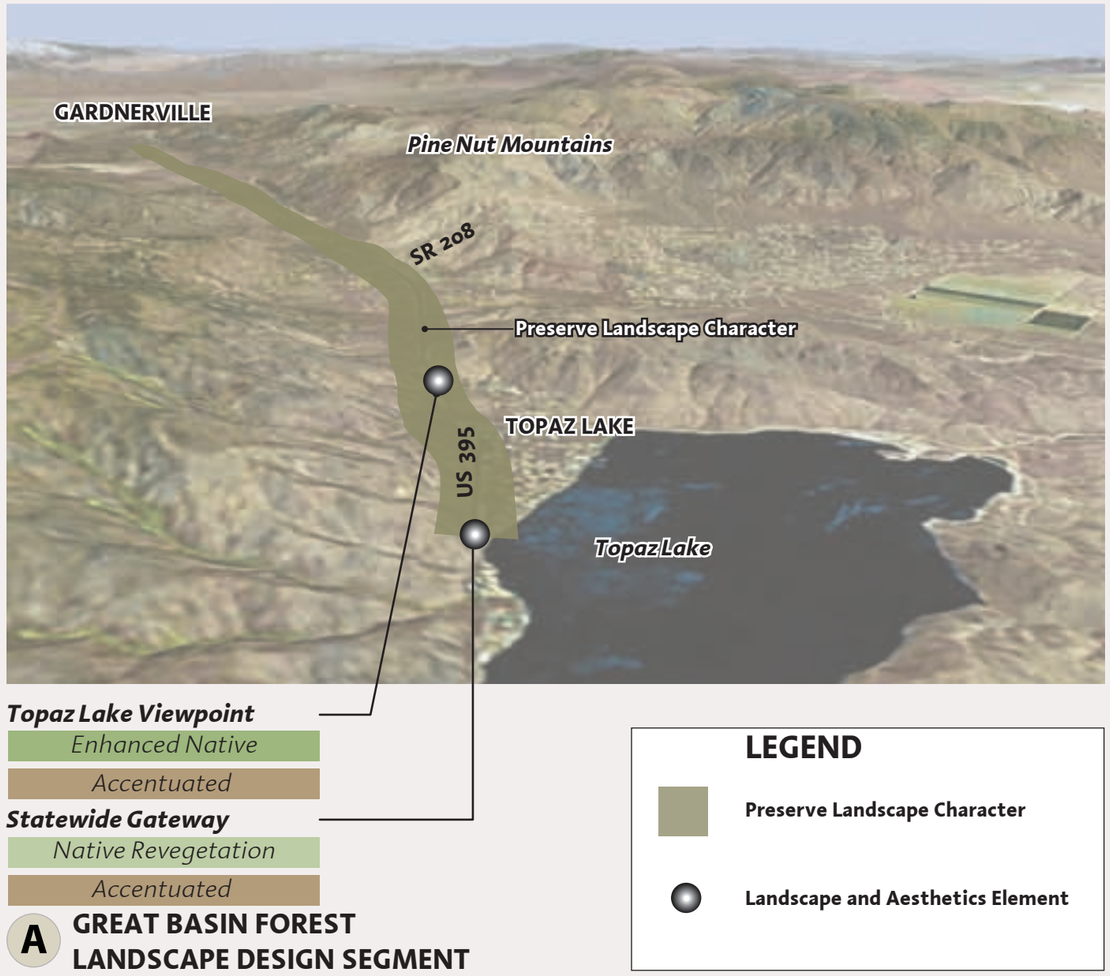
0 1.5 3 6

NORTH

SCALE: 1 inch equals 3 miles

Aerial Landscape and Aesthetic Treatment Simulations

The following aerial images are meant to illustrate landscape and aesthetic treatments at key points along the Great Basin Forest Landscape Design Segment.



***(1)** This aerial view looks north towards Carson Valley along US 395 from Topaz Lake. The statewide gateway is located at the California border. Native revegetation and standard hardscape treatments are used along the segment.*

Design Interpretation Summary – Great Basin Forest

Interpretation of the segment's design themes occurs during individual project design. The corridor plan establishes the direction for project level design. Examples illustrate forms and materials that could be used to accomplish the stated design objectives.

(1) *Preservation of vegetation and revegetation of disturbed areas strengthens the area's natural beauty and draws attention to its distinctive pinyon/juniper plant community.*

(2) *Structure design can reflect the natural forms of the landscape.*

(3) *Structures marking community entries reinforce the character of an area.*

(4), (5) *Hand-crafted structures and simple forms express the rugged quality of the Great Basin Forest Landscape Design Segment.*

(6) *Overlooks highlight unique and scenic landscape features.*

(1) *Incorporating a subtle statewide entry sign with a viewpoint pull-off area welcomes travelers and provides opportunities to learn about state resources and regional environmental resources.*

(2) *The existing entry into Nevada near Topaz Lake lacks a visually inviting aesthetic.*

(3) *Opportunities exist at the statewide gateway near Topaz to view the unique Topaz Lake vista. Combinations of shaded seating areas and interpretive elements provide traveler amenities and enhance the overall experience.*

(1) *Capital Crossroads (Segment B) key map.*

(2) *The construction of the Carson City Freeway creates the opportunity to enhance streetscape amenities within the Historic Downtown/Capitol Mall area of Carson City. Wider sidewalks and pedestrian safety islands create a friendlier environment.*

SECTION THREE: Capital Crossroads

THEME

The Capital Crossroads design segment is notable because of its pioneering history and role as the civic capital of northern Nevada. The segment includes US 395 from Carson Valley through Carson City, and US 50 from Carson City to Dayton, a region that served as the trading center for the Comstock Lode mining district. The design theme for this segment focuses on the historical significance of the area.

In downtown Minden and Gardnerville, signage with an historic focus highlights unique aspects of each community. Similar to Carson City, the downtown core areas transition to pedestrian-oriented roadways with traffic calming, widened sidewalks, pedestrian crossings, and signage informing visitors of unique opportunities for visiting community sites.

Carson City, Minden, and Gardnerville utilize consistent background landscape treatments. Pedestrian connections and median safety islands offer safe crossing zones. Median and sidewalk enhancements provide relief for large spans of roadway. Managed curb cuts for parking entries allow for safe and well-planned access. Upgraded plantings and hardscape highlight key intersections that serve recreation sites such as Lake Tahoe. In the rural areas, the highways bisect the landscape with minimal disturbance. Recreational opportunities, such as horseback riding and fishing in the Carson Valley, are highlighted with travel information provided at viewpoints and on place name signs. Roadside development is carefully managed, preserving views of the Carson Range and adjacent ranches within Carson Valley. Sculptural earth forms and revegetation soften the edges of new developments.

The vernacular architecture and historical features of each community add diversity and enrichment to the traveler's experience. In Carson City, the immediate view from the roadway focuses on the city center and capital grounds. Regional ornamental softscape and focal hardscape treatments delineate the capital grounds and adjacent civic uses. The new Carson City Freeway reduces traffic in the downtown core, facilitating enhanced pedestrian use. Wide sidewalks, well-marked and designed roadway crossings, and traffic calming provide for comfortable pedestrian circulation. Ample signage informs visitors of numerous historic sites, recreational opportunities, and community facilities.

Stretching from the eastern side of Carson City to Dayton on US 50, the roadway is designed to accommodate high daily traffic volumes. Right-of-way management considers the area's growth and desire to maintain viewsheds and rural character. Revegetation efforts are implemented and maintained as needed to provide dust control. ATV disturbance is considered during segment design. The right-of-way encourages pedestrian and bicycle travel and provides safe crossings. Continuing east, signs demarcate nearby community sites. Traffic calming measures in Dayton slow motorists and facilitate well-managed access to commercial areas. Signage appropriate to the town's historic character highlights tourist opportunities in adjacent Old Town Dayton.

DESIGN SEGMENT OBJECTIVES

The Capital Crossroads segment includes the Carson City, Carson Valley, and Dayton areas. These developing communities create unique pressures on the highway. In response, design goals include creating pleasing downtown environments, managing community transition areas, and preserving the scenic character of the roadway. In addition to general goals associated with community transition, community interface, scenic designation, and managed landscape character zones, the following objectives have been established specifically for this segment.

Community Transition

- Provide gateway entries and exits that reflect community character and the landscape setting.
- Consolidate community entry signage. Simplify the number of signs and boldly represent the community character.
- Coordinate the location of gateways with community goals and future growth plans.
- Continue regional trails through the right-of-way. Incorporate a separated, shared-use trail.
- Support efforts to reduce vehicular speeds as motorists enter town. Increase densities of roadside plantings. Incorporate transit stops.

Community Interface - Carson Valley

- Soften roadway appearance and visually mitigate large parking areas fronting the highway through plantings.
- Incorporate a separated, shared-use trail within right-of-way where feasible. Incorporate streetscape planting to separate bike paths and sidewalks from travel lanes.

- Provide bike lane through community center to connect regional trails to commercial destinations.
- Within Carson City, and potentially Minden and Gardnerville, evaluate potential streetscape improvements resulting from the Carson City Freeway and other potential bypasses. Allow for the addition of planted medians, street trees, and bike lanes.
- Recognize historic districts through enhanced streetscape and pedestrian amenities.
- Incorporate street tree programs in Minden, Gardnerville, Carson City, and Dayton.
- Improve the safety of pedestrian crossings. Create bulb-outs and refuge islands, and add signage.
- Incorporate safe facilities for multi-modal transportation. Provide shaded bus stops with plantings.
- Provide directional signage to the community historical destinations such as the Historic Downtown/Capitol Mall and Old Town Dayton encouraging travelers to visit.

Scenic Designation

- Preserve scenic views of the Carson Range and ranches along the design segment.
- Improve riparian areas and river crossings with plantings and erosion control features that mimic natural features and enhance riparian habitat.
- Apply for scenic byway designation through Carson Valley and along Jack's Valley Road.
- Manage the roadway system to maintain the area's rural character. Utilize earth forms and vegetative buffers to mitigate conflicts with roadside development.
- Revegetate disturbed areas and allow the roadway to fit within the natural environment.
- Allow motorists to connect to the surrounding environment by providing place name signage and interpretative information.

Community Interface - Carson City

- Enhance the pedestrian character of the downtown area. Improve sidewalks and streetscape amenities. Provide enhanced refuge zones and pedestrian crossings.
- Reduce road widths or the number of travel lanes. The freeway creates an opportunity to reinvent the Historic Downtown/Capitol Mall's streetscape character and introduce enhanced pedestrian facilities. Enhance median and streetscape plantings.
- Coordinate tourism information and signage to direct visitors to historic sites.
- Create a corridor that prominently emphasizes civic quality.

Urban Background - Carson City Freeway

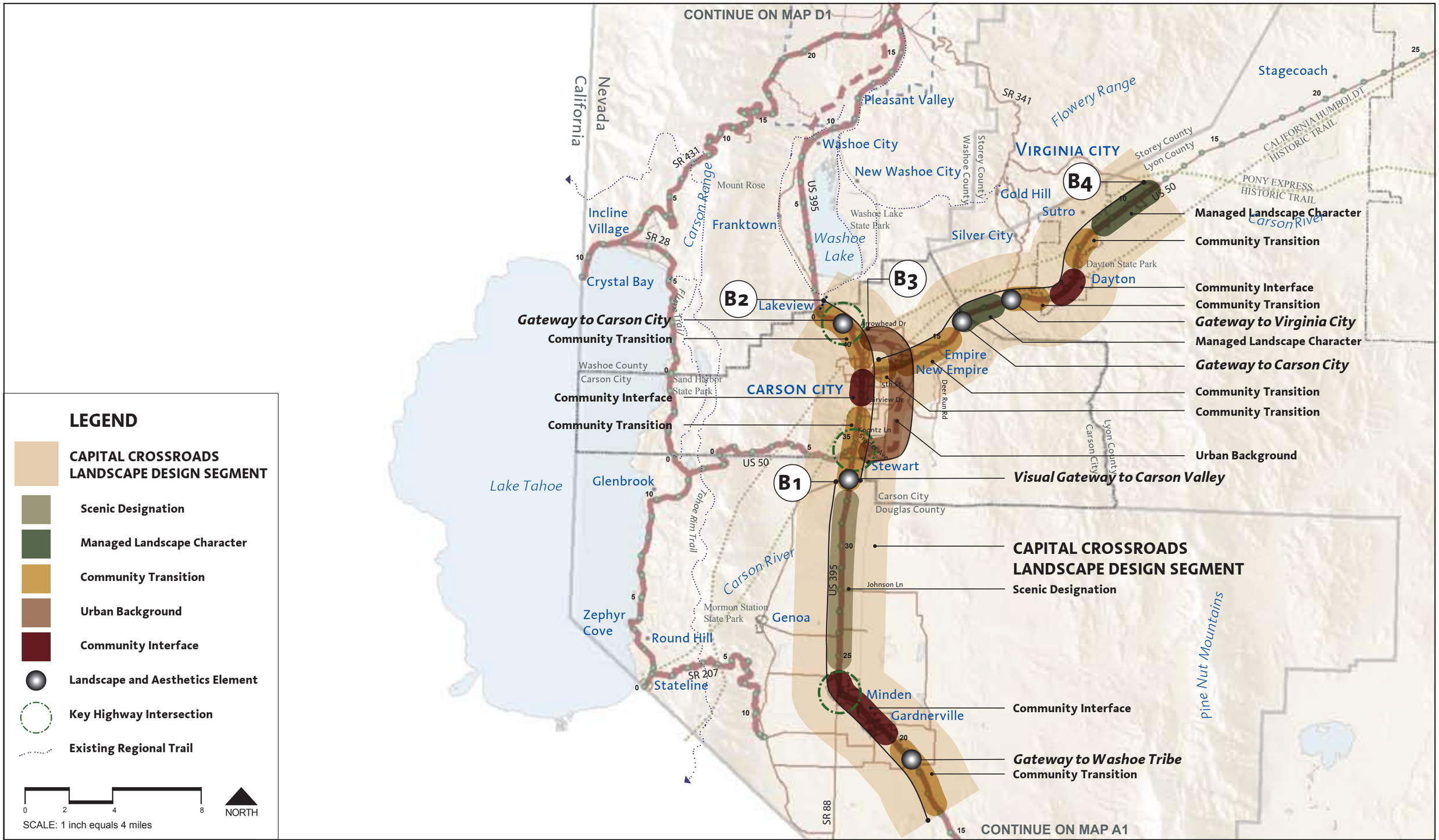
- Reflect the importance of surrounding environmental features such as the mountains to the west and the hills to the east.
- Utilize native revegetation seed mixes to blend features into existing landscape.
- Utilize landscape boulders on highly visible freeway slopes.
- Utilize boulders excavated during construction for aesthetic treatments.
- Contour slopes with gentle undulations to simulate a natural terrain.

Managed Landscape Character

- Incorporate shared-use trail in right-of-way to connect Carson City and Dayton. Provide connections to regional trails.
- Maintain adequate right-of-way width to buffer new development with earth forms and vegetative screening.
- Revegetate disturbed roadsides.
- Interpret and provide connections to the V&T Railroad, Virginia City, and the Comstock Lode.
- Use a simple palette of materials that blend with the contextual landscape.
- Maintain view corridors of surrounding mountain ranges.
- Incorporate wildlife crossings to accommodate wild horses.

(1) *Within downtown community interface areas, pedestrian-oriented roadways include traffic calming features such as widened sidewalks, on-street parking, and pedestrian crossings. Signage should inform visitors of unique opportunities for visiting community sites.*

(2) *Pressure from developing communities, such as the Dayton area, create unique pressures on the highway. Design goals include coordinating new development to maintain a revegetated buffer along highway.*



LEGEND

CAPITAL CROSSROADS LANDSCAPE DESIGN SEGMENT

- Scenic Designation
- Managed Landscape Character
- Community Transition
- Urban Background
- Community Interface
- Landscape and Aesthetics Element
- Key Highway Intersection
- Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

MAP B1

2.22

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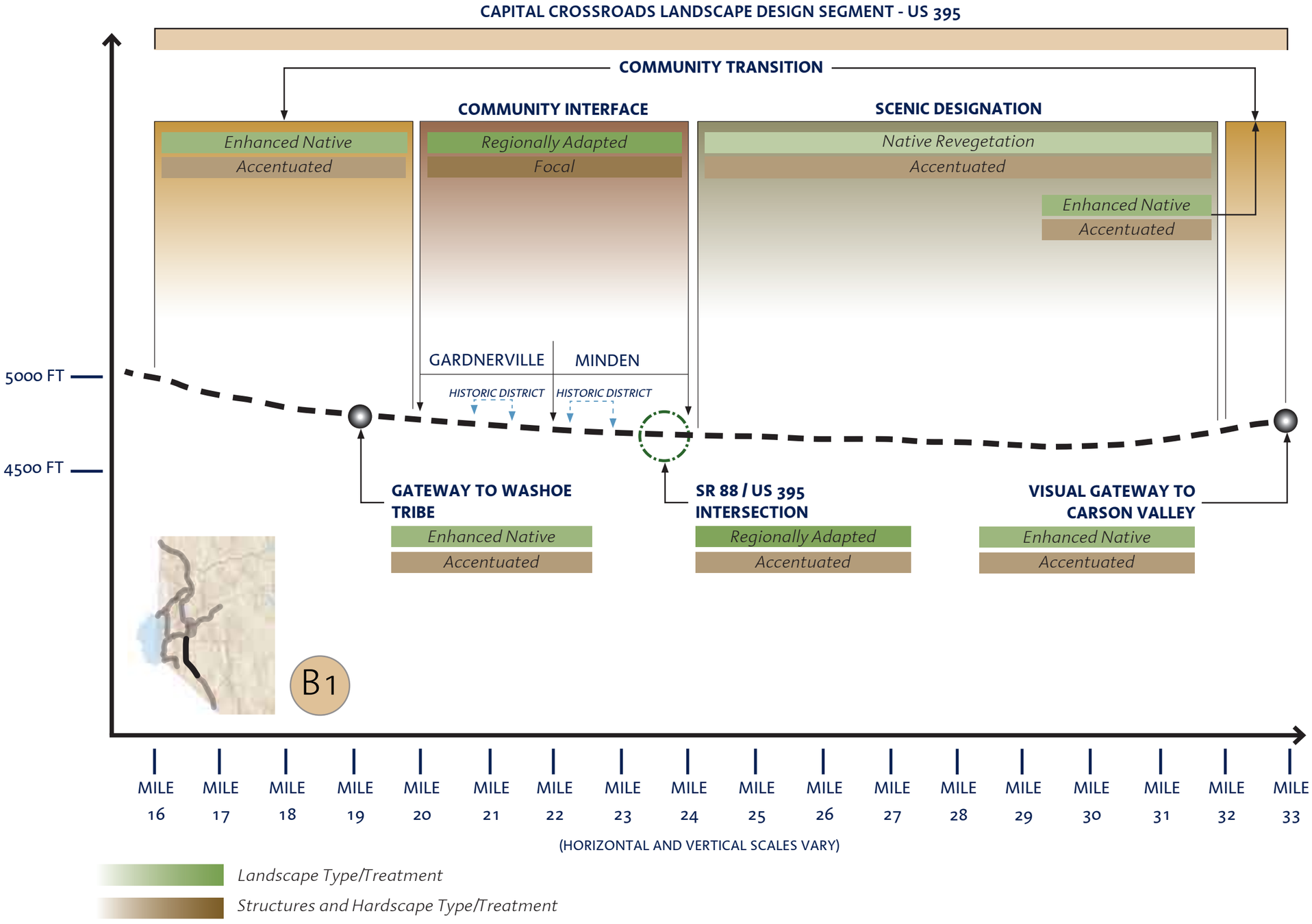
US 395, West US 50, SR 28, SR 207 and SR 431 corridor plan

CAPITAL CROSSROADS – DESIGN OBJECTIVES

US 395: CARSON VALLEY, CARSON CITY, AND DAYTON

UNLV LANDSCAPE ARCHITECTURE & PLANNING PROGRAM

NEVADA DOT



ELEMENTS

Community Interface - Gardnerville and Minden

1. Provide signage to historic main street.
2. Establish community gateway at SR 88 intersection.
3. Link regional trails with marked and signed bike trails through town.
4. Preserve downtown character.
5. Utilize brick masonry compatible with historic buildings.
6. Utilize consistent street lighting fixtures.
7. Enhance street tree program. Provide regularly spaced trees to distinguish districts. Consider creating a planted median to calm traffic.

Scenic Designation

1. Preserve open views.
2. Highlight ranching character and historical connections to Genoa.
3. Designate scenic byway from SR 88 intersection to south of Jack's Valley Road intersection.

Gateway to Washoe Tribe

1. Interpret Native American culture.
2. Provide information about how to respect Native American lands. Increase awareness of regulations, permits, and ways to be respectful at kiosk.

SR 88 / US 395 Intersection

1. Provide gateway to Minden/Gardnerville.
2. Reduce paving.
3. Interpret ranching and wildlife character.
4. Utilize materials consistent with historic character.
5. Consider utilizing a roundabout.

Visual Gateway to Carson Valley

1. Establish entry into and exit from Carson Valley.
2. Provide simple architectural feature of local stone and regional character.

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CAPITAL CROSSROADS – LONGITUDINAL SECTION

US 395: DOUGLAS CO. MM 16 TO DOUGLAS CO. MM 33

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ELEMENTS

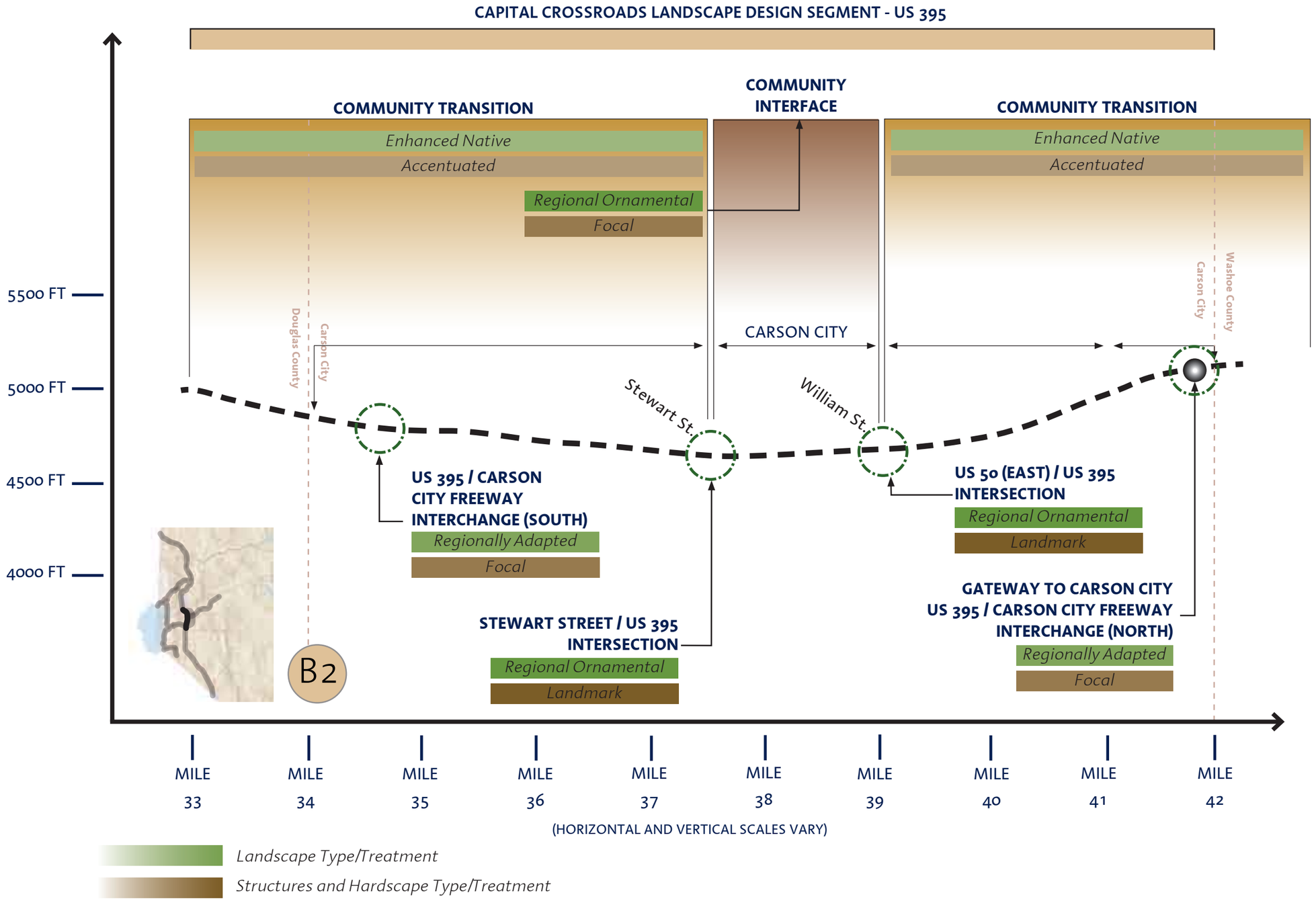
Community Interface
1. Establish civic presence.
2. Recognize historic significance and city's importance to the state.
3. Utilize cut stone and historical elements.

US 395 / Carson City Freeway Interchange (South)
1. Establish the entry into the state Capital.
2. Emphasize unique landforms and geologic features.

Stewart Street / US 395 Intersection
1. Establish the gateway to the Historic Downtown/Capitol Mall area traveling north along US 395.

US 50 (East) / US 395 Intersection
1. Establish the gateway to the Historic Downtown/Capitol Mall area.

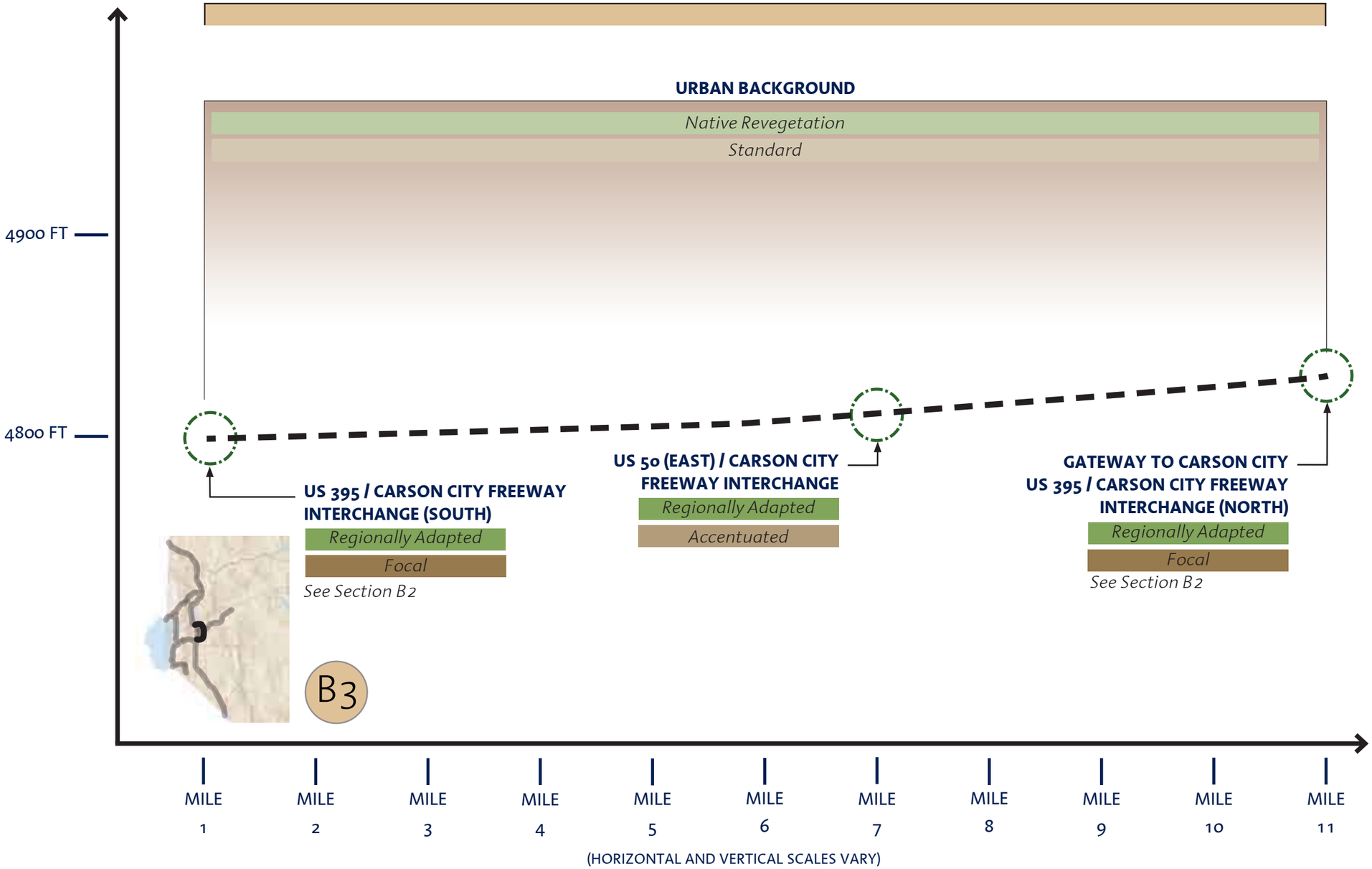
Gateway to Carson City US 395 / Carson City Freeway Interchange (North)
1. Create a stately civic gateway into the Capital City.
2. Incorporate historical elements.
3. Include access to trailheads.



CAPITAL CROSSROADS – LONGITUDINAL SECTION

US 395: DOUGLAS CO. MM 33 TO CARSON CITY/WASHOE CO. BOUNDARY

CAPITAL CROSSROADS LANDSCAPE DESIGN SEGMENT - CARSON CITY FREEWAY



ELEMENTS

Urban Background

1. Emphasize surrounding geology and landforms as design elements.
2. Paint/stain highway facilities to coordinate and visually recede into the contextual landscape.
3. Incorporate rock outcroppings where appropriate.
4. Create pedestrian linkages to ensure the community is not separated by the Freeway.

US 395 / Carson City Freeway Interchange (South)

1. Establish the entry into the state Capital.
2. Emphasize unique landforms and geologic features.

US 50 (East) / Carson City Freeway Interchange

1. Establish a civic presence to provide entry into the Historic Downtown/Capitol Mall area.

Gateway to Carson City US 395 / Carson City Freeway Interchange (North)

1. Create a stately civic gateway into the Capital City.
2. Incorporate historical elements from the V&T Railroad.
3. Include access to trailheads.

ELEMENTS

Community Interface - Dayton

1. Provide gateway connection to Old Downtown.
2. Establish community gateways that are integrated into highway facilities and include historic features.
3. Minimize access through Moundhouse area. Provide revegetated median.
4. Coordinate new development to maintain revegetated buffer along highway.
5. Address floodplain issues during highway design.

Gateway Viewpoint and Point of Interest to Carson City (V&T Railroad Bridge)

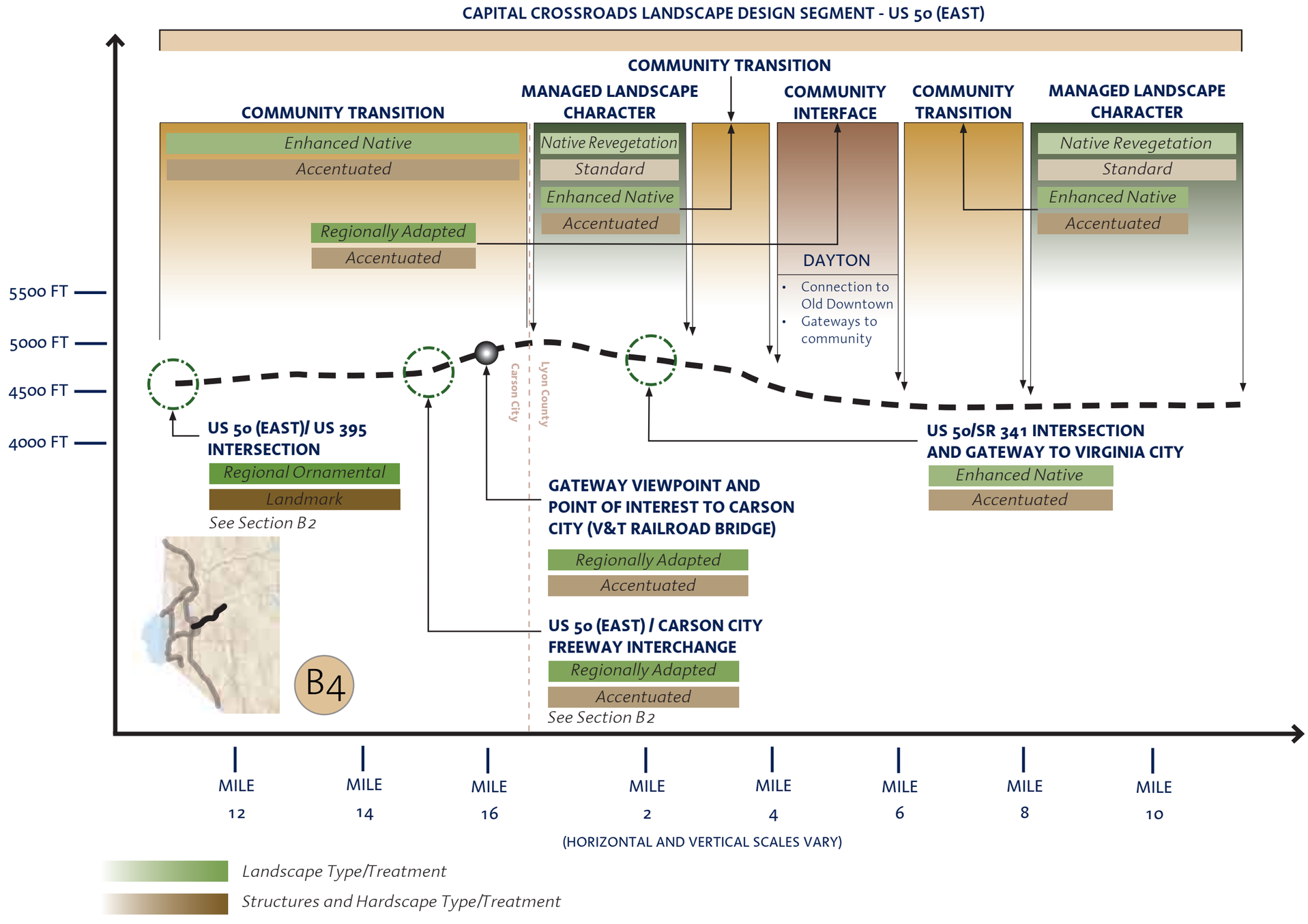
1. Create gateway announcing the entry into Carson City and the State Capital. Locate at the visual entry into the valley.
2. Integrate built elements into the hillside.

US 50 / SR 431 Intersection and Gateway to Virginia City

1. Establish entry into Virginia City.
2. Provide thoughtful interpretation of Comstock Lode and V&T Railroad.

Managed Landscape Character

1. Revegetate disturbed areas.
2. Utilize scattered rock mulch for dust control.



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CAPITAL CROSSROADS – LONGITUDINAL SECTION

US 50: CARSON CITY TO SIX MILE CANYON ROAD

UNLV LANDSCAPE ARCHITECTURE & PLANNING RESEARCH
NEVADA DOT

LEGEND

COMMUNITY OPPORTUNITIES
1. Statewide gateway
2. Community gateway
3. Pedestrian linkage and circulation
4. Bike and multi-use trail linkage
5. Highway archaeology, cultural, or historic awareness
6. Highway and community compatibility improvement
7. Partnerships and resource leveraging

TRAVEL AND TOURISM OPPORTUNITIES
1. Roadside services
2. Viewpoints and points of interest
3. Travel information program
4. Highway art
5. Community rest area

PLANTING OPPORTUNITIES
1. Ground treatment
2. Revegetation with native grasses, forbs and herbaceous plants
3. Enhanced native planting
4. Great Basin regionally adapted planting
5. Great Basin ornamental planting

NATURAL RESOURCE AND WILDLIFE OPPORTUNITIES
1. Environmental resources preservation
2. Wildlife movement enhancement
3. Water resources enhancement
4. Rare, unique, or special natural resource enhancement

VIEWS AND LANDMARK OPPORTUNITIES
1. Highway scenic designation
2. Highway scenic improvement

ROADWAY PRACTICES AND STRUCTURE OPPORTUNITIES
1. Sound protection or acoustic wall
2. Bridge and structure aesthetic
3. Information and directional signage
4. Highway maintenance practices
   Note: Includes maintenance practices for milled asphalt bi-products for entire corridor
5. Highway facility enhancement
6. Landform or contour grading enhancement
7. Geometrics, alignment, and land relationship enhancement
8. Sustainable corridor practice opportunity

TRAILS
Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

ENTIRE CORRIDOR

- 2 BILLBOARD MITIGATION
- 1 PRESERVE HIGH QUALITY VIEWS
- 2 REPAIR AND MAINTAIN FENCING AND CREATE WILDLIFE OVERPASSES OR UNDERPASSES
- 3 REVEGETATE ROAD CUTS FOR EROSION CONTROL
- 1 USE EARTH FORMS FOR SOUND ABATEMENT, WHERE POSSIBLE
- 4 ADDRESS MILLINGS PRACTICES AND REMOVE STOCKPILED MILLINGS

CARSON CITY COMMUNITY

- 2 COMMUNITY GATEWAYS (3)
- 3 PEDESTRIAN CROSSING ENHANCEMENTS
- 4 DEDICATED BIKE LANE
- 3 STATE CAPITAL COMPLEX INTERPRETATION
- 4 COORDINATE STREETSCAPE PLANTINGS WITH URBAN FORESTRY PROGRAM

MINDEN/GARDNERVILLE COMMUNITY

- 2 COMMUNITY GATEWAYS (PER COMMUNITY PLANS)
- 3 PEDESTRIAN CROSSING ENHANCEMENTS
- 4 MULTI-USE TRAIL CONNECTIONS
- 4 DEDICATED BIKE LANE
- 4 STREETSCAPE AND PLANTINGS

- 3 INVERTED SIPHON PLACE NAME SIGN
- 4 FRANKTOWN BICYCLE LOOP CONNECTION
- 3 ROCK POINT MILL PLACE NAME SIGN

DAYTON COMMUNITY

- 2 DAYTON COMMUNITY GATEWAYS (2)
- 3 PEDESTRIAN CROSSINGS
- 5 OLD DOWNTOWN SIGNAGE
- 3 PONY EXPRESS AND VIRGINIA CITY PLACE NAME SIGNS
- 4 STREETSCAPE AND PLANTINGS
- 4 INCORPORATE BIKE LANES

- 2 WILD HORSE CROSSING
- 2 REPLACE GLARE DEFLECTORS
- 3 PLACE NAME SIGNS FOR CALIFORNIA HUMBOLDT AND PONY EXPRESS HISTORIC TRAILS
- 2 GATEWAY TO VIRGINIA CITY AND THE COMSTOCK
- 3 V&T HISTORIC RAILROAD CROSSING PLACE NAME SIGN
- 3 BIKE/PEDESTRIAN LINKAGES
- 2 GATEWAY TO LAKE TAHOE
- 4 INTERSECTION ENHANCEMENTS
- 2 VISUAL GATEWAY TO CARSON VALLEY
- 4 CONNECT BIKE TRAILS FROM CARSON CITY TO MINDEN
- 3 GENOA AND MORMON STATION STATE PARK PLACE NAME SIGN
- 4 US 395/SR 88 GATEWAY INTERSECTION. REDUCE PAVING, IMPROVE PEDESTRIAN CROSSINGS AND ENHANCE LANDSCAPING
- 4 BIKE SYSTEM CONNECTIONS TO EXISTING ROUTES
- 2 GATEWAY TO WASHOE TRIBE WITH INTERPRETIVE KIOSK

US 395, West US 50, SR 28, SR 207 and SR 431 preliminary corridor plan

CAPITAL CROSSROADS – SPECIFIC FEATURES

CARSON VALLEY, CARSON CITY, AND DAYTON

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MAP B2

2.27

Aerial Landscape and Aesthetic Treatment Simulations

The following aerial images are meant to illustrate landscape and aesthetic treatments at key points along the Capital Crossroads Landscape Design Segment.

B CAPITAL CROSSROADS LANDSCAPE DESIGN SEGMENT

(1) This aerial view looks north towards Carson City along US 395 from Carson Valley. The US 50/US 395 intersection creates a gateway to Lake Tahoe. Along Us 395, Community Background stretches toward the Historic Downtown/Capitol Mall in the center of Carson City.

B CAPITAL CROSSROADS LANDSCAPE DESIGN SEGMENT

(2) This aerial view looks north through Carson City along US 395. The Historic Downtown/Capitol Mall distinguishes itself from the surrounding community background with heightened landscape types and treatments. The Us 50/US 395 intersection enhances the entry into historic downtown Carson City.

**Note: The Carson City Freeway is not shown on these aerials due to the date of aerial information, but they are illustrated on the maps and sections.*

Design Interpretation Summary – Capital Crossroads

Interpretation of the segment's design themes occurs during individual project design. The corridor plan establishes the direction for project level design. Examples illustrate forms and materials that could be used to accomplish the stated design objectives.

(1), (2), (3) *Civic buildings and historic structures reinforce community character. Architectural styles and community elements express dignity and have a timeless quality.*

(4) *The legacy of ranching and mining sets the tone of the Capital Crossroads segment.*

(7) *City centers include spacious pedestrian walkways and site amenities that strengthen the local economic development.*

(8) *Historic districts comprise an important component of the segment. Signage and interpretation elevate the traveler's awareness of the resources.*

(5) *Gateway elements denote community boundaries and establish the character of a place.*

(9) *Safe pedestrian crossings include a change in paving materials, flashing signage, and safe zones at medians.*

(6) *Tree-lined boulevards define space and mark the transition to downtown areas.*

(10) *Regional materials reflect elements of ranching and the historic importance of railroads within the area.*

(1) *The existing community entry into Minden lacks visual interest and is dominated by asphalt paving.*

(2) *A new community entry establishes a sense of arrival. Materials reinforce the overall community character set throughout the downtown area.*

(1) *Traffic-calming features such as a planted median aesthetically define the roadway and create a more inviting pedestrian environment.*

(2) *The wide appearance of the existing roadway encourages faster travel speeds and discourages pedestrian movement.*

(3) *Continuation of the shared-use trail to regional trail connections creates a connected system for alternative transportation. Separating the trail from the highway and providing enhanced native plantings promotes use.*

(4) *The existing trail in east Carson City can be connected to other regional trails.*

(1) *Lake of the Sky (Segment C) key map.*

(2) *Promotion of multi-modal transportation within the corridor improves traffic circulation and visitor satisfaction. Access to destinations can be provided through shared-use trails and shuttle systems.*

SECTION FOUR: Lake of the Sky

THEME

The Lake Tahoe area, known for its scenic and recreational opportunities, attracts both national and international visitors. The roadways included in the Lake of the Sky design segment include US 50 from the US 395 intersection, SR 28, SR 207, and SR 431. US 50, SR 28, and SR 431 are scenic byways, and SR 207 should receive a scenic byway designation. Within the Tahoe Basin, all roadways fall under the purview of standards set by TRPA. The guidelines set by TRPA will be considered for design elements of this segment.

The Tahoe Basin presents a range of constraints that must be considered and addressed during the design and implementation of vision for this segment. Constraints such as steep terrain, narrow rights-of-way, funding, erosion control, and environmental regulations present significant challenges. However, the segment currently is used by a large number of recreators, a trend that is expected to increase. The proposed improvements of rest areas and trail linkages serve to address the safety and conflicts among existing users.

The design theme integrates the roadway as an aesthetic component of the landscape. Roadway features complement, rather than detract from, the visual setting. Materials, textures, and colors reflect the natural setting. Appropriate material choices include rough-hewn wood, stone, and weathered steel. A color palette of flat earthen tones – tans, browns, and grays – complements the existing landscape character. Grading that mimics the natural landform, and repair, restoration, and re-coloration of disturbed slopes are roadway design improvements that enhance the scenic quality and views from the lake. Concrete barriers and other structures are simple in form and materials, and are consistently used to create a visually cohesive system.

Enhancing circulation, traveler amenities, and connections to activity access points will improve recreational opportunities. A system of informational and directional signage points travelers to recreational opportunities and highlights the area's natural history. Aesthetically improved viewpoints include travel information, and facilitate a safe exit off the roadway for photo opportunities. Recreation is incorporated into the roadway system with shared-use trails and bike lanes in the right-of-way. In addition, parking areas for recreational activities are provided. Partnerships are developed to provide transit systems and park-and-rides to relieve roadways of heavy traffic and provide travelers with alternative means to reach their destination.

Improvements in the relationship between the highway and adjacent communities must be factored into this design theme. Community areas such as Stateline, Incline Village, and Crystal Bay provide pedestrians and bicycles with ample room for movement. Streetscape enhancements utilize local materials. As SR 431 approaches Reno, the roadway environment is managed by scenic preservation efforts and buffers for new development.

DESIGN SEGMENT OBJECTIVES

The Lake of the Sky design segment includes those roadways located within and providing access to the Lake Tahoe Basin. The spectacular natural setting drives the design objectives, which are focused on visually integrating the roadway into the environment and improving facilities to enhance the traveler's recreational experience. In addition to general goals associated with scenic designation, community interface, and community transition, the following objectives have been established specifically for this segment.

Scenic Designation

- Apply for scenic byway designation for SR 207. Promote and provide signage for the existing scenic byway designations of US 50, SR 28, and SR 431.
- Support the removal of outdoor advertising along scenic byways. Coordinate with local jurisdictions to prevent billboards from blocking scenic views.
- Coordinate signage elements with appropriate architectural styles. Ensure that sizes and heights do not detract from scenic views. Select colors to reduce visual distractions.
- Repair and restore rock cuts. Stain, revegetate, and/or re-contour disturbed areas to improve their visual quality. Utilize a combination of rock armoring and revegetation to secure slopes. Remove rock gabions and repair rock cuts through a combination of retaining walls with simple finish, rock armoring, re-grading, and revegetation. The design of rock cuts should consider erosion control, just as erosion control projects should consider aesthetics as part of design.
- Maintain spectacular lake views.

- Improve the view of highways as seen from the lake. Minimize cut and fill. Sensitively blend roadway facilities in the landscape.
- Coordinate road services with recreation opportunities around the lake and on SR 431. Create a recreation system that promotes alternative transportation. Develop a series of rest areas connected by a separated, shared-use path. Allow for lake and recreational access from facilities.
- Partner with agencies such as the USFS, NDSP, TRPA, and Regional Transportation Commission (RTC) to create a transit system to recreation destinations, including beaches along SR 28, Mount Rose, and Tahoe Meadows. Create park-and-ride facilities to promote transit use. Provide tourism information notifying motorists where appropriate parking facilities are located to reduce parking in undesignated areas.
- Partner with USFS and NDSP to utilize existing pull-off facilities as rest areas.
- Enhance existing viewpoints. Provide appropriate signage before viewpoints to safely direct travelers off the road. Enhance viewpoints through structured interpretive facilities, improved viewing opportunities, and appropriate softscape treatments.
- Significantly improve wildlife crossings. Remove existing fill and create bridge structures at appropriate canyon crossings to allow for enhanced wildlife movement.
- Incorporate a separated, shared-use path within the corridor. Utilize opportunities to coordinate with other projects such as utility upgrades and environmental improvement projects.
- Utilize materials that respond to and blend with the natural surroundings. Examples include muted, dark tones; granite stone; native plant material; and rough-hewn timbers.
- Utilize a consistent type of hardscape treatment for structures such as concrete barriers and walls. Treatments may slightly vary between the highways, but should be coordinated with an overall appearance.

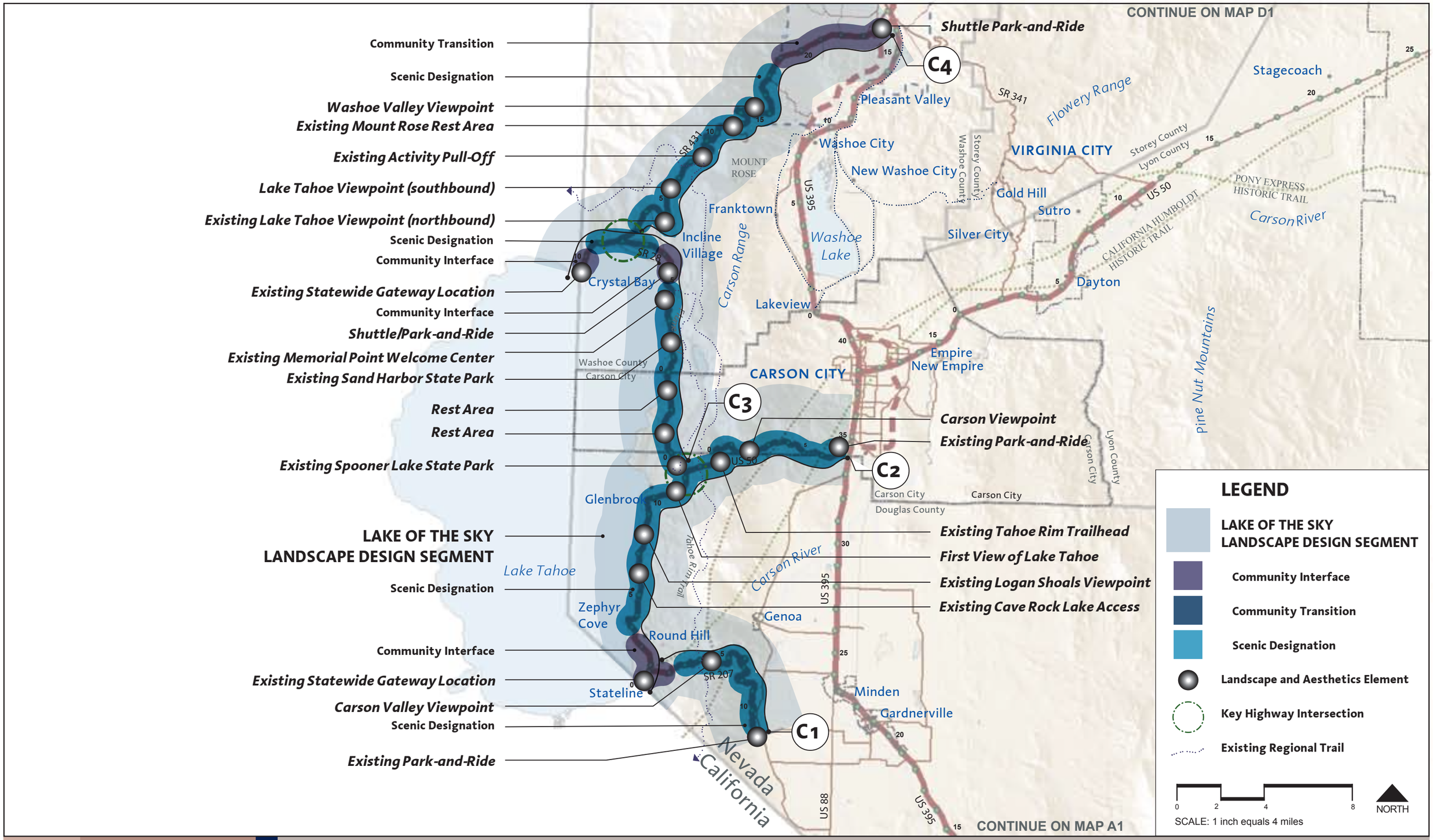
Community Interface

- Partner with Caltrans to promote streetscape improvements along US 50 through Stateline. Improve pedestrian amenities and create safe crossings.
- Enhance the aesthetic quality of the street environment, especially for pedestrians.
- Enhance the statewide gateways. Provide gateway signage welcoming and thanking motorists as they enter and exit the state.
- Create or enhance gateways to mark the community entry/exit. Coordinate the location of gateways with community goals and future growth plans.
- Incorporate pedestrian amenities and appropriate lighting.
- Support street tree programs within the communities.
- Provide safe pedestrian crossings through a variety of methods – enhanced signage, flashers, signals, and bridges or underpasses.
- Incorporate a bike lane through downtown areas.
- Provide accentuated transit stops that provide winter shelter.
- Utilize materials that respond to the context and setting. A wider range of materials are acceptable outside of areas designated as scenic.

Community Transition

- Re-contour and revegetate roadside berms to blend smoothly into landscape.
- Maintain shared-use trails and connect to trail systems within Lake Tahoe.
- Incorporate pedestrian amenities and appropriate lighting.
- Maintain appropriate right-of-way width to provide vegetative buffer for new development.

(1) Constraints such as steep terrain, narrow rights-of-way, funding, erosion control, and environmental regulations present significant challenges.



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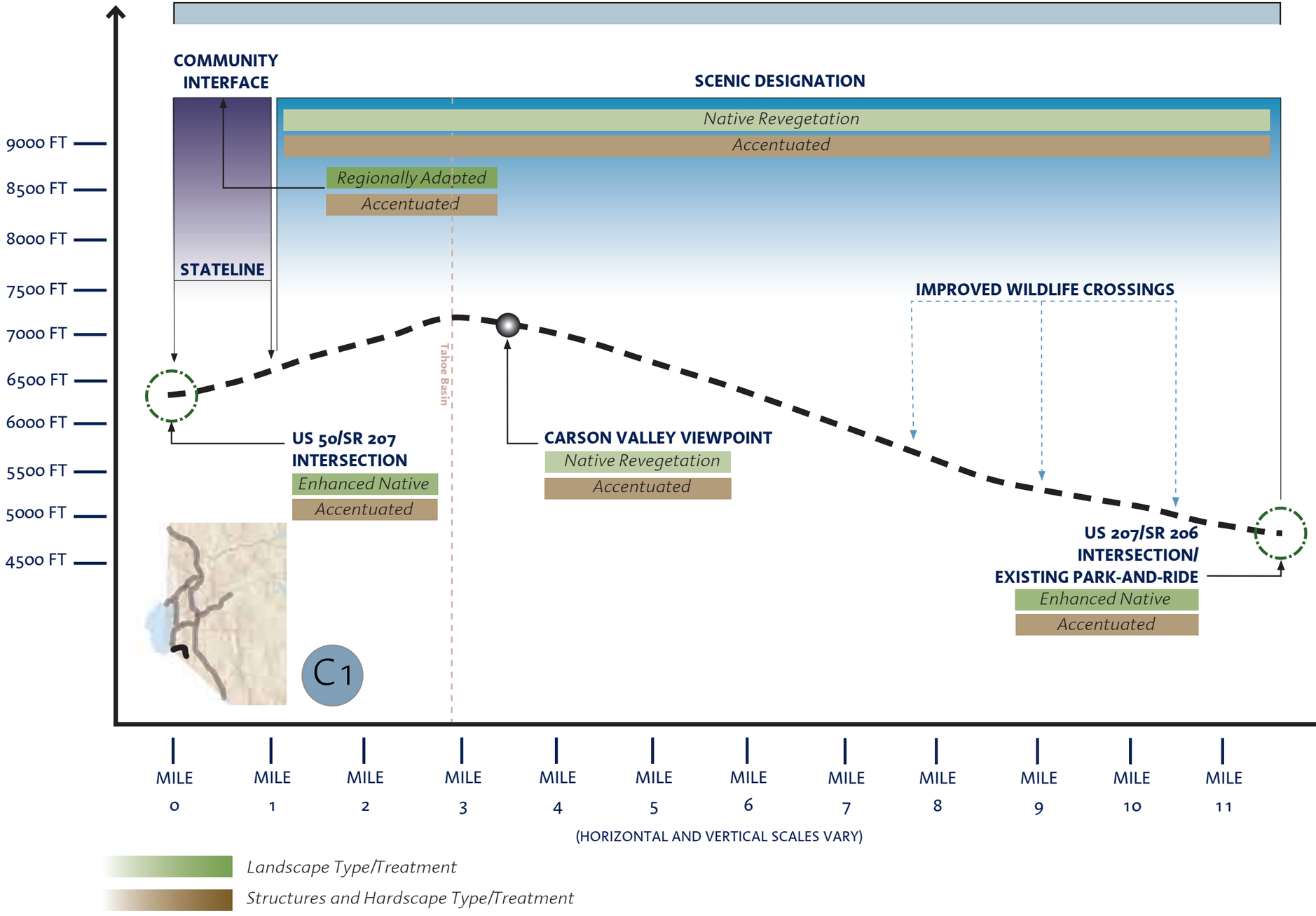
LAKE OF THE SKY – DESIGN OBJECTIVES

LAKE TAHOE BASIN

LAKE OF THE SKY LANDSCAPE DESIGN SEGMENT - SR 207



DESIGN OBJECTIVES

Wildlife Crossings

1. Reconnect habitat areas segmented by SR 207. Provide large underpasses at canyon locations.
2. Coordinate efforts with USFS and Nevada Division of Wildlife to provide appropriate structures.

Park-and-Ride Pull-offs

1. Provide pull-off for transit pick-up / drop-off. Coordinate park-and-ride locations with transit opportunities to provide access to recreation destinations.

Viewpoints

1. Relocate existing historical marker to a pull-off at the Carson Valley viewpoint.
2. Provide appropriate signage notifying motorists of upcoming pull-off.
3. Incorporate low wall at edge of pull-off to improve safety. Coordinate materials with viewpoint marker.

Rock Cuts and Slope Treatments

1. Repair and revegetate rock cuts.
2. Consider using a simple retaining wall treatment for select cuts in order to stabilize slopes.
3. Replace gabion wall structures. Utilize simple wall feature consistent with others within the segment. Other options include laying back slope to revegetate or providing plantings to screen gabion structures.

Stateline Area

1. Within developed areas, provide sidewalk areas for pedestrian movement.
2. Incorporate pedestrian refuge islands to designate the transition into urban areas and provide pedestrian visibility.
3. Powder-coat light fixtures within the Stateline area.

DESIGN OBJECTIVES

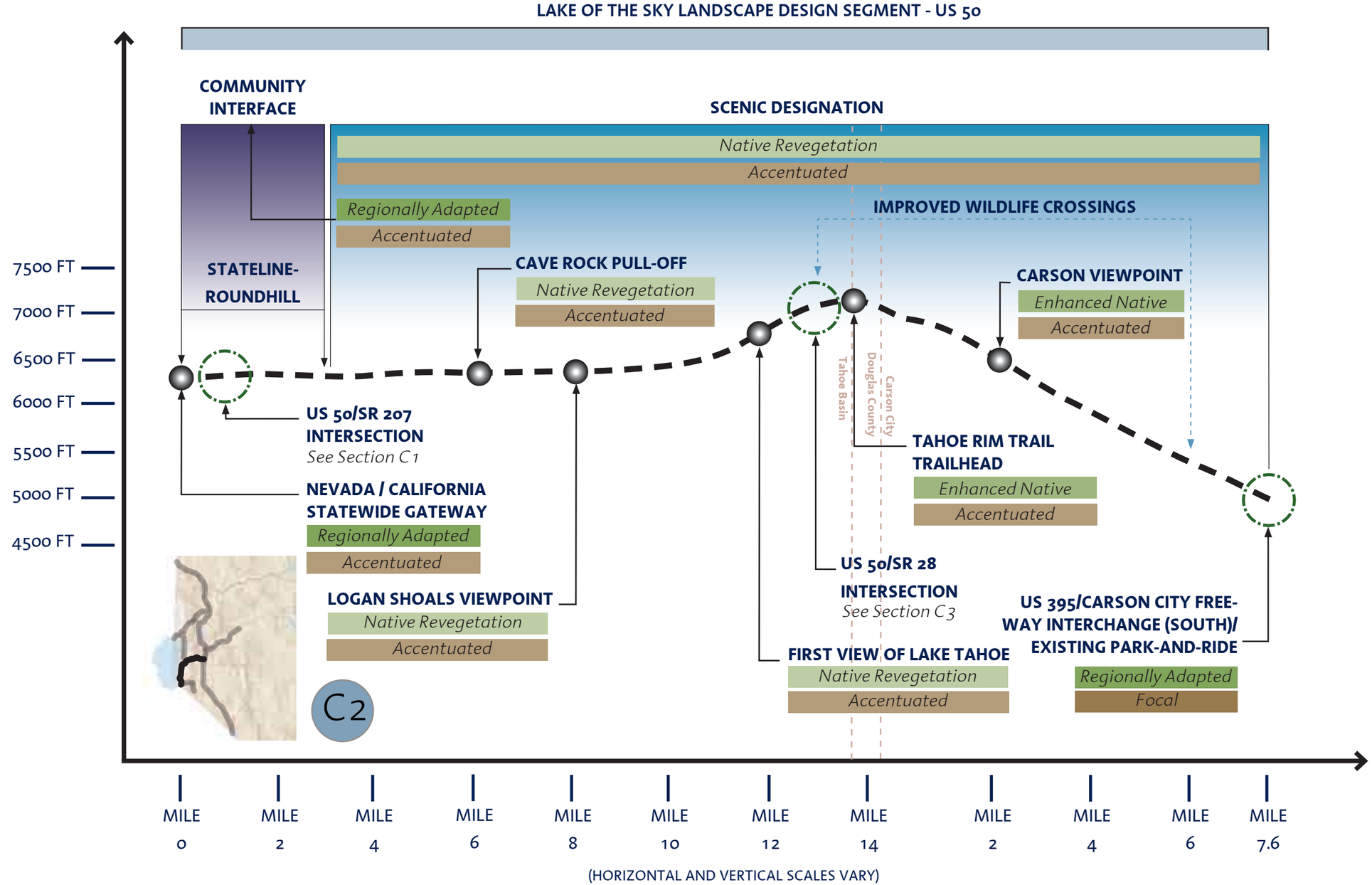
Wildlife Crossings
1. Reconnect habitat areas segmented by US 50. Provide large underpasses at canyon locations.
2. Coordinate efforts with USFS and Nevada Division of Wildlife to provide appropriate structures.

Viewpoints
1. Improve signage notifying motorists of upcoming pull-off areas.
2. Separate parking from travel lanes where possible.
3. Provide interpretive information and information regarding proper access points and parking areas.
4. Utilize granite, rough-hewn timbers, and muted colors as aesthetic treatments.

Park-and-Ride Pull-offs
1. Provide pull-off for transit pick-up / drop-off. Coordinate park-and-ride locations with transit opportunities to provide access to recreation destinations.

Non-motorized Transportation
1. Consider utilizing old Lincoln Highway as a shared-use trail connection from Glenbrook to Spooner Summit.
2. Incorporate a designated Class II bike lane.
3. Incorporate a shared-use trail from Stateline to Spooner Summit.
4. Provide connection for Tahoe Rim Trail across US 50. Consider an overpass option that also serves as a gateway to the Tahoe Basin.

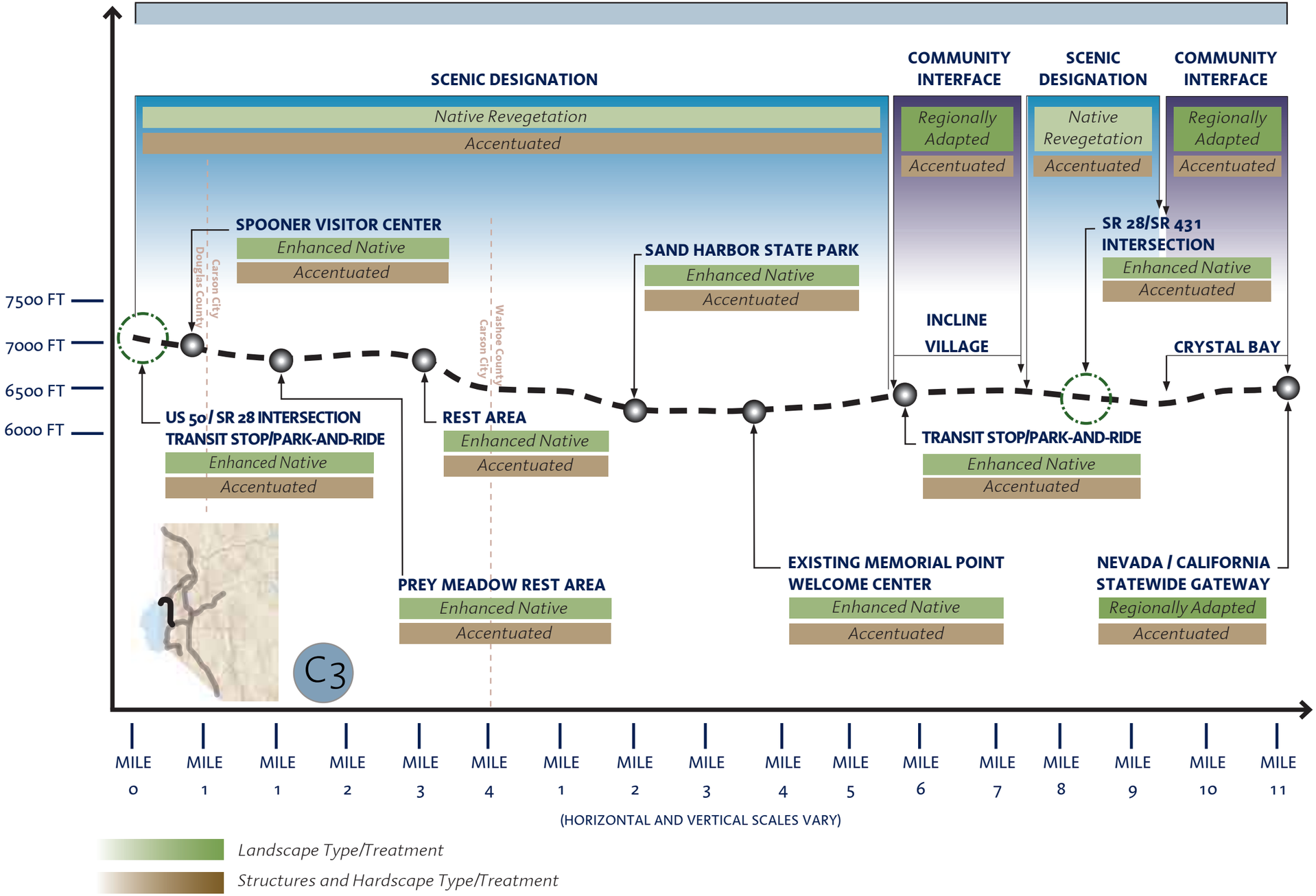
Rock Cuts and Slope Treatments
1. Repair and revegetate rock cuts.
2. Consider using a simple retaining wall treatment for select cuts in order to stabilize slopes.
3. Stain rock cuts to blend with surrounding landforms.
4. Utilize muted colors for retaining walls. Structure should visually recede and not be noticable from Lake Tahoe.



DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill
CONSULTANT TEAM

LAKE OF THE SKY – LONGITUDINAL SECTION
US 50: STATELINE TO US 50/US 395 INTERSECTION

LAKE OF THE SKY LANDSCAPE DESIGN SEGMENT - SR 28



(HORIZONTAL AND VERTICAL SCALES VARY)

Landscape Type/Treatment

Structures and Hardscape Type/Treatment

DESIGN OBJECTIVES

Rest Area / Transit System

1. Provide a series of rest areas and trailheads. Coordinate with USFS.
2. Link rest areas with a shared-use trail.
3. Incorporate a transit stop at rest areas to provide recreation access to the lake, mountain bike trails, and other destinations. Shuttles should be equipped to carry recreation accessories.
4. Provide central park-and-ride areas at Spooner Summit and Incline Village.
5. Incorporate signage and recreation information notifying travelers of appropriate parking areas.
6. Provide interpretive signage on environmental sensitivity and the highway's role in creating a sustainable landscape.
7. Create partnerships with USFS, NDSP, and TRPA to create rest area system.
8. Link trails with waterborne transit where appropriate to provide a connected system.
9. Utilize pedestrian underpass where necessary to reduce the number of pedestrians crossing the highway.

DESIGN OBJECTIVES

Rest Areas and Pull-off Facilities

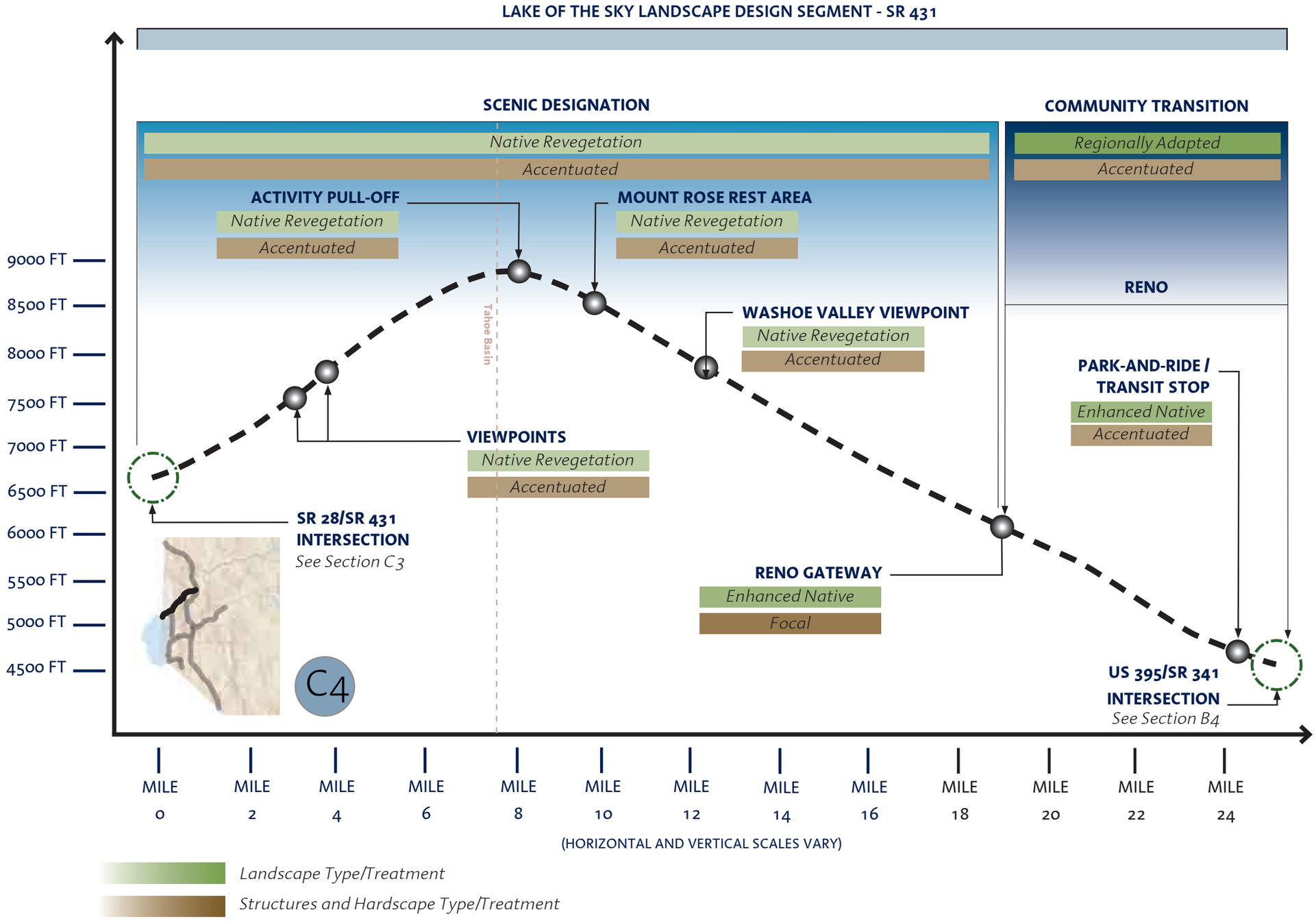
1. Provide designated pull-off and parking areas to provide access to recreation opportunities. Coordinate with public agencies.
2. Utilize aesthetic treatments to highlight architectural features. Incorporate treatments consistent with USFS Built Environment Image Guide.

Community Transition - Reno

1. Incorporate pedestrian refuge island at major pedestrian crossings to highlight the transition into the urban area.
2. Coordinate planning with Washoe County to maintain a planted setback area and minimize the need for noise walls.
3. Revegetate and recontour existing roadside berms,
4. Establish a community gateway to Reno from the Lake Tahoe area.

Non-motorized Transportation

1. Incorporate a designated Class II bike lane.
2. Provide signage for direction to trails and parks.



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LAKE OF THE SKY – LONGITUDINAL SECTION

SR 431

ENTIRE CORRIDOR

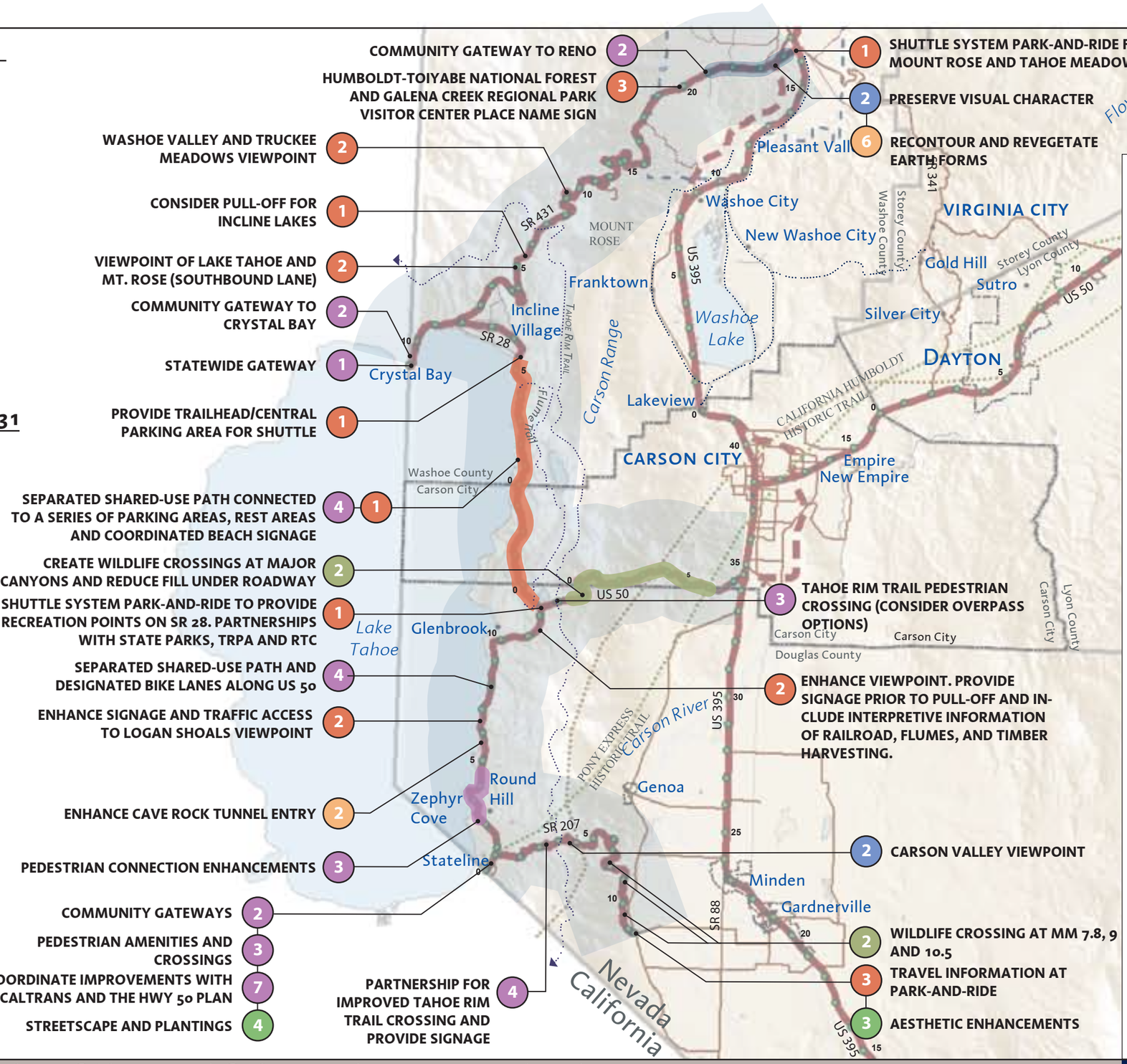
- 2 BILLBOARD MITIGATION
- 1 PRESERVE HIGH QUALITY VIEWS
- 2 REPAIR AND MAINTAIN FENCING AND CREATE WILDLIFE OVERPASSES OR UNDERPASSES
- 3 REVEGETATE ROAD CUTS FOR EROSION CONTROL
- 1 USE EARTH FORMS FOR SOUND ABATEMENT, WHERE POSSIBLE
- 4 ADDRESS MILLINGS PRACTICES AND REMOVE STOCKPILED MILLINGS

LAKE OF THE SKY LANDSCAPE DESIGN SEGMENT
US 50, SR 28, SR 207, AND SR 431

- 4 SHARED-USE PATH SYSTEM AROUND THE LAKE WITH REST AREAS
- 1 CREATE COORDINATED SYSTEM OF BIKE TRAILS AND REST AREAS
- 3 PROVIDE CONSOLIDATED TRAVEL INFORMATION WITH PARKING AND PULL-OFF LOCATIONS IDENTIFIED
- 3 COMPLETE THE WOODEN MILE MARKER PROGRAM
- 2 IMPROVE WILDLIFE CROSSINGS
- 2 REMOVE BILLBOARDS AND UNDERGROUND UTILITY LINES
- 2 VISUAL QUALITY IMPROVEMENTS ACCORDING TO TRPA SCENIC IMPROVEMENT PROGRAM
- 2 REDUCE VISUAL CONTRAST OF BARRIER RAILS AND GUARD RAILS AND USE ONE CONSISTENT TREATMENT TYPE
- 5 ROCK CUTS AND EROSION ENHANCEMENTS
- 5 REMOVE GABION WALLS AND REPAIR ROCK CUT

- 2 COMMUNITY GATEWAY TO RENO
- 3 HUMBOLDT-TOIYABE NATIONAL FOREST AND GALENA CREEK REGIONAL PARK VISITOR CENTER PLACE NAME SIGN
- 2 WASHOE VALLEY AND TRUCKEE MEADOWS VIEWPOINT
- 1 CONSIDER PULL-OFF FOR INCLINE LAKES
- 2 VIEWPOINT OF LAKE TAHOE AND MT. ROSE (SOUTHBOUND LANE)
- 2 COMMUNITY GATEWAY TO CRYSTAL BAY
- 1 STATEWIDE GATEWAY
- 1 PROVIDE TRAILHEAD/CENTRAL PARKING AREA FOR SHUTTLE
- 4 1 SEPARATED SHARED-USE PATH CONNECTED TO A SERIES OF PARKING AREAS, REST AREAS AND COORDINATED BEACH SIGNAGE
- 2 CREATE WILDLIFE CROSSINGS AT MAJOR CANYONS AND REDUCE FILL UNDER ROADWAY
- 1 SHUTTLE SYSTEM PARK-AND-RIDE TO PROVIDE RECREATION POINTS ON SR 28. PARTNERSHIPS WITH STATE PARKS, TRPA AND RTC
- 4 SEPARATED SHARED-USE PATH AND DESIGNATED BIKE LANES ALONG US 50
- 2 ENHANCE SIGNAGE AND TRAFFIC ACCESS TO LOGAN SHOALS VIEWPOINT
- 2 ENHANCE CAVE ROCK TUNNEL ENTRY
- 3 PEDESTRIAN CONNECTION ENHANCEMENTS
- 2 COMMUNITY GATEWAYS
- 3 PEDESTRIAN AMENITIES AND CROSSINGS
- 7 COORDINATE IMPROVEMENTS WITH CALTRANS AND THE HWY 50 PLAN
- 4 STREETSCAPE AND PLANTINGS
- 4 PARTNERSHIP FOR IMPROVED TAHOE RIM TRAIL CROSSING AND PROVIDE SIGNAGE

- 1 SHUTTLE SYSTEM PARK-AND-RIDE FOR MOUNT ROSE AND TAHOE MEADOWS
- 2 PRESERVE VISUAL CHARACTER
- 6 RECONTOUR AND REVEGETATE EARTHFORMS
- 3 TAHOE RIM TRAIL PEDESTRIAN CROSSING (CONSIDER OVERPASS OPTIONS)
- 2 ENHANCE VIEWPOINT. PROVIDE SIGNAGE PRIOR TO PULL-OFF AND INCLUDE INTERPRETIVE INFORMATION OF RAILROAD, FLUMES, AND TIMBER HARVESTING.
- 2 CARSON VALLEY VIEWPOINT
- 2 WILDLIFE CROSSING AT MM 7.8, 9 AND 10.5
- 3 TRAVEL INFORMATION AT PARK-AND-RIDE
- 3 AESTHETIC ENHANCEMENTS



LEGEND

COMMUNITY OPPORTUNITIES
1. Statewide gateway
2. Community gateway
3. Pedestrian linkage and circulation
4. Bike and multi-use trail linkage
5. Highway archaeology, cultural, or historic awareness
6. Highway and community compatibility improvement
7. Partnerships and resource leveraging

TRAVEL AND TOURISM OPPORTUNITIES
1. Roadside services
2. Viewpoints and points of interest
3. Travel information program
4. Highway art
5. Community rest area

PLANTING OPPORTUNITIES
1. Ground treatment
2. Revegetation with native grasses, forbs and herbaceous plants
3. Enhanced native planting
4. Great Basin regionally adapted planting
5. Great Basin ornamental planting

NATURAL RESOURCE AND WILDLIFE OPPORTUNITIES
1. Environmental resources preservation
2. Wildlife movement enhancement
3. Water resources enhancement
4. Rare, unique, or special natural resource enhancement

VIEWS AND LANDMARK OPPORTUNITIES
1. Highway scenic designation
2. Highway scenic improvement

ROADWAY PRACTICES AND STRUCTURE OPPORTUNITIES
1. Sound protection or acoustic wall
2. Bridge and structure aesthetic
3. Information and directional signage
4. Highway maintenance practices
   Note: Includes maintenance practices for milled asphalt bi-products for entire corridor
5. Highway facility enhancement
6. Landform or contour grading enhancement
7. Geometrics, alignment, and land relationship enhancement
8. Sustainable corridor practice opportunity

TRAILS

..... Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

US 395, West US 50, SR 28, SR 207 and SR 431 preliminary corridor plan

NEVADA DOT UNLV

LAKE OF THE SKY – SPECIFIC FEATURES
LAKE TAHOE BASIN

CONSULTANT TEAM
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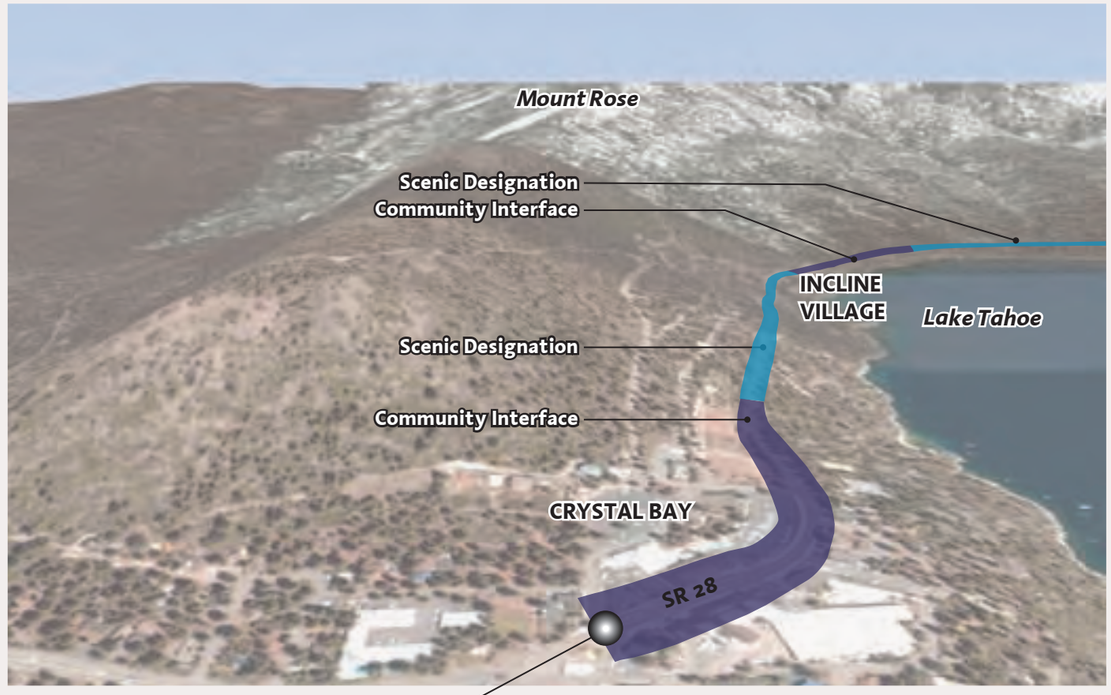
MAP C2

2.39

Aerial Landscape and Aesthetic Treatment Simulations

The following aerial images are meant to illustrate landscape and aesthetic treatments at key points along the Lake of the Sky Landscape Design Segment.

***(1)** This aerial view looks west along US 50 towards Lake Tahoe. The first view of the lake is formalized with an accentuated viewpoint.*



***(2)** This aerial view looks east from the California state line at Crystal Bay towards Incline Village. The community background is enhanced through heightened landscape treatments. The statewide gateway welcomes travelers to Nevada.*

Design Interpretation Summary – Lake of the Sky

Interpretation of the segment's design themes occurs during individual project design. The corridor plan establishes the direction for project level design. Examples illustrate forms and materials that could be used to accomplish the stated design objectives.

(1) *A separated shared-use trail connects a system of rest areas through highly used recreation areas. Increased alternative transportation access for recreation destinations relieves traffic congestion and increases the opportunities for restoration of way trails. Overlooks provide interpretive opportunities and resting points.*

(2) *Rest areas provide multiple opportunities for travelers. They serve many functions including, but not limited to, resting areas for travelers, viewpoints, trailheads, and staging area for recreationists.*

(6) *Heavy stone foundations and exposed structural beams create structures that blend with the impressive scale of the surrounding landscape.*

(3) *Slopes should be treated with materials that match the context of surrounding landscape's color and texture.*

(4) *Community centers include pedestrian amenities such as seating, lighting, planting, transit stops, and spacious walkways.*

(5) *Well-designed signage identifies local resources and reinforces the community's character.*

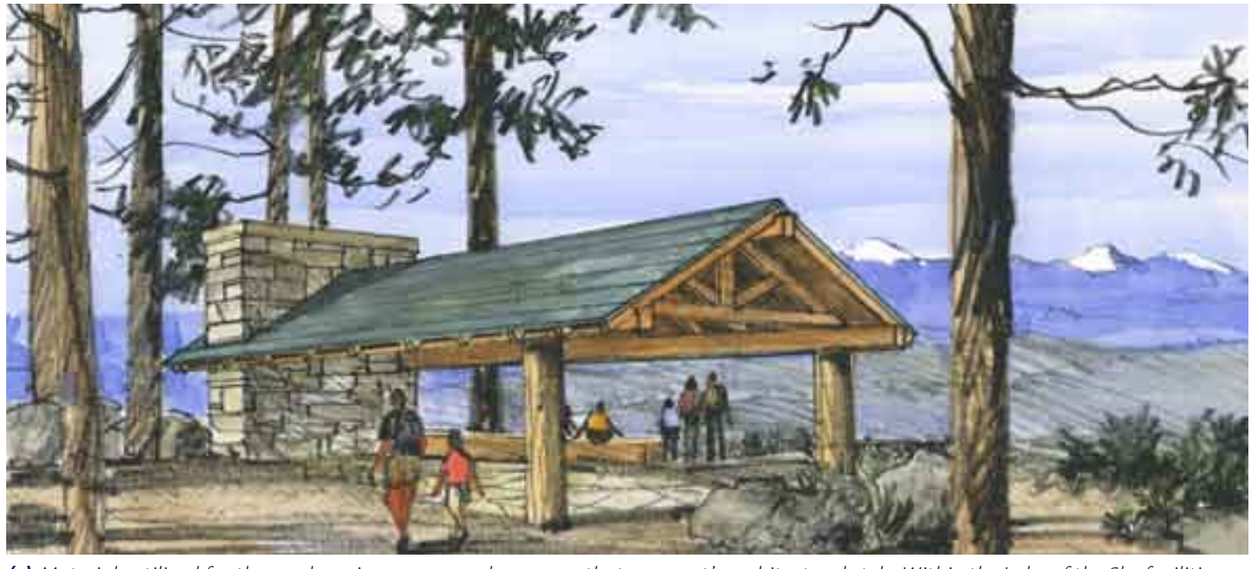
(7) *Unique and scenic areas require that particular attention is given to the color and design of roadway structures to preserve the visual quality of the place.*

(8) *Providing public transportation to recreational opportunities is critical to the economic and environmental quality of the area.*

(9) *Roadway design considers wildlife movement through drainages. Fill of canyons is minimized.*

(1) *The state entry at Stateline is constrained by existing development and right-of-way conditions.*

(2) *Stateline has the opportunity to reinvent its character and provide a better connection to the redevelopment at Heavenly Village. Pedestrian connections may be improved as street systems are evaluated and alternative routes are improved through a partnership with Caltrans.*



(3) *Materials utilized for the road services program draw upon that segment's architectural style. Within the Lake of the Sky facilities should use combinations of rustic elements and muted earth tones.*

SECTION FIVE: Edge of the Sierra

THEME

The Edge of the Sierra is an area of transition between two major geographic areas of the state – the Sierra Nevada Range and the Great Basin. The segment includes US 395 from the south end of Washoe Valley northward through Reno to the California state line. As US 395 stretches north through Washoe Valley, the Carson Range rises to the west. Throughout the corridor, the mountains provide an impressive backdrop that shapes the region's identity.

As the highway approaches Reno and Sparks from both the south and the north, the rural landscape transitions to an urban environment. Major interchanges emphasize the corridor's relationship with the nearby mountains through designs that reflect the coexistence of the natural environment and the urban character of the city. Other significant interchanges capture the character of the place through transportation art that depicts cultural and historical motifs. Throughout the corridor a palette of Sierra and Great Basin materials are combined to represent the corridor's unique geographic location.

Within the Reno urban area, roadway elements are softened with appropriate vegetation, textures, barriers, railings, and lighting that are indicative of a city that cares about its image. Adjacent industrial views are screened from the roadway.

DESIGN SEGMENT OBJECTIVES

Urbanization and community growth will have the most significant impact on aesthetics. US 395 becomes an elevated highway within Reno, and therefore has a unique design objective – community background. Other design objectives concentrate on preserving views and managing the character of the roadway through the rural and urban environment. In addition to applicable corridor-level objectives, design objectives have been established specifically for this segment.

Scenic Designation

- Preserve scenic views of Washoe Valley, including Slide Mountain and Washoe Lake.
- Apply for scenic byway designation through Washoe Valley.
- Improve riparian areas and river crossings with plantings and erosion control features that mimic natural features and enhance riparian habitat.
- Revegetate highway medians and allow the roadway to blend with the natural environment.
- Encourage motorists to connect with the surrounding environment by providing place name signage and interpretative information.
- Utilize simple structures and hardscape elements that are visually unobtrusive.
- Improve litter collection along the corridor.
- Restrict outdoor advertising.
- Retrofit existing structures to visually blend with the surrounding environment.

Community Transition

- Reinvent the roadway through Pleasant Valley. The construction of I-580 from the Mount Rose intersection to Washoe City reduces the traffic demand through Pleasant Valley and creates opportunities for the highway to respond to the surrounding communities.
- Utilize traffic calming measures and provide street tree plantings to enhance the community character through Pleasant Valley.
- Incorporate a separated, shared-use trail within the right-of-way. Create connections to the Franktown bike loop and other regional trails in the Pleasant Valley/Washoe Valley area.
- Screen unattractive industrial developments adjacent to the highway through berming and vegetation.
- Utilize simple structures and facilities that gracefully respond to the Truckee Meadows environmental context. Use muted colors present in the landscape.
- Provide a statewide gateway monument at the California/Nevada border. Coordinate signage with the surrounding landforms and vegetation. Signage is secondary in scale to interstate statewide gateways.

Urban Background

- Establish a significant gateway at the I-580/SR 431 interchange. Create a portal that communicates the entry into and exit from the following areas: Reno, Truckee Meadows, and the Mount Rose/Lake Tahoe area. Design should reflect the influence of environmental features such as the Carson Range and Truckee River as well as recreational features.
- Utilize a high standard for design appropriate to Reno as an urban community and tourist destination. Key interchanges serve as portals to both the city and recreational opportunities. Therefore, significant aes-

(1) *Edge of the Sierra (Segment D) key map.*

(2) *This segment is an area of transition between the landscapes of the Sierra Nevada and the Great Basin.*

(1) *Environmental management and scenic preservation are heightened along zones of scenic designation.*

(2) *Design elements reflect its importance as an urban community and tourist destination.*

thetic improvements and heightened attention to detail improve the city's image. Key interchanges are grouped according to their level of importance. The heirarchy ranges from level one to level four as shown on page 2.47.

- Announce the entry into Reno and connections to the Lake Tahoe area at major interchanges. Hierarchy of interchange importance reflects the facility's role as a portal for visitors and residents.
- Minimize the height of sound walls to maintain views such as the Carson Range, Mount Rose, Rattlesnake Mountain, and Peavine Mountain.
- Partner with local communities to enhance the bicycle and trail network. Provide bike lane and trail connections as part of interchange design.
- Consider alternatives to high mast lighting that are in scale with the roadway environment. Tall, shiny standards distract from the overall roadway aesthetic and do not relate to the density of adjacent development.
- Establish a direct connection from the corridor to Reno's downtown.
- Utilize a combined palette of Sierra Nevada and Great Basin plant materials to reflect the synthesis of the two plant communities.
- Upgrade older facilities and structures to new standards and to the segment's designated landscape treatment levels as US 395 is widened through Reno.
- Reinforce the visual gateway to and from Reno at the Dandini interchange. Create a gateway that announces Reno and recognizes the University of Nevada and Desert Research Institute.

Statewide Gateway Location

Community Transition

Reno Visual Gateway

Urban Background

EDGE OF THE SIERRA LANDSCAPE DESIGN SEGMENT

Managed Landscape Character

Community Transition

Scenic Designation

LEGEND

EDGE OF THE SIERRA CROSS-ROADS LANDSCAPE DESIGN SEGMENT

- Urban Background
- Community Transition
- Scenic Designation
- Managed Landscape Character
- Landscape and Aesthetics Element
- Key Highway Intersection
- Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

Petersen Mountain
CR 293
Hungry Valley
Border Town
White Lake
Stead
Spanish Springs
Copperfield
US 395
SR 445
Pah Rah Range
WADSWORTH
Peavine Mountain
Golden Valley
D3
Nevada
California
Raleigh Heights
Panther
UNION PACIFIC RAILROAD
Fernley
Truckee Meadows Regional Planning Boundary
I-80
Truckee River
RENO
SPARKS
Patrick
Mustang
Verdi
Lockwood
Virginia Range
McCarran Blvd
Rattlesnake Mountain
Fernley Township Limits
D4
D2
Washoe County
Storey County
Lyon County
Silver Springs
SR 431
I-580
Steamboat
SR 341
Stagecoach
Pleasant Valley
Silver Springs Township Limits
Washoe City
VIRGINIA CITY
New Washoe City
Gold Hill
US 50
Incline Village
Franktown
Washoe Lake
Sutro
Silver City
Crystal Bay
Tahoe Rim Trail
Dayton
Lakeview
D1
Lake Tahoe
SR 28
CONTINUE ON MAP B1

US 395, West US 50, SR 28, SR 207 and SR 431 preliminary corridor plan

EDGE OF THE SIERRA – DESIGN OBJECTIVES

RENO METROPOLITAN AREA

CONSULTANT TEAM
DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
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MAP D1

2.45

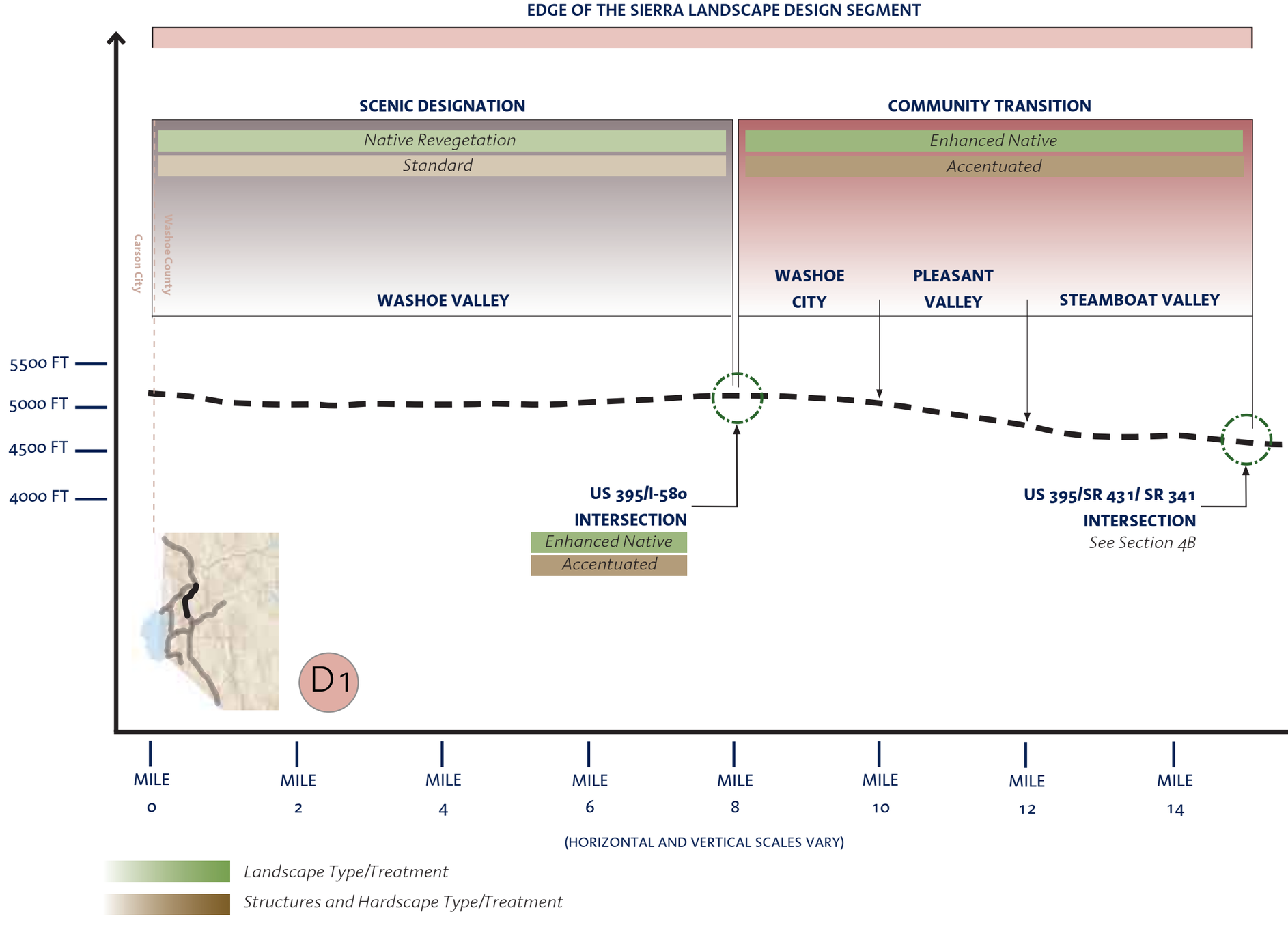
ELEMENTS

Scenic Designation

1. Apply for scenic byway designation through Washoe Valley.
2. Re-paint Bellevue bridge to blend into scenic vista.
3. Improve signage to State Park, interpretive trails around Washoe Lake, and historic wetlands.
4. Consider place name signs for ruins, wildlife viewing, birds/perches, geothermal energy, mining, original V&T alignment, and Jumbo Grade historic railways.

Community Transition

1. Reinvent highway as a result of I-580 construction. Consider reducing the number of lanes.
2. Incorporate traffic calming features. Provide planted median.
3. Incorporate shared-use path into right-of-way. Provide room for equestrian movement. Provide east/west bicycle and equestrian crossings below and above grade where appropriate.
4. Enhance local commercial districts.
5. Protect Jeffrey Pines and endangered Buckwheat at Steamboat.
6. Connect Franktown, Pleasant Valley, and Davis Creek with trail system. Preserve Franktown bike loop.
7. Interpret historical features and provide recreation access at Old Washoe City.
8. Preserve existing cottonwoods.
9. Retrofit existing structures with new color palette.



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DESIGN WORKSHOP
PLACES
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JW Zunino & Associates
CH2MHill

EDGE OF THE SIERRA –LONGITUDINAL SECTION

US 395: CARSON CITY/WASHOE COUNTY LINE TO WASHOE COUNTY MM15

EDGE OF THE SIERRA LANDSCAPE DESIGN SEGMENT

MANAGED LANDSCAPE CHARACTER

Native Revegetation

Standard

URBAN BACKGROUND

Enhanced Native

Accentuated

US 395/SR 431/SR 341 INTERSECTION
Regionally Adapted
Accentuated

SOUTH VIRGINIA/MEADOWOOD INTERCHANGE AT NEIL
Regionally Adapted
Focal

GATEWAY AT DANDINI
Regionally Adapted
Accentuated

5500 FT
5000 FT
4500 FT
4000 FT

US 395/SOUTH VIRGINIA STREET
Regionally Adapted
Focal

PLUMB LANE INTERCHANGE
Regional Ornamental
Landmark

MILL STREET INTERCHANGE
Regional Ornamental
Landmark

N. MCCARRAN INTERCHANGE
Enhanced Native
Focal

I-80 INTERCHANGE
Regional Ornamental
Landmark
Refer to I-80 Corridor Plan

D2

MILE 16 | MILE 18 | MILE 20 | MILE 22 | MILE 24 | MILE 26 | MILE 28 | MILE 30

(HORIZONTAL AND VERTICAL SCALES VARY)

Landscape Type/Treatment

Structures and Hardscape Type/Treatment

ELEMENTS

Interchange Hierarchy of Importance

(Not all interchanges may be located on the section)
Basic interchange improvements include a paint/stain retrofit and incorporation of transportation art.

Level One
I-80/US 395 Interchange

Plumb Lane Interchange
- Establish the gateway into Reno from the airport

Mill Street
- Establish the gateway into downtown Reno

Mount Rose Highway Interchange (SR 431 and I-580)

Level Two
South Virginia Street Interchange

Neil/Meadowood Interchange

Moana Interchange

Oddie Interchange

North McCarran Interchange

Stead Interchange

Parr/Dandini Interchange
- Establish the gateway to UNR and the Desert Research Institute
- Create the visual gateway into Reno

Level Three
Arrowcreek/Damonte Ranch Interchange

South Meadows Parkway Interchange

Glendale Interchange

Golden Valley Interchange

Panther Interchange

Lemmon Interchange

Red Rock Interchange

Cold Springs Interchange

Bordertown Interchange

Level Four
East Lake Interchange

Bellevue Interchange

Bowers Mansion Interchange (I-580/US 395)

NEVADA DOT | UNLV

EDGE OF THE SIERRA – LONGITUDINAL SECTION

US 395: WASHOE COUNTY MM15 TO WASHOE COUNTY MM30

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JW Zunino & Associates
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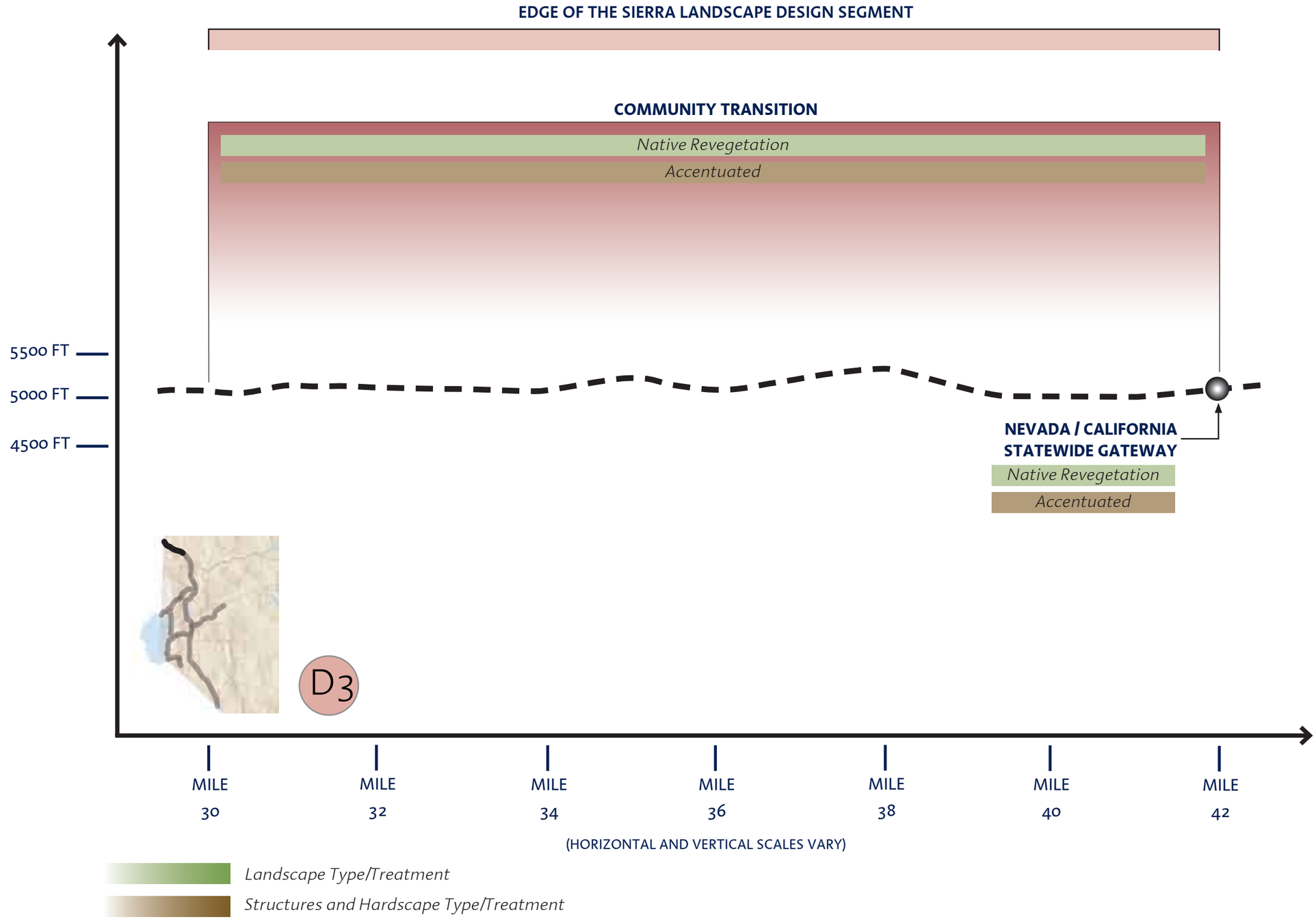
ELEMENTS

Community Transition

1. Provide signage into Hungry Valley. Provide information regarding appropriate areas for OHV/ATV use and legal trailheads.
2. Coordinate with Washoe County for planned growth. Maintain adequate setback to provide native revegetation along roadside to buffer road from new development.
3. Utilize scenic views and vistas of White Lake for design influence.
4. Retrofit existing structures with new color palette.

Nevada / California Statewide Gateway

1. Subtle entry signage.
2. Incorporate into existing topography so that it aesthetically fits into the landscape.



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CONSULTANT TEAM

EDGE OF THE SIERRA –LONGITUDINAL SECTION

US 395: WASHOE COUNTY MM30 TO NEVADA/CALIFORNIA STATE LINE

EDGE OF THE SIERRA LANDSCAPE DESIGN SEGMENT - I-580 Freeway Extension

MANAGED LANDSCAPE CHARACTER

Native Revegetation

Standard

5500 FT

5000 FT

4500 FT

BOWER'S MANSION (I-580/US 395 INTERCHANGE)

Native Revegetation

Standard

GALENA BRIDGE

Native Revegetation

Accentuated

I-580/SR 431 INTERCHANGE

Regionally Adapted

Accentuated

D4

MILE 0 | MILE 2 | MILE 4 | MILE 6 | MILE 8 | MILE 10 | MILE 12

(HORIZONTAL AND VERTICAL SCALES VARY)

Landscape Type/Treatment

Structures and Hardscape Type/Treatment

ELEMENTS

Managed Landscape Character

1. Address aesthetic impacts of new highway cuts and fills from the existing US 395 corridor.
2. Stain cuts and riprap if needed to match natural soil color.
3. Provide for wildlife movement. Utilize bridge structures to maintain migration corridors.
4. Utilize natural rock outcroppings and geologic features as design features.
5. Stain structures to blend with terrain.
6. Utilize contour grading to soften areas of cut and fill.

CONSULTANT TEAM

DESIGN WORKSHOP
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Sand County Studios
JW Zunino & Associates
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LEGEND

COMMUNITY OPPORTUNITIES
1. Statewide gateway
2. Community gateway
3. Pedestrian linkage and circulation
4. Bike and multi-use trail linkage
5. Highway archaeology, cultural, or historic awareness
6. Highway and community compatibility improvement
7. Partnerships and resource leveraging

TRAVEL AND TOURISM OPPORTUNITIES
1. Roadside services
2. Viewpoints and points of interest
3. Travel information program
4. Highway art
5. Community rest area

PLANTING OPPORTUNITIES
1. Ground treatment
2. Revegetation with native grasses, forbs and herbaceous plants
3. Enhanced native planting
4. Great Basin regionally adapted planting
5. Great Basin ornamental planting

NATURAL RESOURCE AND WILDLIFE OPPORTUNITIES
1. Environmental resources preservation
2. Wildlife movement enhancement
3. Water resources enhancement
4. Rare, unique, or special natural resource enhancement

VIEWS AND LANDMARK OPPORTUNITIES
1. Highway scenic designation
2. Highway scenic improvement

ROADWAY PRACTICES AND STRUCTURE OPPORTUNITIES
1. Sound protection or acoustic wall
2. Bridge and structure aesthetic
3. Information and directional signage
4. Highway maintenance practices
   Note: Includes maintenance practices for milled asphalt bi-products for entire corridor
5. Highway facility enhancement
6. Landform or contour grading enhancement
7. Geometrics, alignment, and land relationship enhancement
8. Sustainable corridor practice opportunity

TRAILS

Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

STATEWIDE GATEWAY (1)

PRESERVE VIEWS OF WHITE LAKE (2)

STEAD AIR FORCE BASE PLACE NAME SIGN (3)

RENO VISUAL GATEWAY AT PARR/DANDINI (2)

N. MCCARRAN INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS (2, 4)

NEIL/MEADOWOOD INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS (2, 4)

SOUTH VIRGINIA STREET INTERCHANGE - BRIDGE AESTHETICS ENHANCEMENTS (2)

I-580 INTERCHANGE -TAHOE RECREATIONAL GATEWAY (2)

HISTORIC VIRGINIA CITY TRAVEL INFORMATION (5)

MT. ROSE SCENIC BYWAY DESIGNATION SIGN ON SR 431 (3)

SLIDE MOUNTAIN PLACE NAME SIGN (3)

REPAINT/STAIN BELLEVUE BRIDGE (2)

CONNECT FRANKTOWN BIKE LOOP TO CARSON CITY (4)

UNDERPASS FOR BIKE TRAIL CONNECTION (4)

OVERALL ROAD TREATMENT

- AESTHETICALLY RETROFIT BRIDGES, STRUCTURES AND SOUNDWALLS (2)
- COLOR MATCH MAINTENANCE PAINTING (4)
- REDUCE HIGH MAST LIGHTING TO IMPROVE VISUAL QUALITY (5)

ENTIRE CORRIDOR

- BILLBOARD MITIGATION (2)
- PRESERVE HIGH QUALITY VIEWS (1)
- REPAIR AND MAINTAIN FENCING AND CREATE WILDLIFE OVERPASSES OR UNDERPASSES (2)
- REVEGETATE ROAD CUTS FOR EROSION CONTROL (3)
- USE EARTH FORMS FOR SOUND ABATEMENT, WHERE POSSIBLE (1)
- ADDRESS MILLINGS PRACTICES AND REMOVE STOCKPILED MILLINGS (4)

I-80 INTERCHANGE (SEE I-80 CORRIDOR PLAN) - TRANSPORTATION ART, SOUND WALL AESTHETIC RETROFITS, BRIDGE AESTHETICS ENHANCEMENTS (4, 1, 2)

DESIGNATE CONNECTION TO DOWNTOWN AT MILL ST. (2)

PLUMB LANE INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS (4, 2)

US 395/SOUTH VIRGINIA INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS (4, 2)

STONEHOUSE AND HOT SPRINGS PLACE NAME SIGN (3)

ROADWAY IMPROVEMENTS

- SEPARATED SHARED-USE TRAIL FROM WASHOE LAKE TO SR 431 (4)
- RETROFIT THE HIGHWAY – UTILIZE TRAFFIC CALMING FEATURES (6)

Petersen Mountain · Hungry Valley · Spanish Springs · SR 445 · Border Town · Bordertown · White Lake · Stead · Red Rock · US 395 · Copperfield · California · Nevada · Lemmon · Golden Valley · Raleigh Heights · Panther · Parr/Dandini · North McCarran · Oddie · SPARKS · RENO · I-80/US 395 · MH · Plumb · Moana · McCarran Blvd · South Virginia · Neil/Meadowood · Verdi · I-80 · Virginia Street · Mustang · Washoe County · Storey County · Lyon County · Fernley Township Limits · Pah Rah Range · Truckee River · UNION PACIFIC RAILROAD · I-80 (REFER TO I-80 CORRIDOR PLAN) · Virginia Range · South Meadows · Arrowcreek/Damonte Ranch · I-580/SR 431 · US 395/SR 431 · SR 431 · SR 341 · Steamboat · I-580 · Pleasant Valley · Davis Creek · Washoe City · I-580/US 395 · Bowers Mansion · New Washoe City · VIRGINIA CITY · Gold Hill · Sutro · US 50 · Silver City · Franktown · Washoe Lake State Park · Incline Village · Tahoe Rim Trail · US 395 · Washoe Lake · Bellevue · Crystal Bay · SR 28 · Lake Tahoe · Lakeview · DAYTON · Silver Springs Township Limits

US 395, West US 50, SR 28, SR 207 and SR 431 corridor plan

MAP D2

2.50

CONSULTANT TEAM

DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill

EDGE OF THE SIERRA – SPECIFIC FEATURES

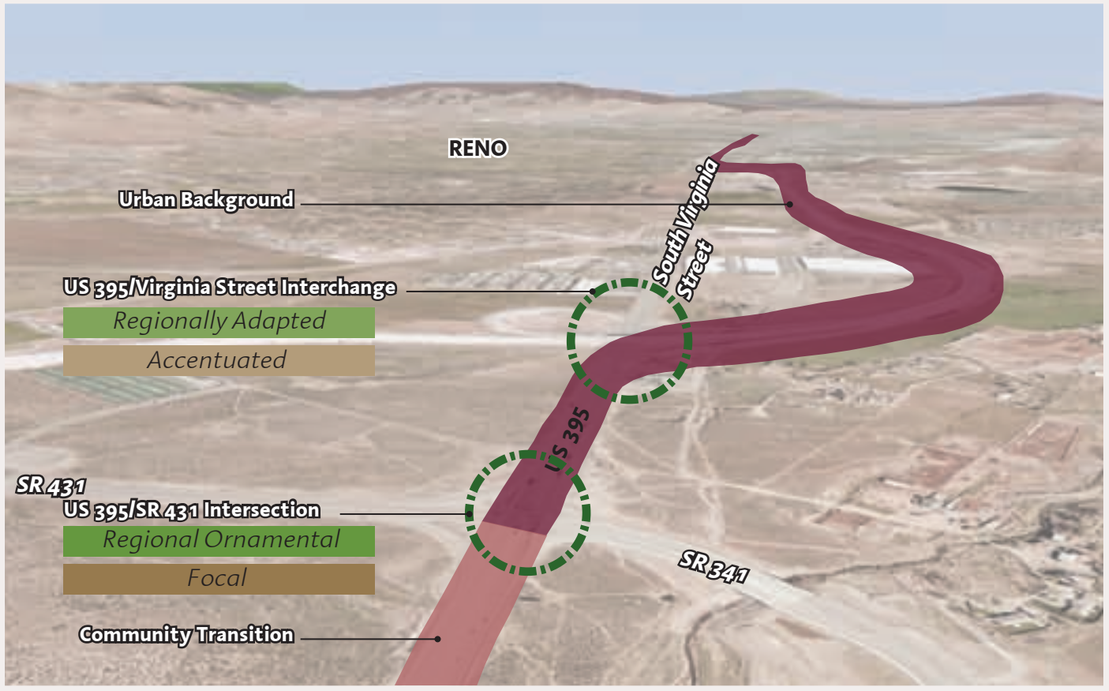
RENO METROPOLITAN AREA

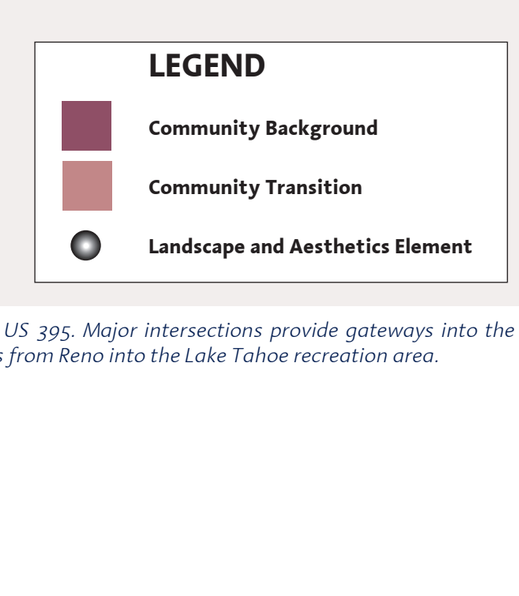
UNLV LANDSCAPE ARCHITECTURE & PLANNING RESEARCH

NEVADA DOT

Aerial Landscape and Aesthetic Treatment Simulations

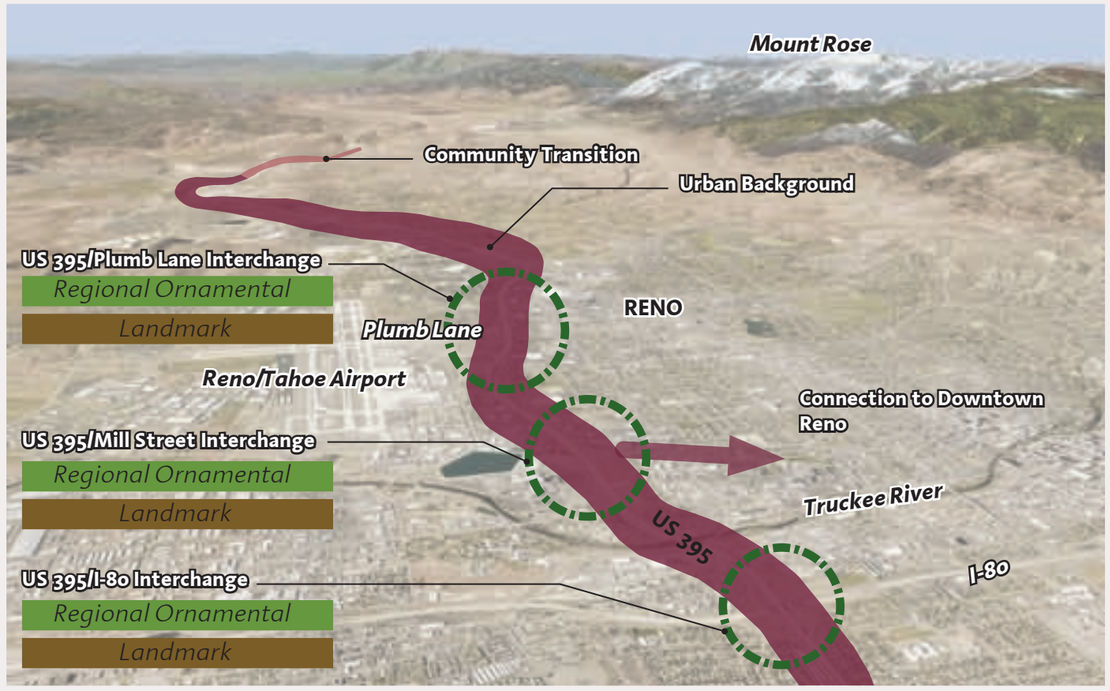
The following aerial images are meant to illustrate landscape and aesthetic treatments at key points along the Edge of the Sierra Landscape Design Segment.

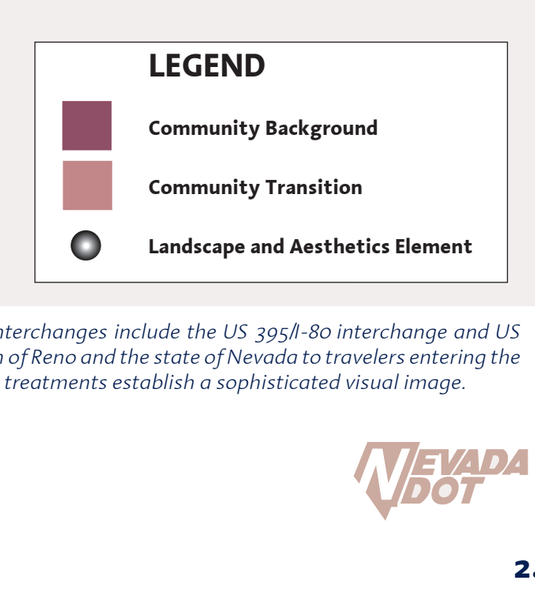




D **EDGE OF THE SIERRA LANDSCAPE DESIGN SEGMENT**

(1) *This aerial view looks north towards the entry into Reno along US 395. Major intersections provide gateways into the metropolitan area. The heightened treatments also create gateways from Reno into the Lake Tahoe recreation area.*





D **EDGE OF THE SIERRA LANDSCAPE DESIGN SEGMENT**

(2) *This aerial view looks south along US 395 in Reno. Important interchanges include the US 395/I-80 interchange and US 395/Plumb Lane interchange. The latter provides the first impression of Reno and the state of Nevada to travelers entering the area from the Reno/Tahoe airport. Heightened landscape types and treatments establish a sophisticated visual image.*

Design Interpretation Summary – Edge of the Sierra

Interpretation of the segment's design themes occurs during individual project design. The corridor plan establishes the direction for project level design. Examples illustrate forms and materials that could be used to accomplish the stated design objectives.

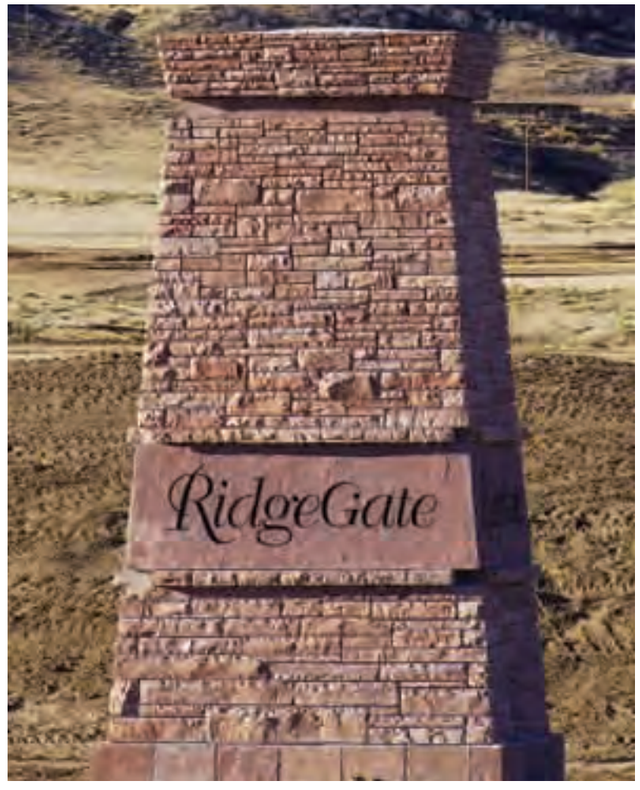
(1), (2), (3) *Plant material representative of the Great Basin and Sierra Nevada landscapes are combined into a single plant palette in the Edge of the Sierra Crossroads Landscape Design Segment.*

(4) *Hillside and slope treatments reinforce the region's distinctive beauty.*

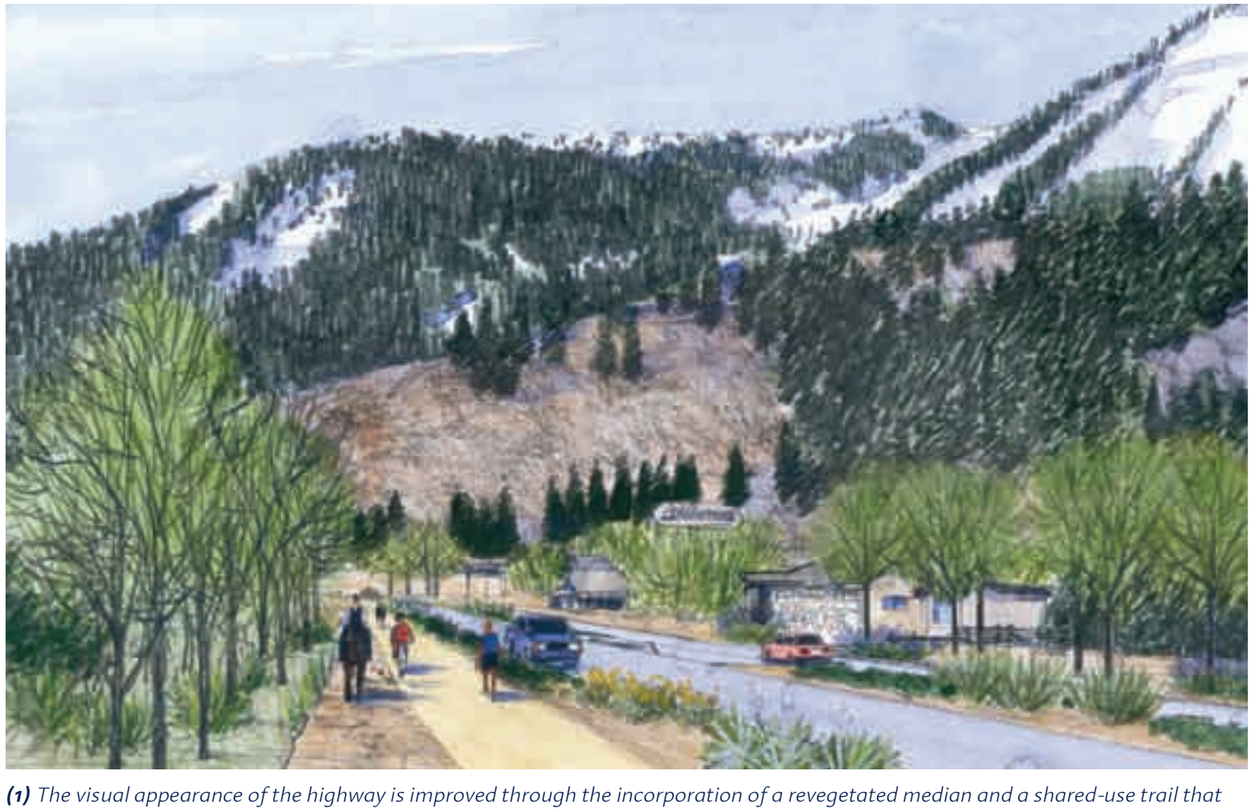
(7) *Sophisticated forms and materials reinforce the urban quality of downtown areas.*

(5), (6) *The artistic design of structures is an opportunity to express the region's unique character.*

(8) *Structures within the Edge of the Sierra Crossroads should utilize colors and materials representative of the surrounding landscape. The Plumb Lane interchange establishes the gateway into the Reno/Tahoe area from the international airport, justifying landmark treatments.*



(9) *Accentuated structures combined with distinctive views highlight community and recreational gateways.*



(1) *The visual appearance of the highway is improved through the incorporation of a revegetated median and a shared-use trail that links to regional trails and recreation opportunities.*

(2) *The construction of I-580 provides an alternative transportation route around Pleasant Valley. The community has an opportunity to reinvent the road.*

(3) *A simplified bridge structure is enhanced through the reduction of slope paving and use of regionally adapted softscape treatments.*

(4) *The interchange with Mount Rose Highway (I-580/SR 431) establishes the entry into the Reno area. As the state's second largest metropolitan statistical area, highway structures should establish a sophisticated image.*

Design Guidelines

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PURPOSE OF DESIGN GUIDELINES

Design Guidelines provide the framework for improving the aesthetics of existing, new, and retrofit highway projects. They are written statements of recommendations to meet the segment design objectives. Guidelines should not be mistaken as new standards for highway design. They represent recommendations for design solutions.

Guidelines approach corridor aesthetics as a comprehensive effort, intentionally avoiding a project-to-project approach. Guidelines assist in the development of design. Adherence to the guidelines in planning, design, and operations accomplishes the following goals:

- Interpreting the design themes of each landscape design segment.
- Creating visual unity among all highway structures and facilities.
- Selecting finishes, color palettes, and surface patterns that are compatible with the surrounding landscape.
- Incorporating transportation art motifs and media that represent the landscape design segment themes.

The guidelines, accompanied by concept diagrams, sketches, or photographs, demonstrate ways in which to achieve the design intent.

NDOT will review each project design for consistency with these guidelines and the overall Landscape and Aesthetics Corridor Plan. The full design team – NDOT staff, communities, engineers, project managers, landscape architects, consultants, contractors, and maintenance crews – is strongly encouraged to:

1) Become familiar with design guidelines for the design segment in which a project is located. The guidelines direct the design toward creating aesthetic unity within the design segment.
2) Understand the site context. The landscape surrounding the proposed project – including predominant materials, colors, and structures, as well as natural and cultural resources and social elements – provides direction for enhancement.
3) Seek early review of the project. Changes are much easier to make at the beginning of the project than at the end. Involving others early in the planning/design process helps ensure that the project is both economically and aesthetically feasible.

How to Use the Design Guidelines

The Design Guidelines are divided into four sections, described below. The full design team as well as potential partnering entities, such as communities and other organizations, should be familiar with each section.

1) **Design Process Guidelines**:
   Describe the necessity of integrating landscape and aesthetics at the beginning of every project.
2) **Lake of the Sky Guidelines**:
   Describe the vision, components, and management plan for the Lake of the Sky Landscape Design Segment associated with Lake Tahoe.
3) **Community and Urban Context Guidelines**:
   Describe guidelines for facilities and amenities that are primarily influenced by local communities, depending on right-of-way extents.
4) **Highway Facilities Guidelines**:
   Describe guidelines that are primarily influenced by NDOT's standards, including structures, grading, roadside services, and construction practices.

(1) *The Corridor Plan provides NDOT with the ability to facilitate improvements and to provide highways that support the vision and needs of a community.*

(2) *The purpose of these guidelines is to create a cohesive highway corridor that is compatible with Nevada's existing landscape, communities, and urban areas.*

SECTION ONE: Design Process Guidelines

These guidelines describe the necessity of integrating landscape and aesthetics at the beginning of every project.

1.0 PROJECT DESIGN PROCESS

1.1 Integrate landscape and aesthetics at the onset of the planning, design, and engineering phases of all highway projects.

Landscape and aesthetics should not be an afterthought to a highway project.

- Landscape and aesthetics are an integral part of the planning, design, and engineering of all highway projects.
- NDOT's structure inventory report regarding type, size, and location of highway structures should include information on landscape and aesthetics. It should also provide justification for proposed structures that do not meet the design guidelines.
- Engineering design should incorporate landscape and aesthetics to create highway structures and facilities that are effective, safe, and aesthetically appealing.

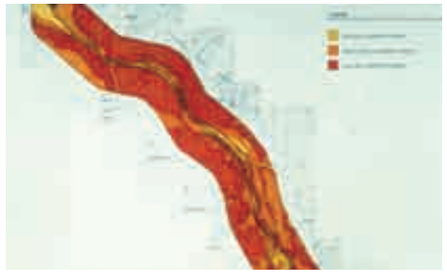
1.2 Understand the design segment theme and select design concepts that interpret the theme.

- Review the vision and objective for the landscape design segment as described in the Corridor Plan and ensure that the theme guides the project design.
- Understand the site context, including the viewshed analysis and landscape design segment objectives described within the Plan.
- Ensure project design successfully interprets the landscape design segment theme.

1.3 Understand the site context, including the surrounding landscape, and conduct a comprehensive analysis.

- Conduct a comprehensive site analysis for each project. The site inventory for each project should extend beyond project boundaries

LANDSCAPE AND AESTHETICS IS NOT AN AFTERTHOUGHT TO ENGINEERING, BUT THE STARTING POINT FOR INTEGRATED, CONTEXT SENSITIVE SOLUTIONS.



(1) *Understanding the corridor conditions and context is a critical part of the design process.*

(2) *Computer simulation of a planned highway at the conceptualization of the project provides greater understanding of highway layout and potential impacts to environmental resources.*

(3) *Photo simulation of a highway project allows visualization of physical design and improves communication of design concepts.*

to analyze the site and surrounding landscape. Ensure the planning and design of the highway project responds to this comprehensive analysis.

- Consider characteristics such as precipitation, topography, ground cover, size and location of plant material, visual conditions, soils, site drainage, rock outcroppings, and other natural features that are located on, and surrounding, the site. Additionally, cultural context such as archaeological and cultural resources and categories, such as historic settlement patterns, are important.

1.4 Use a variety of sketches, three dimensional modeling, and other tools to visualize and detail the highway.

As the level of design progresses from general to specific, highway layout and facilities should be visualized through a variety of methods to create a high quality system.

1.5 Visualize design concepts in three dimensions.

Plan view design does not accurately represent the experience of the traveler along the highway or illustrate issues of visual design. Therefore, it is important to understand design concepts in their three-dimensional framework.

- Utilize sketches, models, and digital visualization tools. "Roadway Explorer" is an excellent tool to utilize for this purpose.

1.6 Consider landscape and aesthetics costs in conjunction with baseline costs.

Landscape and aesthetics should be considered simultaneously with a project's capital budget and estimates. In addition to determining a project's baseline construction cost, allocation of budgets and resources for landscape and aesthetics should be clearly outlined at the start of a project.

1.7 Estimate maintenance costs during design to calculate the total life cycle cost for landscape and aesthetic treatments.

Maintenance is a key component to the success of landscape and aesthetic treatments.

- Design new projects that are low maintenance.
- Consider maintenance routines required for the design program, and identify areas that may need additional attention.
- Create maintenance agreements with local agencies as necessary to establish appropriate practices and levels of maintenance over the life of the project.

(4), (5), (6), (7) *This series of highway design studies shows the level of design progression from general to specific as well as the need to use a variety of modeling tools to visualize and detail the highway.*

SECTION TWO: Lake of the Sky Guidelines

Guidelines for Lake of the Sky segment establish the vision of highway aesthetics for highways within and entering into the Lake Tahoe area.

1.0 LAKE OF THE SKY DESIGN PRINCIPLES

1.1 Create an environmentally sensitive highway with recreational links to facilities within and entering the Tahoe Basin.

The vision for these highways is organized around the idea that the road is an integral part of a spectacular landscape. As such, it should respond to and be respectful of the land and the spirit of place (see illus. 1). It is recognized that a large number of people use the road for access to recreation. Providing highway facilities that reduce the conflict between bicyclists and vehicles is important. Constraints such as steep slopes, narrow rights-of-way, funding, and environmental coordination are elements that must be considered and addressed during the design phase.

- Highlight the experience of the surrounding Sierra Nevada mountains, Lake Tahoe, drainages, meadows, forests, plants, animals, and people.
- Establish a model for future highways in environmentally sensitive areas and project a system of the highest quality .
- Provide access to highly utilized recreation destinations.
- Allocate funds from the Southern Nevada Public Lands Management Act to elevate the Lake of the Sky highway system to a level equal to the status of the landscape through which it passes.

1.2 Utilize enhanced guidelines for nationally significant areas.

An elevated standard is applied to areas of national significance. Within the US 395, West US 50, SR 28, SR 207, and SR 431 Cor-

(1) *Highway facilities should fit seamlessly within the landscape. Roadways should be sensitively sited and designed within areas of scenic importance.*

(3) *Interpretive signage should reflect the relationship between roadway design and environmental resources and preservation.*

(5) *Rest area design should provide environmentally friendly access to the lake and reduce the impact of unrestrained roadside parking. Formalized roadside facilities provide direct access to recreation opportunities. Signage and parking information should be available to direct travelers to appropriate parking areas.*

(2) *Colors and simple patterning of walls and barrier rails should be the standard in areas of national significance.*

(4) *Highway design and bridges should facilitate natural wildlife migration patterns along drainage ways.*

(6) *Boardwalks and other construction methods should be used within the shorezone to minimize disturbance. Interpretive signage reinforces the need for users to minimize their impact on natural resources.*

ridor Plan area, the Lake Tahoe Basin is an area of significant importance. As such, an accentuated level of hardscape treatment (see illus. 2) should be provided as the standard level of treatment for the Lake of the Sky design segment.

- The base level of landscape treatment type should be accentuated hardscape with native revegetation softscape.
- Features such as concrete barriers, retaining walls, and drainage elements should have aesthetic treatments that respond to the landscape setting.
- Additional specific guidelines describing elevated treatments for this roadway are included within the individual guideline sections.

1.3 Components.

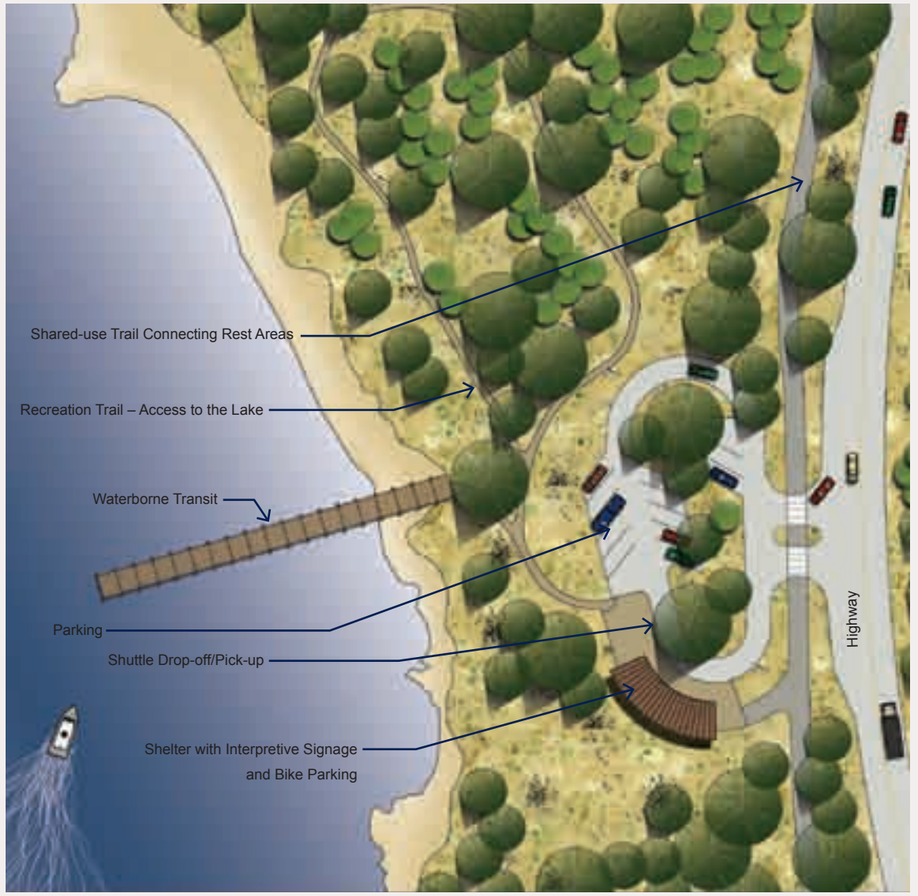
Due to the high level of recreation around Lake Tahoe, a coordinated system of rest areas should be established and linked by shared-use trails to identify access points to the lake. Implementing the vision will require innovative design solutions to deal with the legitimate implementation challenges posed by the narrow right of way, steep terrain, and TRPA regulations.

- Restrict roadside parking and install a shuttle system to relieve traffic congestion along the roadway.
- Connect trails to a waterborne transit system where appropriate (see illus. 7).
- Promote awareness of the natural environment through a system of signage and interpretative information.
- Interpret features of the highway that improve the compatibility between the highway and its natural setting (see illus. 3 on page 3.4).
- Incorporate wildlife habitat corridors throughout the highway and retrofit existing facilities to increase connectivity (see illus. 4 and 5 on page 3.4).
- Utilize innovative design solutions to deal with the legitimate implementation challenges.

1.4 Corridor management plan.

Recreation and the highway are inter-related within the Tahoe Basin. Both recreation facilities and the roads that serve them have carrying capacities. Therefore special management mechanisms are needed for the Lake of the Sky Landscape Design Segment. Every attempt has been made to make these guidelines compatible with future plans.

- Corridor management plans are required for scenic byways in order to comply with SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act - A Legacy for Users) funding requirements.
- Include a strategy for working with federal and state agencies, TRPA, Caltrans, and other community development/resource protection organizations.
- Identify methods to protect and enhance the byway's intrinsic qualities and character.
- Preserve and restore the natural settings along the highway through the use of site-sensitive materials.
- Establish scenic easements in areas of potential future development to protect scenic resources.
- Solicit public and agency input in the development of a specialized management plan that will guide highway planning and design within the Lake of the Sky segment.



(7) *Multi-use rest areas accommodate both travelers and others in search of recreation access. Facilities are linked by a shared-use trail and provide waterborne transit opportunities to promote alternative transportation and reduce the traffic load on roadways.*

SECTION THREE: Community and Urban Context Guidelines

These guidelines include facilities that are primarily influenced by local community desires but may benefit from NDOT's support. A community's highway is important and serves as a primary component of the public realm. Even though NDOT is not responsible for facilities outside of the right-of-way, it recognizes the need to work with local jurisdictions to create context-sensitive solutions.

NDOT understands the need for flexibility, and it functions as a facilitator in supporting a community's vision and goals for the highway. The guidelines found in this section are meant to enhance established traffic engineering and road design practice. No single solution will transform a community's highway through downtown. Rather, communities should carefully evaluate and consider several options and thoroughly understand the issues at hand in order to create a highway that fulfills the collective goals of the partnership established between the community and NDOT. Neither NDOT nor the community can accomplish the goals on their own.

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1.0 COMMUNITY GATEWAYS

1.1 Establish gateways that clearly express community identity.

Gateways are highly visible areas specially designed and maintained to convey the first impression and identity of neighborhoods, communities, towns, cities, and regions.

- Provide an impressive visual aesthetic.
- Utilize appropriate landscape and/or structural techniques to screen unsightly land uses.

1.2 Integrate the gateway into the highway facilities.

Gateways should be part of a larger design intent, coordinated with community facilities, and using materials that are repeated throughout the town (see illus. 2). Refer to Softscape and Hardscape Types and Treatments (pages 1.6-1.9) and Softscape Type guidelines (pages 3.39-3.46), for more details about the types of features and plants to consider for community gateways.

- Community gateways need to be integrated with highway structures and landscape.
- Architectural elements may include transportation art, rock walls, accent lighting, and signage.
- Utilize bridges to establish community identity.
- Ensure that community gateways are distinctive, memorable, and functional.

1.3 Ensure community gateways contribute to community identity and clearly define community identity points.

Highlight community entrances with clear and attractive signage, using landscape materials that reflect the community character. Execute the design in a clear, consistent, and bold manner. Repetition of the design is the basis for the unique identity of the corridor.

- Signage should be appropriately sized and incorporated into an architectural or sculptural element consistent with the community's character, the environmental context, and the corridor's theme (see illus. 3).
- Landscape plantings should include layers of low water-use plant material arranged to enhance the architectural elements and reinforce the transition into the community.

1.4 Locate gateways at likely future growth boundaries.

Community gateways mark the entrances/exits and designate the transition to increased development. Gateways marking downtowns may be used to improve community identity and draw motorists into the heart of town.

- Downtown gateways should complement the community gateway while reflecting the special character of the city center.

1.5 Engage agencies and organizations in the planning and design process.

Engage applicable State and local agencies, as well as local stakeholders and organizations in the planning, design, and implementation of community gateways.

(1) Avoid *cluttering community entries with numerous signs. Although the entry signage shown above is currently used, it is not advocated.*

(2) Preferred *signage uses materials and forms that compliment the Town's unique design aesthetic.*

(3) *Gateways create a visitor's first impression of a community and should therefore engage local stakeholders in the planning, design and implementation of such features to ensure they reflect the community's vision.*

2.0 COMMUNITY-BASED STREET SYSTEMS ISSUES

2.1 Consider improvements to the surrounding street system before widening the highway through communities.

Wide streets discourage pedestrian activity and have a negative economic impact. Secondary streets that are not performing well influence the way in which a highway operates as a community main street. Improvements to other major and minor streets impact the functionality of a main street.

- Traffic improvements should be considered in context with surrounding transportation patterns. Improvements to other streets allow potential lane width reductions along the highway and provide additional space for landscape and aesthetics.
- Improvements to surrounding city streets may include utilizing parallel streets, implementing a truck bypass, improving the local street network, and using parallel, one-way streets (see illus. 2).

2.2 Shorter blocks encourage pedestrian activity and provide more corner lots, essential for local businesses.

Short blocks with connecting streets characterize traditional main streets.

- Utilize short blocks of up to 400 feet where possible to encourage pedestrian activity in downtowns.

2.3 Consider routing trucks onto a parallel street and encourage vehicular traffic through main street.

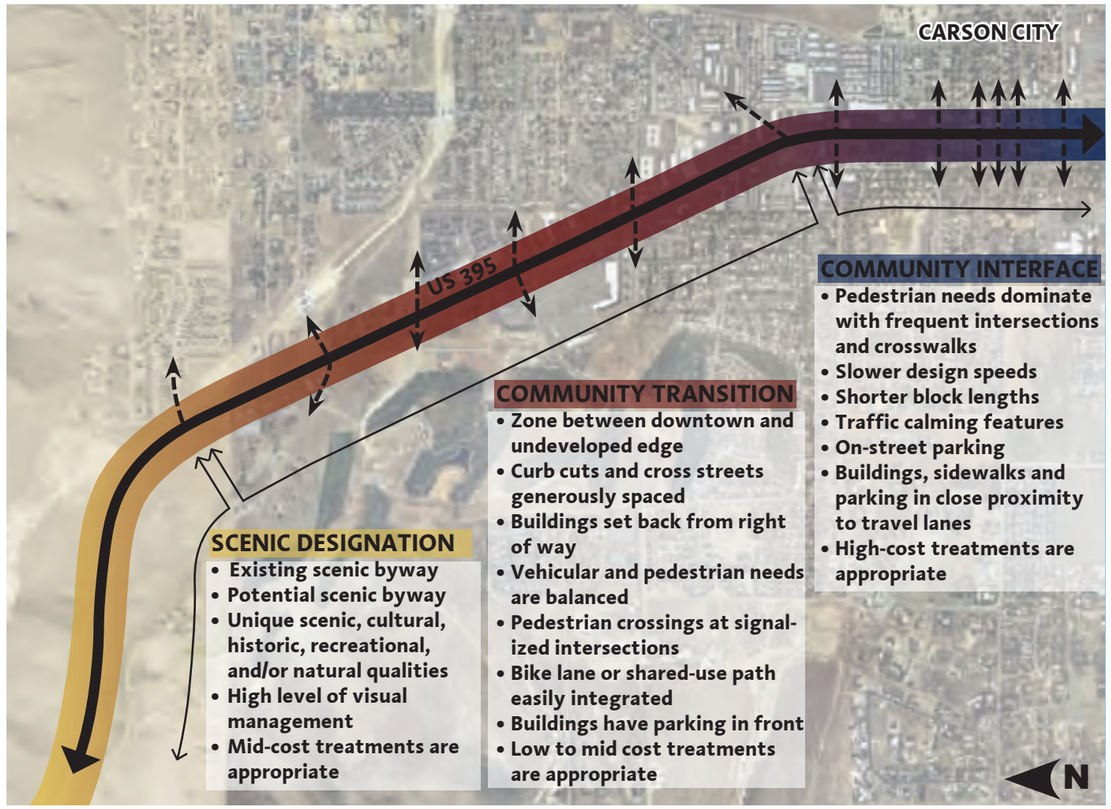
Truck traffic requires more space for turning movements and increases noise levels and fumes within the community. Wide streets discourage pedestrian activity and can harm the town's economic potential.

- Diverting truck traffic away from the local main street may distribute traffic loads more evenly and improve the function of the main street.
- Vehicular traffic should continue through main street where feasible in order to support community businesses and facilities.
- Parallel streets should have few interruptions and maintain a fairly direct connection that may be improved to accommodate truck traffic.

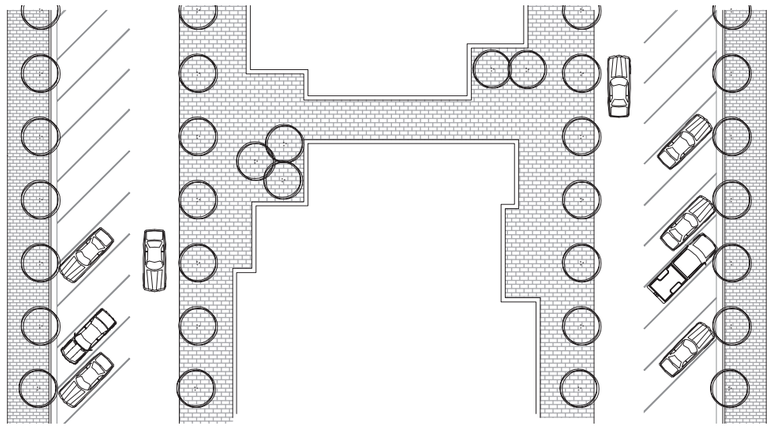
2.4 Avoid bypasses and only use them in limited applications.

Bypasses are utilized to divert traffic around communities, particularly when heavy traffic conditions obstruct the functionality of main street. However, bypasses reduce the interaction between travelers and communities.

- A bypass may work in certain cases where the highway is designated as part of the freight system or heavy traffic volumes overload a well-designed street system.
- If a bypass is used, maintain connectivity for bicyclists and pedestrians and provide direct connections back to community business districts.



(1) *As highways travel through communities, the function of the road changes as development increases at its edges. Improvements to other streets allow the highway to function more smoothly as it incorporates landscape and aesthetic elements.*



(2) *Parallel, one-way street systems may be used to improve traffic patterns and provide additional space for landscape, pedestrian improvements, or additional commercial development.*

3.0 SIDEWALKS

3.1 Provide a 10 to 15 foot sidewalk width for downtown areas where possible.

A wider sidewalk allows for more pedestrian activities along the street (see illus.1-4).

- Additional width may be required to accommodate transit shelters, outdoor dining, and retail.
- A sidewalk may be 8 feet wide in constrained circumstances. Minimum sidewalk width is 6 feet.

3.2 Provide continuous sidewalks throughout downtown areas.

The ability of pedestrians to access and move through downtown areas depends on the connectivity of sidewalks and paths, as well as appropriate design and placement of crosswalks.

- Establish connections to other sidewalks or path systems where town centers transition into suburban or rural areas.

3.3 In town centers, provide pedestrian amenities (benches, drinking fountains, transit shelters, kiosks, trash receptacles, newspaper racks, banners, and decorations).

Streetscapes that appear lively and inviting attract travelers and support local businesses (see illus. 5 and 6).

- Street furnishings should be consistent with surrounding architectural styles and the overall landscape segment theme.
- Maintain a minimum 5 feet of clear space around street furniture to accommodate pedestrian movement.
- Provide wide sidewalks and curb extensions as locations for benches.

3.4 Use distinctive paving to highlight sidewalk areas immediately adjacent to the inside face of curb.

Sidewalk areas can be organized into two zones – the amenity zone and the pedestrian zone. The amenity zone is adjacent to the curb and should be a minimum of 2 feet wide, but preferably 4 feet or greater, depending on the sidewalk width.

- Distinctive paving treatments may be used in this area to distinguish it from pedestrian movement areas.
- Treatments should be consistent over a block length, but may vary from block to block.
- Street trees, planters, benches, transit shelters, signs, utility poles, and other elements are located in the amenity zone.
- Elements should be grouped together or placed in a way that leaves a minimum open area of 8 feet between them, allowing passage from the sidewalk to the street.

3.5 Provide pleasant seating opportunities along every block in the downtown area.

Seating is essential in a comfortable pedestrian environment (see illus. 7).

- Arrange seating to accommodate a variety of views.
- Locate benches and gathering spaces to absorb sun on cold days and provide shade on hot days.
- Ensure that communities commit to maintain and clean street furniture as part of

***(1)** Eight foot sidewalks allow minimal 2-way pedestrian traffic and street furnishings.*

***(2)** Ten foot sidewalks provide enhanced user comfort and space.*

***(3)** Twelve foot sidewalks allow room for outdoor dining and sidewalk displays.*

***(4)** Fifteen foot sidewalks create area for high levels of pedestrian activity.*

***(5)** In areas of adequate right-of-way, wide sidewalks should be encouraged in order to promote pedestrian activity.*

***(6)** Appropriate organization of lighting, street furnishings and planting areas lead to a successful pedestrian experience.*

***(7)** Creating pleasant and protected areas for pedestrians to sit is an important component of active downtown areas. Seating areas can be interspersed with on-street parking spaces.*

maintenance agreements that are negotiated prior to construction.

3.6 Consider under-grounding utilities to provide additional space for sidewalk enhancements.
Utilities should be consolidated to minimize poles and other sidewalk obstructions (see illus. 8).

- Coordinate signage with utility poles, where feasible.
- Avoid placing signs and utilities in pedestrian areas.

3.7 Incorporate transit shelters to promote pedestrian and non-motorized transportation (NMT) opportunities.

Coordinate transit stops with local transportation agencies or Metropolitan Planning Organizations (MPO).

- Locate bus pull-outs on the far-side location of intersections.
- Minimize conflicts between vehicles, passengers, pedestrians, and cyclists (see illus. 9).

3.8 Consider using artistic paving and historical marker insets to accentuate downtown areas.

- Celebrate distinctive areas with accentuated paving materials.
- Consult artists for ideas to improve the community downtown.
- Paving patterns should coordinate with intersection designs and overall community character (see illus. 10).

(8) *The placement of lighting and other utilities should be considered in conjunction with providing appropriate space for unobstructed pedestrian movement.*

(9) *Locate transit stops to minimize conflicts between vehicles, pedestrians, and cyclists.*

(10) *Historical markers inlaid in paving enhance place-making.*

4.0 STREET TREES AND PLANTING STRIPS

4.1 Carefully select plant species.

- Select trees that thrive in the local climate and consider species whose roots, seasonal flowers or fruit will not disrupt sidewalks (see illus. 1).
- Evaluate trees based on site-specific characteristics as well as design intent.
- Considerations for physical characteristics include form, height, spread, height to canopy bottom, canopy density, trunk size, root habit, rate of growth, and longevity.
- Consider habitat requirements affecting plant growth, including soil type, soil oxygen deficiency resistance, salt resistance, irrigation need, shade tolerance, heat tolerance, air pollution resistance, and wind resistance.
- Minimize maintenance costs by avoiding trees with excessive maintenance requirements including flowers, foliage, fruit, and twigs.
- Consider common insect and disease problems that consistently require maintenance, or are life threatening.
- Maintain storefront visibility and reduce pedestrian conflicts by selecting trees whose form remains intact when limbed up 7 to 8 feet (see illus. 2).
- Consider tree height over traffic lanes. Canopies should appear natural when trimmed to 13 feet.
- Select plants that will provide a variety of ornamental characteristics, such as seasonal color, fruit, texture, bark, and foliage.
- Plant species according to the softscape type and treatment designated by the design objectives.
- Avoid planting a single species in suburban areas due to the risk of a pest or disease destroying an entire street tree planting.
- Downtown districts may be highlighted through a formalized street tree pattern.

(1) *Choose tree species that are appropriately sized, do not drop fruit or seed pods, and are easy to maintain.*

(2) *Trees should be placed so that they do not block the view of business names and entries.*

4.2 Properly place trees in sidewalk conditions. Maximize the lifespan of trees to reduce the cost of tree replacement.

- Protect trees from damage by car doors. Where on-street parking is provided, allow adequate room between trees and cars (2 feet minimum, 3 feet to 4 feet ideal, see illus. 3). Trees may be placed between parking spaces to minimize damage.
- Allow for root aeration and potential water harvesting through the use of tree wells (4 foot by 4 foot minimum, 5 foot by 5 foot ideal). Dry-set pavers may also be used, ensuring adequate root aeration.
- Consider light placement as part of tree spacing and placement (typically 25 feet to 40 feet).
- Place trees so they do not block vehicular site lines or building access ways. Maintain visibility of traffic signals, directional signage and access to entry drives.

4.3 Street tree plantings may be varied to distinguish downtown areas from transition zones and accentuate wayfinding. Small trees in combination with medium and large trees can reinforce wayfinding in towns.

- Distinctive trees may be used within downtown areas to distinguish them from other commercial areas.
- Key intersections and gateways may be designated by clustering smaller trees or other distinctive groupings (see illus. 4 and 5).

4.4 Utilize hanging baskets, containers, and other vertical elements where feasible. In areas of limited rights-of-way, hanging baskets, moveable planters, and other vertical elements may be used to provide structure or to accent street tree plantings.

- Hanging baskets may be incorporated into the street design and attached to light fixtures or buildings to provide visual relief and enhance the aesthetics (see illus. 6).
- Baskets may be replaced with wreaths or other seasonal accents during dormant seasons.
- Moveable planters add flexibility to the streetscape design (see illus. 7).
- Avoid placing containers within clear zones and immediately adjacent to curbs where high levels of heat and vehicle exhaust are more prevalent.
- No container should be used if planter widths exceed 25% of the entire sidewalk width.
- Select neutral container colors that harmonize with brick pavers, concrete sidewalks, most building facades, and the myriad color combinations produced by annual plantings.
- Container design should be simple and understated (see illus. 8).
- Use a consistent planter type within communities and provide groupings where possible. Containers should be sited near street corners (as long as clear visibility is maintained for drivers), to flank entrances to landmark buildings, or to physically and visually define outdoor café spaces.
- Combined height of containers and plantings should not obstruct the view of either motorists or pedestrians at street intersections and access drives.

(3) *Place street trees where they are protected from car door damage and in areas where they easily facilitate pedestrian movement.*

(4) *Varied street tree types may be used to distinguish key areas and gateways.*

(5) *Used consistently, street trees help define the extent of downtown districts and neighborhoods. A change in planting type and spacing can be used to signal transition zones between downtown and outlying areas.*

(6) *Baskets may be hung from light poles in areas that have limited room for street trees.*

(7) *Coordinate container colors with sidewalk and other site features.*

(8) *Container color and form should be simple and understated.*

4.5 Buffer sidewalks from the roadway through the use of planting strips or raised planters where possible.

Planting strips provide opportunities to absorb runoff water and decrease overall drainage requirements. Additionally, they create areas to store snow during removal periods throughout the winter.

- Where space is not required for widened sidewalks or on-street parking, provide planting strips (ideal 5 feet minimum width) or raised planters (see illus. 9 and 10).
- Planting strip design should consider the placement of benches, signs, bicycle racks, and other street furniture.
- Raised planters should incorporate seat walls to provide additional pedestrian seating.
- Consider providing 3 feet of hard surface between planting strips and parallel on-street parking to accommodate motorists upon exit from their vehicles.

4.6 Ensure that communities commit to maintain and provide irrigation for streetscape plantings.

The success of a streetscape program within communities requires dedication to maintenance and irrigation of planted areas.

- Streetscape plantings should not be provided without community endorsement and support.
- Avoid spray irrigation systems where possible, and do not overspray onto walkways and into gutters.
- Irrigation and maintenance may be funded through community beautification committees and other community organizations.

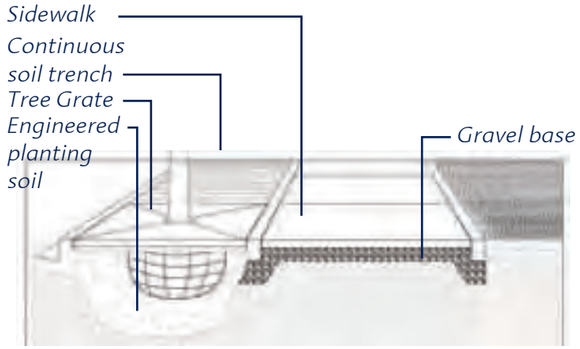
4.7 Use engineered planting soil for street tree plantings.

Trees planted in urban conditions and as part of street tree programs face unique challenges. The soil under adjacent sidewalks and roadways is typically compacted to support the paving. This compaction inhibits root growth and spread, causing shallow root growth and tree stress. Engineered planting soils (see illus. 11) include mixtures of soil, loam, stone, water, and a moisture-retaining polymer or sand that transfers weight-bearing loads from stone to stone in the gravel, leaving the soil between the stones unaffected by compaction. This type of engineered soil creates a larger root volume with increased porosity, nutrient-holding capacity, and drainage for a healthier tree root growth environment.

- Engineered planting soils should be used around root balls of street trees.
- Continuous trenches of engineered planting soil are recommended between street trees.
- Locate trenches parallel to curbs and under non-mortared brick pavers. Trenches provide greater volumes of soil for root growth and permit air and water to reach tree zones.

(9) *Street trees can be combined with planting strips to buffer pedestrian zones from traffic. Plant height should not block sight distances.*

(10) *Raised planters create a buffer between vehicles and pedestrians, and offer additional seating options.*



(11) *Engineered planting soil can increase the lifespan of street trees by allowing tree roots to grow and expand into areas that otherwise would be inaccessible.*

5.0 GRAPHICS AND SIGNAGE

5.1 Create a standard system of signage that aids wayfinding within communities while also providing information about local facilities and organizations.

- Provide a coordinated signage system that reflects the distinctive character of special districts (see illus. 1).
- Graphics can take the form of signs, banners, information kiosks, or pavement inscriptions or inlays (see illus. 3).
- Materials and designs should be clear and simple, so as to be easily read and quickly understood by pedestrians or motorists, as appropriate.

5.2 Locate and size signage and graphics so that they are easily read and understood by both cars and pedestrians.

- Pedestrian-scaled signage should be placed at heights that can be easily seen from the sidewalk (see illus. 2).
- Signage designed for motorists can be larger, and placed at heights and intervals that can be easily seen and understood at higher traveling speeds.

5.3 Provide community graphics such as banners to promote special events and define special districts and neighborhoods.

- Create a coordinated system of signage that describes community events and reinforces community character (see illus. 5).
- Banners that span the roadway should be used sparingly and in more commercial locations. Banners can be installed permanently, or as seasonal and temporary forms of signage.

5.4 Use distinctive signage to direct motorists through the heart of the community.

Truck traffic is often not desired within downtown areas and separate truck routes may be established. Vehicular and tourist traffic, however, is desirable.

- Ensure that signage appropriately directs vehicular traffic to promote tourism and support local businesses.

5.5 Coordinate light fixture design with graphics and signage.

- Banners may be incorporated into light fixtures and should be considered as part of the design. Graphics should be consistently displayed (see illus. 4).
- Customized light fixtures reinforce context-sensitive solutions.

5.6 Utilize a consistent color palette within local communities.

Local jurisdictions may choose a color palette for fixtures and amenities that corresponds with the community's vision.

- Colors should respond to the natural setting and subtly enhance the community without overpowering the streetscape design.
- Color should complement the NDOT color palette for structures within the right-of-way.

(1) *Clear and distinctive signage serves as wayfinding for both motorists and pedestrians.*

(2) *Signage scaled for pedestrians can be used to identify individual business within a downtown area.*

(3) *This kiosk provides community event information and reflects the character of the Carson City capital complex.*

(4) *Banners promote special districts and reinforce community character.*

(5) *Banners can be used to identify festivals or seasonal activities that may be of interest to local citizens and visitors.*

SECTION FOUR: Highway Facilities Guidelines

These guidelines pertain to highway facilities that are primarily influenced by NDOT's standards, including structures, grading, roadside services, and construction practices. The guidelines found in this section are meant to enhance established traffic engineering and road design practice. No single solution will transform the highway. Partnerships may be created with communities and other agencies and organizations to accomplish landscape and aesthetic treatments in addition to supporting landscape and aesthetic elements that impact areas outside of the right-of-way. Established partnerships and design teams should carefully evaluate and consider several options and thoroughly understand the issues at hand in order to create a highway that fulfills their collective goals. Neither NDOT, communities, nor other agencies or organizations can accomplish the goals on their own.

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1.0 NON-INTERSTATE STATEWIDE GATEWAYS

1.1 Provide statewide gateway features crafted from the land where US 50 and US 395 enter Nevada from California.

Identify statewide entry points to welcome travelers to Nevada.

- Non-interstate gateways should be understated and relate to the scale of the road (see illus. 1 and 2).
- Include the Nevada name and state seal.
- Utilize vernacular forms and stone material from local sources.
- Use softscape treatment types identified in the landscape design segment.

(1) *Statewide gateways located in urban areas may be integrated into the streetscape design to welcome and thank visitors upon entrance and exit.*

(2) *Non-interstate gateways create a memorable entry experience and respond to the scale of the road.*

(3) *Architectural features at gateways utilize local materials that reflect the surrounding landscape.*

(4) *Use combinations of vernacular materials and forms to reinforce local character.*

(5) *Bridges can subtly reinforce entries by echoing local architectural character.*

2.0 REST AREAS, VIEWPOINTS, AND PULL-OFFS

2.1 Provide a comprehensive roadside service program.

Roadside services are key components of the highway corridor, particularly where long distances separate developed areas. Provide a comprehensive roadside service program throughout the corridor. The road services matrix on the opposite page describes varying levels of service stops and associated program elements. Refer to the Specific Corridor Features maps (pages 2.16, 2.27, 2.39, and 2.50) for potential road service facility locations.

- Locate rest areas to provide safe stopping points.
- Connect rest areas located in highly utilized recreation areas with a shared use trail.
- Incorporate facilities for transit stops where necessary.
- Buffer roadside services from the highway, or provide an access road when located off the highway.
- Consider major site resources and features such as topography, views and vistas, unique vegetation, geological features, wetlands, and other qualities native to the site and its surroundings.
- Consider siting activity pull-offs where they provide access to activities located adjacent to the highway.
- Locate truck parking so as not to disrupt views and other features.

2.2 Ensure rest area design reflects the local setting.

All rest areas, viewpoints, and pull-offs should readily accommodate travel needs and reflect the corridor's design theme (see illus. 1 and 2).

- Utilize vernacular forms and local materials to create rest areas that blend seamlessly with the surrounding landscape.
- Avoid using makeshift, adapted site facilities with no distinctive architectural style.
- Concrete barriers and brightly painted pole bollards should not be used for parking delineation or site boundaries at rest areas and pull-offs.
- Sustainable architecture may be appropriate for many highway service areas where water, energy, and landscape resources are difficult to secure and maintain.
- Provide lighting in scale with the site development.
- Articulate space, frame views, and provide shade through the use of landscape plantings and/or architectural features.

2.3 Retrofit existing rest areas.

Analyze existing rest area structures, buildings, amenities, and layout for their visual interest. Renovate to improve the aesthetics and user comfort of existing road service facilities.

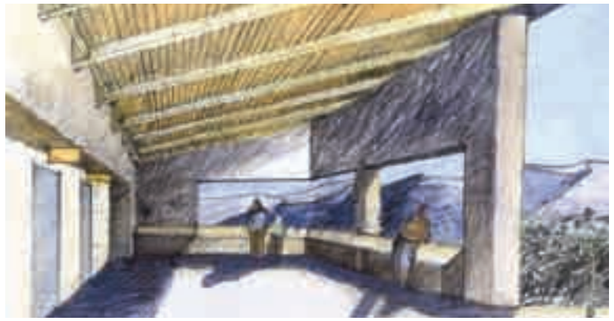
2.4 Locate viewpoints and points of interest to take advantage of visual access to the features of interest.

Give special attention to existing or potential views, vistas, and cultural or historical attractions (see illus. 3, 4 and 5) that are unique to the site or have outstanding resource value, such as Native American heritage and emigrant history.

- Locate viewpoints at the following locations:

(1) *Rest area architecture should blend vernacular forms with sustainable technology to preserve the character and resources of a place. Complete rest areas include picnic facilities with shade structures.*

(2) *The design of rest area structures should incorporate plantings, materials, and landscape features that reinforce the corridor's design theme.*



(3) *Rest stops should be situated within the environment to take advantage of impressive views of the surrounding landscape.*

(4) *This rest area location takes advantage of unique site qualities such as vistas and opportunities for wildlife viewing.*

(5) *A sheltered structure at a point of interest gives travelers a protected place to enjoy views.*

ROAD SERVICES MATRIX

	Description	Landscape Treatment	Program Elements
ROADSIDE PULL-OFF	Roadside pull-offs provide facilities for drivers to exit the highway for a brief period. Facilities and minimal parking are provided to accommodate the abbreviated stay. (Referred to as "Rest Stop" under former NDOT naming conventions.)	• Native plant revegetation to enhanced native landscape types • Standard hardscape type	• Site-specific interpretive signage • No toilets or running water • Trash containers • Limited car and Recreational Vehicle parking • Scenic overlooks • Located according to unique or outstanding features • Shade canopy (vegetation or structure)
VIEWPOINTS AND POINTS OF INTEREST	Viewpoints and points of interests present opportunities to view unique vistas, geologic and historic features, or cultural landmarks. Interpretive elements are integrated into the site design, and Place Name Signage and Travel Information elements are provided to establish the relationship between highway and place. Typically, the length of stay is short and parking is limited.	• Native plant revegetation to enhanced native landscape types • Standard to accentuated hardscape types	• Located according to travelers' needs and unique site features • Site-specific interpretive signage • Toilets/no running water • Handicap accessible • Picnic tables and shade structures • Trash containers • Paved car and Recreational Vehicle parking • Telescopes/viewfinders • Nature walks or short trails • Seating Areas • Shade canopy (vegetation or structure)
BASIC REST AREA AND COMMUNITY REST AREA	Basic Rest Areas are typically located throughout the state offering site specific interpretive information. They offer limited restroom facilities and may or may not include running water, depending on availability. Typically, these rest areas are located adjacent to scenic views, unique historical, cultural or environmental features. Community rest areas provide facilities within the town's infrastructure and function as a pocket park or town square.	• Enhanced native landscape type • Standard to accentuated hardscape types	• Located according to traveler's needs and unique site features • Site-specific interpretive signage • Toilets/no running water • Emergency call box • Handicap accessible • Picnic tables and shade structures • Trash containers • Paved car and Recreational Vehicle parking • Paved truck parking • Nature walks or short trails • Seating Areas • Shade canopy (vegetation or structure) • Local community information
COMPLETE REST AREA	Complete Rest Areas are typically located at 60-mile intervals throughout the state and are usually situated outside of developed areas. They feature fully-operable facilities in combination with interpretive information on regionally significant cultural and historical sites. Complete Rest Areas also provide travelers with picnic facilities and include children's play areas and pet areas.	• Regionally adapted landscape type • Focal hardscape type	• Regional interpretive signage • Running water and flushing toilets • Emergency call box and telephones • Drinking fountains • Vending machine services (at manned sites) • Handicap accessible • Picnic tables and shade structures • Trash containers • Bicycle storage units • Recreational Vehicle dump station • Paved car and Recreational Vehicle parking • Paved truck parking • Telescopes/viewfinders • Interpretive and overlook features • Children's play area • Pet rest facilities • Shade canopy (vegetation or structure) • Local community information
GATEWAY REST AREA	Gateway facilities convey first impressions and identity. Special features may be incorporated to highlight the area through design interpretation of the place. Gateways may be associated with any level of rest stop in the listing. The incorporation of local community information regarding amenities, events and interpretative elements, improves the interface between the highway and the communities it serves.	• Regionally adapted landscape type • Landmark hardscape type	Program elements are consistent with the type of Road Service Area provided. Specific elements include: • Regional services information • Interpretation of regional sites and features • Information on regional recreational attractions
WELCOME CENTER	Welcome Centers are located along major entry routes to the state. They offer introductions to the state and travelers can find access to useful travel information. Welcome Centers include a staffed information kiosk.	• Regionally adapted landscape type • Landmark hardscape type	• Located at major entry routes to state • Informational Services • Staffed visitor center • State-wide interpretive signage • Running water/flushing toilets • Emergency call box and telephones • Drinking fountains • Vending machine services • Handicap accessible • Picnic areas and shade structures • Trash containers • Bicycle storage units • Paved car and Recreational Vehicle parking • Paved truck parking • Improved trails • Children's play area • Pet rest facilities • Shade canopy (vegetation or structure) • Telescopes/viewfinders

- Carson Valley (SR 207 and US 395)
- Washoe Valley (US 395),
- Truckee Meadows (SR 431 and US 395)
- Lake Tahoe (SR 28, SR 431, and US 50)
- Topaz Lake, Spooner Summit
- Carson River (US 395)

- Design the viewpoint to reflect the surrounding setting and unique features.
- Coordinate the preservation and management of scenic vistas and unique features with the appropriate organizations and groups.
- Evaluate viewpoints periodically to ensure the integrity of the view.
- Consider the use of scenic easements to protect views and vistas.
- Limit the construction of outdoor advertising and other elements and structures that detract from the quality of the landscape.

2.5 Coordinate locations of rest areas with recreational access points.

Coordinate locations of rest areas with regional trail systems, particularly within the Tahoe Basin where trails provide additional access to the lake and other areas of interest (see illus. 8).

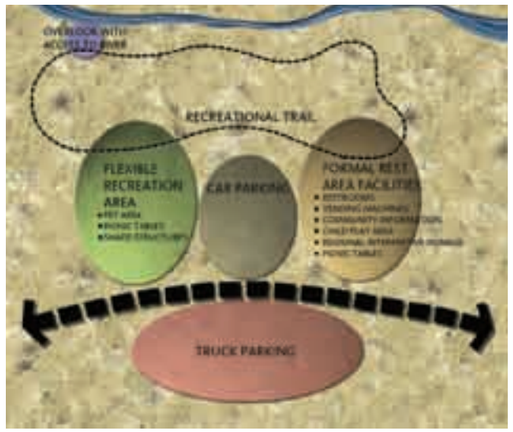
- Coordinate with appropriate agencies to provide informational signage for recreational activities.
- Coordinate the location of park-and-ride lots, rest areas, and activity pull-offs with transit stops to encourage use of public transportation, particularly in areas of heavy tourist traffic.

2.6 Provide community rest areas within designated towns.

Community rest areas have the dual benefit of serving as town parks and engaging travelers with local businesses (see illus. 10).

- Develop community rest areas through cooperative agreements with local municipalities.
- Provide information about local and regional activities, businesses, and points of interest.

***(8)** Coordinating rest area locations with public access points and regional trails creates an additional benefit to the rest area facility.*



***(6)** Conceptual layout of rest area amenities responds to environmental context and separates truck parking from view corridors.*

***(9)** Viewpoints and points-of-interest are separated from the highway and offer opportunities to view distinctive environmental features.*

***(7)** Rest areas should include a series of buildings or structures that reflect a homestead arrangement. Outdoor spaces should be considered as part of the building layout.*

***(10)** Community rest areas provide parks and gathering spaces for residents as well as serving traveler needs. Pedestrian connections to local businesses and attractions encourage travelers to explore the community.*

3.0 TRANSPORTATION ART

3.1 Engage artists early in the design and development stages of highway projects to ensure an integrated and comprehensive art program.

Transportation art should not be an afterthought or decoration (see illus. 1,2 and 3).

- Incorporate art as part of the design process as a means of interpreting the corridor's theme.
- Integrate art as part of functional aspects of highway facilities.
- Artists should coordinate with community members, landscape architects, and architects throughout the design process.
- Scale artwork based on travel speed, slope, and sight distance.

3.2 Create regionally appropriate and meaningful art.

Art enhances the travel experience and can create the first impression of a place. Transportation art should clearly express a meaning and purpose that relates to the surrounding locale, the unique culture and environment of the area, and the travel experience. Patterns and objects used thoughtfully, and even abstractly, can and should evoke a response that connects travelers to the uniqueness of the site and/or the surrounding landscape.

- Patterns imprinted on a highway structure should be designed as an artistic composition of objects, imprints, or patterns.
- Patterns should offer an appropriate level of complexity and interest to the place and highway travel speed.
- Avoid the use of repetitive, overused symbols and patterns.
- Consider artwork that utilizes light and shadow to create pattern and images.
- Avoid monotony in the duplication of repetitive literal pictorial application.

3.3 Ensure artwork expresses an excellence of craftsmanship, quality, truthfulness, and originality.

Transportation art should complement the overall design of highway facilities. Materials and forms should be carefully considered to ensure the long-term suitability of the project.

- Select a composition of materials that are durable for the projected life span of the project.
- Avoid the use of ready-made, randomly placed, stand-alone objects, or imprints that portray little meaning.
- Use evocative artistic expressions that engage observers and complement highway structures and the surrounding landscape.
- Elements of highway art should not be obvious or forged. Rather, transportation art should depict an excellence of craftsmanship, quality, truthfulness, and originality.

3.4 Consider each art piece as part of a larger whole.

Highway art can be carefully crafted, giving the simplest of all elements a very powerful effect. When planning transportation art, the entire design segment and overall corridor should be considered (see illus. 4).

- Consider surrounding landscape views.
- Art should be scaled at a size relative to the surrounding landscape and highway speed.
- Avoid distracting art pieces. Consider glance recognition and the intensity of surrounding features in order to prevent safety issues.

(1)

(2)

(3)

(1),(2),(3) *Involving artists early in the design process helps ensure the resulting project is representative of the community's vision and fits into the functionality of the highway facility. The images above are part of a mural designed by artist Stephen Farley in which photos from the general public were converted to glazed ceramic tile and incorporated into the design for a community gateway.*

(4) *Although simple in concept, the ribbon sculpture along the above wall is a dynamic art piece that responds to the scale and speed of travel along the adjacent roadway.*

3.5 Ensure transportation art supports the landscape design segment themes.

Transportation art is not a typical highway project, and the choice of appropriate subject matter and media is essential to obtaining the desired expression for each landscape design segment theme. Choose art subjects that support the landscape design segments' themes, such as:

Great Basin Forest
- Subtle Statewide Gateway to Nevada
- Topaz Lake
- Pinyon and Juniper Forests
- Outdoor Recreation
- Native American Heritage
- Forestry
- Mountain Views

Capital Crossroads
- Ranching
- Wildlife
- Job's Peak
- Outdoor Recreation
- Birding
- Carson River
- Historic settlements
- State Capital
- Railroad
- Mining
- US Mint

Lake of the Sky
- Subtle Statewide Gateway to Nevada
- Outdoor Recreation
- Lake Tahoe
- Native American Heritage
- Forestry
- Sierra Nevada Wildlife and Plant Communities
- Scenic Views
- Historic Logging and Flumes – Connection to Mining

Edge of the Sierra
- Subtle Gateway Marking the Arrival to Nevada
- Outdoor Recreation
- Washoe Lake
- Reno History and Museums
- Native American Heritage
- Forestry
- Great Basin/Sierra Nevada Wildlife and Plant Communities
- Scenic Views
- Truckee Meadows

Enhance bridges, pedestrian structures, noise walls, and retaining walls with appropriate motifs and consider sculptural ornamentation, decoration, and landmark features.

3.6 Engage local agencies and organizations in the planning process.

Relationships with local agencies as well as the Nevada Arts Council should be developed to assist in the review and implementation of proposed transportation art projects.

- Consider transportation art at the onset of project development.
- For Community Matching Fund and Transportation Art programs, refer to the guidelines outlined in the current *Landscape and Aesthetics Community Match Procedures Manual: Guidelines, Applications, Instructions and Forms for the Community Matching Funds and Transportation Art Program*, NDOT.

(5) *Metal trees enhance place-making and are integrated as part of the design process.*

(7)

(8)

(7),(8) *Cultural symbols can be integrated into bridges to highlight important crossings.*

(6) *Light and shadow can be used to create pattern and images.*

(9) *Streetscape design may include artwork within community centers and along sidewalks to enhance the sense of place.*

4.0 SIGNAGE

4.1 Provide a standard, cohesive system of service signage.

NDOT manages the Tourist Oriented Directional Signage System (TODS). TODS are preferred over numerous private individual business signs and billboards. Work with local community agencies and businesses to develop and locate TODS. Refer to the Outdoor Advertising discussion (pages 1.28 -1.29) for more information about billboards along the corridor.

4.2 Implement a Statewide Place Name Sign Program.

A comprehensive place recognition signage program should be implemented through partnership initiatives with local communities and agencies. The program and sign types are described on pages 1.12-1.13. Areas of interest within the design segments that could be highlighted include:

- Historic Features: Historic flumes, railroads, emigrant trails, State Railroad Museum, and V & T Railroad (from Virginia City to Carson City), inverted siphon near Duck Hill, Genoa, Mormon Station, and Bowers Mansion;
- Wildlife and Natural Areas: Tahoe Rim Trail and wildlife viewing areas in the Tahoe Basin, Washoe and Carson Valleys;
- Geographic Features: Lake Tahoe, Logan Shoals, Glenbrook Canyon, Carson River, Topaz Lake, Washoe Valley, Slide Mountain, Mt. Rose, and Stonehouse and Steamboat Hot Springs;
- Cultural/Recreational Resources: Mount Rose Scenic Byway (SR 431), Carson City State Capitol and Historic District, Dayton Historic District, sovereign lands and reservations of the Washoe and Paiute tribes, Tahoe Pyramid Bikeway, and Virginia City National Historic District, Rock Point Mill Site, and Stead Airport (site of Reno Air Races).

- Use a consistent color and material for signs.
- Use signs that are high quality and as durable as other standard highway signs.
- Use the MUTCD as a guide for signage requirements.

4.3 Create a family of iconic symbols to represent features.

Encourage the recognition of cultural and environmental features through iconic imagery.

- Signage should depict the general physical shape of the point of interest.
- Establish icons to represent general categories of interest within the Nevada landscape. Illustration 1 shows examples of symbols to represent the categories. Unique icons may be created for areas of national significance such as Lake Tahoe. Additional symbols should be developed to represent Nevada landmarks/historic points, emigrant trails, scenic byways, and Native American features. Engage Nevada tribes to develop a universal symbol that is both appropriate and simple to represent the state's Native American resources.
- Features and points of interest to be recognized in this program will be coordinated with NDOT, NDSP, Native American Tribes, and the State Historic Preservation Office.
- Name and labels included shall be consistent with State archives and map naming conventions. Consider travel speed when descriptions are used. Lettering less than 6 inches in height can be difficult to read at high speeds.
- Final icon and name approval will rest with NDOT.

EXAMPLE CATEGORIES OF ICONIC SYMBOLS FOR PLACE NAME SIGNS

(1) Universal symbols represent Nevada's cultural and environmental features as part of the Place Name Sign Program. Additional categories such as Nevada landmarks/historic points and Native American features should be developed to provide straightforward icons that symbolize these resources.

4.4 Implement an Audio Interpretation Program.
Develop and coordinate an audio/multimedia interpretative program with the Statewide Place Name Sign Program. This program could be implemented via broadcast radio, CD or DVD programs, wireless Internet hotspots, satellite transmission, or other media that allows travelers to access additional information from their car.

- Information may include cultural and natural resources, tourist opportunities, and services along the corridor.
- Link the Audio Interpretation Program to the Statewide Place Name Sign Program and state welcome centers in order that travelers can access specific information on selected sites.
- Utilize synchronous technologies that allow users to control how and when they access this additional information.
- Incorporate the program into the Intelligent Transportation System regional informative architecture to allow messages to be updated in real time and coordinated with AMBER alert and 511 traveler information messages.
- Coordinate with programs, organizations, agencies, and municipalities along the corridor, and explore ways in which to expand the Audio Interpretation Program.

4.5 Coordinate the Statewide Place Name Sign Program with the national Watchable Wildlife program and with other community driven programs.
Work with other agencies, civic groups and municipalities to provide interpretive signage where applicable.

4.6 Highlight scenic byway entrances with signage that is coordinated with the Statewide Place Name Sign Program.
Reflect the place and character of the area with iconographic images incorporated on scenic byway signs (see illus. 7).

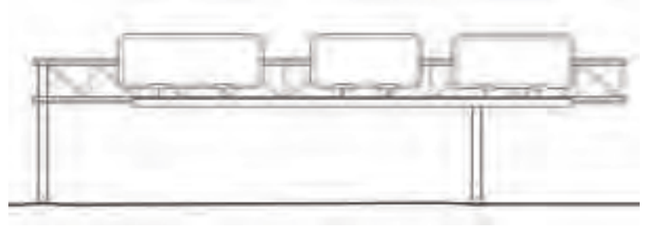
4.7 Incorporate the anti-littering campaign.
Anti-littering messages located at highway stops that include food and beverage services will provide an immediate reminder to travelers.

- Work with local vendors to place the anti-littering messages on disposable cups, plates, and other items likely to be tossed out the vehicle window.
- Along non-interstate roadways, utilize pole signage anti-littering signs.
- Develop signage that engages Nevada residents and encourages active participation in maintaining clean and beautiful highways.

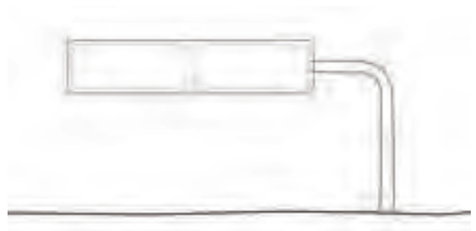
4.8 Simplify signage supports used on bypasses and elevated bypasses.

- Use single arm monotube systems for freeway signage support where possible.
- Minimize the number of trusses used in order to reduce visual clutter (see illus. 8 and 9).

(7) *Scenic byways should include a specific pictorial graphic that is related to the place.*



(8) *Sign bridge with numerous trusses is visually cluttered.*



(9) *Single arm monotube with one signage board clarifies appearance of information.*

5.0 COLOR PALETTE APPLICATION

5.1 Use a uniform, consistent color palette for all highway structures.

Standard NDOT practice should utilize a uniform and consistent color palette for all new and existing highway structures that complements the surrounding landscape. Base and accent stain or paint colors for all highway structures along the US 395, West US 50, SR 28, SR 207, and SR 431 Corridor have been selected. To ensure accurate color reference, the colors are matched to the Dunn Edwards system (see illus. 2).

- Each highway structure should use a selection of one base color and up to two accent colors, chosen from the palette. No more than two accent colors should be used per site.
- Ensure roadway structures within a single landscape design segment utilize the same base color and accent color(s).
- When existing structures require refinishing, they should be stained or repainted to be consistent with the selected color palette.
- Specific town logos and transportation art are exempt (refer to Transportation Art guideline, page 3.19).

5.2 Ensure accent colors highlight structural aspects.

Accent colors should highlight structural aspects and/or details of highway structures, such as the beam of a bridge or a bridge railing.

- Ensure accent color application logically responds to and reinforces structural features or change in materials.

5.3 Use color composition on bridges to visually reinforce structural elements.

Use the base and accent colors to reinforce the structural elements and integrity of a bridge.

- Concrete bridge spans, super-structure support, and slope paving should be selected from the landscape segment base color.
- Railing and other features incorporating a material change should utilize accent colors. In addition, steel bridge spans should use an accent color.

5.4 Blend new rock cuts and/or soil with the surrounding landscape.

Match new rock and soil treatments with existing rock and soil color to blend disturbed areas with the surrounding environment.

- Use this process for any corridor project in which rock cuts are included.
- Blend newly excavated soil and rock with existing weathered rock.
- Where possible, the application should occur in a central location and away from sensitive receiving waters.

(1) *The landscape inspires the color palette for each landscape design segment. Base colors correspond to the landscape design segment's environmental features.*

BASE COLORS

Great Basin Forest
#6223

Capital Crossroads
#6215

Lake of the Sky
#6223

Edge of the Sierra
#6215

ACCENT COLORS

Any two accent colors may be selected from the following. All landscape design segments use this accent color palette.

DE 5537

DE 5936

DE 6013

DE 6040

DE 6097

DE 6224

(2) *The proposed color palette refers to the Dunn Edwards paint system and should be used for reference purposes only.*

(3) *The color palette was field tested in morning, afternoon and evening conditions.*

(4) *The Carson City Bypass successfully applied the color palette.*

6.0 ROADWAY DESIGN

6.1 Reduce the appearance of a wide right-of-way through communities.

Every effort should be made to keep the roadway as narrow as possible. Wide roads allow for faster vehicular travel speeds, negatively impacting the safety of pedestrians.

- Consider reducing the number of lanes. Four lane highways may be retrofitted to two travel lanes or two travel lanes and a turn lane when other street systems are improved and overall traffic patterns move effectively.
- The appearance of a wide roadway may be reduced through the use of vertical elements, curb extensions, and a narrow shy distance (side clearance from fog line to edge of structure). Utilize a one to two foot shy distance from curbs and medians in downtown areas to reduce speed.
- Provide passing lanes outside of rural communities rather than only within town to reduce the number of lanes within town and slow travel speeds. Highways that only provide passing lanes within communities encourage higher travel speeds through town because it is the only opportunity to pass slower traffic.

6.2 Consider the use of rumble strips in transition zones to signal a speed reduction.

Changes in paving material and roughened paving provide a visual and audible cue to drivers to slow down.

- Rumble strips may be combined with enhanced roadside treatments such as plantings and gateways to reinforce the entry into pedestrian areas.
- Avoid placing rumble strips in bike lanes, and do not use in situations where bikes share travel lanes.

6.3 Provide curbs no greater than 6 inches in height in downtown areas.

Curbs define the edge of the highway and delineate the pedestrian zones within communities. Curbs greater than 6 inches in height may restrict pedestrian movement and create difficult transitions at pedestrian crossings.

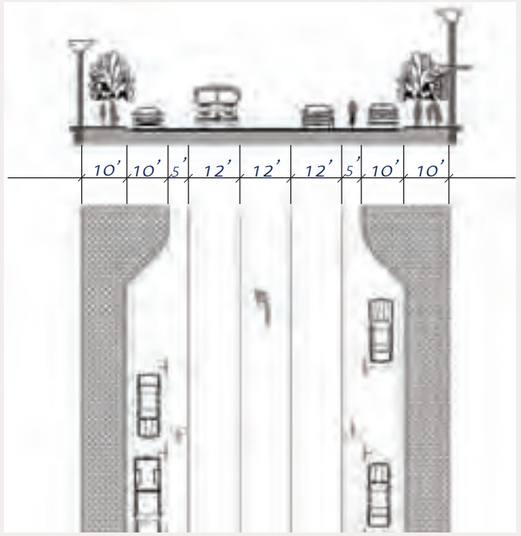
6.4 Utilize on-street parking in community interface zones to buffer the sidewalk from traffic.

On-street parking accommodates access to local businesses and slows traffic (see illus. 1-2).

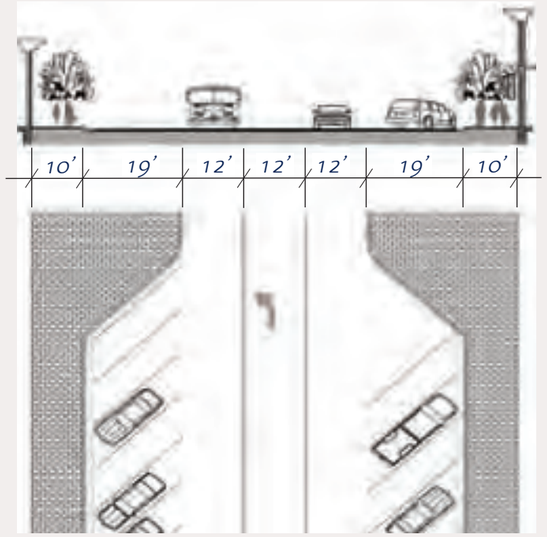
- Use curb extensions to enhance the visibility of pedestrians crossing the street.
- Angle parking should only be used in areas of very low travel speeds.
- Provide a bike lane between parking and travel lanes to create a buffer.
- When bike lanes are not incorporated, consider using a wider outside travel lane or parking area to minimize conflicts with opening doors.
- For all forms of on-street parking, maintain adequate visibility and buffer zones between travel lanes and parking to prevent conflicts with through traffic.

6.5 Integrate art, softscape, and hardscape as part of a simple landscape treatment for roundabouts.

- Roundabout design should express the segment theme and community vision.
- Sensitively site transportation art and plantings.
- Treatments should complement and coordinate with the surrounding environment and landscape features and be part of an integrated design approach.



(1) *Parallel parking is best in areas where visibility and traffic flow are concerns.*



(2) *Where room and travel speeds allow, angled parking creates more parking spaces.*

(3) *Street systems have a large influence on the social and economic impacts of a community. Reducing the visual width of the street, allowing for on-street parking, and implementing a truck bypass are examples of ways in which communities can greatly reduce the negative impacts of a highway.*

7.0 MEDIANS

7.1 Revegetate medians along rural highways to integrate the highway with the landscape.

Utilize native plant material to revegetate medians along rural highways to create a more natural and consistent visual experience (see illus. 1).

7.2 Utilize median plantings and treatments to enhance a community's image.

Landscaped medians beautify wide streets by breaking up large expanses of pavement and making the street feel narrower. Medians can include a combination of rock mulch, signage, plantings, and boulders that help to identify the character of the place (see illus. 2 and 3).

- Avoid use of asphalt paving in medians. Stamped, colored concrete or pavers should be used in narrow medians (less than 5 feet wide). Paving score patterns and texture should be simple and coordinate with surrounding architecture and pedestrian areas. Colored concrete should use the segment's base color (see Color Palette guideline page 3.23) or coordinate with adjacent pedestrian walkways.
- The placement of plantings and treatments should direct pedestrians and facilitate the vehicle operator's view. Selected plant species should also be suitable for the harsh roadway environment.
- Planted medians are generally the width of the center turn lane but can be as narrow as 5 feet. Regardless of width, medians need to be designed to allow for safe maintenance as well as for anticipated plant growth.
- Design medians to allow for adequate percolation of water to avoid irrigation water infiltrating into the road base/subbase and causing pavement failure.

7.3 Utilize medians to reduce potential vehicle-pedestrian conflicts and to enhance pedestrian walkability.

Medians function to improve pedestrian visibility by minimizing turning conflicts and directing and separating traffic. They provide an effective way of reducing conflicts between pedestrians and vehicles, allowing pedestrians to incrementally cross the traffic lanes.

- Medians may be constructed with curbs and combined with pedestrian refuge islands.
- Future development, access management, usage patterns, available right-of-way, and changing transportation demands should be examined when determining if raised medians are the appropriate solution for the roadway.

7.4 Direct stormwater to planted medians and landscaped planting strips where feasible.

Utilize drainage swales within medians to handle excess stormwater runoff (see illus. 4 and 5).

- Carefully design curbs, gutters, catch basins, and drain grates for ease of maintenance.
- Ensure pedestrian movement is not unduly impacted by ponding water.
- In areas where run-off may contain high levels of salt, select salt-tolerant plants.

(1) *Native revegetation is appropriate for highway medians in rural settings.*

(2) *A combination of planting and streetscape elements helps identify the character of the place.*

(3) *Medians provide the opportunity for planting and design details that help define distinct areas within a community. Breaks in the median provide a safe haven and allow pedestrians to cross lanes incrementally. These refuge islands provide pedestrians with an additional level of security.*

(4) *Rock lined medians, alone or in combination with drainage swales, allow for runoff of excess stormwater.*

(5) *Landscaped medians beautify streets and create context sensitive solutions.*

8.0 PEDESTRIAN CROSSINGS

8.1 Improve pedestrian safety at crossings.

Motorists can see striped crosswalks from a greater distance (see illus. 1).

- Utilize a zebra striping pattern for painted crosswalks.
- Crosswalk striping should correspond to the width and location of sidewalks.

8.2 Use alternative paving type, coloring, or other means to visually highlight pavement in pedestrian crossings.

Crosswalks may be marked with distinctive paving material, colors, and texture (see illus. 3).

- Concrete is preferred over brick for its durability. Concrete may be stained, embossed with patterns, or constructed with unit pavers to give crossings a distinctive feel in particular areas.
- Textures and materials should provide a visual contrast with the adjacent road surface, however, they must also provide a smooth travel surface and good traction.

8.3 Reduce curb-to-curb distances at crosswalks. Incorporate curb extensions as part of the highway system when on-street parking is provided. Provide refuge islands to break up long crosswalks.

Curb extensions reduce the crossing distance for pedestrians, increase visibility for motorists and pedestrians, prevent illegal parking at corners, and provide additional room for people waiting to cross the street.

- Curb extensions should extend into the street no further than the edge of the travel or bike lane.
- Curb extensions may be used at mid-block crossings and are beneficial when combined with pedestrian refuges.
- Refuge islands are located at crosswalks in the middle of streets to provide a safe waiting area for pedestrians.
- The waiting area in refuge islands should align with the crosswalk and be as wide as the crosswalk to allow persons with disabilities to cross without obstruction.
- Refuge islands may include additional pedestrian safety features such as bollards and flashing signage to enhance their visibility.

8.4 Alert motorists to pedestrian crossings through the use of signage and flashers.

Pedestrian signals work in conjunction with traffic signals to assign right-of-way at intersections (see illus. 2).

- Active signals are preferred over passive signals.
- Pedestrian signals are appropriate at all intersections with traffic signals where crossing is permitted.

8.5 Provide appropriate lighting to enhance visibility of pedestrians by motorists.

Pedestrian-scale lighting and motor vehicle-scale lighting should complement each other in an effort to ensure that both pedestrian crossing areas and travel lanes are effectively illuminated.

***(1)** Zebra striped crossings require less maintenance and are more noticable than standard parallel striping.*

***(2)** Flashing pedestrian crossing signals enhance pedestrian visibility. In the image above, sensors on either side of the crosswalk activate flashing lights in the pavement when pedestrians cross the street.*

***(3)** Use of colored paving at pedestrian crossings elevates the importance of the pedestrian.*

- Accentuated lighting may be used at crossing points to further distinguish crossing locations.

8.6 Consider pedestrian facilities as part of roundabout design.

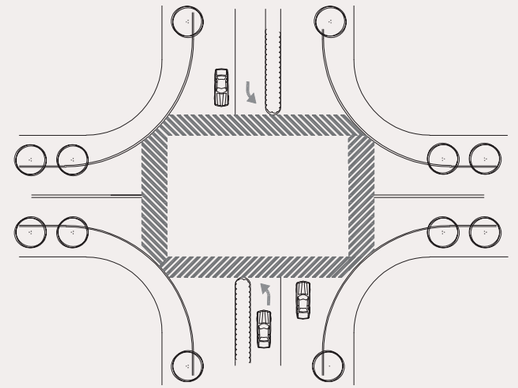
Pedestrian crossings at roundabouts should balance pedestrian convenience, pedestrian safety, and roundabout operations.

- Crossings at roundabouts implement the same design strategies identified for typical crosswalks but also need to consider the unique geometry of the roundabout design.

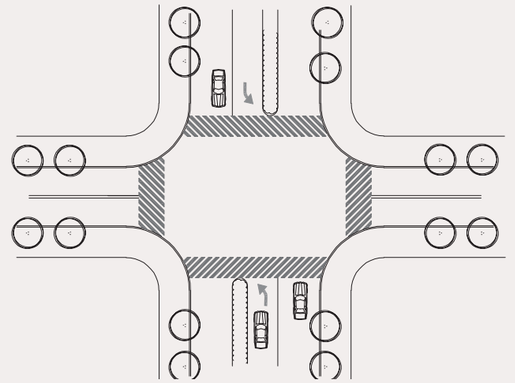
8.7 Balance the need for adequate vehicular turning radii with pedestrian needs.

A tighter turn or shorter radius forces drivers to slow down, allowing them to see pedestrians and make quick stops. Additionally, they create more sidewalk space for pedestrian amenities (see illus. 4 and 5).

- Reduce corner radii where feasible to shorten and align pedestrian crossings while reducing vehicle turning speed.
- Reduce the use of slip lanes (channelization) where possible to minimize pedestrian/vehicular conflicts.

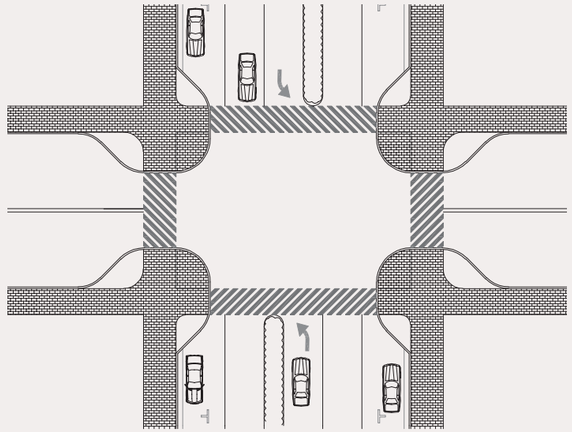


(4) *Pedestrian movement is directly affected by turning radii. Larger radii increase traffic speed and crossing distance for pedestrians, thereby reducing pedestrian comfort.*

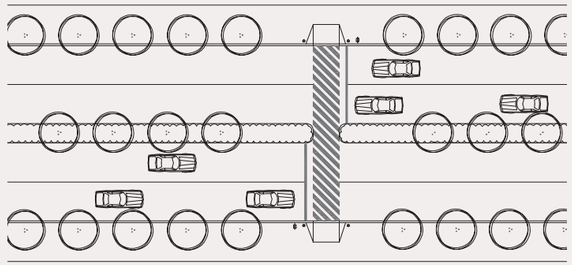


(5) *Tighter, shorter turning radii reduce traffic speed and shorten pedestrian crossing distances. In these situations, motorists are better able to see pedestrians and stop quickly.*

(6) *Tighter turning radii provide sidewalk space for landscape enhancements and clear delineation of crossing points.*



(7) *Curb extensions are easily integrated into roadways with on-street parking. Consider the use of curb extensions in highly utilized pedestrian areas in order to provide pedestrian amenities and reduced crossing distances.*



(8) *Breaks in the median provide a safe haven and allow pedestrians to cross lanes incrementally. Pedestrian refuge islands provide an additional level of security while crossing.*

9.0 NON-MOTORIZED TRANSPORTATION SYSTEMS (NMT)

9.1 Consider aesthetics as part of bicycle facility design.

Users of non-motorized transportation systems are more likely to use facilities that include aesthetic treatments and that link to critical destinations.

- Minimize underpass length to allow for natural lighting (see illus. 1).
- Utilize transportation art consistent with the segment theme (see illus. 2).

9.2 Engage agencies and organizations in the planning and design process.

Ensure proper planning conveniently accommodates NMT while minimizing adverse safety and environmental impacts.

- Engage Federal, State and local agencies as well as local user groups and organizations in the planning, design, and implementation of non-motorized transportation facilities.
- Ensure the maintenance of connections to regional trails and pedestrian systems.
- Consult the statewide bicycle and pedestrian plans prepared by NDOT.
- Provide signage to trail heads and regional trails to encourage NMT use.

9.3 Integrate NMT into the right-of-way.

Where topography, site conditions, and land use warrant, separate bicycle paths may be built in the right-of-way.

- Ensure that direct connections are made to existing and future trail systems and shared-use pathways (see illus. 3).

9.4 Incorporate designated bike lanes within the roadway to link regional bike trail systems.

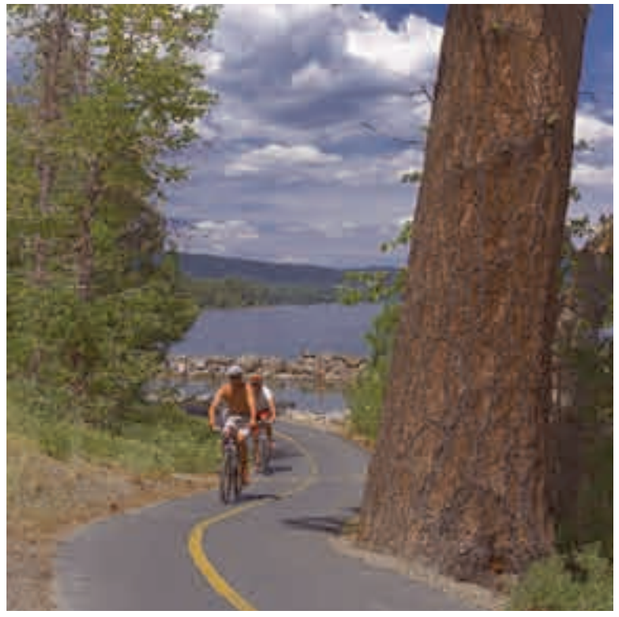
Within developed community areas, bike lanes provide access to regional bike trail systems and to local community facilities.

- Stripe, sign, and provide a painted bike lane symbol for designated bike lanes to promote driver awareness, better define travel lanes, and enhance user comfort (see illus. 4).
- Enhanced paving or pavement markings may be used in downtown areas.
- In areas of limited right-of-way and low speeds, bicyclists may share travel lanes in order to accommodate street improvements such as widened sidewalks and on-street parking. However, bike lanes should be included as part of the roadway whenever possible.

9.5 Consider bicycle facilities as part of roundabout design.

(1) *The length of underpasses should be minimized where possible in order to allow natural lighting.*

(2) *Daylighting and aesthetic imprints accentuate underpasses making them more inviting.*



(3) *Highly utilized recreation areas should have a shared-use trail linking destination points.*

(4) *Bike lanes should be signed, striped, and designated with a bike symbol.*

10.0 BRIDGES

10.1 Use a consistent bridge design.

Bridges are prominent features in the landscape and can significantly affect the visual quality of the environment. NDOT standard bridge design incorporates a concrete and steel I-girder, or concrete and steel box girder bridge structure of similar proportion, finish, and barrier rail design. The major structural elements – piers, girders, and abutments – also serve as the major architectural features.

- Aesthetic qualities must consider proportion, rhythm, balance, and unity. Refer to the *Aesthetic Guidelines for Bridge Design* (Minnesota Department of Transportation) for a complete discussion.
- Bridge form should be simple and uncomplicated (see illus. 2 and 3).
- Large amounts of slope paving should be avoided (see illus. 3).
- Street names should be embossed on the bridge span, providing place identification for the motorist.
- Where special conditions arise and larger or different bridge spans or types are required, ensure landscape and aesthetic aspects are incorporated into the standard design type.

10.2 Use simple sub-structure and support features.

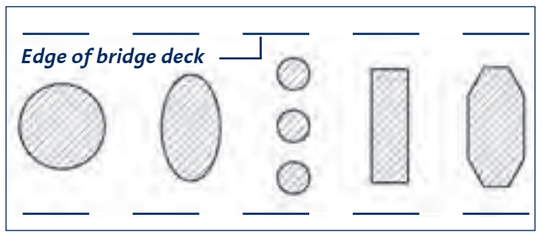
Use simple sub-structure and support features with strong proportional relationships in all standard bridge design.

- Avoid "V," "Y" or flared support shapes in sub-structure and support features.
- Use simple geometric shapes to minimize the support profile as well as the number of supports required (see illus. 1).
- When bridge supports involve stream crossings, a column shape must account for bridge scour.

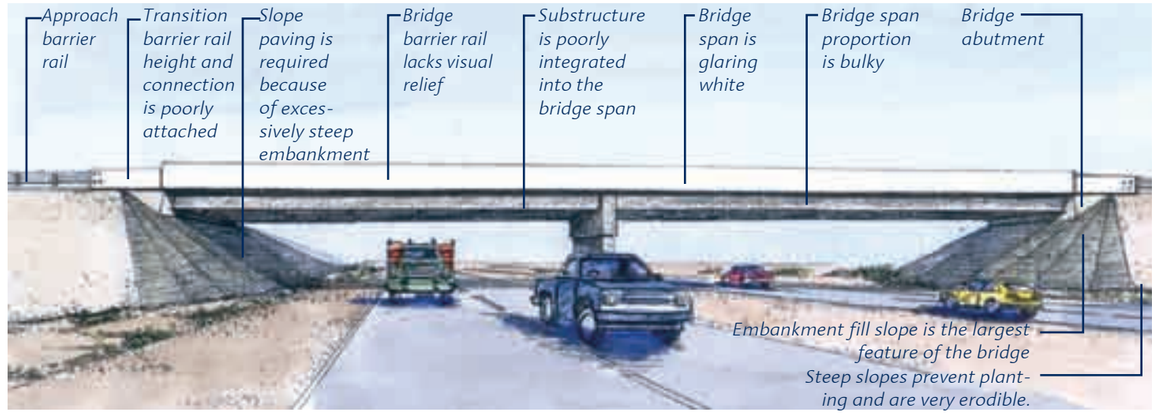
10.3 Use visually transparent bridge rail structures.

Consider open rail design of steel rail or concrete barrier and steel, both to create a more refined bridge with a lighter appearing span, and to maintain scenic views and views to the surrounding landscape.

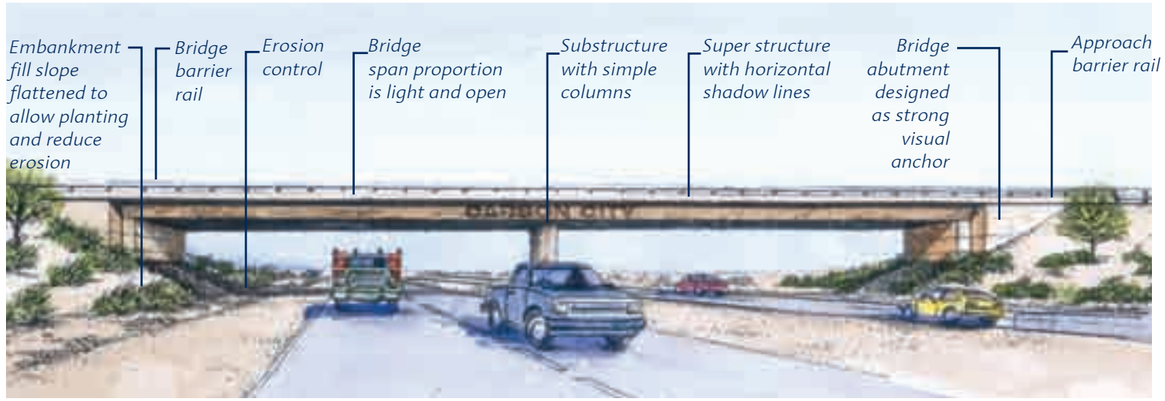
- Use shadow lines and patterns to avoid blank surfaces where safety mandates a solid concrete barrier.



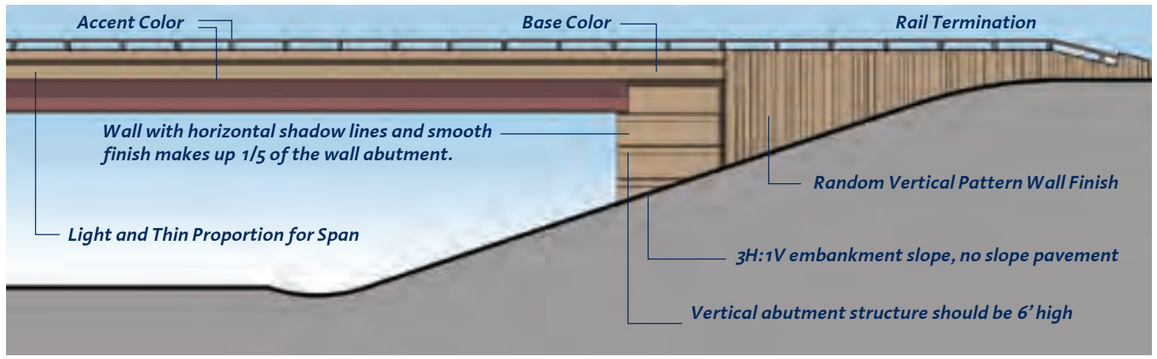
(1) *Sample bridge support cross sections.*



(2) Avoid *components and proportions lacking visual appeal.*



(3) Preferred *landscape and aesthetic treatments that improve the appearance of the bridge when applying design guidelines from this section.*



(4) Preferred *bridge design elements for this corridor.*

10.4 Consider fill embankments and approach rails as part of the bridge design.

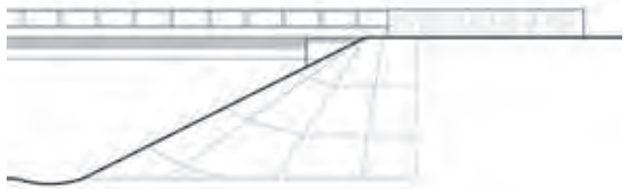
All NDOT bridge design should consider fill embankments and approach rails in concert with the abutment, bridge barrier rail, and superstructure (see illus. 10).

- Materials, height, and attachment details should be carefully considered when connecting guardrails to the bridge to avoid joining incompatible materials and creating abrupt vertical changes at connection points.
- Avoid slope paving at bridge embankments, grade to a slope of 3H:1V to allow for slope revegetation (see illus. 5-9).

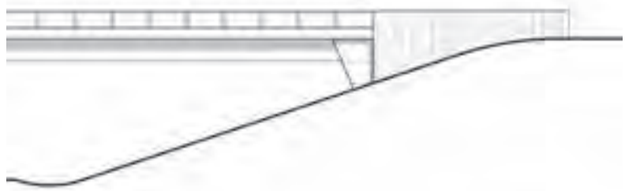
10.5 Use landscape or rock mulch to stabilize embankments.

Contour grade embankments and use landscape planting to maintain embankment. Use rock retaining walls to establish suitable flat landscape areas where right-of-way is narrow.

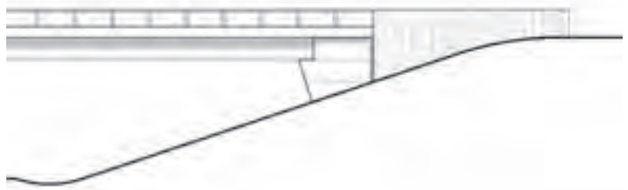
- Ensure mulch materials match bridge structure color and the surrounding landscape (see Color Palette guideline for appropriate color selection, page 3.23).
- Use rock mulches, stone rip-rap, or decorative slope paving (minimally) to stabilize abutments below the bridge.
- When slope pavement is used, include integral color or stain to match base color palette.



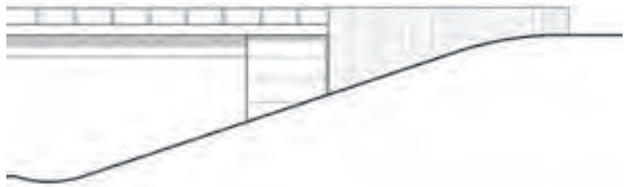
(5) Avoid *2:1 slope as primary bridge abutment and the need for slope pavement.*



(6) Avoid *weak proportions in bridges with shallow or undersize abutments.*

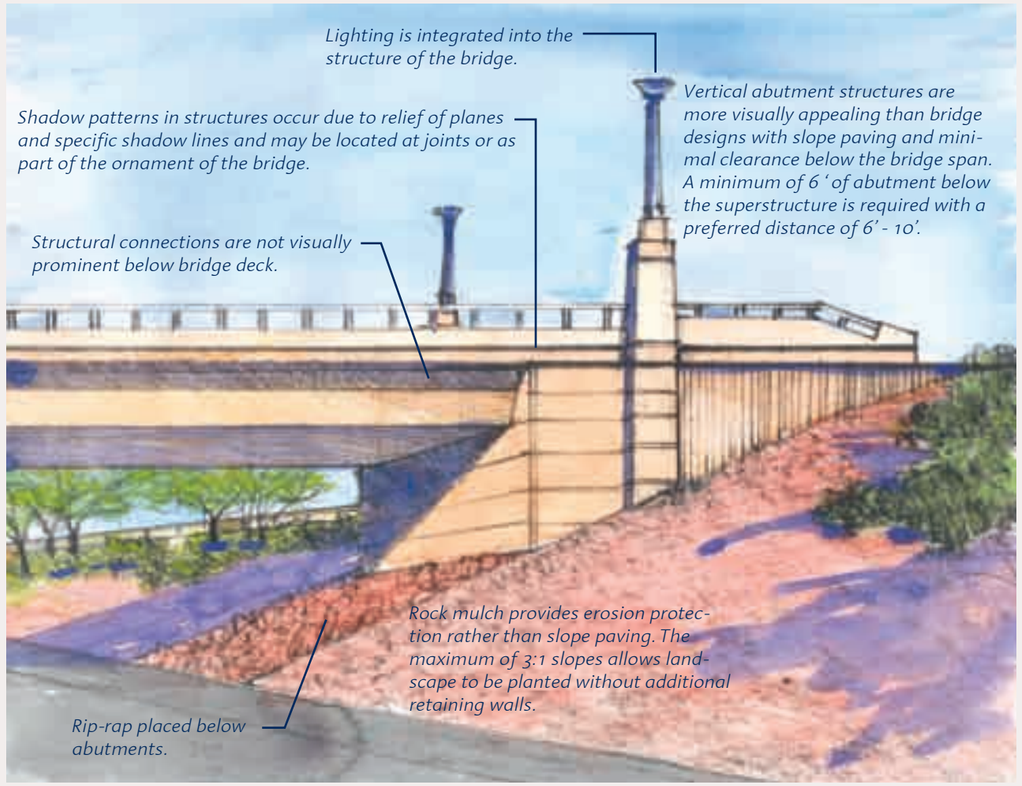


(7) Avoid *characteristic shapes that do not visually support the structure.*



(8) Preferred *use of bridges with retaining wall abutment and 3:1 slope is intended for the corridor.*

(9) Preferred *use of a batter to the abutment is a desirable feature.*



(10) *Bridge abutment and barrier rail designed as a composition with jointing and materials consistently applied into a well proportioned bridge*

(11) *Consider rail features and open bridge spans as part of bridge design to evoke a sense of character that relates to surrounding development and historical influences.*

10.6 Select vandalism-resistant finishes.

Finish type, color, and surface patterns are important design elements in coordinating the structure with the surrounding landscape. Select bridge finishes of appropriate color (see Color Palette guideline, page 3.23) and vandal-resistance.

- Where appropriate, structures with detailed treatments located in urban areas should be treated with non-sacrificial anti-graffiti finish.
- Color and finish selections will assist in reinforcing the design intent of the bridge structure.

10.7 Create a visual design unity among all existing and new structures.

Ensure bridges coordinate with noise walls, retaining walls, and other highway structures.

- Establish a visual design relationship that coordinates materials, patterns, color, and other design elements of structures (see illus. 14).
- Establish a visual design continuity between existing bridges and other structures by implementing a paint/stain retrofit program to unify color schemes where they vary within a corridor.

10.8 Design bridges to accommodate additional elements and structures that are required.

Accommodate pedestrian corridors and other additional structures with extra width. In areas where noise walls are required on bridges, the bridge should be widened to allow for noise walls that are completely separated from concrete barriers (refer to Noise Reduction and Walls guideline 11.5, page 3.33, image 9). Street name identification should be placed on the concrete barrier rail.

10.9 Accentuate locations where bridges cross major water bodies, drainage courses, or canyons.

Utilize landscape treatments in order to highlight crossings and connect motorists to the landscape (see illus. 13).

- Consider the integration of a grade-separated pedestrian crossing into structure when possible.
- Coordinate with local jurisdictions to determine the need for these features.

10.10 Retrofit existing bridges.

Bridges are gateway features to cities and communities.

- Aesthetic treatments such as staining should be the basic treatment for updating existing structures.
- Where possible, include segment-appropriate artistic motifs with sculptural ornamentation and decorations (see illus. 12).

10.11 Provide direct connections from bypasses back to the community core.

Heightened levels of landscape and aesthetic treatments, including effective signage, should mark exits to downtown areas.

- Increasing density of landscape and architectural elements heightens the sense of arrival into community centers.

(12) *Aesthetic retrofits to existing bridges within the Reno urban area improve the sense of place and character. Travelers entering Reno from the Reno-Tahoe International Airport recognize a community that cares about its image.*

(13) *Architectural details and columns provide opportunities accentuate prominent drainages.*

(14) *Subtle bridge materials enhance place-making and add visual interest.*

11.0 NOISE REDUCTION AND WALLS

11.1 Consider grading to minimize wall height.

Where possible, use an embankment slope with landscape planting to buffer sound (see illus. 1), or use a combination of earth forms and noise walls to achieve structural integrity and buffer sound while limiting actual wall height.

- This guideline does not change or supersede Federal noise wall requirements, which specify the location of noise walls according to adjacent land uses and a sound level threshold approaching 67 decibels.
- Noise walls should not be greater than 14 feet in height without a step in the wall plane.
- Walls used only for visual screening may not be taller than 10 feet.
- Use natural barriers and land forms when possible.

11.2 Provide landscape planting and setback space between the vehicle recovery zone and the noise wall.

When necessary, work with developers to ensure adequate right-of-way is provided for sound abatement.

- Consider grading to minimize wall height. Landscape plantings in front of walls will soften the appearance of large wall faces (see illus. 2).
- Ensure planting and maintenance is provided.

11.3 Select a simple design palette.

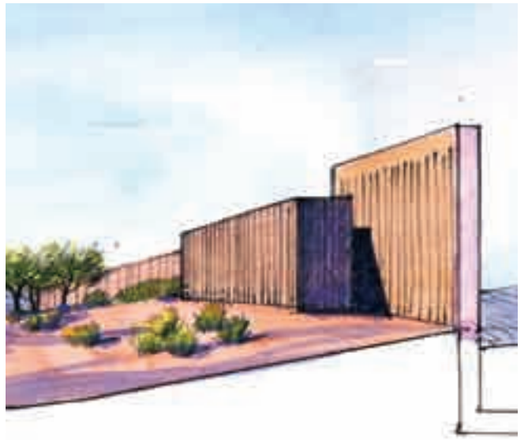
Choose a simple design palette of material, pattern, color, and texture that coordinates with the corridor's landscape design segment theme for retaining walls and noise walls.

- Maintain consistent use of the selected material, pattern, color, and texture. The required prototypical surface pattern is shown in illustration 3.
- Avoid using multiple materials, such as steel and concrete or CMU, on continuous spans of wall.
- Post and panel systems are not encouraged for noise wall construction, and should be used only for temporary applications. If a post and panel system is used, it should be constructed with a single material, preferably pre-cast concrete for all components (see illus. 5).
- Use visual design themes and/or pictorial motifs comprised of simple patterns and surface texture, and carefully design the motifs composition (height and position) on the wall (see illus. 6).
- Noise walls over 12 feet in height require special graphic or pattern treatment (refer to Transportation Art guideline, page 3.19, for more information about appropriate subject matter).

11.4 Create visual breaks and interruptions to avoid monotony along noise walls.

Use staggered and/or curved walls of varying lengths to provide visual interest along extended stretches of noise wall (see illus. 1).

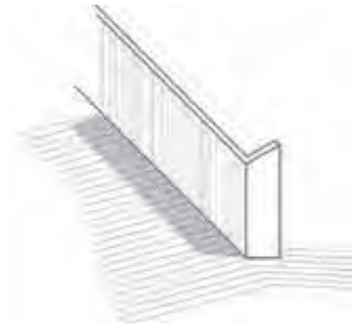
- Avoid abruptly ending noise walls. Use a wall return of 3 feet for noise walls located outside of the clear zone.
- Battered walls, also known as inclined walls, can provide additional interest.
- Shadow patterns can be introduced to create visual interest that shift and change throughout the day.



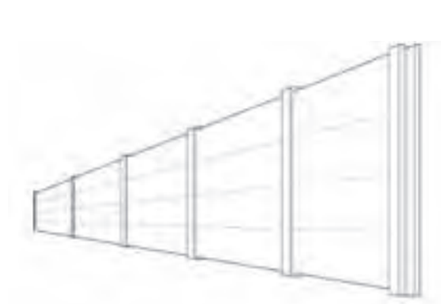
(1) *Grading, in combination with walls, will reduce the height of walls while still meeting federal noise standards.*

(2) *Integrate noise walls into highway right-of-way with landscape planting between wall and roadway. The setback also allows earth contour grading to vary the wall heights and base grade.*

(3) Preferred *prototypical surface pattern is rusticated variable vertical ribbing. Dimensions vary between 2"-8" apart.*



(4) *A wall return of three feet is recommended for noise walls outside the clear zone at the beginning of the wall facing the driver.*



(5) Avoid *post and panel system for permanent noise wall application.*

(6) *Focal noise wall imprint adds an additional layer of interest to noise walls.*

(7) *The integration of vertical vegetation visually softens noise walls.*

- Use appropriate ornamentation to break up the surface of long, uninterrupted spans.

11.5 Separate noise walls from other highway structures and set back from travel lanes.

Ensure noise walls are carefully planned for and integrated with the design of the highway and/or bridge.

- Avoid attaching noise walls to concrete barriers, bridges, and/or retaining structures. When noise walls are attached to such structures, use compatible materials, colors, and forms.
- Recess noise walls a minimum of 30 feet from edge of travel lane where possible. Noise walls may be placed on top of concrete barriers only when no other practical solution exists.
- Consider drainage impacts when locating or placing walls as the area flanked by walls will need to freely drain.

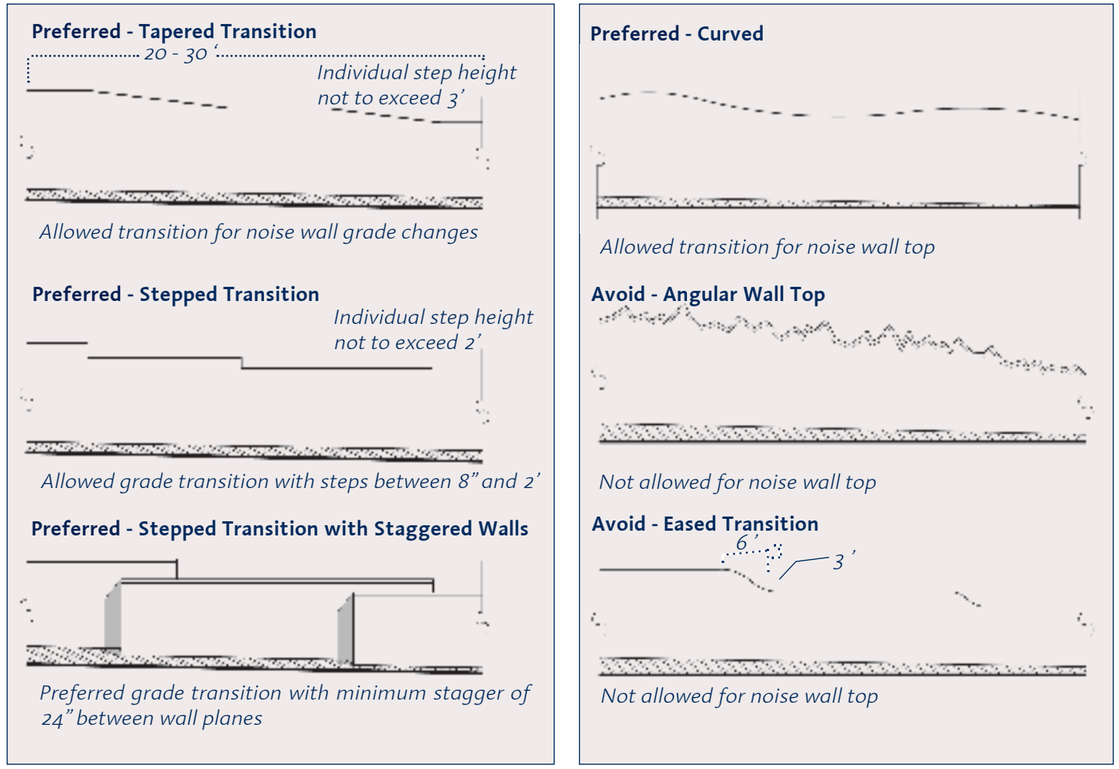
11.6 Encourage noise-compatible land uses adjacent to highway corridors.

At the planning level, encourage land uses that are compatible with highway noise, such as commercial and light industrial areas.

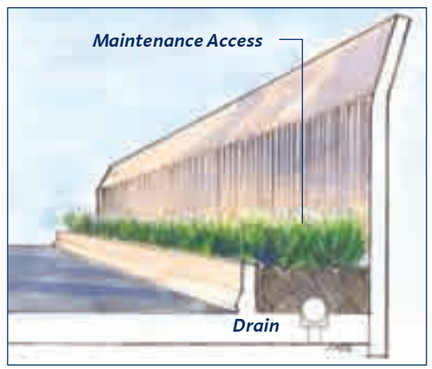
- Noise sensitive facilities (schools, churches, etc.) require sound abatement strategies.
- Coordination at the planning stages is critical to avoid conflicts.

11.7 Retrofit noise walls that do not meet recommended requirements.

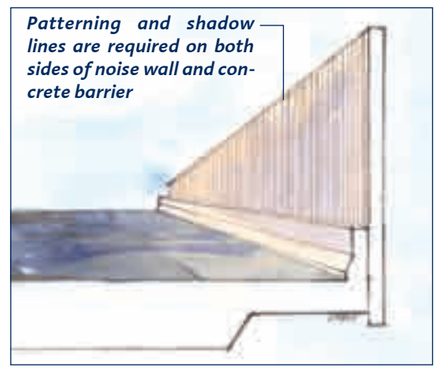
- Painting should be the basic treatment to improve existing structure aesthetics.
- Enhancements could include the application of artistic motifs with sculptural ornamentation and decorations, or visual relief by modulating the top edge of walls.



(8) *Using curved or staggered walls reduces the impact of a monolithic structure. Keep lines of the wall faces and tops clean and simple.*



(9) *Walls approaching bridges can be adapted with a setback and planting strip. A flare of the upper one-fourth of the wall further prevents an enclosed, narrow passage. Design flared walls so they do not become top-heavy and cause hazards to motorists and pedestrians.*



(10) *When concrete barrier and noise walls coexist without buffer space, wall is integrated into concrete barrier rail.*

12.0 CONCRETE BARRIERS AND GUARD RAILS

12.1 Stain concrete barriers to blend the roadway into the surrounding environment.

- Concrete barriers should be stained to match the segment's base color (see illus. 1). Refer to Color Palette guideline, page 3.23, for more information on color selection.

12.2 Avoid bright and shiny guard rails.

Use acid-washed steel guardrails where appropriate (see illus. 2).

(1) *Stained concrete barriers should use colors from the design segment's color palette.*

(2) *Acid washed steel guardrail should be used along the majority of highways.*

13.0 LIGHTING

13.1 Avoid over-lighting.

Excessive high mast lighting can create light pollution along a corridor and impact views to the surrounding landscape.

- Study current lighting level standards to determine levels needed for safety only. Adjust current standards, if necessary, and apply the minimum height, illumination, and number of light masts required.
- Focus attention on luminance versus illumination (i.e. brightness of pavement versus brightness of light).
- Along all sections of the corridor, use lighting fixtures that minimize light pollution and provide even light dispersion.
- Eliminate lighting where possible.
- Use cobra head or shoebox-type pole and fixtures instead of high mast lighting where appropriate.

13.2 Use a consistent lighting fixture and pole.

In central commercial districts and town centers, use light fixtures and lamps that are consistent with surrounding architectural styles.

- Use a durable, powder-coated finish for light poles of a color that matches other structures and the surrounding landscape. Typically use colors that blend with the background and do not visually overwhelm.
- Use poles and fixtures with consistent maintenance requirements and procedures for lighting types used within the same maintenance district.
- Use accent color palette for poles (refer to Color Palette guideline, page 3.23, for more information).
- Select a sleek and simple pole configuration (see illus. 5).
- Allow for context-sensitive design in fixtures and poles where appropriate, particularly in areas such as historic sites (see illus. 2 and 3).
- Consider color properties when selecting lamps. Metal halide lamps are preferred in pedestrian areas. Mercury vapor lamps produce favorable lighting for enhanced landscape treatments. Energy efficient high-pressure sodium lamps are commonly used for large portions of the roadway.

13.3 Lighting height and brightness should be consistent with pedestrian scale needs in downtown or heavily pedestrian-oriented areas.

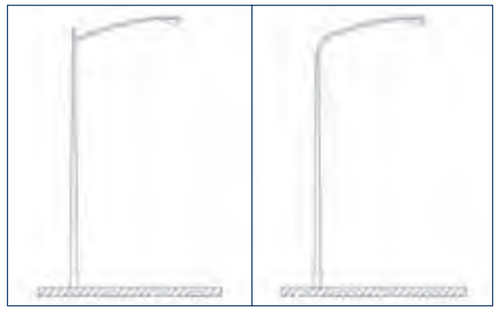
Create desirable pedestrian environments by using pedestrian-scale lighting along sidewalks.

- Fixtures should be more closely spaced than conventional "cobra head" street lights.
- Lighting height and brightness should clearly illuminate walking paths.

(1) *A change in lighting height and style emphasizes the transition into a community.*

(2), (3) *Sculptural lighting reflects urban character in a landmark setting (above). Context-sensitive lighting reflects community character in special districts (above right).*

(4) Avoid *this type of pole design in favor of more streamlined attachments.*



(5) Preferred *type of fixture and pole configuration.*

(6) *Limit use of high mast lighting.*

14.0 FENCING

14.1 Ensure right-of-way fencing blends with the landscape.

Fencing can be used in non-urban areas to delineate the highway right-of-way and control access.

- Use wire fencing that blends with the landscape and conforms to current Nevada Revised Statutes.
- Ensure right-of-way fencing is well maintained.
- Minimize the use of fencing within rights-of-way where possible.
- In urban areas use colored steel fencing such as powder-coated, acid-washed, or stained-galvanized fencing that visually recedes into the urban background.

(1) *Fencing should not visually distract travelers from the overall landscape. Use simple, multi-strand wire fencing that blends with the landscape.*

(2) *In urban areas, use colored steel fencing or stained-galvanized fencing that visually recedes.*

15.0 GRADING AND RETAINING WALLS

15.1 Avoid creating steep slopes.

Smooth, moderately inclined slopes will blend more readily with the surrounding landscape, are safer to maintain, and are less vulnerable to erosion.

- Flattened fill slopes can assist in decreasing erosion. Flattened slopes also reduce the need for guardrails and provide better accident recovery in the roadside clear zone.
- Acquire adequate right-of-way to provide enough land to construct the desired slope and grade.
- In some locations, steeper slopes may be unavoidable to protect important natural or cultural resources adjacent to the highway.

15.2 Create smooth landform transitions and revegetate slopes.

- Use finish-grading techniques such as slope rounding at the top and bottom of cuts to create smooth landform transitions that blend with the natural terrain (see illus. 1).
- Carefully grade slopes around natural outcrops and abrupt topography to improve aesthetics and allow for easier and more cost-effective maintenance.
- Topographic patterns should be considered with proposed grading. Valleys, high points, and ridges require graded transitions rather than abrupt embankment cuts or fills.
- At a minimum, ensure that all constructed slopes are revegetated (refer to Native Plant Revegetation Softscape Type guideline, page 3.40).

15.3 Create artful earthwork.

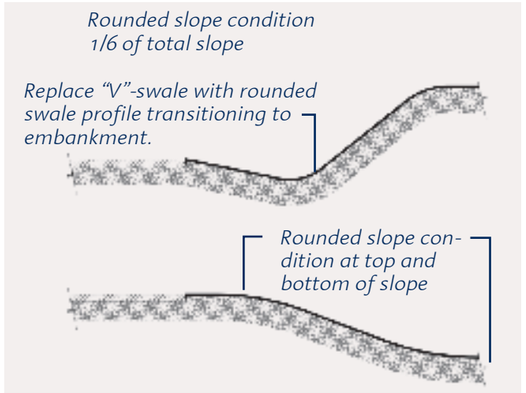
Create landforms that respond to the uniqueness of the site, the surrounding landscape, and the roadway travel experience.

- Contour grade to create effective planting embankments, shadow patterns, and artful earthwork.
- Where feasible, grade slopes to provide for water harvesting (reclaimed surface runoff).

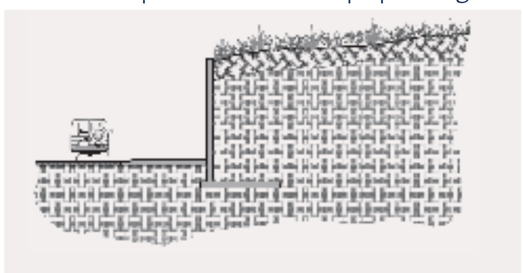
15.4 Utilize retaining walls that reflect surrounding landform and soil colors to minimize large slope cuts.

Contrary to terraced high wall cuts, staggering, terracing, and progressive offset of retaining walls can stabilize slopes and reduce erosion while smoothly blending into surrounding landforms, (see illus. 2 and 3).

- Select retaining structures or slope stabilization methods that blend with the surrounding landscape and encourage revegetation.
- Provide landscape plantings in front of walls to soften their appearance.
- Provide a minimum of 8 feet between terraces to provide for landscape planting.



(1) *Smooth transitions between cut and fill slopes and existing conditions can be accomplished by rounding the slopes.*



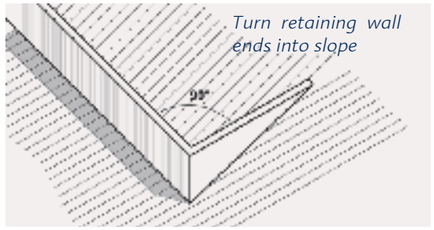
(2) Avoid *the tunnel effect created by a retaining wall greater than 14 vertical feet.*

(3) Preferred *designs incorporate a step or change of plane for a retaining wall greater than 14 vertical feet.*

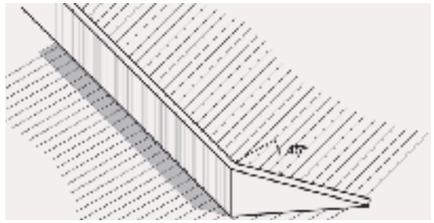
- Carefully design gabion walls. Color should be dark and muted to match soil and surrounding landscape. Wire mesh should match stone color. Plant terraces with native vegetation to break-up visual impacts.
- Retaining walls should be consistent within a segment and utilize a simple design palette and anchor to the earth (see illus. 5 and 9).
- Utilize a simple design palette. Avoid using multiple materials such as steel, concrete, keystone block, or CMU on walls. Exterior finish for retaining walls should have the same visual appearance independent of the type of wall.
- For MSE walls, rectangular shaped panels with vertical joints with a consistent pattern are preferred. All panels should have a rusticated variable vertical pattern that extends across the entire surface (see illus. 6, 7, and 10).

(4) Preferred *gabion systems that utilize dark, muted stone. Wall should not appear to be an artificial system.*

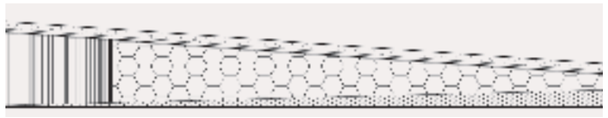
(8) Avoid *gabion retaining walls that utilize large light-colored rocks. Narrow spaces between terraces prevent the ability to plant native vegetation for visual relief.*



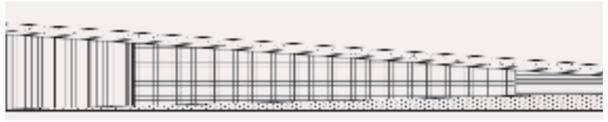
(5) *Turning the ends of retaining walls "anchors" them into the earth and creates a finished end to the retaining wall.*



(9) *Retained slopes with walls should return to meet uphill grade.*



(6) Avoid *small scale joints, octagon, or cruciform shaped panels. These are only acceptable when textured with a rusticated variable vertical pattern.*



(7) Avoid *multiple materials, shapes, and joint patterns*

(10) Preferred *finish is rusticated with variable vertical texture and pattern. Surfaces should have a single finish whether MSE, cast-in-place, or other wall type is used. Consistency with other structures is required.*

16.0 ROCK CUT AND EXCAVATION

16.1 Analyze rock geology.

Provide a multi-disciplinary team of civil engineers, geotechnical engineers, and landscape architects to ensure that the inherent character of a rock's natural bedding planes, fractures, joints, and overall stability is carefully analyzed and informs the design of all rock cuts.

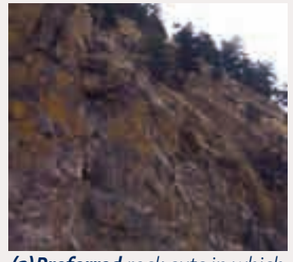
- Conduct careful rock geology, site, and cost analysis, and design rock cuts to avoid the need for rock fall protection fencing.

16.2 Design rock cuts to be natural in form, texture, and color in relationship to the surrounding landforms.

- Blend rock cuts to match natural rock forms and use naturalized bedding planes to avoid creating an unnatural rock face (see illus. 2).
- Ensure all designed landforms are natural in appearance and blend with the topography and geology of the surrounding landscape (see illus. 5).
- Match new rock and soil excavations with existing rock and soil using rock staining, soil-coloring treatments, and/or accelerated weathering techniques.
- Where site conditions and cost analysis permit, acquire adequate right-of-way to provide enough land to design and build the desired rock cut slope and grade.

(1) Avoid *straight cuts and benches with custom naturalized cuts.*

(4) Preferred *custom benching follows the natural formation of the rock and accomplishes the same elevation change as shown in illustration 1.*



(2) Preferred *rock cuts in which natural bedding planes were used to excavate naturalized landform.*

(3) Avoid *securing slopes with concrete facing when possible. When necessary, use colored concrete that resembles natural rock face textures.*

(5) Preferred *re-sculpted rock cut changes artificial slope banks into naturally occurring landforms. Plan cuts that terrace, bench, and use bedding planes found in rock formations are the final design of any rock slope.*

17.0 DRAINAGE

17.1 Use naturalized channel design and infiltration methods.

Avoid paving drainage ditches or check dams with asphalt or concrete. Where possible, secure check dams with rock and use naturalized channel design and infiltration methods to enhance, both functionally and visually, highway drainage systems (see illus. 1).

- In unique situations, utilize geotextiles, impervious mats, or stone lining to maintain the appearance of a natural channel.
- Excessive flow velocities and erosion potential may demand paved drainage surfaces. Consider the use of open cell concrete block with native grass or rock mulch.
- Vary the size of rock treatments. Meander naturalized treatments so that they feather into the landscape (see illus. 3).

17.2 Revegetate drainage infrastructure.

Drainage detention and infiltration areas should be shaped with natural undulating edges and bottoms rather than angular embankment slopes (see illus. 2).

- Upper slopes of drainage detention basins should be revegetated or covered with appropriate ground treatment (refer to Ground Treatment Softscape Type guideline and Native Revegetation Softscape Type guideline, page 3.40).

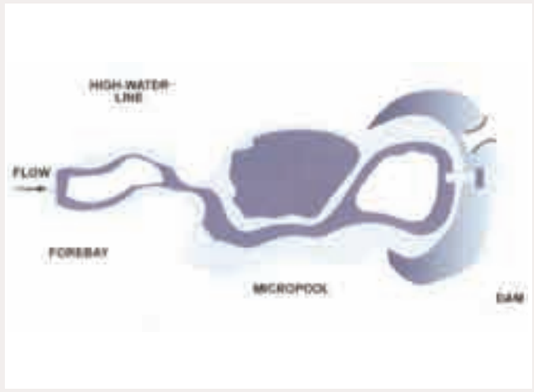
17.3 Naturalize culvert ends.

- Use rock to naturalize inlets and outlets.
- Culverts should not be exposed except at the end of headwalls and endwalls or with mitered end sections.
- When it is essential to have portions exposed, they should be stained to blend with the surroundings.
- Consider whether trails or wildlife passages can be coordinated with culverts.

17.4 Create small-scale detention basins in the Lake Tahoe watershed to protect lake and stream zone water quality in a manner consistent with current NDOT practices.

- Use native rock, soil, and organic materials to line retention basins. Open cell concrete block may be used. Revegetate basin with native grass to cover units.
- Add native vegetation along the margins of the basins to blend with surrounding landscape (see illus. 4).
- Promote infiltration, while preventing erosion and stabilizing biotic soil conditions.

(1) *Rock-lined drainage channels are an attractive alternative to concrete or unlined ditches.*



(2) *Design of detention basin uses naturalized, curvilinear shapes instead of "V" channels.*

(3) *Feather rock treatments into surrounding landscape so they appear more natural.*

(4) *Small detention features lined with rock and native vegetation allow slow infiltration of runoff.*

18.0 EROSION CONTROL

18.1 Stabilize soils to ensure successful revegetation and to control erosion. Use native materials for stabilization and revegetation, to blend with surrounding landscape.

- Use techniques such as heavy textured soil and/or gravel mulches to slow water run-off and provide dust control.
- Where water concentrates, riprap material and/or geotextile reinforcement may be used to avoid erosion.
- Permanent revegetation efforts can be improved by providing in situ topsoil, native vegetation fragments, and rocks and improving soil salvage techniques and seed mixes.
- Provide uncompacted topsoil surfaces (approximately 85% compaction) prior to seeding.

18.2 Refer to temporary and permanent erosion control best management practices as prepared and documented by NDOT.

(1) *Native rock and vegetation add aesthetic value while stabilizing slopes.*

(2) *Application of soil stabilizer aids in dust and erosion control.*

19.0 WATER HARVESTING

19.1 Maintain soil moisture and improve water retention by preserving topsoil, site surfacing, site grading, track walking, applying mulches and tackifiers, sensitively siting features, and using permeable paving or cisterns.

The collection of runoff for use in landscape design is especially important in arid climates. Increase the availability of natural water by directing runoff and precipitation into areas such as planting beds prior to moving it off site into drainage structures. Water harvesting methods also reduce the amount of runoff, thereby reducing non-point source pollution, erosion, and flooding while recharging the groundwater. Soil moisture and water retention can be maintained and enhanced in several ways, including:

- **Topsoil Preservation:**

  Stripping and salvaging the existing topsoil, vegetation seeds, and plant fragments for later reapplication should occur at every site requiring disturbance. This live topsoil contains organisms, seeds, and plant fragments that increase the potential success of revegetation and increases both the quantity of organic matter and permeability of the soil.

- **Site Surfacing:**

  Rock surface composition should simulate the original or adjacent surface cover or be integrated as part of the overall design. Create artful water harvesting features that contribute to the aesthetic quality as well as functionality of landscape treatments. Placing rocks and shaping landforms to create depressions increases water retention and provides moisture to the plants (see illus. 1). Rocks create impervious cover, resulting in water harvesting for the remaining soil and seeds. Rocks also create a rough, uneven surface, thereby slowing water runoff, allowing water to collect and increasing infiltration. Rock mulches retain moisture and protect plants by reducing evaporation, providing wind protection, and moderating the soil temperature so that it is cool in the summer and warm in the winter, effectively lengthening the growing period.

- **Site Grading:**

  Grade surfaces to slow water flow, encouraging absorption. Instead of a continuously angled slope, position breaks or depressed areas around planted areas. Contour slopes allowing water to infiltrate around vegetation. Prevent erosion by minimizing slope angle and directing water flow.

- **Track Walking:**

  Where possible, track walk all slope surfaces to stabilize material and minimize potential erosion. Track walking should be performed perpendicular to the contour.

- **Mulches and Tackifiers:**

  Use mulch and tackifiers to hold seed and topsoil cover and assist with moisture retention during germination. Mulches such as bark or straw can be used to stabilize seeds and topsoil and assist in moisture retention during plant germination and growth.

- **Siting of Features and Facilities:**

  Thoughtful consideration should be given to the siting of features and facilities. Rest area and other facilities where vegetation is desired should be located where natural surrounding upland topography can provide increased water to the planted areas. Within interchanges, planted areas should be sited where roadway runoff can be directed to provide water to these areas before it enters structured drainage systems. This method enhances plant growth, and supplements the irrigation needed for high water use plants, thereby reducing the cost of irrigation. Features used to direct or store water can be part of the aesthetics of design.

- **Permeable pavements:**

  Pavements such as flagstone or permeable asphalt should be used where appropriate to aid in the infiltration of precipitation in urban areas.

- **Water Storage in Cisterns or Tanks:**

  In some cases it may be desirable to store water in a cistern for later use. Storage provides the most control and flexibility in the use of harvested water. Cisterns collect water throughout the year and store it until it is needed during the height of summer. Consider the need for mosquito abatement during design. Water should not be stored in open systems for long periods of time. Cisterns can be sculptural and incorporated into an aesthetic design, or they can be large and relatively flat, and located under a parking lot.

(1) *The naturally contoured slope allows for water collection around rock outcroppings and promotes vegetation growth.*

19.2 Use natural and/or artificial products to collect, store, and release water for plant use.

Use products such as:

- Pumice wicks
- Polymer products
- Diatomaceous earth
- Wattles

20.0 IRRIGATION

20.1 Select efficient and effective irrigation systems.

Select efficient and easily maintained drip irrigation systems that have a central controller.

- Consider the use of reclaimed water, including fully treated effluent and water harvesting techniques, as a supplement to irrigation.
- If a non-domestic water source is used, include a filter system to prevent clogging of emitters.
- Consider threaded emitters as opposed to punch-in types to minimize vandalism.

20.2 Provide appropriate irrigation for each softscape type.

The early stage of revegetation growth demands the most water use and is most critical to the establishment of young plants in an arid climate. As revegetation becomes more established and mature, the demand for water will lessen to the point of complete removal.

- Temporary watering is required for containerized native plants for a period of approximately one to two years, depending on the success rate of revegetation.
- Permanent irrigation to individual plants is required for all enhanced native, regionally adapted, and regional ornamental softscape types.
- When a water source is not available, consider water harvesting methods or the use of vertical elements and structures.

20.3 Manage the high concentration of salts.

Nevada's desert soils often concentrate salts at the outer edge of the wetted soil volume, including near the soil surface, particularly in drip irrigation situations.

- Salt management techniques include flushing the soil periodically with heavy watering and/or planting salt tolerant materials.

***(1)** Drip irrigation is required for all enhanced native, regionally adapted, and regional ornamental softscape types even after they have reached maturity.*

***(2)** Certain plant species such as Ephedra and Rabbitbrush are adapted for survival in saline soils.*

21.0 SOFTSCAPE TYPES AND TREATMENTS

GENERAL GUIDELINES

21.1 Consider aesthetics and maintenance of selected softscape treatment.

In all non-paved areas, select ground treatments that meet both aesthetic and maintenance requirements.

21.2 Select appropriate plant sizes.

Minimum plant size used should consider plant survival and the visual effect of the material.

- Consider sunlight, water requirements, and wind exposure when placing plant material.

21.3 Preserve healthy trees and vegetation.

Mature vegetation is an integral part of community identity and an important public resource that enhances the quality of life.

- Preserve areas that have been previously landscaped with ornamental plant materials that are in good condition, form, and health.
- Include a tree inventory listing all protected trees and other landscape materials within the right-of-way.
- Include a listing of species, size, and condition of each tree, index of trees to remove or preserve, and specifications for tree maintenance during construction.

***(1)** Softscape treatments within the right-of-way should be adapted to the specific environmental conditions of the region.*

GROUND TREATMENT SOFTSCAPE TREATMENT

21.4 Implement appropriate ground treatment and softscape type.

Use recommended softscape and ground treatment types to assist with erosion and dust control, consistent with NDOT specifications.

- Rock mulch, where used, should complement and/or match the surrounding natural environment.
- For rural areas, ground treatment should be derived from natural patterns found in playas, foothills, or ephemeral drainages.
- For landscaped areas in urban settings, use rock mulches to create patterned and textured ground treatments.
- Implement a ground treatment retrofit program to treat areas of bare soil.

21.5 Coordinate ground treatment with surrounding landscape.

Ground treatment should coordinate in size, texture, color, and aggregate mix with the surrounding landscape.

- Mulches composed of multi-sized rock that resemble natural patterns of surrounding soils should be considered as a matching technique.

(1) *Mulches that utilize natural elements help to blend disturbed areas with their natural surroundings.*

NATIVE REVEGETATION SOFTSCAPE TREATMENT

21.6 Apply native revegetation softscape along open, rural highways.

Reestablish the native conditions using the native revegetation softscape type. The native revegetation softscape type is the background planting for the majority of the corridor and should be implemented as indicated in the landscape design segments.

- Roadsides should be revegetated after a fire to reduce erosion and snow drift.
- Plant density and spacing should mimic surrounding conditions, incorporating scattered rock mulch to reduce erosion and improve revegetation success.
- Distribute scattered rock mulch in a pattern similar to that found in the surrounding landscape instead of a thick, even spread of rock mulch.
- Select an appropriate native plant palette based on elevation, soil conditions, and ecosystem type.

21.7 Carefully select native plant species.

In addition to plant species identified in *Mapping Ecosystems along Nevada Highways and the Development of Specifications for Vegetation Remediation* (Tueller, et all 2002), use the list of native plant species provided for revegetation efforts. Plant palettes are not restrictive. They provide a starting point for plant selection.

- Ensure the plant palette selected for the site complements existing desirable vegetation in the surrounding landscape.
- Use native plant species to create plant communities with variations in plant height and width.
- Additional plants not included in the adjacent list can be included upon review and approval.

(1) *Native plant materials of northern Nevada includes: Sagebrush, Bitterbrush, and Rabbitbrush.*

21.8 Revegetation methods.

- Reestablish native conditions using the native plant revegetation softscape type. Select perennial grasses, forbs, and shrubs that will establish with little or no maintenance over the long term. Incorporate the Native Wildflower Program in revegetation efforts. Select plants that have been evaluated for drought tolerance, salt and alkali tolerance, seedling vigor, fire retardant characteristics, growth habit, suitable soil groups, seeding rates, Pure Live Seed (PLS), availability, and general costs of native seed sources. Ecosystem categories and suitable plant species have been identified for revegetation specifications along Nevada's highways in *Mapping Ecosystems Along Nevada Highways and the Development of Specifications for Vegetation Remediation* (Tueller et al, 2002). Tueller's report offers a complete description of suitable plant species and plant communities, soil classification units, and best management practices for vegetation remediation, and should be used as a guide for revegetation.

- Salvage existing native plants and topsoil prior to construction. Species salvagability depends on location, size, soils, and analysis of plant value, including potential survival rate. Salvaged plants can be utilized at revegetation sites to improve roadside aesthetics and to provide mature plants that would otherwise take years to establish. Where existing native plants can not be re-used, chip salvaged plants and incorporate into the topsoil. In addition, ensure native topsoil is collected and stored for reuse. Native topsoil provides a seed source and important bacteria for salvaged plant establishment and growth. Carefully remove, stockpile, and store the native topsoil of new construction projects to be used as final bedding material. Ensure native soil stockpiles are protected from the wind to avoid erosion and the creation of a dust hazard. Organic mulches may be used to improve soil quality. Firmly anchor mulches to the site. Carefully analyze the site to determine the need for fertilizers and pH amendments.

- Salvage and stockpile native rock mulch. Existing rock naturally blends with the landscape. Re-use of existing materials should be considered as part of site design.

- Apply a prescribed soil treatment such as plowing, disking, harrowing, furrowing, hydroseeding, applying mulches (such as straw), and using tackifiers (such as dark colored netting). Soils should be roughened before and after planting to create favorable seed sites, particularly for grass and forb seeds. In silty conditions, a soil stabilizer, such as a hydromulch, or a matting material can reduce potential dust problems. On some sites, deep ripping can loosen hardpan and improve seeding success. In conditions of steep cuts and slopes greater than 40%, slope disking may create seed pockets. Use scattered rock mulch in coordination with revegetation. This mulch provides seed pockets and protects plant establishment.

Figure 12 - Native Revegetation Plant Palette

Plant Palette - Great Basin Areas

	Height x Width	*Exposure to Sun*	*Water Requirement*	*Seasonal Interest*
Upper Elevations				
Big Sagebrush Sites				
Shrubs:				
Artemisia tridentata - Big Sagebrush	1.5' to 6' x 10'	Full sun	minimal	Aromatic
Chrysothamnus viscidiflorus - Green Rabbitbrush	2' x 3'	Full sun	minimal	Yellow flowers
Erigonum ovalifolium - Cushion Buckwheat	1' x 1'	Full sun	minimal	Yellow flowers
Ephedra viridis - Green Ephedra	3' x 3'	Full sun	minimal	Evergreen
Prunus fasciculata - Desert Peach	4' x 4'	Full sun	minimal	Small white flower
Purshia tridentata - Bitterbrush	6' x 6'	Full sun	minimal	Yellowish spring *color*
Salvia dorrii - Purple Sage	2' x 2'	Full sun	moderate	Blue flowers
Grasses:				
Achnatherum thurberianum - Thurber's needlegrass	24" x 24"	Full sun	minimal	Grass
Agropyron spicatum - Bluebuch Wheatgrass	18" x 12"	Full sun	moderate	Grass
Agropyron trichophorum - Pubescent Wheatgrass	18" x 12"	Full sun	moderate	Grass
Bromus inermis - Smooth Brome	12" x 12"	Full sun	moderate	Grass
Festuca idahoensis - Idaho Fescue	12" x 12"	Full sun	moderate	Grass
Leymus triticoides - Creeping Wildrye	24" x 24"	Full sun	moderate	Grass
Poa ampla - Big Bluegrass	up to 4' tall x 1'	Full sun	moderate	Grass
Forbs:				
Argemone munita - Prickly Poppy	36" x 36"	Full sun	minimal	Large white flowers
Castilleja spp. - Indian Paintbrush	12" x 8"	Full sun	moderate	Brilliant flowering color
Helianthus annuus - Sunflower	8' x 2'	Full sun	moderate	Large yellow flower
Linum lewisii - Prairie Flax	24" x 24"	Full sun	minimal	Delicate blue flowers
Lupinus spp. - Lupine	12" x 12"	Full sun	minimal	Brilliant flowering color
Penstemon palmeri - Palmer's penstemon	36" x 24"	Full sun	minimal	Large fragrant flowers
Vicia dasycarpa - Woolypod Vetch	18" x 12"	Full sun	moderate	Purpleish flowers
Pine and Juniper Woodland Sites				
Trees:				
Amelanchier alnifolia - Serviceberry	12' x 6'	Full sun	minimal	Bluish-purple fruit
Juniperus osteosperma - Utah Juniper	shrubby to 20-30'	Full sun	minimal	Yellowish green foliage
Pinus aristata - Bristlecone Pine	20' x 15'	Full sun	minimal	Evergreen
Pinus monophylla - Single-leaf Pinyon Pine	20' x 15'	Full sun	minimal	Evergreen
Pinus ponderosa - Ponderosa Pine	100' x 30'	Full sun	minimal	Evergreen
Shrubs:				
Artemisia nova - Black Sagebrush				
Artemisia tridentata - Big Sagebrush	1.5' to 6' x 10'	Full sun	minimal	Aromatic
Cercocarpus ledifolius - Curl-leaf Mountain Mahogany	15' x 10'	Sun to light shade	minimal	Narrow green leaves
Chrysothamnus spp. - Rabbitbrush	5' x 5'	Full sun	minimal	Golden flowers
Ephedra spp. - Mormon Tea	3' x 3'	Full sun	minimal	Evergreen
Kochia prostrata - Summer Cypress	3' x 3'	Sun to light shade	minimal	Gray-green foliage
Purshia tridentata - Bitterbrush	6' x 6'	Full sun	minimal	Yellowish spring color
Rhus trilobata - Skunkbush Sumac	5' x 15'	Full sun	minimal	Yellow to red fall color
Grasses:				
Bromus inermis - Smooth Brome	12" x 12"	Full sun	minimal	Grass
Leymus glaucus - Blue Wild Rye	36" x 24"	Sun to light shade	minimal	Grass
Poa sandbergii - Sandberg's Bluegrass	12" x 12"	Full sun	minimal	Grass
Pseudoroegneria spicata - Bluebunch Wheatgrass	36" x 24"	Full sun	minimal	Grass
Forbs:				
Castilleya spp. - Indian Paintbrush	12" x 8"	Full sun	moderate	Brilliant flowering color
Geranium viscosissimum - Sticky Purple Geranium	24" x 12"	Sun to light shade	minimal	Purple flowers
Linium lewisii - Prairie Flax	12" x 12"	Full sun	minimal	Delicate blue flowers
Lupinus spp. - Lupine	12" x 12"	Full sun	minimal	Brilliant flowering color
Penstemon palmeri - Palmer's penstemon	36" x 24"	Full sun	minimal	Large fragrant flowers
Sanguisorba minor - Small Burnet	12" x 24"	Sun to light shade	moderate	Unique foliage

- Collect native seed. Initiate a process for native seed collection at the start of each project where revegetation is designated. Native seed should be collected from a site in close proximity to the revegetation area. Because unpredictable weather patterns can affect seed availability, plan ahead to ensure usable seed. Native seed can also be purchased through seed companies or BLM nurseries.

- Monitor revegetation during construction to ensure the specified materials and installation methods have been used. Plan and budget for maintenance of revegetation and weed control areas until the desired species are established. In addition, continue to monitor revegetation plantings for up to five years after construction to ensure successful establishment. Include temporary irrigation if needed. Provide training for NDOT staff who oversee revegetation administration. Failures in revegetation can often be attributed to poor installation and maintenance practices.

- Develop a program to control noxious weeds and invasive plant species. In areas requiring revegetation, quickly establishing native species is the most effective method of controlling invasive species. In much of the corridor, however, re-establishing native plant communities may take many years. Use biotic or organic forms of control, such as temporary mulches, to prevent invasive species from establishing. Provide regular and frequent monitoring of new plantings to identify when additional forms of control may be needed.

Plant Palette - Great Basin Areas (cont.)

	Height x Width	Exposure to Sun	Water Requirement	Seasonal Interest
Lower Elevations Big Sagebrush Sites				
Shrubs:				
Artemisia tridentata - Big Sagebrush	1.5 to 6' x 10'	Full sun	minimal	Aromatic
Atriplex canescens - Fourwing Saltbush	5' x 7'	Full sun	minimal	Narrow gray leaves
Chrysothamnus viscidiflorus - Green Rabbitbrush	2' x 3'	Full sun	minimal	Yellow flowers
Ephedra viridis - Green Ephedra	3' x 3'	Full sun	minimal	Evergreen
Krascheninnikouia lanata - Winterfat	3' x 3'	Full sun	minimal	Yellowish flower clusters
Prunus andersonii - Desert Peach	5' x 5'	Full sun	minimal	Pinkish flowers
Purshia tridentata - Bitterbrush	6' x 6'	Full sun	minimal	Yellowish spring color
Rhus trilobata - Skunkbush Sumac	5' x 15'	Full sun	minimal	Yellow to red fall color
Grasses:				
Achnatherum hymenoide - Indian Ricegrass	24" x 24"	Full sun	minimal	Grass
Achnatherum speciosum - Desert Needlegrass	24" x 24"	Full sun	minimal	Grass
Leymus cinereus - Basin Wildrye	36" x 24"	Full sun	moderate	Grass
Leymus triticoides - Creeping wildrye	24" x 24"	Full sun	moderate	Grass
Poa ampla - Big Bluegrass	36" x 24"	Sun to light shade	moderate	Grass
Poa secunda - Sandberg Bluegrass	36" x 24"	Sun to light shade	moderate	Grass
Pseudoroegneria spicata - Blue Bunch Wheat Grass	36" x 24"	Full sun	minimal	Grass
Forbs:				
Ipomopsis aggregata - Scarlet Gilia	3' x 1'	Full sun	minimal	Delicate red flowers
Linum lewisii - Prairie Flax	12" x 12"	Full sun	minimal	Delicate blue flowers
Lupinus spp. - Lupine	36" x 36"	Full sun	minimal	Blue flowers
Medicago sativa - Alfalfa	36" x 12"	Full sun	moderate	Pinkish flowers
Melilotus officinalis - Yellow Sweet Clover	48" x 24"	Full sun	moderate	Small yellow flowers
Penstemon eatonii - Firecracker Penstemon	36" x 24"	Full sun	minimal	Red flower spike
Penstemon palmeri - Palmer's Penstemon	36" x 24"	Full sun	minimal	Large fragrant flowers
Oenothera tanacetifolia - Tansy-leaf evening primrose	6" x 12"	Full sun	moderate	Bright yellow flowers
Sanguisorba minor - Small Burnet	12" x 24"	Sun to light shade	moderate	Unique foliage
Solidago spectabilis - Goldenrod	18" x 12"	Sun to light shade	moderate	Yellow flowers
Sphaeralcea coccinea - Globe Mallow	12" x 12"	Full sun	minimal	Orange flowers
Vicia spp. - Vetch	36" x 12"	Full sun	moderate	Pinkish flowers
Salt Desert Shrub - Shadscale and Bailey's Greasewood Sites				
Shrubs:				
Atriplex canescens - Fourwing Saltbush	5' x 5'	Sun to light shade	minimal	Yellow flowers
Atriplex confertifolia - Shadscale	3' x 3'	Full sun	moderate	Flowering spikes
Atriplex gardneri - Gardner Saltbush	1.5' x 3'	Full sun	minimal	Evergreen
Grayia spinosa - Spiny Hopsage	3' x 3'	Full sun	minimal	Evergreen
Kochia prostrata - Prostrate Summer Cypress	3' x 3'	Sun to light shade	minimal	Gray-green foliage
Grasses:				
Achnatherum hymnenoides - Indian Ricegrass	12" x 6"	Full sun	minimal	Grass
Agropyron sibericum - Siberian Wheatgrass	24" x 12"	Full sun	moderate	Grass
Distichlis spicata - Saltgrass	6" x 6"	Full sun	minimal	Grass
Elymus elymoides - Squirreltail	18" x 12"	Full sun	minimal	Grass
Hilaria jamesii - Jame's galleta	6" x 6"	Full sun	minimal	Grass
Leymus triticoides - Creeping Wildrye	24" x 24"	Full sun	moderate	Grass
Sporobolus airoides - Alkali Scaton	36" x 18"	Full sun	minimal	Grass
Forbs:				
Oenothera spp. - Evening Primrose	48" x 24"	Full sun	moderate	Small yellow flowers
Melilotis officinalis - Yellow Sweet Clover	48" x 24"	Full sun	moderate	Small yellow flowers
Sphaeralcea coccinea - Globe Mallow	12" x 12"	Full sun	minimal	Orange flowers

Plant Palette - Great Basin Areas (cont.)

	Height x Width	Exposure to Sun	Water Requirement	Seasonal Interest
Salt Desert Shrub-Black Greasewood Sites				
Shrubs:				
Atriplex canescens - Fourwing Saltbush	5' x 5'	Sun to light shade	minimal	Yellow flowers
Atriplex lentiformis - Quail Bush	5' x 5'	Full sun	minimal	Yellow flowers
Chrysothamnus nauseosus - Rabbitbrush	2' x 3'	Full sun	minimal	Yellow flowers
Kochia prostrata - Kochia	3' x 3'	Sun to light shade	minimal	Gray-green foliage
Sarcobatus vermiculatus - Greasewood	3' x 3'	Full sun	minimal	Bright green foliage
Grasses:				
Agropyron elongatum - Tall Wheatgrass	36" x 18"	Full sun	minimal	Grass
Distichlis spicata - Salt Grass	6" x 6"	Full sun	minimal	Grass
Elymus elymoides - Squirreltail	18" x 12"	Full sun	minimal	Grass
Leymus cinereus - Great Basin Wildrye	36" x 24"	Full sun	moderate	Grass
Sporobolus airoides - Alkali Sacaton	36" x 18"	Full sun	minimal	Grass
Forbs:				
Melilotus officinalis - Yellow Sweet Clover	48" x 24"	Full sun	moderate	Small yellow flowers
Oenothera pallida - White Evening Primrose	48" x 24"	Full sun	moderate	Small white flowers
Sphaeralcea ambigua - Desert Globe Mallow	36" x 36"	Full sun	moderate	Orange flower color
Streamside Sites ***(use only in streamside conditions)***				
Trees and Shrubs:				
Alnus incana - White Alder	25' x 12'	Full sun to shade	moderate	Bright green
Alnus tenuifolia - Mountain Alder	25' x 15'	Full sun to shade	high	Greenish yellow catkins
Baccharis glutinosa - Water Willow	6'x 6'	Full sun	high	White flowers
Betula occidentalis - Water Birch	40' x 25x	Full sun	moderate	Copper bark
Cornus sericea - Red-Twigged Dogwood	15' x 15'	Full sun to shade	moderate	Red fall color
Populus freemontii - Fremont Cottonwood	60' x 30'	Full sun	moderate	Bright lemon yellow in fall
Populus tremuloides - Quaking Aspen	50' x 25'	Full sun	moderate	Golden yellow in fall
Populus trichocarpa - Black Cottonwood	75' x 30'	Full to part sun	moderate	Yellow fall color
Salix boothii - Willow	15' x 10'	Full sun	high	Narrow green leaves
Salix lasiolepsis - Lance-leaf Willow	8' x 6'	Full sun	high	Narrow green leaves
Salix lasiandra - Pacific Willow	40' x 25'	Full sun	high	Narrow green leaves
Sambucus coerulea - Blue Elderberry	7' x 10'	Sun to light shade	moderate	Creamy white flowers
Spirea densiflora - Spirea	2' x 3'	Sun to light shade	moderate	Pink flowers
Grasses:				
Agropyron riparium - Streambank Wheatgrass	36" x 24"	Full sun	moderate	Grass
Carex nebraskensis - Nebraska sedge	24" x 12"	Full sun	high	Grass
Poa palustris - Fowl Bluegrass	48" x 24"	Sun to light shade	moderate	Grass
Hordeum brachyantherum - Meadow Barley	24" x 12"	Full sun	moderate	Grass
Juncus balticus - Baltic Rush	48" x 24"	Full sun	high	Grass
Forbs:				
Aconitum columbianum - Columbian monkshood	5' x 3'	Sun to light shade	high	Bright blue flowers
Agastache urticifolia - Nettleleaf Giant Hyssop	18" x 6"	Sun to light shade	moderate	Blue Flowers
Geranium viscosissimum - Sticky Purple Geranium	24" x 12"	Sun to light shade	minimal	Small pinkish flowers
Mertensia longiflora - Small Bluebells	6" x 6"	Sun to light shade	moderate	Small purple flowers
Veratrum californicum - California False Hellebore	6' x 2'	Sun to light shade	high	Large flower spike
Wyethia mollis - Mule's Ear	2.5' x 2.5'	Sun to light shade	minimal	Orange flowers

Plant Palette - Forested/Pine Areas

	Height x Width	Exposure to Sun	Water Requirement	Seasonal Interest
Forested Pine/Fir Sites				
Trees:				
Pinus aristata - Bristlecone Pine	20' x 15'	Full sun	minimal	Evergreen
Pinus jeffreyi-Jeffrey Pine	90'x30'	Full Sun	moderate	Evergreen
Pinus contorta murrayana – Lodgepole Pine	80'x30'	Full Sun	moderate	Evergreen
Shrubs:				
Ceanothus velutinus - Snowbush	6'x6'	Full Sun	moderate	Glossy green leaves
Quercus vaccinifolia - Huckleberry Oak	2'x4'	Sun to light shade	moderate	Gray green leaves
Amelanchier alnifolia - Serviceberry	12'x6'	Full Sun	minimal	Bluish-purple fruit
Prunus melanocarpa - Chokecherry	20'x12'	Full Sun	moderate	Dark fruit
Ceanothus integerrimus - Whitehorn	8' x 8'	Sun to light shade	moderate	Semi-evergreen
Cercocarpus ledifolius - Mountain Mahogany	15'x10'	Sun to light shade	minimal	Narrow green leaves
Arctostaphylos patula - Manzanita	6' x 6'	Full sun	moderate	Evergreen, white flower
Ceanothus prostrates - Squaw Carpet	6"x8'	Sun to light shade	minimal	Glossy green leaves
Artemisia tridentata vaseyana – Mountain Big Sagebrush	1.5-6'x10'	Full sun	minimal	Aromatic, gray green
Purshia tridentata – Bitterbrush	4' x 6'	Full sun	minimal	White flowers sp/sum
Grasses:				
Bromus marginatus – California Brome	12"x12"	Full sun	minimal	Grass
Bromus intermis – Smooth Brome	12"x12"	Full sun	minimal	Grass
Festuca arundinacea – Tall Fescue	36"x18"	Full sun	moderate	Grass
Agropyron smithii – Western Wheatgrass	12"x12"	Full sun	minimal	Grass
Agropyron trichorophum - Pubescent wheatgrass	30"x12"	Full sun	low-moderate	Grass
Poa ampla – Sherman Big Bluegrass	30"x18"	Full sun	low-moderate	Grass
Forbs:				
Wyethia mollis – Wolly mules ears	1' x 1.5'	Sun to light shade	low-moderate	Flowers
Penstemon palmeri – Palmers Penstemon	6'x3'	Sun to light shade	minimal	Flowers
Lupinus alpestris – Mountain Lupine	1' to 3'x2'	Sun to light shade	minimal	Flowers
Aquilegia formosa – Columbine	1.5' to3'x2'	Sun to light shade	minimal	Flowers
Phacelia campanularia – California Bluebells	6" to 18"x1'	Sun to light shade	minimal	Flowers

(1) Native revegetation softscape types should be used to repair and restore roadsides along the majority of the highway.

ENHANCED NATIVE SOFTSCAPE TREATMENT

21.9 Apply enhanced native softscape along transition zones and as part of simple gateway treatments.

Enrich the native softscape palette with the enhanced native softscape type. The enhanced native softscape type is the second most commonly used plant palette throughout the corridor and should be utilized as shown in the landscape design segments. The enhanced native softscape type enriches the Great Basin and Sierra Nevada plant palettes with a mix of vertical heights and densities.

- Typical applications are specified for transition zones into communities as well as simple gateway treatments.
- A variety of native species are planted in moderately dense patterns to create this landscape.
- Enhanced native softscapes use the plant material of the native revegetation palette as a base and add a limited number of regionally adapted trees, shrubs, and other materials for diversity in form.
- Plants are placed in massings and at a closer proximity to one another than in the surrounding native landscape..

21.10 Carefully select enhanced native plant species.

In addition the plants listed in the native revegetation softscape type, the following list of plants comprise the enhanced native softscape type. Use these species to create plant communities with variations in plant height and width.

- Ensure the plant palette selected for the site complements existing vegetation in the surrounding landscape.
- Use existing vegetation as a cue to selecting appropriate plant species.
- Additional plants not listed above or adjacent may be included upon review and approval.

(1) *The enhanced native softscape type utilizes a combination of native and non-native plants to create a planting arrangement with varying heights and widths.*

Figure 13 - Enhanced Native Plant Palette

Plant Palette

	Height x Width	*Exposure to Sun*	*Water Requirement*	*Seasonal Interest*
Trees:				
Acer ginnala - Amur Maple	15' x 12'	Sun to light shade	moderate	Bright red fall color
Acer glabrum v. torreyi - Rocky Mountain Maple	15' x 15'	Light shade	moderate	Orange-red fall color
Acer grandidentatum - Wasatch Maple	30' x 30'	Full sun	moderate	Red/gold fall color
Celtis reticulata - Netleaf hackberry	30' x 30'	Full sun	low	na
Cupressus arizonica - Arizona Cypress	60' x 25'	Sun to light shade	moderate	Evergreen
Elaeagnus umbellate - Autumn Olive	14' x 14'	Full sun	moderate	Red globose fruits
Juniperus osteosperma - Utah Juniper	Shrub to 20'-30'	Full sun	minimal	Yellowish green foliage
** Pinus aristata* - Bristlecone Pine	20' x 15'	Full sun	minimal	Evergreen
Pinus edulis - Pinyon Pine	20' x 15'	Full sun	minimal	Evergreen
Pinus monophylla - Single-leaf Pinyon	50' x 25'	Full sun	minimal	Evergreen
Quercus gambelii - Gamble Oak	25' x 25'	Full sun	minimal	Red fall color
Rhus spp. - Sumac	15' x 15'	Full sun	minimal	Yellow to red fall color
Shrubs:				
Atriplex canescens - Fourwing Saltbush	6' x 6'	Sun to light shade	minimal	Narrow green leaves
Buddleia davidii - Butterfly Bush	10' x 8'	Full sun	moderate	Colorful flowers
Caragana pygmaea - Dwarf Peashrub	3' x 5'	Sun to light shade	moderate	Yellow flowers
Cytisus spp. - Broom	7' x 6'	Full sun	minimal	Bright yellow flower
Foresteria neomexicana - Desert Olive	8' x 12'	Full sun	minimal	Narrow green leaves
Kochia spp. - Kochia	6' x 6'	Full sun	minimal	Narrow green leaves
Perovskia spp. - Russian Sage	3' x 1.5'	Full sun	moderate	Lavendar spike flowers
Potentilla spp. - Cinquefoil	1.5' x 2'	Sun to light shade	minimal	Yellow flower
Rosa woodsii - Woods rose	3' x 5'	Sun to light shade	moderate	Light pink flower sp/sum
Rhus spp. - Skunkbush and Aromatic Sumac	6' x 8'	Sun to light shade	minimal	Yellow to red fall color
Sambucus spp. - Elderberry	7' x 10'	Sun to light shade	moderate	Creamy white flowers
Shepherdia argentea - Silver Buffaloberry	10' x 10'	Sun to light shade	moderate	Red fruit in winter
Shepherdia rotundifolia - Roundleaf Buffaloberry	15' x 10'	Sun to light shade	low	Evergreen
Spirea spp. - Spirea	varies	Sun to light shade	moderate	Pink flower
Forbs and Grasses:				
Achillea millefolium - Yarrow	3' x 2'	Sun to light shade	moderate	White flowers
Artemisia - Silver Mound	18" x 24"	Full sun	moderate	Silver-green foliage
Aster spp. - Daisy	18" x 24"	Full sun	moderate	Large colorful flowers
Coreopsis verticulata - Cut-Leaf Coreopsis	18" x 24"	Full sun	moderate	Yellow flower
Echinacea purpurea - Purple Coneflower	18" x 12"	Full sun	moderate	Large purple flowers
Eriogonum spp. - Sulphur Flower	12" x 36"	Full sun	minimal	Bright yellow flowers
Gaillardia grandiflora - Blanket Flower	24" x 12"	Full sun	moderate	Red and yellow flowers
Hesperaloe parviflora - Red Yucca	3' x 4'	Full sun	minimal	Pinkish-red flowers
Linum lewisii - Prairie Flax	12" x 12"	Full sun	minimal	Delicate blue flowers
Lupinus - Lupine	12" x 12"	Full sun	minimal	Brilliant flowering
Penstemon strictus - Strictus Bandera	28" x 18"	Sun to light shade	moderate	Small purplish flowers
Rudbeckia fulgida - Goldsturm Blackeyed Susan	18" x 24"	Full sun	moderate	Brilliant flowering color
Sedum spectibile 'Autumn Joy' - Sedum Autumn Joy	24" x 24"	Full sun	moderate	Pink flowers
Elymus cenereus - Ashy wildrye	24" x 18"	Full sun	low	Grass
Miscanthus sacchariflorus- Silver Banner Grass	6' x 4'	Full sun	moderate	Grass
Miscanthus sinensis - Japanese Silver Grass	3' x 4'	Full sun	moderate	Grass

** Note: Pinus aristata to be used only on forested pine or fir sites.*

REGIONALLY ADAPTED SOFTSCAPE TREATMENT

21.11 Apply regionally adapted softscape in urban areas and locations of high visibility.

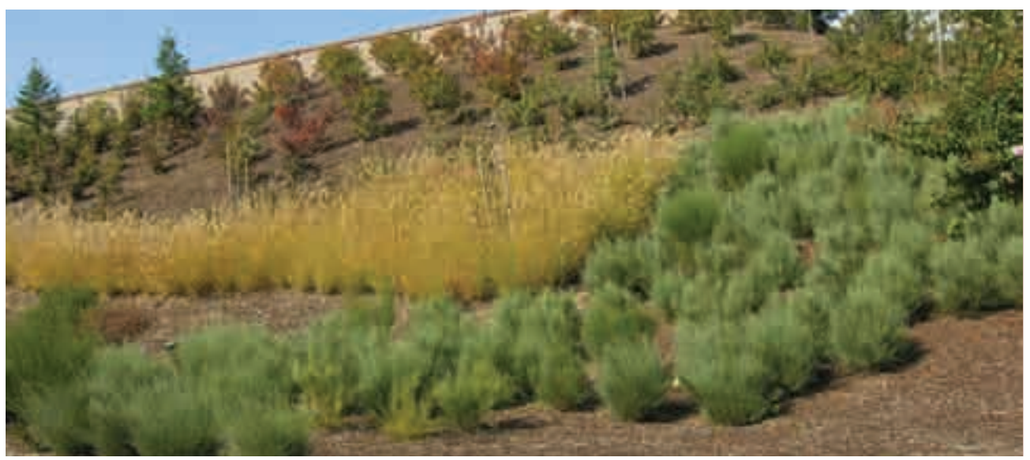
Use the regionally adapted softscape type where identified in each landscape design segment (refer to Chapter Two, Sections Two - Five). This softscape type utilizes the Great Basin and Sierra Nevada plant palettes along with other low-water use plants that are well adapted to local conditions.

- Typical applications includes welcome centers, gateways, rest areas, urban areas, and other high visibility locations.
- Plants are arranged in greater densities, forming over-story and under-story layers, to create a richness of color, texture, form, and seasonal change, enhancing the desert garden.

21.12 Carefully select regionally adapted plant species.

Use regionally adapted plant species. In addition to the plants listed in the native revegetation and enhanced native softscape types, the following list of plants should be used to comprise the regionally adapted softscape type.

- Use plant species to create plant communities with variations in plant height and spread.
- Additional plants not listed above or adjacent may be included upon review and approval.



(1) Regionally adapted aoftscape types should be used in areas where a highly visible landscape is desirable.

Figure 14 - Regionally Adapted Plant Palette

Plant Palette

	Height x Width	*Exposure to Sun*	*Water Requirement*	*Seasonal Interest*
Trees:				
Acer freemanii - Autumn Blaze Maple	40' x 30	Sun to part Shade	moderate	Grown for foliage
Acer ginnala - Amur Maple	15' x 12'	Sun to part shade	moderate	Red fall color
Cedrus atlantica 'Glauca' - Blue Atlas Cedar	40' x 40'	Full sun	minimal	Evergreen
Cedrus deodara - Deodor Cedar	70' x 30'	Sun to part shade	minimal	Evergreen
Celtis occidentalis - Hackberry	50'x 25	Sun to part shade	minimal	Green foliage
Fraxinus pennsylvanica 'Urbanite' - Urbanite Ash	70' x 35'	Sun to part shade	moderate	Yellow green
Koelreuteria paniculata - Golden Rain Tree	45' x 25'	Full sun	moderate	Yellow flowers
Picea pungens - Colorado Spruce	75' x 30	Sun to part shade	moderate	Evergreen
Pinus nigra - Austrian Pine	120' x 40'	Full sun	moderate	Evergreen
Pyrus calleryana - Ornamental Pear	50' x 25	Full sun	moderate	White flowers
Quercus macrocarpa - Bur Oak	100' x 60'	Sun to part shade	moderate	Fall color
Quercus rubra - Red Oak	100' x 60'	Sun to part shade	moderate	Fall color
Shrubs:				
Aronia melanocarpa- Chokeberry	4' x 4'	Full sun	minimal	Pink flowers
Buddleia daviddii - Butterfly Bush	7' x 7'	Full sun	moderate	Purple flower
Caryopteris spp. - Blue Mist Spirea	48" x 36"	Full sun	moderate	Purple flowers
Ceanothus cuneatus - Buckbrush	6' x 6'	Full sun	low	White flowers
Chamaebatiaria millefolium - Fernbush	5' x 5'	Full sun	minimal	Unique foliage
Cotinus coggygria - Smoke Tree	12' x 10'	Full sun	moderate	Pink flowers
Cotoneaster spp. - Cotoneaster	4' x 4'	Sun to light shade	moderate	White-pink flower
Cytisus spp. - Broom	7' x 6'	Full sun	minimal	Yellow flowers
Eriodictyon californica - Yerba santa	4' x 5'	Full sun	minimal	White flowers
Foresteria neomexicana - Desert Olive	8' x 12'	Full sun	minimal	Green foliage
Genista lydia - Lydia Broom	36"x 36"	Full sun	moderate	Bright Yellow
Juniperus spp. - Juniper	6' x 3'	Full sun	minimal	Evergreen
Mahonia aquifolium - Oregon Grape	8' x 4'	Sun to light shade	minimal	Green foliage
Mahonia repens - creeping mahonia	1' x 4'	Full sun	low	Evergreen
Potentilla spp. - Cinquefoil	2.5' x 2.5'	Sun to light shade	minimal	Yellow flowers
Prunus besseyi - Western Sand Cherry	3' x 3'	Full sun	moderate	White flowers
Prunus glandulosa - Pink Flowering Almond	3' x 3'	Sun to light shade	minimal	Green foliage
Spirea spp. - Spirea	4' x 4'	Sun to light shade	moderate	Showy flowers
Perovskia spp. - Russian Sage	6' x 6'	Full sun	moderate	Lavendar flowers
Shepherdia argentea - Silver Buffaloberry	15' x 12'	Sun to light shade	moderate	Silver foliage
Sumac spp. - Rhus	6' x 4'	Full sun	minimal	Red fall foliage
Forbs:				
Aurinia saxatilis - Basket of Gold	12" x 24"	Full sun	minimal	Groundcover
Cerastium tomentosum - Snow-In-Summer	6" x 12"	Full sun	minimal	White/near white
Coreopsis spp. - Coreopsis	24" x 24"	Full sun	moderate	Yellow
Echinacea purpurea - Purple Coneflower	18" x 18"	Full sun	moderate	Pinkish flowers
Hemerocallis spp. - Daylily	18 x 24"	Full sun	moderate	Various color
Knipfolia spp. - Red Hot Poker	24" x 24"	Full sun	minimal	Poker like flowers
Lavandula spp. - Lavender	18" x 18"	Full sun	moderate	Purple flower
Phlox subulata - Creeping Phlox	6" x 18"	Sun to light shade	moderate	Nice pink flowers
Zauschneria californica - California Fuchia	12" x 20"	Full sun	minimal	Red blooms
Campsis radicans - Trumpet Vine	24" x 24"	Full sun	minimal	Red blooms
Parthenocissus quinquefolia - Virginia Creeper	12" x 48"	Full sun	minimal	Fall color
Grasses:				
Calamagrostis acutiflora 'Karl Foerster' - Foerster's Feather Reed Grass	4' x 5'	Full sun	moderate	Grass
Erianthus ravennae - Ravenna Grass	7' x 4'	Full sun	moderate	Grass
Festuca spp. - Blue Fescue	12" x 12"	Full sun	moderate	Grass
Helictotrichon sempervirens - Blue Oat Grass	24" x 24"	Full sun	moderate	Grass
Panicum virgatum - Switch Grass	6' x 6'	Full sun	moderate	Grass
Stipa gigantea - Giant Feather Grass	7' x 6'	Sun to light shade	moderate	Grass

REGIONAL ORNAMENTAL SOFTSCAPE TREATMENT

21.13 Apply regional ornamental softscape type in areas of extremely high importance.

Use the regional ornamental softscape type to enhance culturally significant landmarks and features. The regional ornamental softscape type is the rarest treatment and should be used where identified in the landscape design segments (refer to Chapter Two, Sections Two - Five).

- It is typically used in areas of extreme high importance as part of place-making.
- This softscape type emphasizes the unique cultural elements of a particular urban environment.
- The use of non-native, ornamental plant species in this softscape type accentuates the composition possibilities inherent in form and color.
- Dynamic ornamental forms, colors, and textures enhance the native Great Basin and Sierra Nevada landscape in complementary patterns.

21.14 Carefully select regional ornamental plant species.

In addition to the plants listed in the native revegetation, enhanced native, and regionally adapted softscape types, the following list of plants comprise the regional ornamental softscape type.

- The species listed represent those plants with significant cultural value.
- Alternative plants that have the same form and characteristics, thereby evoking a similar cultural meaning, may be more desirable if the alternative plant is better suited to the environmental conditions, requires less maintenance, and is more drought-tolerant.
- Additional plants not listed above or adjacent may be included upon review and approval.

Figure 15 - Regional Ornamental Plant Palette

Plant Palette

	Height x Width	*Exposure to Sun*	*Water Requirement*	*Seasonal Interest*
Trees:				
Crataegus douglasii - Douglas hawthorn	25' x 12'	Full sun	moderate	Large thorns
Gleditsia triacanthos inermis - Honeylocust	60' x 40'	Sun to light shade	moderate	Unique branching
Picea pungens 'Glauca' - Colorado Blue Spruce	60' x 20'	Sun to light shade	moderate	Evergreen
Rhus spp. - Sumac	15' x 15'	Full sun	minimal	Bright red fall foliage
Robinia spp. - Locust	50' x 25'	Full sun	moderate	Yellowish-green
Sequoia gigantea - Giant Redwood	80'x 35'	Full sun	moderate	Evergreen
Sorbus aucuparia - Mountain ash	30' x 25'	Sun to light shade	moderate	Bright red fall color
Tilis tomentosa - Silver Linden	45' x 20'	Full sun	low	White flower
Shrubs:				
Forsythia spp. - Forsythia	6' x 4'	Full sun	moderate	Bright yellow flower
Hibiscus syriacus - Rose of Sharon	10' x 6'	Sun to light shade	moderate	Large flowers
Lonicera spp. - Honeysuckle	6' x 6'	Sun to light shade	moderate	Small flowers
Rosa spp. - Rose (native yellow climbing rose)	Varies	Full sun	moderate	Bright yellow flowers
Syringa spp. - Lilac	15' x 15'	Sun to light shade	moderate	Pink flowers
Viburnum spp. - Viburnum	8' x 8'	Sun to light shade	moderate	Bright red berries
Grasses, Forbs, and Perennials:				
Aster - Michaelmas Daisy	12" x 12"	Full sun	moderate	Long bloom time
Festuca spp. - Blue Fescue	12" x 12"	Full sun	moderate	Grass
Hemerocallis spp. - Daylily	24" x 18"	Full sun	moderate	Yellow flowers
Iris spp. - Iris, Tall Bearded	36" x 10"	Full sun	moderate	Large purple flowers
Leucanthemum x superbum - Shasta Daisy	24" x 12"	Sun to light shade	moderate	Long bloom time
Saccarum ravennae - Plume Grass	10' x 6'	Full sun	moderate	Grass

(1) *Regional ornamental softscape types utilize diverse plant palettes to create distinctive landscapes for areas that deserve unique treatment.*

22.0 WILDLIFE CROSSINGS AND PROTECTION

22.1 Engage appropriate agencies in the planning and design of wildlife crossings.

Engage Federal, State, and local agencies and wildlife professionals in the initial stages of planning and design through implementation of wildlife crossings.

- Coordinate information on historic migratory routes and daily wildlife movements to situate crossing structures in appropriate locations.
- Research information that tracks where wildlife-related automobile accidents have occurred, and explore designs to minimize these collisions.

22.2 Use ecologically-appropriate wildlife crossing structures that meet the needs of specific wildlife species in order to improve movement corridors and safety along the corridor.

Analyze wildlife behavioral traits so that designed crossing structures are effective in meeting the needs of all species that will use the structure.

- Specific design criteria varies with each species. Consider larger species, such as deer, and small species such as coyotes.
- Ensure structures complement the primary defense strategy for each wildlife species. For instance, animals such as deer, and elk depend on good visibility as a key defense mechanism.
- Use open-span bridges and culverts that are oriented perpendicular to the road in order to reduce the overall length and improve visibility. Proportionately increase the size of the underpass as the length increases.
- Restore vegetation leading up to wildlife crossings and provide cover to shield the entrance to each wildlife crossing from the road while maintaining clear visibility through the crossing.
- Within underpasses, incorporate naturally-occuring materials that exist in adjacent areas.
- Wildlife underpasses or overpasses combined with fencing have the highest documented rates of success for large and small animals. Most successful crossing structures are open-span bridges with sloping sidewalls (see illus. 1).
- Road underpasses may be constructed of concrete boxes, elliptical metal culverts, or open span bridges. Increased width and height of structures usually correlate with increased use by large mammals. Sizes range from 6.5 foot by 6.5 foot culverts for small animals, to an opening width of 40 feet by a height of 16 feet for larger animals. Use natural bottoms for all underpasses that also accommodate streams or drainage patterns. Determine the actual size, location, and type of structure on a site-by-site basis.
- Placement of underpasses in relation to an animal's habitat is crucial. The habitat within the crossing structure should also be enhanced to encourage wildlife use. Restore vegetation leading up to wildlife crossings and provide cover to shield the entrance to each wildlife crossing from the road while maintaining visibility through the crossing.
- Limit human use of the underpass structures when possible.

22.3 Use different types of fencing as appropriate for different animals.

- Recommended fencing for deer is an 8 foot high, variable-expanded metal mesh fence. Metal mesh fencing should be fastened to metal wire. Barbed wire is unacceptable. Fencing should occur on both sides of the road, and should extend to the underpass or overpass entrance.
- Incorporate breaks, known as jump-outs, in areas with continuous fencing to enable wildlife trapped within the road corridor to escape and return to habitat areas.

22.4 Develop a monitoring system for all major wildlife crossings to document crossing use and to collect data for similar projects.

Several studies in other states indicate that significant movement and migratory disruptions have occurred due to highway construction. Movement and behavior at crossings and other highway locations should be monitored to help improve success of these facilities as part of on-going interagency cooperative research.

22.5 Observation points and watchable wildlife opportunities for observing animal movement may be possible in the design of crossings.

Consideration should only be given when observation points are designed to not interfere with wildlife movement.

22.6 Retrofit existing highway facilities within the Lake of the Sky design segment to restore wildlife migration patterns.

Consider broad areas within the landscape where existing topography provides opportunities. Coordinate location with migration corridors.

22.7 Design wildlife crossing structures to blend with surrounding landscape.

Visually screened bridges and culverts recede into the landscape. Combine recreational trails and wildlife crossings as part of bridge and culvert crossings where feasible.

- Consider visual and scenic impacts of wildlife measures such as deer fencing in visually sensitve areas such as the Tahoe baisn.

***(1)** Wildlife crossing help to preserve critical habitat corridors.*

23.0 CONSTRUCTION PRACTICES

23.1 Clear the site only within the limits of construction.

Avoid the visual scars and plant disturbance from excessive site disturbance.

23.2 Protect important environmental, landscape, and cultural features.

Identify and protect all areas to be preserved prior to construction. These include trees, shrubs, landscape and cultural features, and environmentally sensitive areas.

- Fence areas where vegetation is to remain, and avoid disturbance and compaction of the ground.
- Maintain and enhance existing groundcover to ensure the area is left in a condition consistent with the surroundings.

23.3 Utilize Best Management Practices (BMPs) and appropriate short term stabilization measures to prevent erosion and sedimentation during construction.

Perform a site risk assessment prior to construction to determine the threat of introducing sediments and pollutants into nearby surface waters and drainage systems.

- Utilize short term BMPs to reduce sedimentation and pollutant runoff during construction.
- Consider site specificity, timing of execution, and application of man-made devices and/or vegetative or organic cover to stabilize banks during construction.
- Research alternatives to hard surface paving.
- Give preference to other sediment control devices including sediment basins, diversion earth forms, vegetative buffer areas, channel linings, energy dissipaters, seeding and mulching.

23.4 Carefully manage and dispose of waste material.

Asphalt millings inhibit slope revegetation, contaminates adjacent soils, and create a cluttered, unfinished appearance.

- Avoid placing disposed milled asphalt on highway shoulders.

23.5 Salvage and store topsoil and native plant materials.

After soil erosion and sediment control measures have been implemented and before grading work begins, remove and store topsoil for project reuse.

- Salvage areas should be designated on plans and staked on the site.
- Salvaged plant materials should be stored and maintained during construction, prior to replanting.
- Stripped topsoil in excess of the quantity required for the project should be stored at specified locations for future use.
- Topsoil of lesser quality can be blended with soil amendments to improve condition for final bedding.

23.6 Carefully consider location/reclamation of construction areas.

Construction staging areas, borrow pits, and other construction areas must be carefully located and returned to a condition that is equal to or better than original, and consistent with the Corridor Plan design guidelines.

(1) *Milled asphalt on highway shoulders detracts from the overall visual quality of the landscape.*

24.0 MAINTENANCE FACILITIES AND PRACTICES

24.1 Locate and screen maintenance staging areas in visually unobtrusive areas.

Maintenance staging areas should be adequately set back from the highway. Where possible, site facilities so they are screened from the highway by existing landforms.

- Screen maintenance areas, particularly stockpiles, borrow pits, and equipment, from the highway or from adjacent developed property.
- Consider security fencing, landscape, and architectural solutions.

Grading and drainage is the most important consideration in the site planning and design of a maintenance area in order to prevent any potential environmental damage from leachates in salt and gravel stockpiles. The NDOT *Best Management Practices Manual* outlines additional points for consideration when planning for maintenance staging areas including the following:

- Cover salt and sand piles to avoid watercourse and groundwater degradation.
- Provide space for equipment storage, vehicles, and supplies, as well as employee or visitor parking.
- Consider future expansion needs.

24.2 Coordinate with maintenance personnel when planning and designing maintenance areas.

Planning and design of maintenance areas requires close cooperation between designers and the personnel directly responsible for its use.

24.3 Consult BMPs and provide for efficient and effective maintenance of landscape and aesthetic treatments.

With few exceptions, new landscape and aesthetics projects are designed to be low maintenance. Refer to NDOT *Landscape and Aesthetics Maintenance Manual*. Provide areas where maintenance equipment can be conveniently located. Consider maintenance routines required for the design program, and identify areas that may need additional care or attention initially and/or as the project matures. NDOT maintenance practices include:

- Trash and debris removal.
- Surface finish maintenance (painting, patching, graffiti removal).
- Grading and earthwork.
- Ground treatment (raking, replacing mulch or decorative rock, reconfiguring drainage structures).
- Weed control.
- Plantings (interim, temporary, and permanent irrigation, trimming, pruning of shrubs and trees, manual weed control, fertilizing).
- Disease and pest management (including invasive species control).
- Repair and replacement of structural and electrical components, irrigation, signage, and lighting.

24.4 Create a visual design unity among all existing and new structures based on the design theme.

Ensure a visual design relationship exists among all highway structures. This includes coordinating materials, patterns, and color.

- Ensure structures can be readily patched or painted with matching colors. When paint or stain repair is made, make sure repairs cover the entire surface and extend to joints and logical edges.
- Use anti-graffiti treatment on detailed sculptural elements.
- District level maintenance teams should use the same color palette for all maintenance and repairs (refer to Color Palette guideline, page 3.23, for more information).
- If no logical edge or joint exists, feather edges of paint.

24.5 Avoid pruning or shearing plant material except as required to remove dead, damaged, or diseased plant part or to provide clear visibility for traffic conditions.

(1)*Landscapes require varying degrees of upkeep and should be designed with an understanding of the long-term maintenance implications.*

25.0 RECOMMENDATIONS FOR SUSTAINABLE HIGHWAY ENVIRONMENTS

25.1 Use three key principles in highway construction and natural resource management to create sustainable highway environment – avoid, minimize, and mitigate.

Concepts central to these principles include:

- Water conservation: efficiency, protection, and reuse.
- Construction materials selection: reduce, reuse, and recycle.
- Air quality protection.
- Energy efficiency: use renewable energy.
- Design innovation.

25.2 Techniques for creating sustainable highway environments.

- Develop systems to encourage sustainable highways. Develop performance standards, monitoring procedures, and promote coordination between environmental and transportation agencies.
- Preserve air quality. Use construction mitigation techniques to minimize dust from construction sites.
- Minimize energy consumption and incorporate alternative energy sources. Where possible, use solar powered electronic signs, low energy use lights (such as LED), and passive solar design.
- Use recycled materials for construction. When applicable, use reclaimed concrete and asphalt, scrap tires, plastics, steel slag, roofing shingles, coal fly ash, and composted municipal organic wastes.
- Reduce waste. Waste reduction concepts include right-of-way management, re-use of organic materials, water conservation, and selection of long-lived materials.

25.3 Utilize sustainable development principles in the design and construction of the highway corridor.

Sustainable design is a holistic philosophy that includes all aspects of function and construction operations including, but not limited to: energy use, air quality, material selection, energy generation, water conservation, heat and solid waste, habitat enhancement, and protection.

- Consider sustainability in both the design and construction of highway systems.
- Restore disturbed man-made and natural habitats.

(1) *Solar power provides a sustainable, renewable energy source in remote locations.*

(2) *Wind power generates a clean renewable energy source.*

(3) *Materials like this recycled plastic modular unit can be used in roadway construction.*

Cost Analysis and Implementation

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SECTION ONE: Cost Analysis

To understand the cost implications of the improvements proposed by this Corridor Plan, estimates on a cost per square foot (sf) and per acre (ac) basis have been prepared. At the planning budget level, these estimates can be applied to the Landscape Design Segments to produce an overall maximum cost for the right-of-way sections through undeveloped areas, communities, and individual interchange improvements. These estimates will inform NDOT in the decision-making process, and help influence budget allocations for the landscape and aesthetics highway improvements. Estimates within the Tahoe Basin may exceed these costs.

APPLICATION OF DESIGN GUIDELINES

The Design Guidelines included in this report describe the elements that compose a typical right-of-way section and interchange along elevated highways and bypasses. They also describe a base level of landscape and aesthetic quality that is used to predict costs. The intent of this section is to develop a definition of what is considered a "standard" treatment. As described in the Design Guidelines, within the Lake of the Sky Landscape Design Segment, an accentuated treatment level should be considered the "standard" treatment. Upon adoption of the Corridor Plan, NDOT should initiate internal reviews to determine implementation strategies. These reviews will include cost evaluation, priorities, scheduling, and visual preference evaluations to test each standard proposed by this section.

Funding for the landscape and aesthetics portion of a project should not be used to cover the ordinary construction costs. The landscape and aesthetics budget is available for softscape and hardscape treatments that exceed the ordinary construction costs.

The following summary describes components contained within an NDOT standard project that are not generally considered landscape and aesthetic costs:

Roadside Service Facilities

- Service area program as defined in the Design Synthesis report inclusive of program elements.

Non-motorized Transportation Systems

- Maintain existing sidewalk dimension of intersecting road across bridge overpass.
- Maintain existing bike lane dimension of intersecting road across bridge overpass.
- New bicycle paths and walkways that are part of an approved transportation plan.
- Six foot concrete sidewalk (community transition zones).
- Ten foot concrete sidewalk (community interface zones).
- Painted zebra pattern pedestrian crossing with pedestrian crossing sign.

Anti-graffiti Control and Removal

- Application of a long-term, non-sacrificial anti-graffiti treatment coating to all appropriate structures.

Bridge Structure

- Steel and concrete I-girders or steel and concrete box girder.
- Cast-in-place concrete with variable vertical ribbed design.
- Two color paint palette—base color with one accent color.
- Concrete barrier rail with acrylic stain base color application or steel rail with painted finish.
- Bridge/road name identification embossment.
- Pedestrian access across and under bridges used at interchanges and over topographic features.

Retaining Walls

- Cast-in-place or pre-cast concrete with fractured fin or similar pattern.
- Acrylic stain base color application.

Noise Walls

- Cast-in-place or pre-cast concrete with fractured fin or similar pattern.
- Acrylic stain base color application.
- Variation in sound wall geometry, material, color, texture, and pattern to eliminate monotonous, linear stretches of wall.

Concrete Barrier

- Cast-in-place concrete barrier.
- Acrylic stain base color application.

Guard Rail

- Galvanized steel thrie-beam guard rail.

Medians

- Revegetated median outside of community zones.
- Revegetated raised 6 inch median with curb within community zones.

Fencing

- Chain link fencing with color application—vinyl clad or painted finish with steel post supports where required (community zones).

How to Read Landscape and Aesthetics (L&A) Costs:

1) Determine the cost of the NDOT standard treatment for softscape and hardscape.

Softscape
(Native revegetation) – $1.20 - $1.40/sf
Hardscape (Standard) – $115 - $120/sf

2) Determine the cost of the selected treatment type.

Softscape (Regionally adapted treatment type):
$2.40 - $2.90/sf

Hardscape (Focal treatment type):
$180 - $195/sf

3) Subtract the standard treatment cost for the cost of the selected treatment type.

Softscape:
$2.40 (Regionally adapted treatment cost)
-$1.20 (Standard treatment cost)
= $1.20 (Landscape and aesthetics cost)

Hardscape:
$180 (Focal treatment cost)
-$115 (Standard treatment cost)
= $65 (Landscape and aesthetics cost)

The portion of cost allocated as a landscape and aesthetics cost is the additional cost.

- Multi-strand wire fencing with painted steel post supports at right-of-way limits (rural areas).
- Fencing required to control access, grading, and drainage.

Grading

- Steepest desired slope of 3H:1V.
- Rounded slopes that blend into existing grade.
- See *Project Design Development Manual* (PDDM) 2.2.4.2 side slopes.

Rock Cuts

- Rock cuts that appear natural in form and blend with existing landforms.
- Staining of rock cut to provide weathered finish.
- Rock fall protection structures, if necessary.

Drainage

- Basic channel conveyance, culverts, and drainage structures.
- Erosion resistant channels.
- Water quality basins.
- Man-made or constructed wetlands fulfilling mitigation requirements.

Erosion Control

- Provision of temporary erosion control during construction.
- Permanent erosion control.
- Temporary and permanent erosion control best management practices.

Native Revegetation for All Disturbed Portions of Highway Construction

- Salvage and storage of topsoil (6 inch horizon minimum) with native plant fragments.
- Re-spreading of stockpiled topsoil and native plant fragments to minimum 6 inch depth (amend topsoil when necessary).
- Application of native plant revegetation seed mix in combination with scattered rock mulch.
- Supplemental irrigation to establish plantings when necessary (two year minimum by maintenance contract).
- Provide invasive and noxious weed control (two year minimum by maintenance contract).

Construction and Maintenance Management Practices

- Implementation of dust control practices.
- Construction fencing to preserve sensitive areas.
- Maintenance period to ensure establishment of native revegetation.
- Development of a native revegetation general maintenance program.

Project Components Required for Compliance

- All practices must be in compliance with applicable Federal and State regulations.

Roadway Lighting

- Thirty foot high pole with galvanized finish, concrete foundation, and high pressure sodium luminaire (rural areas).
- Thirty foot high pole with powder-coat finish, concrete foundation with acrylic powder-coated base color application, and high pressure sodium luminaire with shoe-box fixture (community zones).

Wildlife Crossing

- Under or overpass structures to allow maintenance of natural migration and animal travel patterns.
- Cast-in-place concrete bridges with textured finish and two-color paint palette.
- Wire mesh fencing with painted steel post supports.

PROCESS

Costs (in 2006 dollars) for individual hardscape and softscape treatments, such as pedestrian crosswalks, curb extensions, raised planters, concrete form liner imprints, retaining walls, and landscape irrigation, were gathered from several sources, including NDOT, local engineering and landscape architecture firms, contractors, and product manufacturers. This information was analyzed and compiled into a database that could be applied to several prototypical examples of landscape and aesthetic treatment levels. The softscape and hardscape costs presented here represent the capital costs of construction and do not include extended maintenance costs. The treatments correlate to those presented in the NDOT *Landscape and Aesthetics Master Plan*. A separate report prepared by UNLV, entitled *Maintenance Cost Study for Corridor Planning*, examines long-term maintenance costs such as graffiti removal, pruning, and irrigation.

Prototypical designs for each of the five softscape types and four hardscape treatments were created for sections of highway rights-of-way outside of communities, in developing commercial areas, and in downtown areas. Within communities, designs were created for two-lane, three-lane, and four-lane roadway conditions. The project area was then incorporated into the estimate to create the per square foot and per acre cost analysis.

Overall cost estimates for each level of treatment were developed from these and compared to the costs from actual projects for verification. A similar process was applied to these areas to create a per square foot and per acre cost for each hardscape and softscape type.

COST ESTIMATES

Cost information presented here is provided for the purpose of long-range planning and budgeting. It is not intended to substitute for a project-level detailed cost projection.

Softscape Treatments

Using the process described above, planning level construction cost estimates for the different softscape treatments were determined in 2006 dollars. They are as follows:

Softscape Type Cost Estimate (sf and acre)

Ground Treatment / Native Revegetation:
$1.20 - $1.40/sf
$52,500 - $61,950/acre
L & A Cost $0.00/sf
L & A Cost $0.00/acre

enhanced native:
$1.50 - $1.70/sf
$64,500 - $74,000/acre
L & A Cost $0.30 - $0.50/sf
L & A Cost $12,000 - $21,500/acre

Regionally Adapted:
$2.40 - $2.90/sf
$105,000 - $126,000/acre
L & A Cost $1.20 - $1.70/sf
L & A Cost $52,500 - $73,500/acre

Regional Ornamental:
$3.70 - $6.50/sf
$160,000 - $280,000/acre
L & A Cost $2.50 - $5.30/sf
L & A Cost $107,500 - $227,500/acre

The cost for ground treatment/native revegetation is covered under the general construction costs as part of the NDOT standard. The data shown for the different treatment levels represents a total cost. The landscape and aesthetics cost is the portion of the total cost that is above the NDOT standard.

For example, a regionally adapted softscape costs about $1.20 more per square foot than the standard ground treatment / native revegetation level of treatment, for a total cost of $2.40 per sf ($1.20 + $1.20 = $2.40). The additional $1.20 per sf is funded through the landscape and aesthetics 3% for new construction, or community partnerships because it is above and beyond the NDOT standard. The regional ornamental treatment exhibits the widest range of costs due to the highly customized nature of this type.

Structures and Hardscape Treatments

Within communities, the construction of curbs, sidewalks, and medians compose the majority of hardscape costs. Along elevated highways and bypasses, bridges and sound walls are the main hardscape cost components. For the purposes of cost estimation, the right-of-way conditions established for softscape costs were also used to determine hardscape costs. In addition, a 12,000 square foot (60 foot x 200 foot) bridge was assumed for elevated highways and bypasses. The estimate for the various hardscape levels is:

Hardscape Type Cost Estimate (sf and total)

Standard:
$115 - $120/sf
$1,386,000- $1,500,000 total
L & A Cost $0.00/sf
L & A Cost $0.00 total

Accentuated:
$132 - $142/sf
$1,575,000 - $1,700,000 total
L & A Cost $17 - $27/sf
L & A Cost $189,000 - $200,000/total

Focal:
$180 - $195/sf
$2,145,000 - $2,335,000 total
L & A Cost $65 - $80/sf
L & A Cost $759,000 - $949,000 total

Landmark:
$225 - $270/sf
$2,646,000 - $3,150,000 total
L & A Cost $110 - $155/sf
L & A Cost $1,260,000 - $1,764,000 total

The cost for the standard treatment would be covered by the general capital construction budget.

The treatment levels are represented as a total cost and the landscape and aesthetics cost represents the portion to be covered by the Landscape and Aesthetics 3% for new construction or community partnerships. The landmark level shows the widest range of cost because of the custom nature of many elements such as complex concrete form liners, custom railings, and transportation art that are included in this treatment.

To place the estimates in the context of a highway corridor, an estimate was calculated for a one mile section of road. Typical sections of highway right-of-way for rural and community applications were developed. Two lane (50 foot ROW), three-lane (76 foot ROW), and four lane (102 foot ROW) examples for both suburban and downtown applications were used to determine this value (Figures 17 - 48, pages 4.4 - 4.11). The approximate softscape and hardscape costs to develop one mile of corridor right-of-way at each treatment level were estimated.

Figure 16 **LANDSCAPE TREATMENT TYPES**

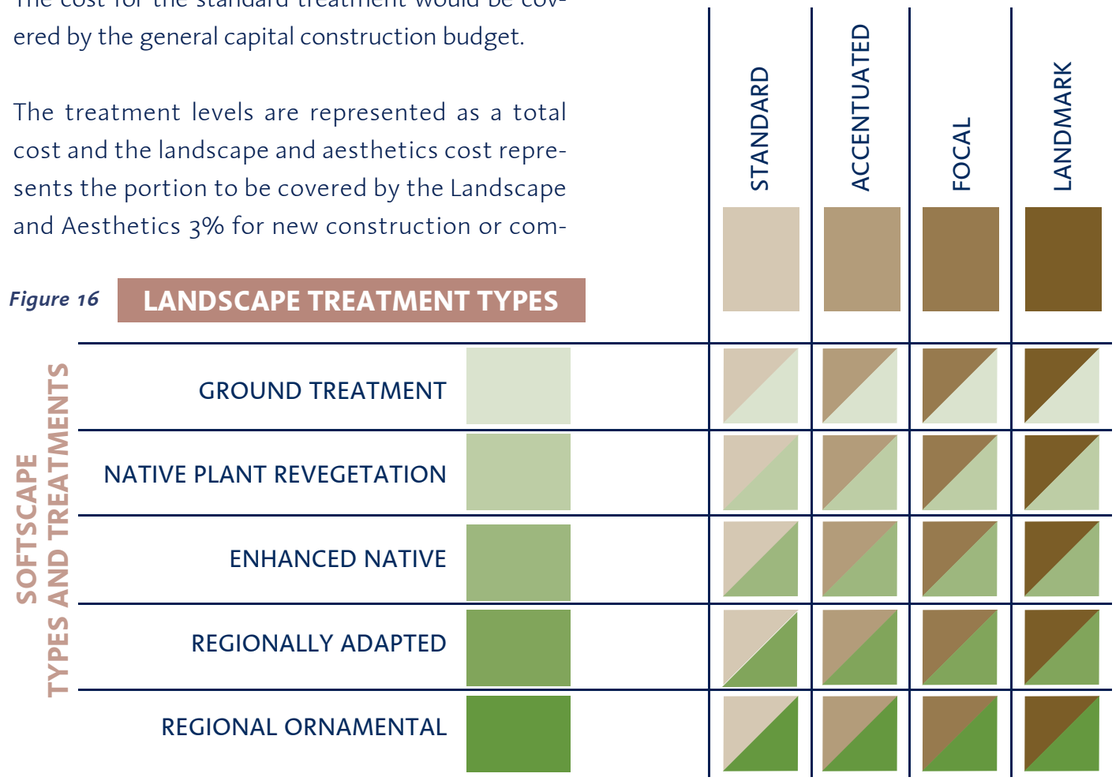
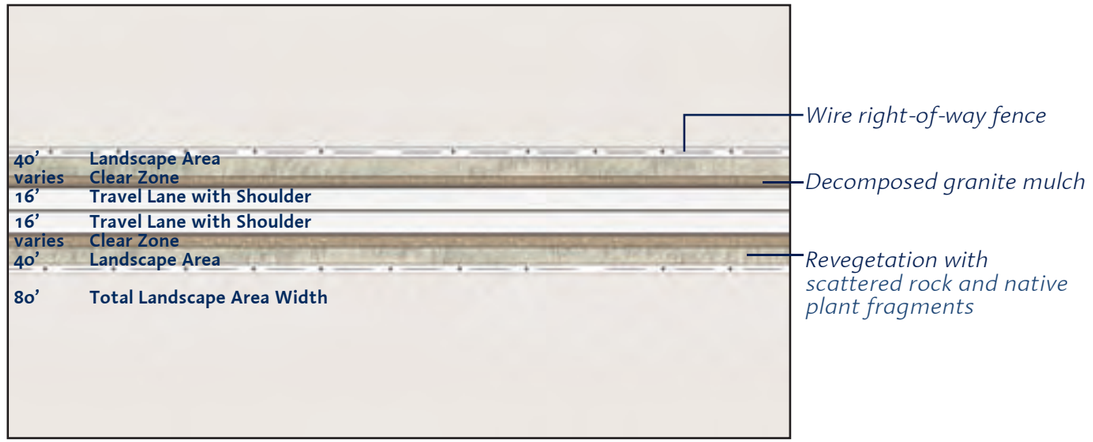


FIGURE 17 - RURAL HIGHWAY

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



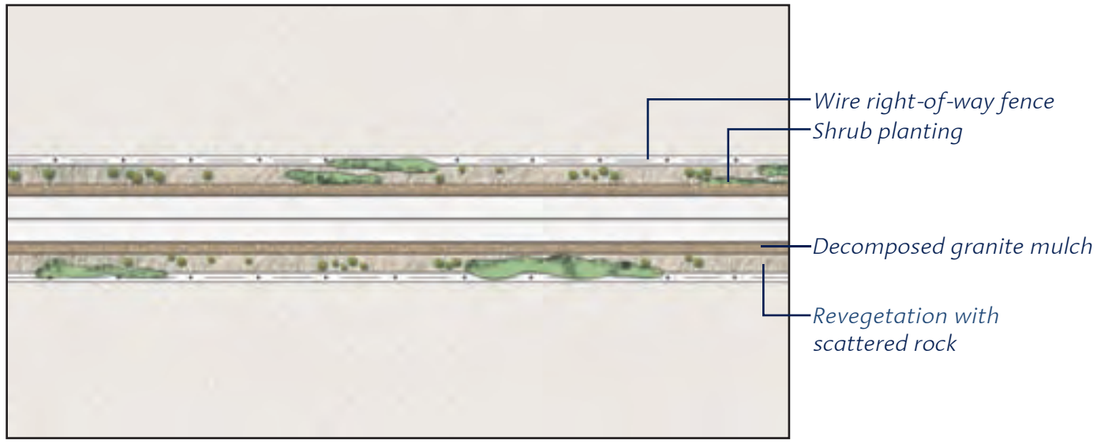
Total Cost: $35,000 - $42,000/acre of ROW area

L&A Cost: $0/acre

FIGURE 18 - RURAL HIGHWAY

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



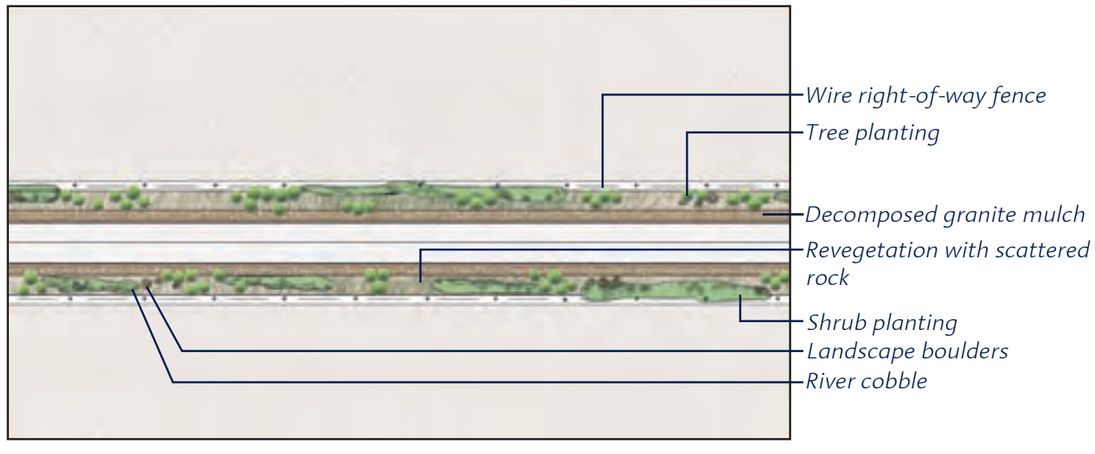
Total Cost: $43,000 - $50,000/acre of ROW area

L&A Cost: $8,000 - $14,000/acre

FIGURE 19 - RURAL HIGHWAY

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



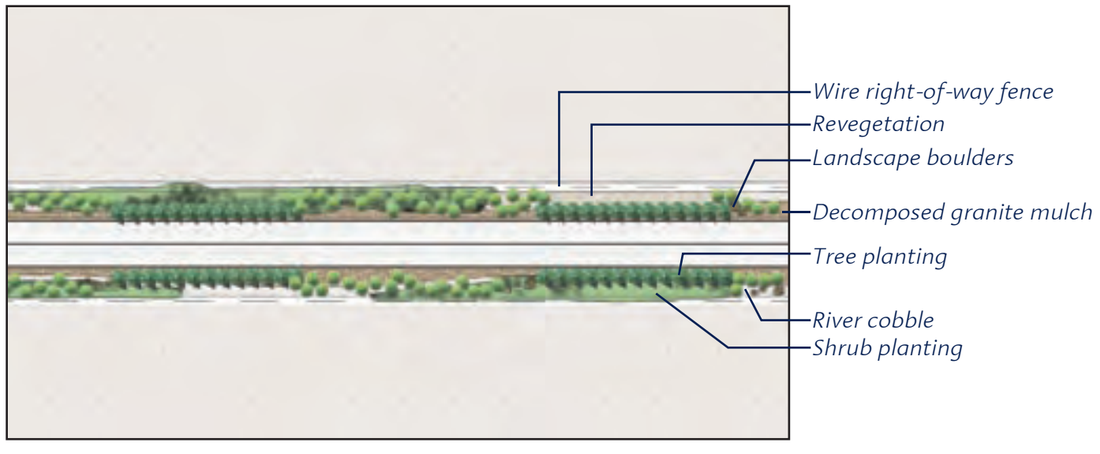
Total Cost: $69,000 - $85,000/acre of ROW area

L&A Cost: $34,000 - $50,000/acre

FIGURE 20 - RURAL HIGHWAY

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**



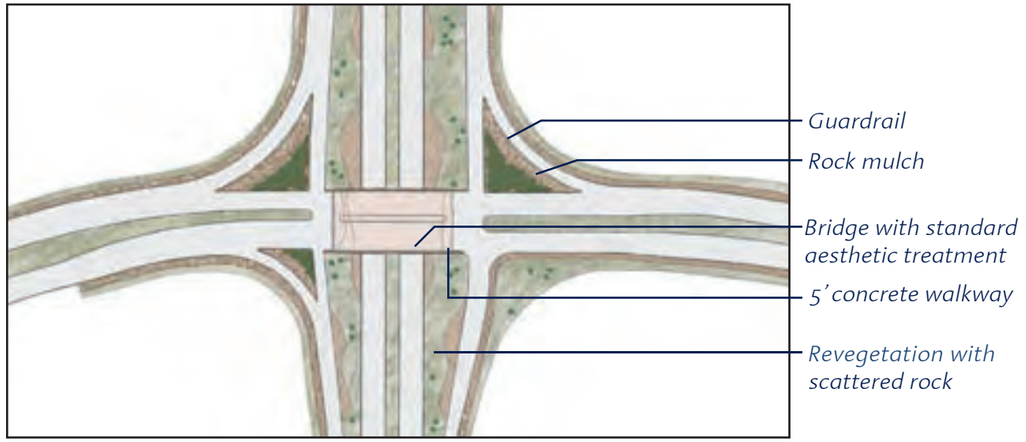
Total Cost: $107,000 - $185,000/acre of ROW area

L&A Cost: $72,000 - $150,000/acre

FIGURE 21 - FREEWAY OR ELEVATED HIGHWAY INTERCHANGES

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



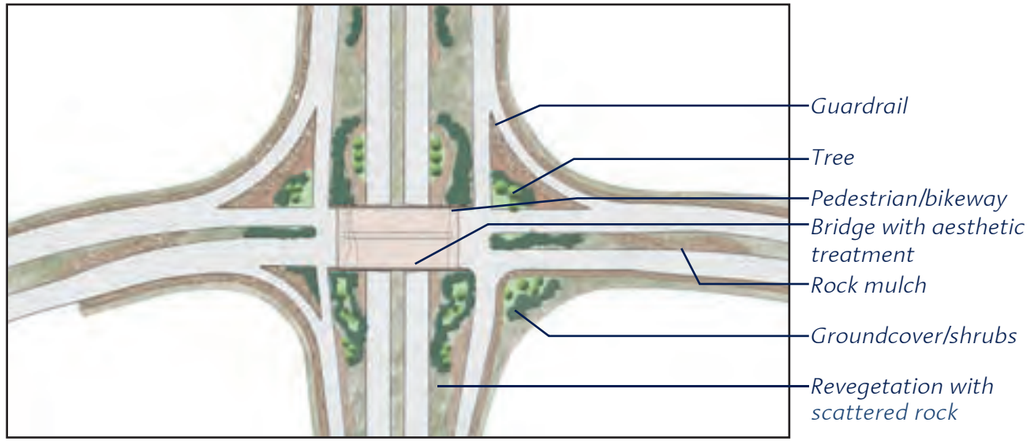
Total Cost: $1,785,000 (infield landscape and bridge deck)

L&A Cost: $0.00/acre

FIGURE 22 - FREEWAY OR ELEVATED HIGHWAY INTERCHANGES

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



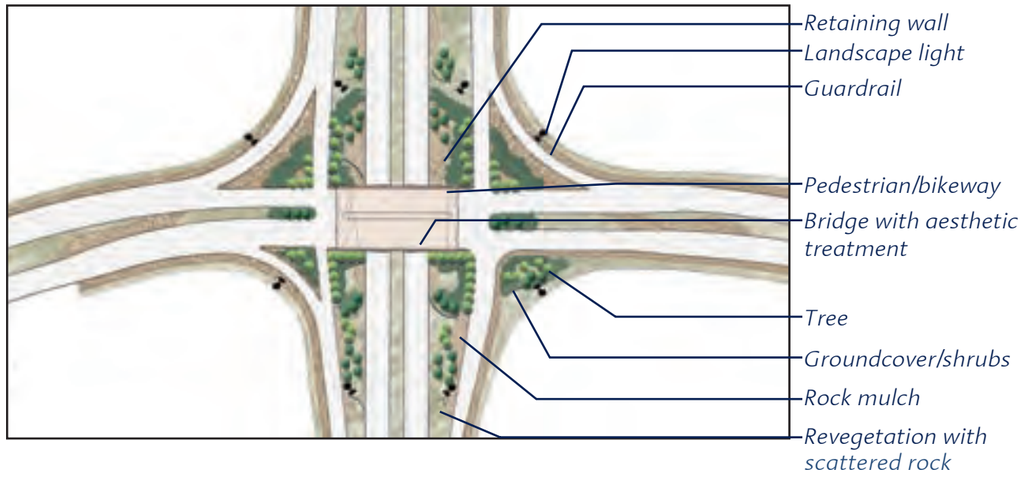
Total Cost: $2,100,000 (infield landscape and bridge deck)

L&A Cost: $315,000/acre

FIGURE 23 - FREEWAY OR ELEVATED HIGHWAY INTERCHANGES

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



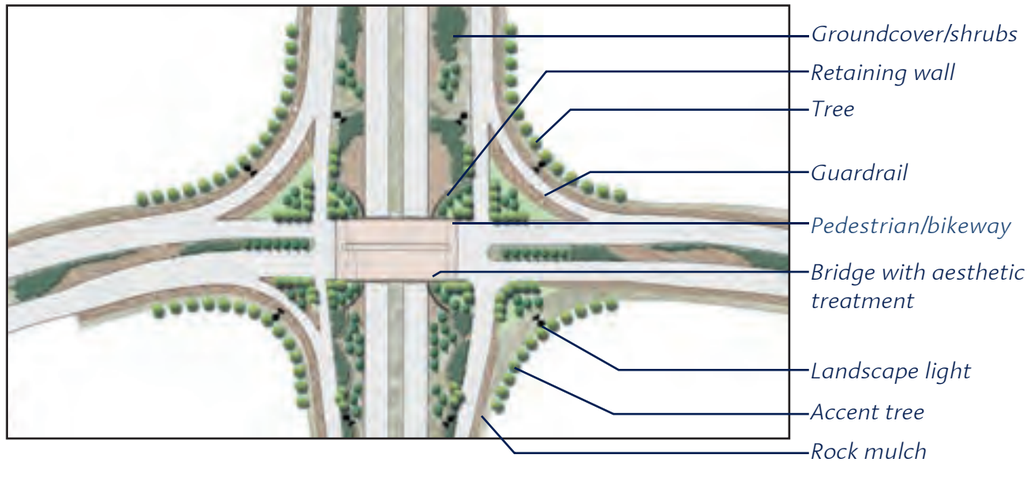
Total Cost: $2,890,000 (infield landscape and bridge deck)

L&A Cost: $1,105,000/acre

FIGURE 24 - FREEWAY OR ELEVATED HIGHWAY INTERCHANGES

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**



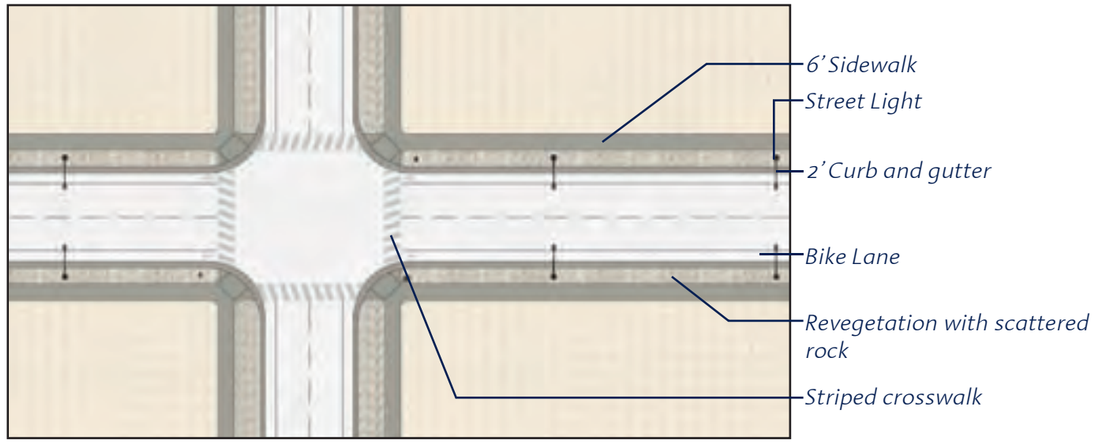
Total Cost: $4,200,000 (infield landscape and bridge deck)

L&A Cost: $2,415,000/acre

FIGURE 25 - TWO LANE SUBURBAN HIGHWAY

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



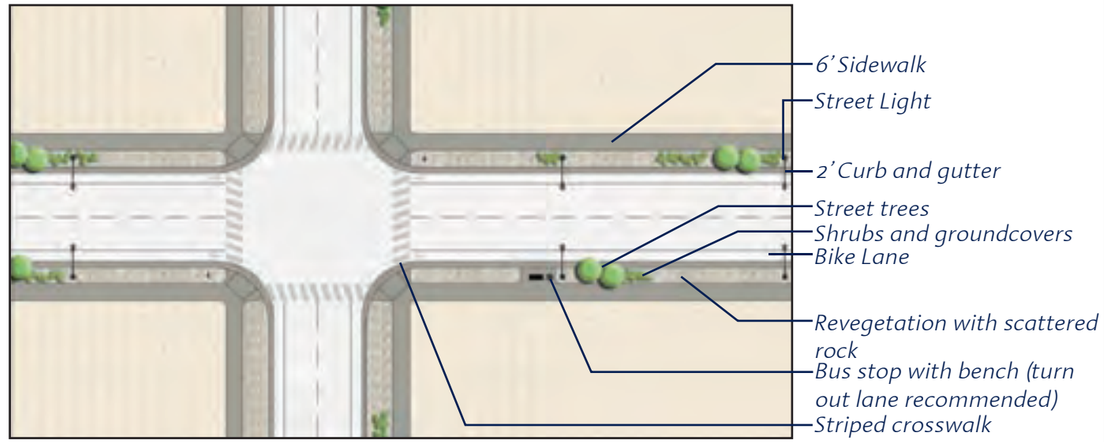
Total Cost: $1,627,000 - $1,908,000/mile of ROW

L&A Cost: $0.00 per mile

FIGURE 26 - TWO LANE SUBURBAN HIGHWAY

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



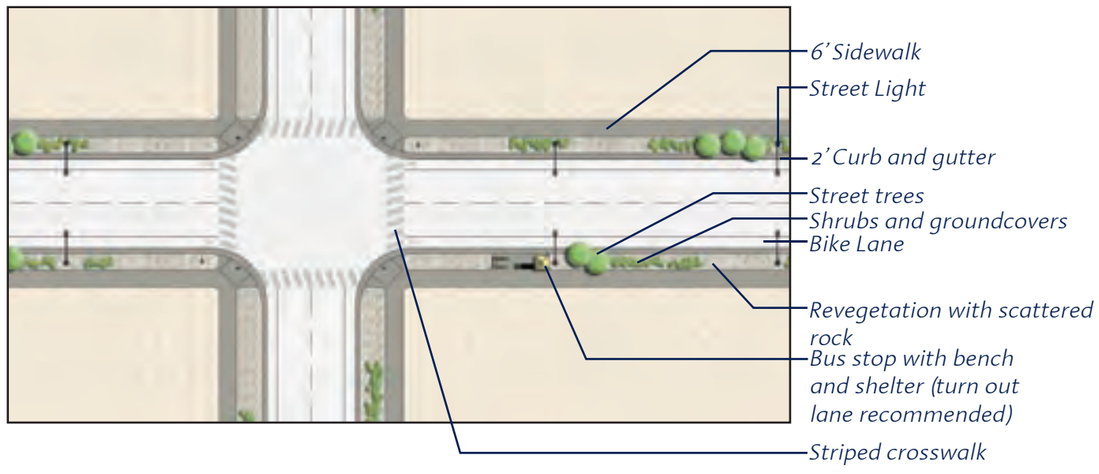
Total Cost: $1,696,000 - $2,025,000/mile of ROW

L&A Cost: $69,000 - $117,000/mile

FIGURE 27 - TWO LANE SUBURBAN HIGHWAY

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



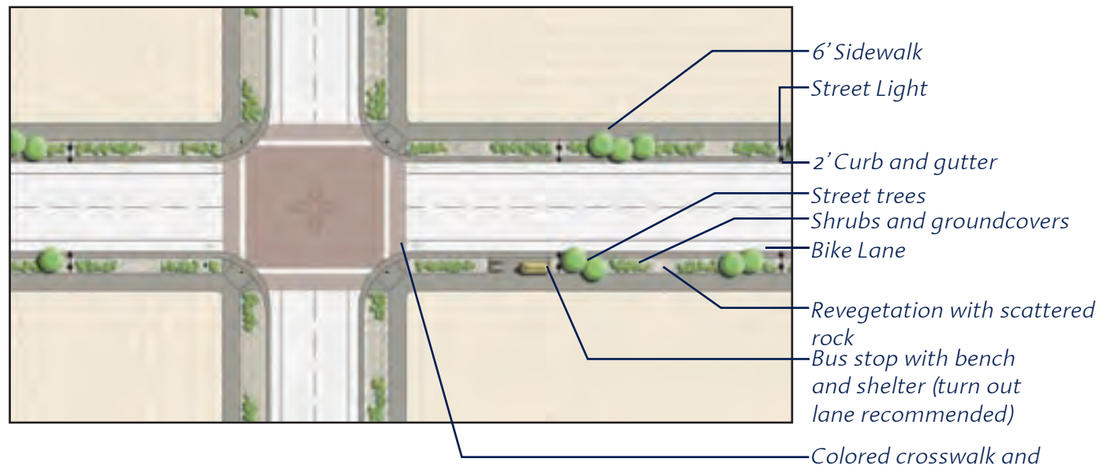
Total Cost: $2,128,000 - $2,509,000/mile of ROW

L&A Cost: $501,000 - $601,000 per mile

FIGURE 28 - TWO LANE SUBURBAN HIGHWAY

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**



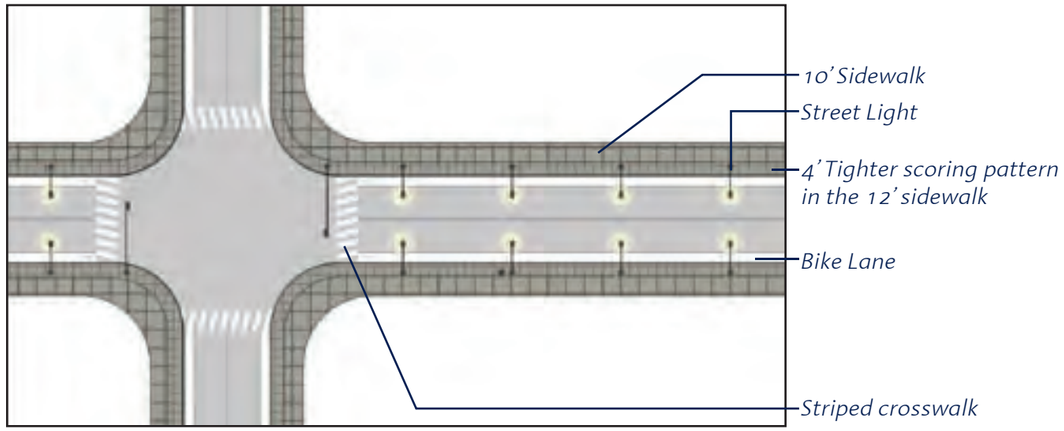
Total Cost: $2,846,000 - $4,336,000/mile of ROW

L&A Cost: $1,219,000 - $2,428,000/mile

FIGURE 29 - TWO LANE DOWNTOWN HIGHWAY

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



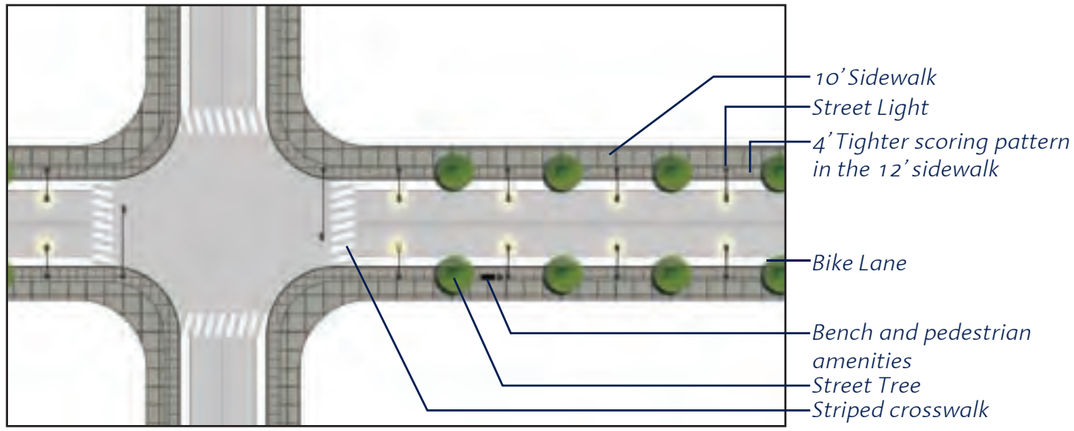
Total Cost: $3,148,000 - $3,644,000/mile of ROW

L&A Cost: $0.00/mile

FIGURE 30 - TWO LANE DOWNTOWN HIGHWAY

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



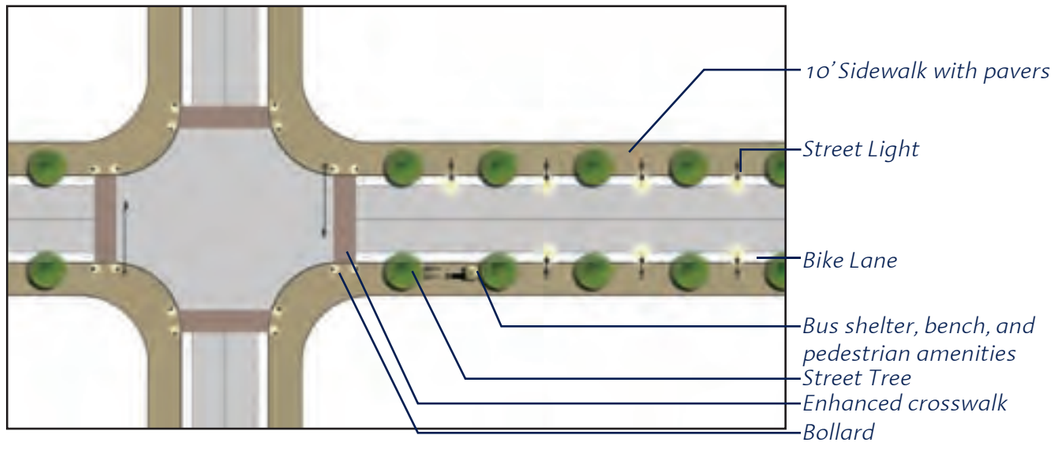
Total Cost: $3,419,000 - $3,973,000/mile of ROW

L&A Cost: $271,000 - $329,000/mile

FIGURE 31 - TWO LANE DOWNTOWN HIGHWAY

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



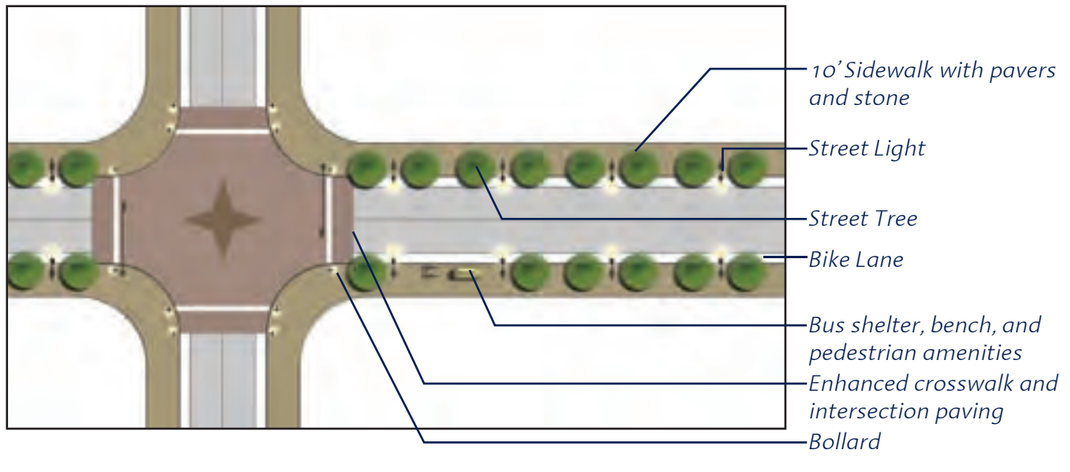
Total Cost: $4,218,000 - $5,609,000/mile of ROW

L&A Cost: $1,070,000 - $1,965,000/mile

FIGURE 32 - TWO LANE DOWNTOWN HIGHWAY

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**



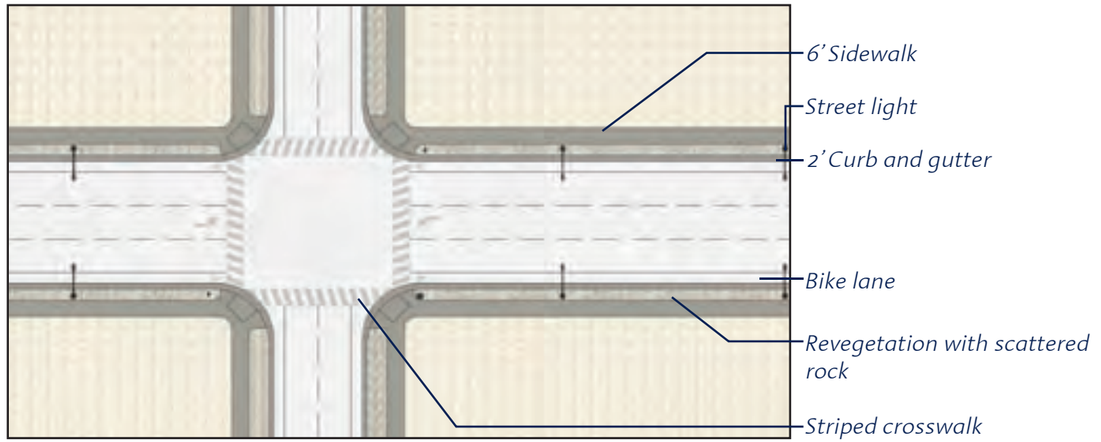
Total Cost: $5,579,000 - $8,089,000/mile of ROW

L&A Cost: $2,431,000 - $4,445,000/mile

FIGURE 33 - THREE LANE SUBURBAN HIGHWAY

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



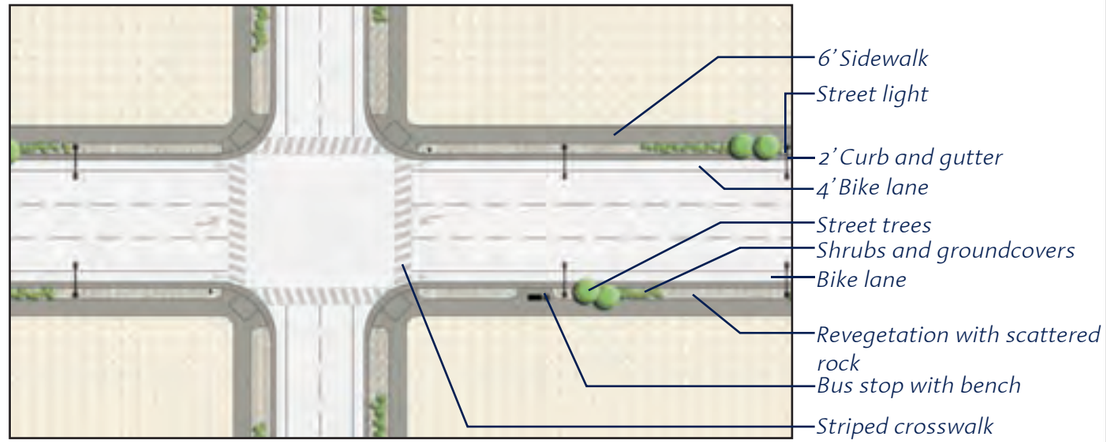
Total Cost: $1,647,000 - $1,934,000/mile of ROW

L&A Cost: $0.00/mile

FIGURE 34 - THREE LANE SUBURBAN HIGHWAY

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



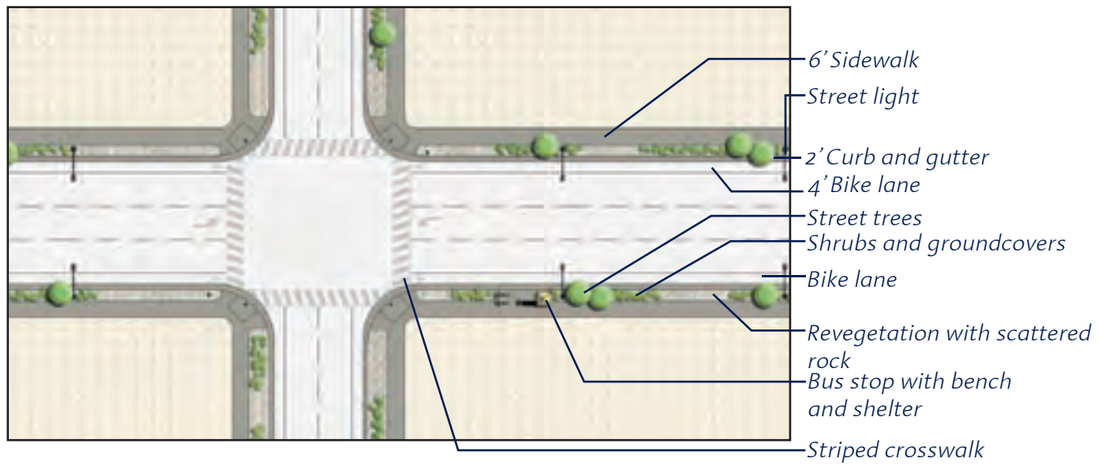
Total Cost: $1,706,000 - $2,033,000/mile of ROW

L&A Cost: $59,000 - $99,000/mile

FIGURE 35 - THREE LANE SUBURBAN HIGHWAY

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



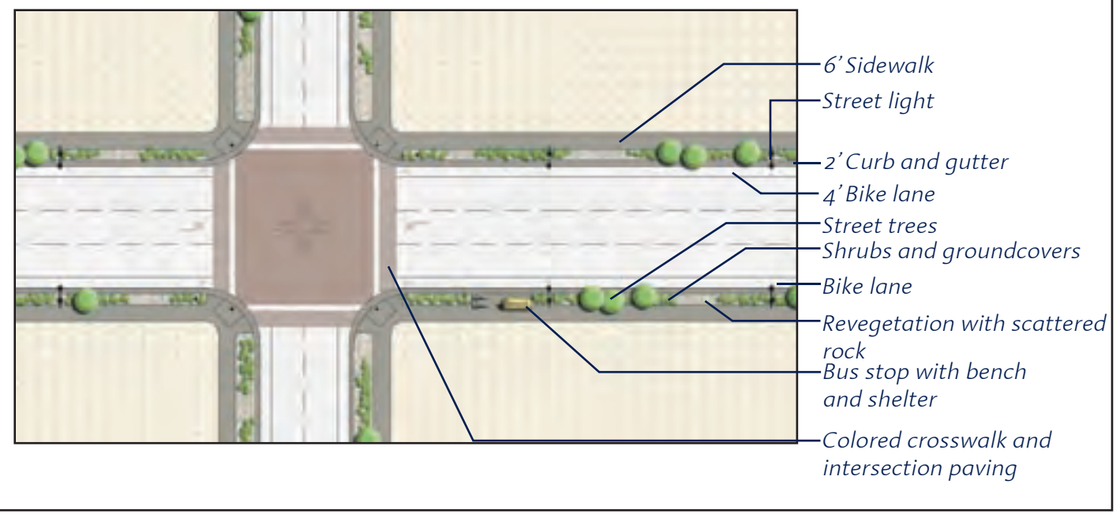
Total Cost: $2,150,000 - $2,535,000/mile of ROW

L&A Cost: $503,000 - $601,000/mile

FIGURE 36 - THREE LANE SUBURBAN HIGHWAY

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**



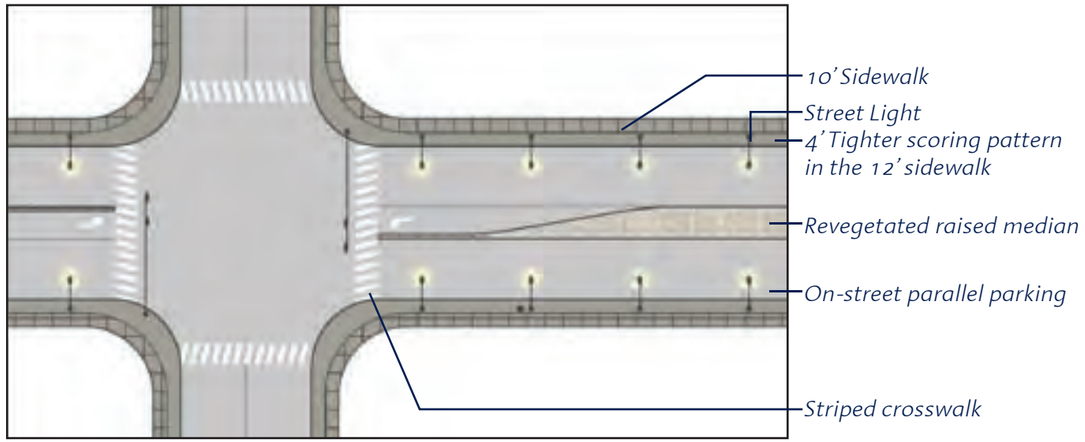
Total Cost: $2,982,000 - $4,550,000/mile of ROW

L&A Cost: $1,335,000 - $2,616,000/mile

FIGURE 37 - THREE LANE DOWNTOWN HIGHWAY

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



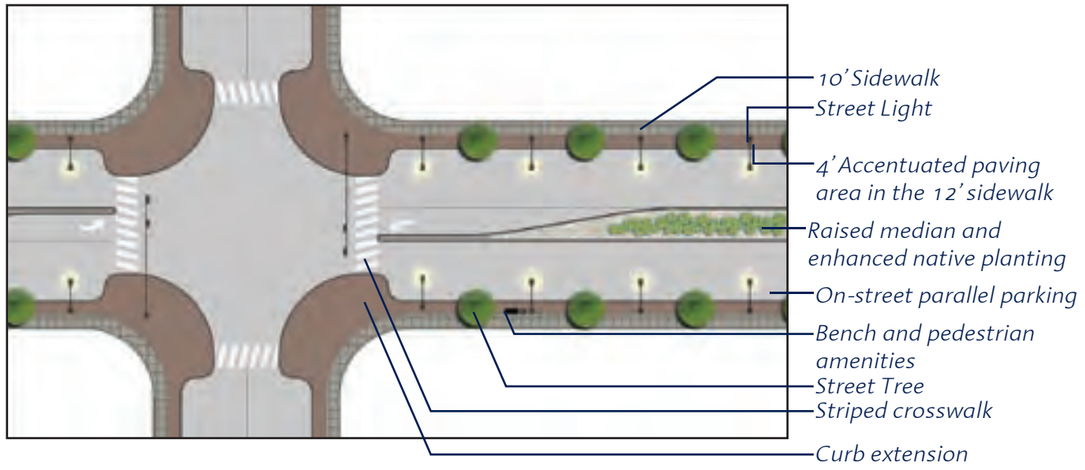
Total Cost: $3,101,000 - $3,594,000/mile of ROW

L&A Cost: $0.00/mile

FIGURE 38 - THREE LANE DOWNTOWN HIGHWAY

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



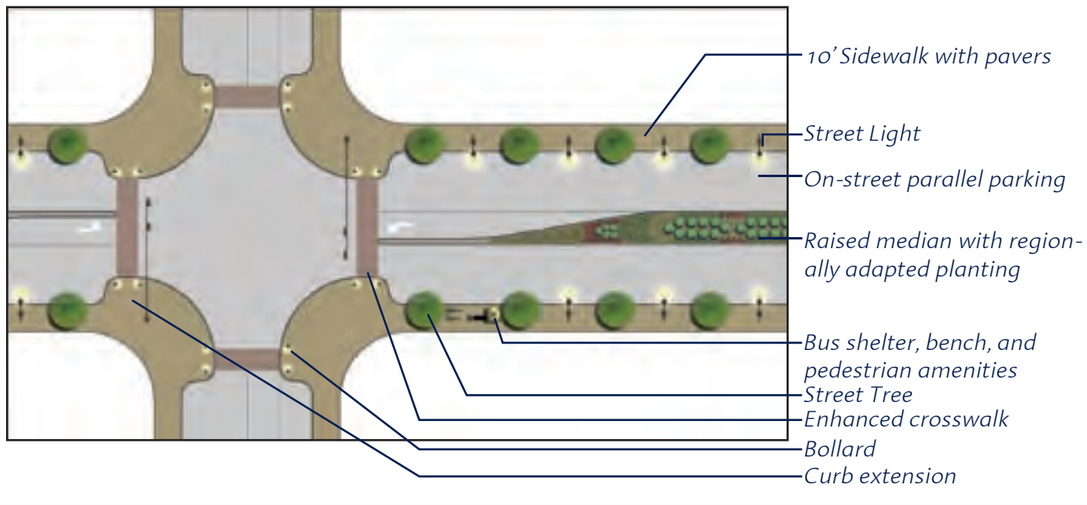
Total Cost: $4,385,000 - $4,990,00/mile of ROW

L&A Cost: $1,284,000 - $1,396,000/mile

FIGURE 39 - THREE LANE DOWNTOWN HIGHWAY

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



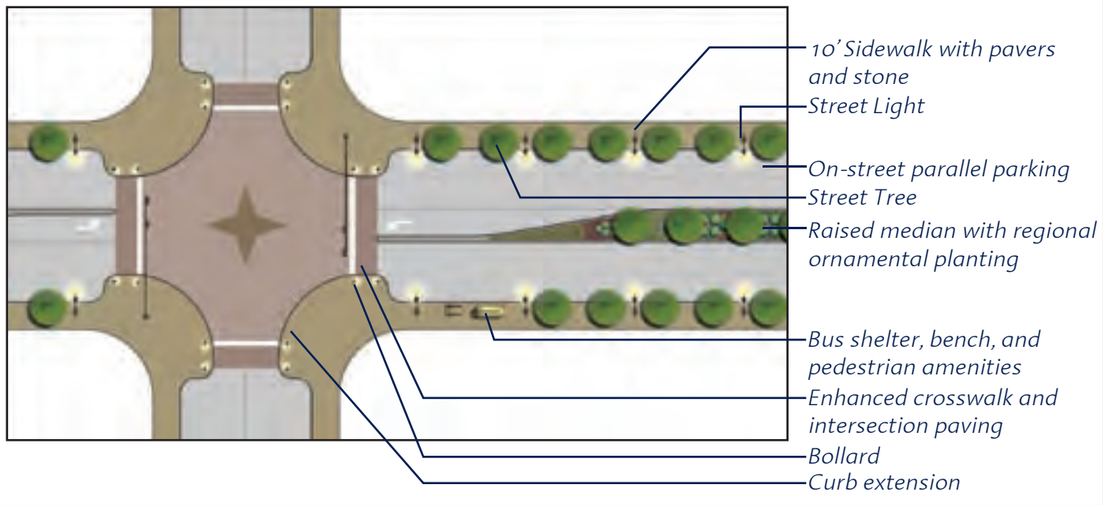
Total Cost: $4,779,000 - $6,624,000/mile of ROW

L&A Cost: $1,678,000 - $3,030,000/mile

FIGURE 40 - THREE LANE DOWNTOWN HIGHWAY

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**



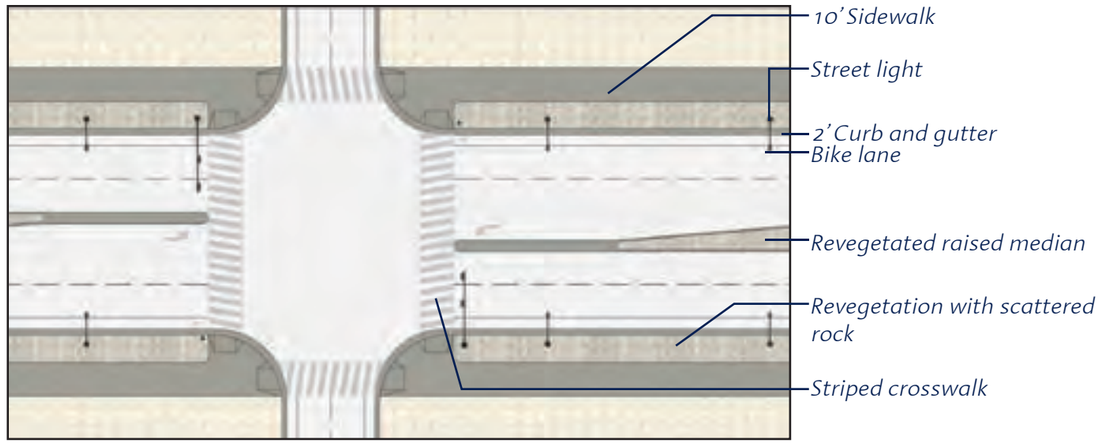
Total Cost: $5,926,000 - $7,411,000/mile of ROW

L&A Cost: $2,825,000 - $3,817,000/mile

FIGURE 41 - FOUR LANE SUBURBAN HIGHWAY

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



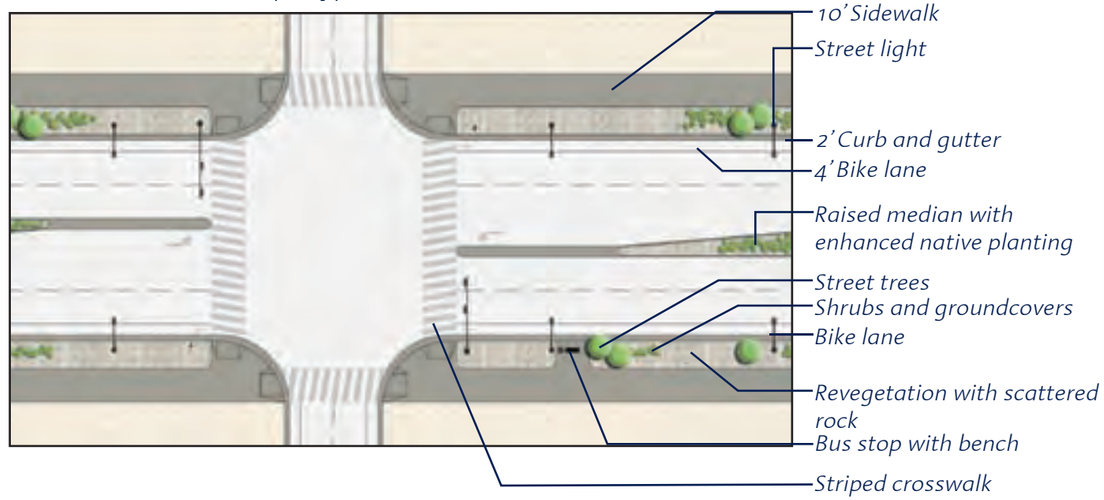
Total Cost: $2,479,000 - $2,916,000/mile of ROW

L&A Cost: $0.00/mile

FIGURE 42 - FOUR LANE SUBURBAN HIGHWAY

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



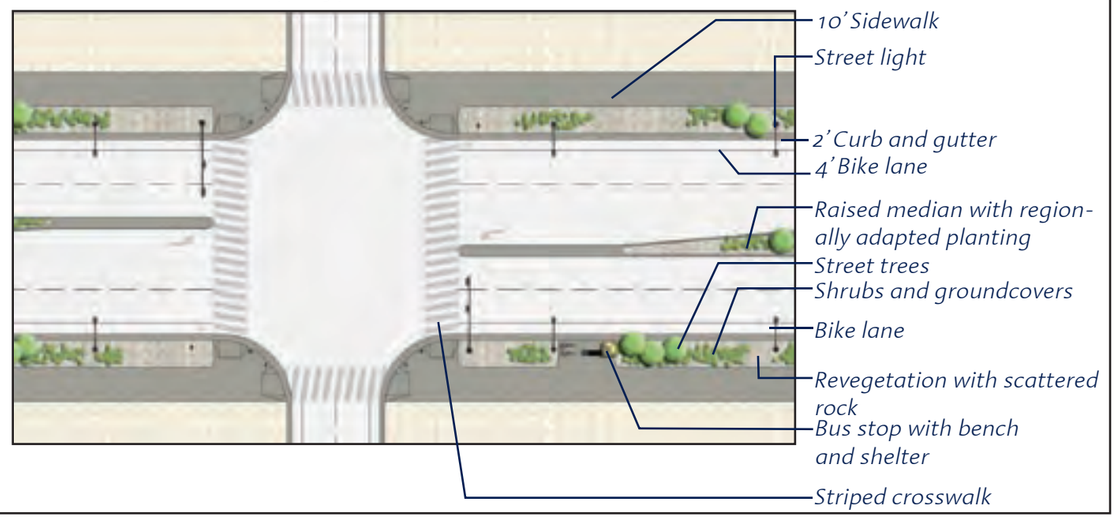
Total Cost: $2,621,000 - $3,113,000/mile of ROW

L&A Cost: $142,000 - $197,000/mile

FIGURE 43 - FOUR LANE SUBURBAN HIGHWAY

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



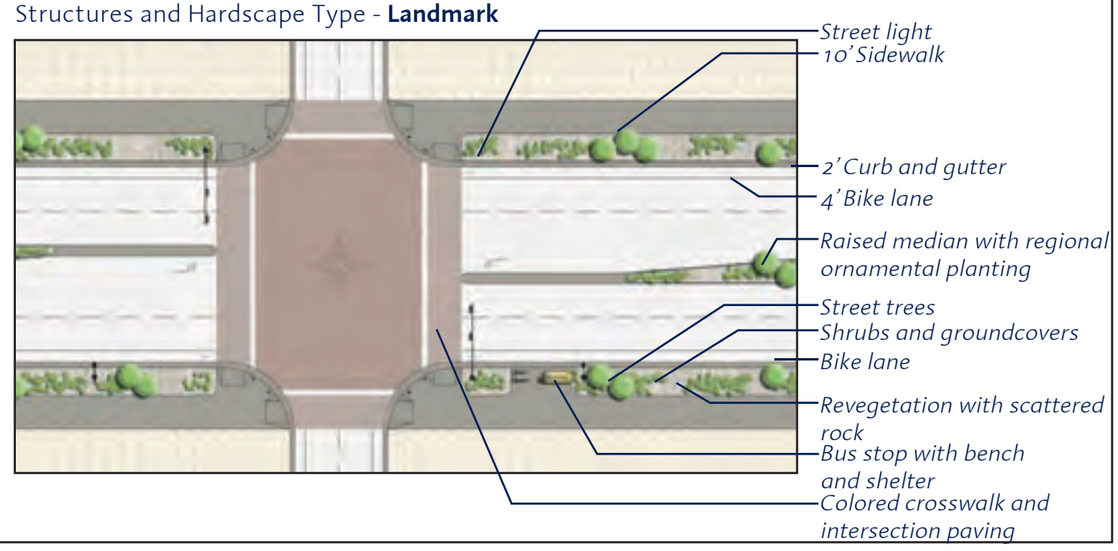
Total Cost: $3,465,000 - $4,038,000/mile of ROW

L&A Cost: $986,000 - $1,122,000/mile

FIGURE 44 - FOUR LANE SUBURBAN HIGHWAY

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**



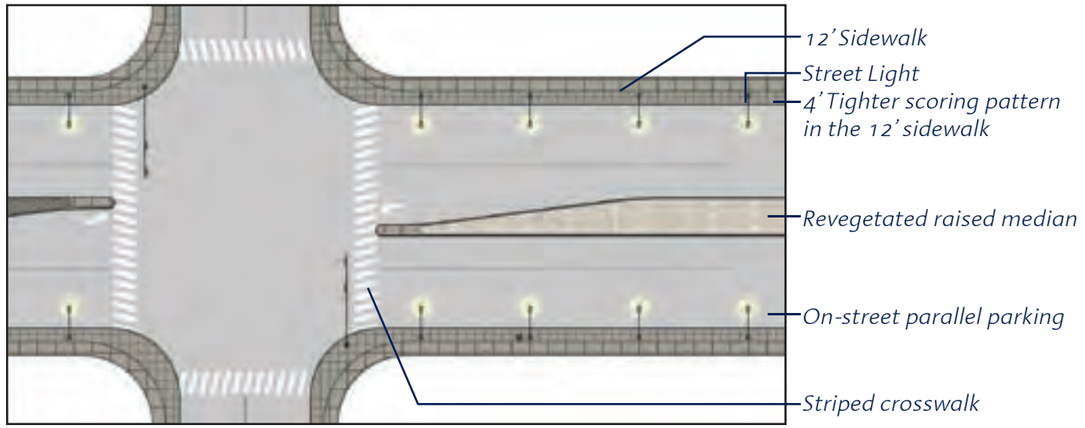
Total Cost: $4,619,000 - $7,165,000/mile of ROW

L&A Cost: $2,140,000 - $4,249,000/mile

FIGURE 45 - FOUR LANE DOWNTOWN HIGHWAY

Softscape Types - **Ground Treatment/Native Revegetation**

Structures and Hardscape Type - **Standard**



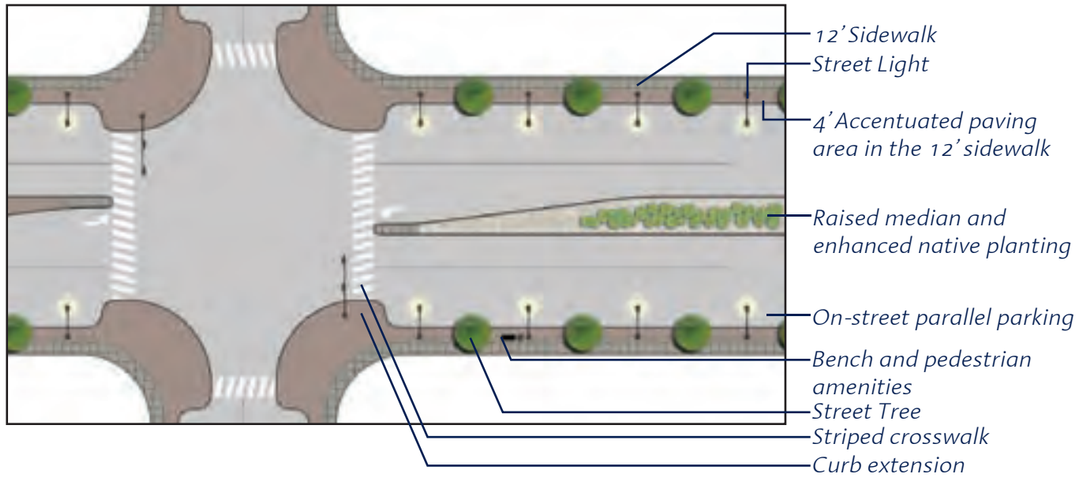
Total Cost: $3,172,000 - $3,681,000/mile of ROW

L&A Cost: $0.00/mile

FIGURE 46 - FOUR LANE DOWNTOWN HIGHWAY

Softscape Types - **Enhanced Native**

Structures and Hardscape Type - **Accentuated**



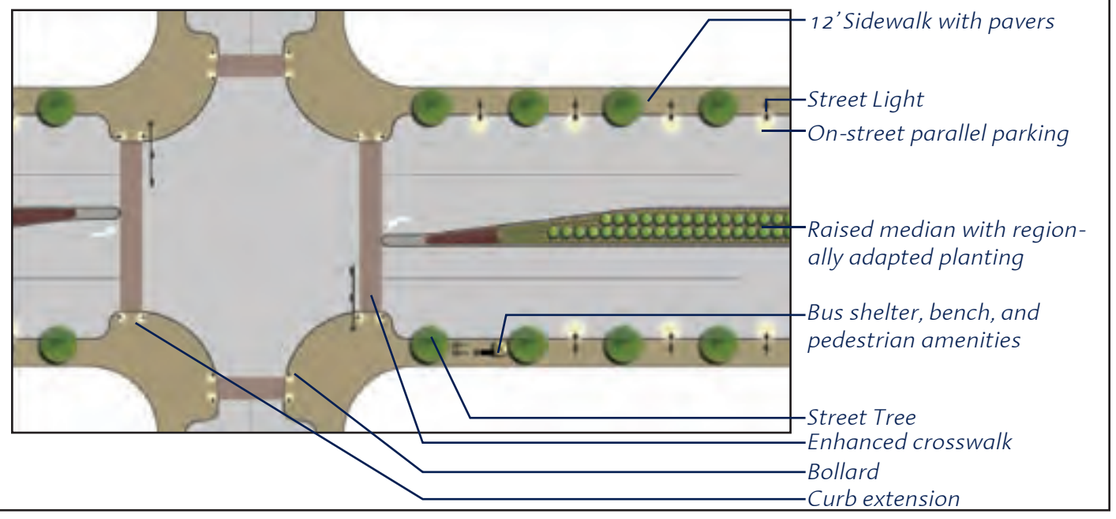
Total Cost: $4,495,000 - $5,124,000/mile of ROW

L&A Cost: $1,323,000 - $1,443,000/mile

FIGURE 47 - FOUR LANE DOWNTOWN HIGHWAY

Softscape Types - **Regionally Adapted**

Structures and Hardscape Type - **Focal**



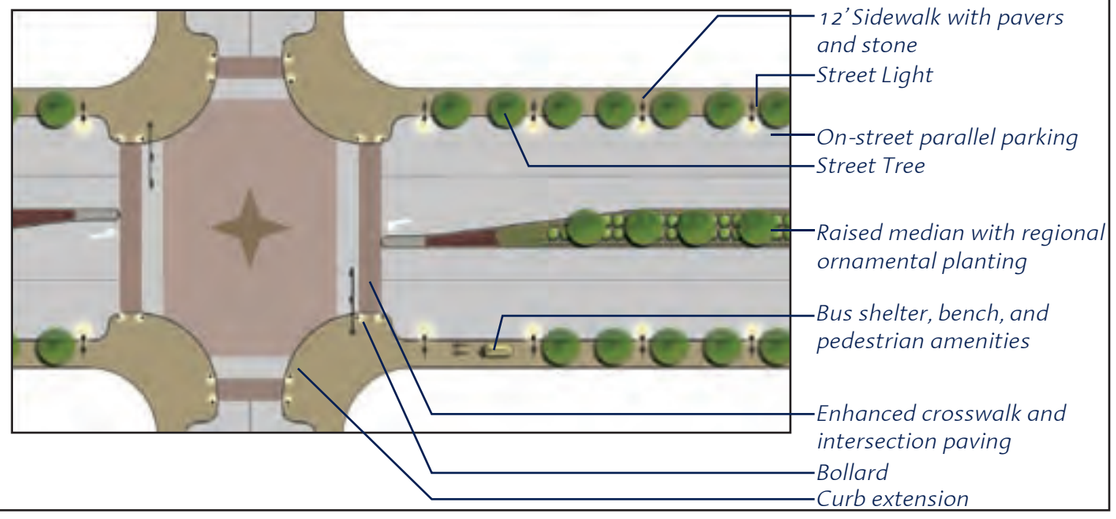
Total Cost: $5,022,000 - $6,873,000/mile of ROW

L&A Cost: $1,850,000 - $3,192,000/mile

FIGURE 48 - FOUR LANE DOWNTOWN HIGHWAY

Softscape Types - **Regional Ornamental**

Structures and Hardscape Type - **Landmark**

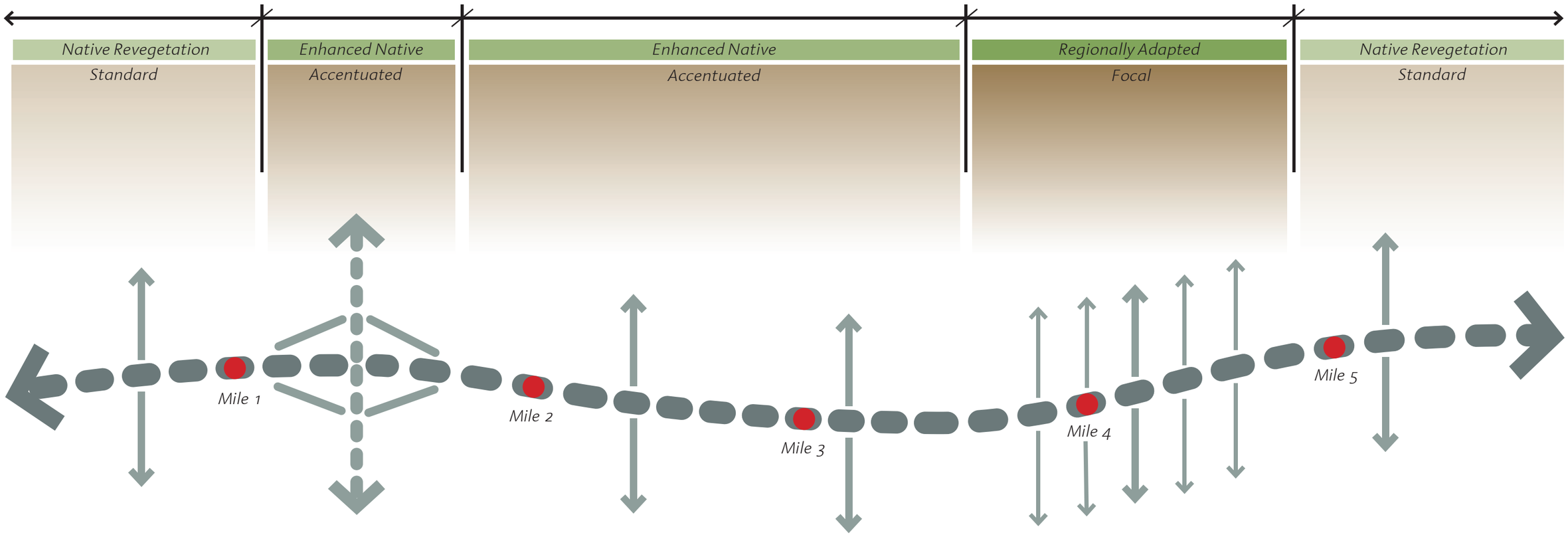


Total Cost: $6,319,000 - $9,437,000/mile of ROW

L&A Cost: $3,147,000 - $5,756,000/mile

The diagram below shows how the cost estimate information can be used to determine a planning level estimate of the landscape and aesthetics costs for this hypothetical seven mile section of highway corridor. The costs shown are for landscape and aesthetic enhancements that are above the defined NDOT standard.

Figure 49 - Planning Level Cost Estimate



MAINTENANCE COSTS

The Corridor Plan identifies the level of landscape and aesthetic treatment, and the maintenance investment. Therefore, it is important that maintenance cost data be incorporated in the Corridor Plan. Furthermore, local public agencies and others will be interested in maintenance expenses to help navigate the long-term maintenance implications of retrofit projects.

In collaboration with the Corridor Plan, long-term maintenance costs have been researched by UNLV and compiled as the *Maintenance Cost Study for Corridor Planning*. Figure 50 diagrams how total life-cycle maintenance costs were developed for the different landscape and aesthetic treatments. Figure 51 shows the maintenance costs that were determined for the various combinations of softscape and hardscape types. Current estimates exhibit relatively wide variations in cost due to the limited amount of data available, however, further research and tracking of projects will result in more clearly defined maintenance cost estimates.

Figure 50 - Total Life Cycle Maintenance Costs

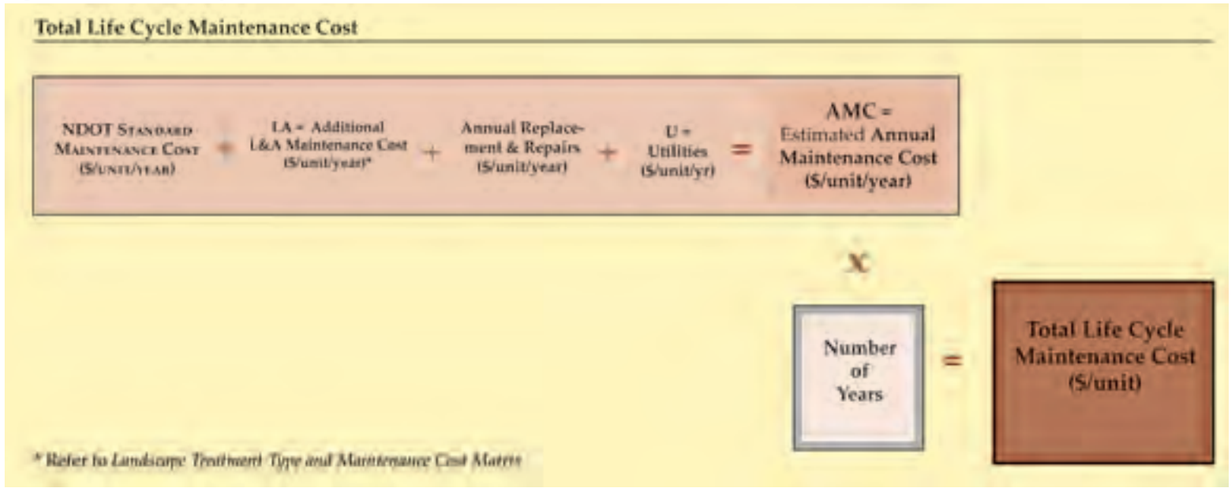


Figure 51 - Maintenance Costs for Landscape Treatment Types

Treatment Type		Hardscape: Standard	Hardscape: Accentuated	Hardscape: Focal	Hardscape: Landmark
Softscape	Ground Treatment	High: $4,655.11 Median: $655.70 Low: $520.00	High: $2,383.19 Low: $1,524.00	$588.00 (based on one project, Cedar City)	Not Available
	Native Plant Revegetation	$720.00*	$1,676.40*	$650.00*	Not Available*
	Enhanced Native	$1,201.12 (based on one project only)	$1,089.87 (based on one project only)	Entire Rest Area: High: $549,200.00 Low: $29,374.00	Welcome Center Memorial Pt. Cost not available
	Regionally Adapted	High: $15,840.00 Median: $3,116.88 Low: $673.02	High: $15,242.45 Median: $5,445.00 Low: $1,448.67	$3,054.55 (based on one project only)	Not Available
	Regional Ornamental	High: $11,775.11 Median: $7,200.00 Low: $433.33	High: $8,500.00 Median: $3,425.74 Low: $2,279.59	$3,005.00 (based on one project only)	$197,846.36 (based on one project only)
	Turf	High: $12,325.46 Median: $6,057.00 Low: $1,529.79	$13,178.57 (based on one project only)	High: $10,363.13 Low: $3,135.00 (based on two projects, only)	High: $9,214.70 Median: $8,391.49 Low: $3,325.82

High: Single project with highest cost
Median: Distribution of projects between high and low cost.
Low: Single project with lowest cost.

All entries are per acre annual costs unless otherwise noted.

* Natural Revegetation costs are assumed to be 10% more than Ground Treatment categories costs.

All entries are planning level estimates based on limited available data.

NOTE: Utilities and Repair & Replacement are not included in numbe

* Prepared by UNLV Landscape Architecture and Planning Research Office

(1) *Partnerships with agencies such as the BLM and USFS, as well as local communities and governing agencies enhance the ability to manage the corridor's scenic quality and maintain the open character along a highway.*

SECTION TWO: Implementation

POTENTIAL FUNDING OPPORTUNITIES

Many opportunities exist to provide funding for the implementation of the corridor projects. Features described as standard will be undertaken by NDOT as new construction, capacity improvements, and replacement of facilities occurs. Upgrades to the standard landscape and aesthetic features will be considered as new highway construction occurs. Funding for new landscape and aesthetic projects associated with the state's highway program will be provided by State and Federal sources. Up to 3% of the total project construction cost may be allocated for landscape and aesthetic improvements associated with all new construction and capacity improvements.

When a landscape and aesthetics project can significantly influence an adjacent community or area, the community may choose to be involved in the process, and participate. The matching funds program provides matching funds up to 50% of the cost for specific community projects. In-kind services, State, and Federal monies may be used for the community match.

Additionally, communities may request enhanced levels of landscape and aesthetic treatments. Capital cost and maintenance cost-sharing agreements with NDOT are required. Communities may also require that developers with properties located directly adjacent to the NDOT right-of-way follow the Corridor Plan recommendations to improve their areas.

Banking landscape and aesthetic project funds is encouraged. In so doing, NDOT can shift landscape and aesthetics money to priority areas needing landscape and aesthetic treatment. The capacity to re-allocate funds allows NDOT to broadly manage landscape and aesthetics on a corridor-wide basis.

Facilities such as rest area and view pull-offs will require NDOT funding. However, funding partnerships with other agencies and organizations are encouraged. Other partnership opportunities include the development of the Statewide Place Name Sign Program and Audio Interpretation Program. With these two programs promoting statewide tourism, a partnership between NDOT and Nevada Commission on Tourism (NCOT) could succeed. Private sector partners, including the Nevada Mining Association and the Nevada Ranchers Association, could also be enlisted.

A Main Street Program in Nevada could assist numerous communities in downtown beautification and economic development efforts. This program could be anchored at the state level, with an organization such as the Nevada Commission on Economic Development. Funding could be provided by community chambers of commerce or other direct sources.

Project and programs described in the Corridor Plan are outlined in figure 52 along with opportunities for potential partnerships, suggested lead agency, and potential funding sources. Counties, cities, agencies, and other organizations should be familiar with the Corridor Plan and coordinate community plans, master plans, and other governing documents in order to provide an integrated approach towards achieving the vision and goals set forth. Active participation and review of the Corridor Plan, coordinated with a review of other community documents, will increase the potential for action and success.

Figure 52 - Potential Funding Opportunities

Projects and Programs	Lead Agency	Coordinating Agency	Possible Funding Sources
Community Gateways	Community	NDOT	Enhancement Fund, Community Match
Upgrade Downtown Streetscape	Community	NDOT	Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction
Upgrade Suburban Streetscape	Community (with Developer support)	NDOT	Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction
Upgrade Rural Streetscape	Community (with Developer support)	NDOT	Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction
Pedestrian Crossings	NDOT	Community	Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction, Developers building adjacent the ROW
Standard Sidewalk	NDOT	Community	NDOT funding
Enhanced Sidewalk	Community	NDOT	Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction, Developers building adjacent the ROW
Street Trees and Planting Strips	Community	NDOT, NDF	Enhancement Fund, Community Match, Developers building adjacent the ROW, NDF plant supply
Community Lighting	Community	NDOT	Enhancement Fund, Community Match, Developers building adjacent the ROW
Community Rest Areas	Community	NDOT	Enhancement Fund, Community Match
Community Environmental Graphics	Community	NCOT	Enhancement Fund, Community Match
Statewide Gateways	NDOT	County and Communities	Enhancement Fund, NDOT funding sources
Roadside Services	NDOT	NDSP	NDOT funding sources
Statewide Place Recognition Sign Program	NDOT	NCOT	NDOT funding sources, NCOT grant
Audio Interpretation Program	NDOT	NCOT	NDOT funding sources, NCOT grant
Transportation Art	Community	NDOT	Enhancement Fund
Color Palette Retrofit of Existing Facilities	NDOT	Community	Enhancement Fund, Community Match
Non-Motorized Transportation Systems	Community	NDOT	Landscape and Aesthetics up to 3% for new construction, SAFETEA-LU
Standard Highway Facilities	NDOT		Landscape and Aesthetics up to 3% for new construction
Enhancements to Highway Facilities above what the 3% would Achieve	NDOT	Community	Enhancement Fund, Community Match, Developers building adjacent the ROW
Wildlife Crossings and Protection	NDOT	NDW	Landscape and Aesthetics up to 3% for new construction, NDW grant
Main Street Approach	Community	NDOT, Nevada Commission on Economic Development	Consortium of Communities, Nevada Commission on Economic Development grant
Native Wildflower Program	NDOT		Surface Transportation and Uniform Relocation Assistance Act, Landscape and Aesthetics up to 3% for new construction
Anti-littering Campaign	NDOT	Communities	NDOT funding
Scenic Highway Designation	NDOT		NDOT funding
Rest Area and Shuttle System in the Tahoe Basin	NDOT	NDSP, USFS, TRPA	Southern Nevada Land Planning Management Act

NDF – Nevada Division of Forestry
NDSP – Nevada Division of State Parks
NCOT – Nevada Commission on Tourism
NDW – Nevada Division of Wildlife
USFS – United States Forest Service
TRPA – Tahoe Regional Planning Agency

SECTION THREE: Priorities

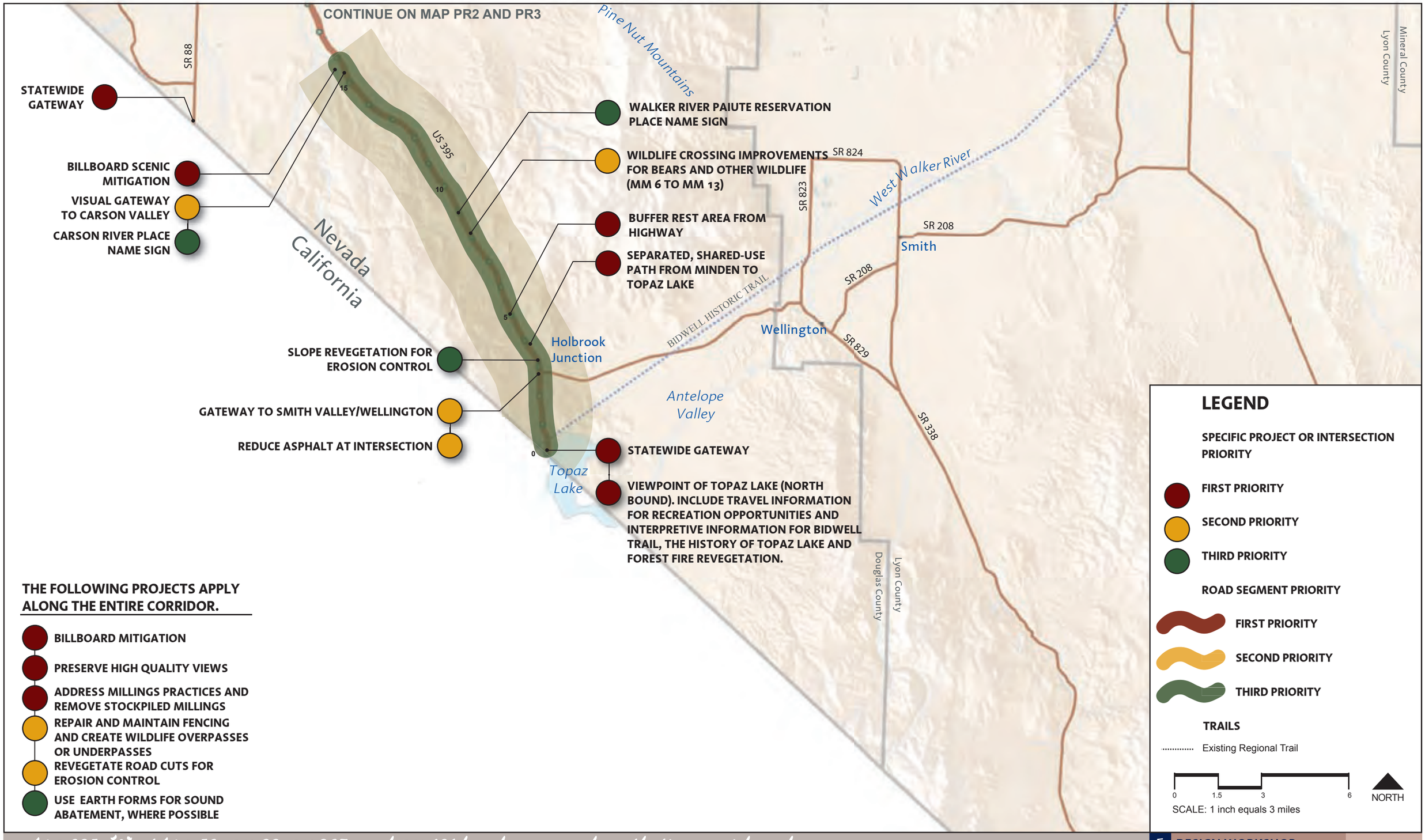
This section describes priority levels for projects within the landscape design segments. The priority levels are based on current capital improvements, as well as landscape and aesthetics planning. They are intended to act as a guide and represent those projects the Corridor Planning team recommends as having the greatest potential impact on the aesthetics of the entire corridor. The priorities identified in this chapter are subject to change according to the availability of funds for individual project improvements. Capital projects are significantly influenced by the availability of funding.

First priority is given to highly visible and identifiable projects and sections of road, areas of significant and immediate quality, and projects that are currently in progress. Second priority applies to projects that will provide additional benefits and aesthetics as part of the long range plan. Third priority is given to areas that currently display a reasonable level of aesthetic quality and, upon enhancement, will complete the landscape and aesthetics program for their particular Landscape Design Segment. General comments received from the public and TRC members influenced the designation of priorities.

The following activities have been selected as high priorities because of the immediate and significant impact they will have on the overall aesthetics and sense of place for the entire corridor.

- Enhancing the community and highway compatibility.
- Providing flexibility for streetscape improvements within urban areas.
- Retrofitting existing structures and hardscape elements through painting/staining. Creating a unified highway system using color and other features represents a major step towards place-making.
- Improving the roadway features in the Lake of the Sky Design Segment. The roadways within, and entries into, the Tahoe Basin represent areas of elevated visibility and importance.

Wildlife movement corridors are an important component of the corridor environment. Recommendations to analyze wildlife corridor movement and provide improved crossing structures are listed as medium priority due to the large capital cost. However, a few specific crossing areas are designated as first priority due to current crossing use and the importance of providing wildlife with safe and contiguous habitat connections. Community gateway establishment is noted as a second priority unless a project is underway because many communities have existing entry signage.



THE FOLLOWING PROJECTS APPLY ALONG THE ENTIRE CORRIDOR.

- BILLBOARD MITIGATION
- PRESERVE HIGH QUALITY VIEWS
- ADDRESS MILLINGS PRACTICES AND REMOVE STOCKPILED MILLINGS
- REPAIR AND MAINTAIN FENCING AND CREATE WILDLIFE OVERPASSES OR UNDERPASSES
- REVEGETATE ROAD CUTS FOR EROSION CONTROL
- USE EARTH FORMS FOR SOUND ABATEMENT, WHERE POSSIBLE

LEGEND

SPECIFIC PROJECT OR INTERSECTION PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

ROAD SEGMENT PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

TRAILS

- Existing Regional Trail

0 1.5 3 6

SCALE: 1 inch equals 3 miles

NORTH

GREAT BASIN FOREST – PRIORITY PROJECTS

US 395: TOPAZ LAKE TO DOUGLAS CO. MM 16

CONSULTANT TEAM
DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill

THE FOLLOWING PROJECTS APPLY ALONG THE ENTIRE CORRIDOR.

- BILLBOARD MITIGATION
- PRESERVE HIGH QUALITY VIEWS
- ADDRESS MILLINGS PRACTICES AND REMOVE STOCKPILED MILLINGS
- REPAIR AND MAINTAIN FENCING AND CREATE WILDLIFE OVERPASSES OR UNDERPASSES
- REVEGETATE ROAD CUTS FOR EROSION CONTROL
- USE EARTH FORMS FOR SOUND ABATEMENT, WHERE POSSIBLE

LEGEND

SPECIFIC PROJECT OR INTERSECTION PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

ROAD SEGMENT PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

TRAILS

- Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

CONTINUE ON MAP PR4

- INVERTED SIPHON PLACE NAME SIGN

CARSON CITY COMMUNITY

- COMMUNITY GATEWAYS (3)
- PEDESTRIAN CROSSING ENHANCEMENTS
- COORDINATE STREETSCAPE PLANTINGS WITH URBAN FORESTRY PROGRAM
- DEDICATED BIKE LANE
- STATE CAPITAL COMPLEX INTERPRETATION

MINDEN/GARDNERVILLE COMMUNITY

- COMMUNITY GATEWAYS (PER COMMUNITY PLANS)
- PEDESTRIAN CROSSING ENHANCEMENTS
- STREETSCAPE AND PLANTINGS
- DEDICATED BIKE LANE
- MULTI-USE TRAIL CONNECTIONS

- ROCK POINT MILL PLACE NAME SIGN

DAYTON COMMUNITY

- PEDESTRIAN CROSSINGS
- STREETSCAPE AND PLANTINGS
- INCORPORATE BIKE LANES
- DAYTON COMMUNITY GATEWAYS (2)
- OLD DOWNTOWN SIGNAGE
- PONY EXPRESS AND VIRGINIA CITY PLACE NAME SIGNS

- WILD HORSE CROSSING
- REPLACE GLARE DEFLECTORS
- PLACE NAME SIGNS FOR CALIFORNIA HUMBOLDT AND PONY EXPRESS HISTORIC TRAILS
- GATEWAY TO VIRGINIA CITY AND THE COMSTOCK
- V&T HISTORIC RAILROAD CROSSING PLACE NAME SIGN
- BIKE/PEDESTRIAN LINKAGES
- GATEWAY TO LAKE TAHOE
- INTERSECTION ENHANCEMENTS
- VISUAL GATEWAY TO CARSON VALLEY
- CONNECT BIKE TRAILS FROM CARSON CITY TO MINDEN
- GENOA AND MORMON STATION STATE PARK PLACE NAME SIGN
- US 395/SR 88 GATEWAY INTERSECTION. REDUCE PAVING, IMPROVE PEDESTRIAN CROSSINGS AND ENHANCE LANDSCAPING
- BIKE SYSTEM CONNECTIONS TO EXISTING ROUTES
- GATEWAY TO WASHOE TRIBE WITH INTERPRETIVE KIOSK

CONTINUE ON MAP PR1

MAP PR2

4.18

CONSULTANT TEAM

DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill

US 395, West US 50, SR 28, SR 207, and SR 431 landscape and aesthetics corridor plan

CAPITAL CROSSROADS – PRIORITY PROJECTS

US 395: CARSON VALLEY, CARSON CITY, AND DAYTON

UNLV LANDSCAPE ARCHITECTURE & PLANNING RESEARCH

NEVADA DOT

LAKE OF THE SKY LANDSCAPE DESIGN SEGMENT
US 50, SR 28, SR 207, AND SR 431

- SHARED-USE PATH SYSTEM AROUND THE LAKE WITH REST AREAS
- CREATE COORDINATED SYSTEM OF BIKE TRAILS AND REST AREAS
- IMPROVE WILDLIFE CROSSINGS
- VISUAL QUALITY IMPROVEMENTS ACCORDING TO TRPA SCENIC IMPROVEMENT PROGRAM
- ROCK CUTS AND EROSION ENHANCEMENTS
- REMOVE GABION WALLS AND REPAIR ROCK CUT
- PROVIDE CONSOLIDATED TRAVEL INFORMATION WITH PARKING AND PULL-OFF LOCATIONS IDENTIFIED
- REMOVE BILLBOARDS AND UNDERGROUND UTILITY LINES
- REDUCE VISUAL CONTRAST OF BARRIER RAILS AND GUARD RAILS AND USE A CONSISTENT TREATMENT TYPE
- COMPLETE THE WOODEN MILE MARKER PROGRAM

COMMUNITY GATEWAY TO RENO

HUMBOLDT-TOIYABE NATIONAL FOREST AND GALENA CREEK REGIONAL PARK VISITOR CENTER PLACE NAME SIGN

WASHOE VALLEY AND TRUCKEE MEADOWS VIEWPOINT

CONSIDER PULL-OFF FOR INCLINE LAKES

VIEWPOINT OF LAKE TAHOE AND MT. ROSE (SOUTHBOUND LANE)

COMMUNITY GATEWAY TO CRYSTAL BAY

STATEWIDE GATEWAY

PROVIDE TRAILHEAD/CENTRAL PARKING AREA FOR SHUTTLE SYSTEM

SEPARATED SHARED-USE PATH CONNECTED TO A SERIES OF PARKING AREAS, REST AREAS AND COORDINATED BEACH SIGNAGE (CC MM 0 - WC MM 5)

CREATE WILDLIFE CROSSINGS AT MAJOR CANYONS AND REDUCE FILL UNDER ROADWAY (MM 0 - MM 7)

SHUTTLE SYSTEM PARK AND RIDE TO PROVIDE RECREATION POINTS ON SR 28. PARTNERSHIPS WITH STATE PARKS, TRPA AND RTC

SEPARATED SHARED-USE PATH AND DESIGNATED BIKE LANES ALONG US 50

ENHANCE SIGNAGE AND TRAFFIC ACCESS TO LOGAN SHOALS VIEWPOINT

ENHANCE CAVE ROCK TUNNEL ENTRY

PEDESTRIAN CONNECTION ENHANCEMENTS

PEDESTRIAN AMENITIES AND CROSSINGS

COORDINATE IMPROVEMENTS WITH CALTRANS AND THE HWY 50 PLAN

STREETSCAPE AND PLANTINGS

COMMUNITY GATEWAYS

PARTNERSHIP FOR IMPROVED TAHOE RIM TRAIL CROSSING AND PROVIDE SIGNAGE

SHUTTLE SYSTEM PARK AND RIDE FOR MOUNT ROSE AND TAHOE MEADOWS

PRESERVE VISUAL CHARACTER

RECONTOUR AND REVEGETATE BERMS

TAHOE RIM TRAIL PEDESTRIAN CROSSING (CONSIDER OVERPASS OPTIONS)

ENHANCE VIEWPOINT. PROVIDE SIGNAGE PRIOR TO PULL-OFF AND INCLUDE INTERPRETIVE INFORMATION OF RAILROAD, FLUMES, AND TIMBER HARVESTING

CARSON VALLEY VIEWPOINT

WILDLIFE CROSSING AT MM 7.8, 9 AND 10.5

TRAVEL INFORMATION AT PARK AND RIDE

AESTHETIC ENHANCEMENTS

CONTINUE ON MAP PR4

CONTINUE ON MAP PR1

Mount Rose
Incline Village
Crystal Bay
Franktown
Washoe City
Pleasant Valley
New Washoe City
Washoe County
Storey County
VIRGINIA CITY
Gold Hill
Sutro
Lyon County
Silver City
DAYTON
Flowery Range
Stagecoach
Carson River
Washoe Lake
Carson Range
Lakeview
CARSON CITY
Empire
New Empire
Washoe County
Carson City
Lake Tahoe
Glenbrook
Round Hill
Zephyr Cove
Stateline
Genoa
Minden
Gardnerville
Douglas County
Nevada
California
SR 431
SR 28
SR 207
SR 341
SR 88
US 50
US 395
TAHOE RIM TRAIL
PONY EXPRESS HISTORIC TRAIL
CALIFORNIA HUMBOLDT HISTORIC TRAIL

LEGEND

SPECIFIC PROJECT OR INTERSECTION PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

ROAD SEGMENT PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

TRAILS

- Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

LAKE OF THE SKY – PRIORITY PROJECTS
LAKE TAHOE BASIN

CONSULTANT TEAM
DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2MHill

THE FOLLOWING LIST REPRESENTS THE PRIORITY OF INTERCHANGE RETROFITS ALONG US 395.

FIRST PRIORITIES
- I-580/SR 431
- PLUMB LANE
- MILL
- I-80/US 395

SECOND PRIORITIES
- SOUTH VIRGINIA STREET
- NEIL/MEADOWOOD
- MOANA
- ODDIE
- NORTH MCCARRAN
- PARR/DANDINI
- STEAD

THIRD PRIORITIES
- DAMONTE RANCH
- SOUTH MEADOWS PARKWAY
- GLENDALE
- PANTHER
- GOLDEN VALLEY
- LEMMON
- RED ROCK
- BORDER TOWN
- COLD SPRINGS
- EAST LAKE
- BELLEVUE
- I-580/US 395

LEGEND

SPECIFIC PROJECT OR INTERSECTION PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

ROAD SEGMENT PRIORITY

- FIRST PRIORITY
- SECOND PRIORITY
- THIRD PRIORITY

TRAILS

- Existing Regional Trail

0 2 4 8

SCALE: 1 inch equals 4 miles

NORTH

STATEWIDE GATEWAY

PRESERVE VIEWS OF WHITE LAKE

STEAD AIR FORCE BASE PLACE NAME SIGN

RENO VISUAL GATEWAY AT PARR/DANDINI

N. MCCARRAN INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS

NEIL/MEADOWOOD INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS

SOUTH VIRGINIA STREET INTERCHANGE - BRIDGE AESTHETICS ENHANCMENTS

I-580 INTERCHANGE - TAHOE RECREATIONAL GATEWAY

HISTORIC VIRGINIA CITY TRAVEL INFORMATION

MT. ROSE SCENIC BYWAY DESIGNATION SIGN ON SR 431

SLIDE MOUNTAIN PLACE NAME SIGN

REPAINT/STAIN BELLEVUE BRIDGE

CONNECT FRANKTOWN BIKE LOOP TO CARSON CITY

UNDERPASS FOR BIKE TRAIL CONNECTION

OVERALL ROAD TREATMENT

- AESTHETICALLY RETROFIT BRIDGES, STRUCTURES AND SOUND WALLS
- REDUCE HIGH MAST LIGHTING TO IMPROVE VISUAL QUALITY
- COLOR MATCH MAINTENANCE PAINTING

THE FOLLOWING PROJECTS APPLY ALONG THE ENTIRE CORRIDOR.

- BILLBOARD MITIGATION
- PRESERVE HIGH QUALITY VIEWS
- ADDRESS MILLINGS PRACTICES AND REMOVE STOCKPILED MILLINGS
- REPAIR AND MAINTAIN FENCING AND CREATE WILDLIFE OVERPASSES OR UNDERPASSES
- REVEGETATE ROAD CUTS FOR EROSION CONTROL
- USE EARTH FORMS FOR SOUND ABATEMENT, WHERE POSSIBLE

I-80 INTERCHANGE (SEE I-80 CORRIDOR PLAN) - TRANSPORTATION ART, SOUND WALL AESTHETIC RETROFITS, BRIDGE AESTHETICS ENHANCEMENTS

DESIGNATE CONNECTION TO DOWNTOWN AT MILL ST.

PLUMB LANE INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS

US 395/SOUTH VIRGINIA INTERCHANGE - TRANSPORTATION ART, BRIDGE AESTHETICS ENHANCEMENTS

STONEHOUSE AND HOT SPRINGS PLACE NAME SIGN

ROADWAY IMPROVEMENTS FROM WASHOE LAKE TO SR 431

- RETROFIT THE HIGHWAY – UTILIZE TRAFFIC CALMING FEATURES
- SEPARATED SHARED-USE TRAIL

CONTINUE ON MAP PR2 and PR3

MAP PR4 4.20	CONSULTANT TEAM
DESIGN WORKSHOP PLACES Sand County Studios JW Zunino & Associates CH2MHill	

US 395, West US 50, SR 28, SR 207, and SR 431 landscape and aesthetics corridor plan

EDGE OF THE SIERRA – PRIORITY PROJECTS

RENO METROPOLITAN AREA

UNLV

NEVADA DOT

Conclusion

Conclusion

The Northern US 395, West US 50, SR 28, SR 207, and SR 431 Landscape and Aesthetics Corridor Plan represents a significant step in Nevada's renewed commitment to landscape and aesthetics as integral elements of the state's highway system. This document guides decisions and policies that affect the aesthetic quality of Nevada's highways on a corridor-wide basis down to the level of individual projects. It presents extensive research and analysis of the existing conditions of Nevada, its highway corridors, and its scenic natural landscapes. The Corridor Plan describes the composition of elements and programs that will be used to enhance the level of landscape and aesthetics across the state. Perhaps most importantly, the Corridor Plan sets the stage for the following discussions:

- Facilitation of community improvements
- Implementation strategies
- Cost evaluation/strategies
- Priorities and scheduling
- Visual preference evaluation

To accomplish an increased level of landscape and aesthetics for Nevada's highways, the Corridor Plan has detailed a new NDOT-standard level of treatment for capital projects. The new standard significantly enhances the basic level of aesthetics on all future projects.

The Corridor Plan is a public/private partnership initiative. The Plan provides the foundation for this unique initiative to build a comprehensive vision for the landscape and aesthetics of the corridor. The partnership policy, outlined in the NDOT *Landscape and Aesthetics Master Plan*, states the unique and exciting result of this process.

Many groups and agencies have reviewed and endorsed the Corridor Plan. Additionally, the planning process has received high recognition from various organizations. This is evidence the intent of this document to inspire and encourage context sensitive solutions will be realized. As a result, the landscape and aesthetics of Nevada's highway corridors will experience significant benefits in the years to come.

Highways can be perceived as edges or boundaries that separate city or landscape. Interchanges are seen as intersections, nodes, and gateways. These perceptions argue strongly for a design approach that recognizes cultural boundaries and deals with the landscape and aesthetic design of the highway as a corridor segment, rather than on an individual project basis.

Technical Appendix

TABLE of CONTENTS

SECTION ONE: Potential Community Funding Sources

STATE AND FEDERAL GRANT PROGRAMS

The sources and structure for funding sources within NDOT are described in the *Program Development Manual*. Numerous State and Federal funding programs exist for use by communities for highway and community improvements. The following list provides a summary of a few funding sources communities may consider as they develop projects. Additional funding opportunities are available when other issues are present, such as a brownfield site located along a highway, tribal land influences, and the presence of historic structures. A list of federal grants is also located at **http://www.grants.gov.**

Communities should review each grant and determine its applicability for a specific project. Separate projects addressing the same issue may be combined and submitted as a single grant application. Many programs overlap, and proponents may use a combination of the funding and organizational resources listed below, as well as others that might not be shown.

Nevada Grant Programs

Nevada Division of Forestry

Nevada Urban and Community Forestry Southern Region Grant Project and *Northern Nevada Urban and Community Forestry Grant Program*

Funds education and outreach related to the urban forest, including planning, management, restoration, and sustainability improvements. A tree planting component must be not more than 50% of the project.

http://www.forestry.nv.gov/docs/summary2_012204.pdf

http://www.forestry.nv.gov

Nevada Department of Cultural Affairs

Nevada Arts Council

Provides a quarterly grant program to assist artists, support exemplary art projects, and support a variety of other art related efforts.

http://dmla.clan.lib.nv.us/docs/arts/programs/grants/grantsfororgs.htm

NDEP – Nevada Brownfields

Agency provides access to funding for brownfield redevelopment. Administered through the US Environmental Protection Agency (EPA), the program allows communities to establish their own brownfields program by designating an area where redevelopment is to be targeted. Additional funds may be awarded for projects categorized as Demonstration Pilots and have a greenspace component. These monies can be accessed through the Brownfields Assessment Demonstration Pilots and Supplemental Assistance for Demonstration Pilots application processes.

http://www.ndep.nv.gov/bca/brownfld_2.htm

ARCO Foundation

Foundation grants are made in five program categories (education, community, arts and humanities, the environment, and public information). (213) 486-3342 or **www.arco.com/init/foundation/index2.html**

ArtsREACH

Provides modest grants to partnerships of cultural, business, social, government, civic, and religious organizations. ArtsREACH is a National Endowment for the Arts (NEA) pilot program designed to increase the level of direct NEA grant assistance to arts organizations in underserved areas.

http://arts.endow.gov

Clorox Company Foundation (Reno)

The Clorox Company Foundation is dedicated to improving the quality of life in communities where Clorox employees live and work. The Foundation makes grants, mobilizes employee volunteers, and works with community leaders and other funders.

http://www.thecloroxcompany.com/community/index.html

Grantmakers in Nevada

Lists a variety of potential grants within Nevada.

http://www.fundsnetservices.com/nevada.htm

Federal Grant Programs

Federal Grant Program information can be found by accessing the Catalog of Federal Domestic Assistance (CFDA) at **www.cfda.gov**. The CFDA is a database of all Federal programs available to State and local governments; federally-recognized Indian tribal governments; domestic public, quasi-public, and private profit and nonprofit organizations and institutions; specialized groups; and individuals. The grant programs can be found by selecting the "Search for Assistance Program" on the CFDA website and entering the provided "Program Number".

USDA Rural Development

Provides services to further economic development in rural communities. Grants.gov provides information on more than 1,000 Federal government grant programs, totaling about $400 billion in funding each year. Rural communities can access funding opportunities at www.grants.gov and then type "rural" in the search section of the website.

http://www.rurdev.usda.gov/nv/offices/offices.htm

National Park Service

Tribal Preservation Program

Assists tribes in preserving historic properties. The grants provide much needed assistance to tribal communities interested in protecting their cultural heritage.

http://www.cr.nps.gov/hps/tribal/index.htm

Historic Preservation Fund

Provides funding support to State Historic Preservation Offices who administer state grants for historic preservation.

http://www.cr.nps.gov/hps/hpf/hpfquest.htm

US Department of Housing and Urban Development

Community Development

Provides a grant program to support community development.

http://www.hud.gov/local/nv/community/cdbg/index.cfm
http://www.hud.gov/grants/index.cfm

US Department of Agriculture

Business and Industrial Loans

Assists rural areas in obtaining quality loans for the purpose of improving the economic and environmental climate in rural communities including pollution abatement and control.

Search: Program Number 10.768

Intermediary Re-lending Program Loans

Provides loans for business facilities or community development in rural areas.

Search: Program Number 10.767

Empowerment Zones Program

Provides for the establishment of empowerment zones and enterprise communities in rural areas to stimulate the creation of new jobs, particularly for the disadvantaged and long-term unemployed, and to promote revitalization of economically distressed areas.

Search: Program Number 10.772

Rural Business Enterprise Grants

Facilitates the development of small and emerging private business, industry, and related employment for improving the economy in rural communities.

Search: Program Number 10.769

Small Business Innovation Research Grants

Provides monies to stimulate technological innovation in the private sector and strengthen the role of small businesses in meeting Federal research and development needs.

Search: Program Number 10.212

Fund for Rural America: Research, Education, and Extension Activities Grant Program

Supports unique, innovative, and high-impact research education, and extension projects to aid farmers, ranchers, and rural communities to address changes and challenges facing agriculture and rural communities as a result of fundamental reforms to Federal farm programs.

Search: Program Number 10.224

US Department of Commerce

Economic Adjustment Program Grants

Assists State and local interests design and implement strategies to adjust or bring about change to an economy.

Search: Program Number 11.307

Public Works and Development Facilities Grants:

Promotes long-term economic development and assists in the construction of public works and development facilities needed to initiate and support the creation or retention of permanent jobs in the private sector in areas experiencing substantial economic distress.

Search: Program Number 11.300

National Technical Assistance Program
Provides funds to 1) enlist the resources of designated university centers in promoting economic development, 2) support innovative economic development projects, 3) disseminate information and studies of economic development issues of national significance, and 4) finance feasibility studies and other projects leading to local economic development.
Search: Program Number 11.303

US Department of Defense
Community Economic Adjustment Funding:
Alleviates serious economic impacts that result from Defense program changes.
Search: Program Number 12.600

Community Economic Adjustment Planning Assistance
Responds to military base closures and realignments.
Search: Program Number 12.607

Department of Housing and Urban Development
Community Development
Awards grants to entitlement community grantees to carry out a wide range of community development activities directed toward revitalizing neighborhoods, economic development, and providing improved community facilities and services.
http://www.hud.gov/local/nv/community/cdbg/index.cfm

Rural Housing and Economic Development
Expands the supply of affordable housing and access to economic opportunities in rural areas.
Search: Program Number 14.250

US Department of Interior
Historic Preservation Fund
1) Provides matching grants to States for the identification, evaluation, and protection of historic properties; 2) provides matching grants to States to expand the National Register of Historic Places, assist in carrying out historic preservation activities; and 3) provides grants to Indian Tribes and Alaskan Native Corporations to preserve their culture.
Search: Program Number15.904.

Rivers, Trails and Conservation Assistance
Provides staff assistance to support partnerships between government and citizens to increase the number of rivers and landscapes protected and trails established nationwide.
Search: Program Number 15.921

Federal Highway Administration (FHWA)
Scenic Byways Discretionary Program
Provides funds to accomplish projects on national scenic byways, all American roads, America's byways, state scenic byways, and Indian tribe scenic byways. Selected projects recognize state priorities and should benefit the byway traveler's experience, whether it will help manage the intrinsic qualities that shape the byway's story, interpret the story for visitors, or improve facilities along the byway used by visitors.
http://www.bywaysonline.org/grants/

Ferry Boats Discretionary Program
Provided funding for water-taxi studies as well as construction of facilities.
http://www.fhwa.dot.gov/discretionary/fbmemos.htm

Public Lands Highways Discretionary Program
Provides funds to improve access to and within the nation's federal lands. Monies have been used for adjacent vehicular parking areas; interpretive signage; acquisition of necessary scenic easements and scenic or historic sites, provision for pedestrians and bicycles; construction and reconstruction of roadside rest areas (including sanitary and water facilities), transit facilities, and appropriate public road facilities such as visitor centers as determined by the Secretary. The replacement of the federally owned bridge over the Hoover Dam in the Lake Mead National Recreation Area between Nevada and Arizona was funded through the program.
http://www.fhwa.dot.gov/discretionary/plhcurrsola3.htm

National Recreational Trails Fund
Funds trails and trail-related projects such as urban trails, maintenance, restoration, easement acquisition, and trail-side and trail-head facilities.
http://www.off-road.com/4x4web/land/nrtfaqa.html
http://environment.fhwa.dot.gov/ecological/eco_app_b.asp

SECTION TWO: Mapping Ecosystems Along Nevada Highways

MAPPING ECOSYSTEMS ALONG NEVADA HIGHWAYS AND THE DEVELOPMENT OF SPECIFICATIONS FOR VEGETATION REMEDIATION

This report has been prepared by Dr. Paul T. Tueller, Professor in the Department of Environmental and Resource Sciences at UNR, Dick Post, Horticulture Specialist with University of Nevada Cooperative Extension (Emeritus) and Erin Noonan a graduate student at UNR (now employed with the National Park Service at Point Reyes, California).

INTRODUCTION

This project was designed to inventory the major plant communities and general soil classification units along the various highways across the state, and to recommend The best procedures and management practices for vegetation remediation based on the appropriate ecosystems and soil types.

SALT DESERT SHRUB– Shadscale and Bailey's Greasewood Sites

Site Analysis

These sites are adjacent to many miles of highways in northern and central Nevada. This vegetation primarily follows the valley bottoms and usually accompanies many miles of relatively straight highways. The soils vary but can be neutral to somewhat strongly saline. They are generally saline to strongly saline over much of this vegetation type. Many of the soils are fairly sodic. The surface soils are often restrictive to good water penetration. Some of the soils are quite sandy, especially on sites supporting Bailey's greasewood. Many of the soils may have restrictive layers in the form of silica or calcium carbonate duripans.

The floristics of this vegetation is quite simple. Only a few shrubby species are found associated with the shadscale and Bailey's greasewood. Some other common shrubs that might be present include green rabbitbrush, bud sage, whitesage (in some valleys), and spiny hopsage. Forbs are particularly wanting. They often consist of weeds such as mustards and halogeton, and annual grasses, such as cheatgrass. One important native forb is globe mallow. Perennial grasses include saltgrass, indian ricegrass and squirreltail.

Species Selection

Shrubs	lbs. seed/acre
1. Shadscale – *Atriplex confertifolia*	2.0
2. Fourwing saltbush – *Atriplex canescens*	2.0
3. Spiny hopsage – *Grayia spinosa*	1.0
4. Gardner saltbush – *Atriplex gardneri*	0.5
5. Prostrate summer cypress – *Kochia prostrata*	2.0
Grasses	
1. Saltgrass – *Distichillis spicatum*	2.0
2. Squirreltail – *Elymus elymoides*	0.5
3. Creeping wildrye – *Elymus triticoides*	1.0
4. Galleta grass – *Hilaria jamesii*	0.5

5.	Indian ricegrass – *achnatherum hymenoides*	2.0
6.	Siberian wheatgrass – *Agropyron sibericum*	1.0
7.	Alkali sacaton – *Sporobolus airoides*	1.0

Forbs

1.	Globe mallow – *Spheralcea coccine*	1.0
2.	Yellow sweet clover – *Melilotis officinalis*	2.0
3.	Evening primrose – *Oenothera* spp.	0.5
	Total 20.0 lbs./acre	

In developing appropriate seed mixes, the cost of some of the less common seed may be prohibitive. This must, of course, be taken into consideration as the seed mixture is formulated and the total costs for the seed mixture is determined. In our mixtures we have, in some cases, used lower seeding rates because some of these less available seeds would be much more costly. However, their potential importance on these landscapes suggests that they be included in the mixtures.

Site/Soil Preparation

Because these sites are often very droughty, we would recommend the use of some kind of mulch. For establishment supplemental irrigation would be very helpful, but water often is not available. In some cases, where you wish to obtain new vegetation with a high success rate, it might then be feasible to provide water for one or more supplemental irrigations by hauling water to the site. Often when seeding in shadscale/Bailey's greasewood sites, the remediation specialist must be prepared to seed the entire area perhaps two years in a row particularly if no supplemental irrigation is used.

These sites often would be relatively low in many nutrients, particularly nitrogen, and would require a fertilizer of some sort, possibly applied with the supplemental irrigation. Since the seed sources might be devoid of mychorrizal fungi then an inoculum can be prescribed.

Revegetation Procedures

These sites may vary from rocky to loamy soils. If the site has few rocks, it might lend itself to seeding with a drill. Also, unless the berms are quite steep the terrain in this type of vegetation is generally flat and could be drilled with a rangeland drill or some other drill used for tough seeding.

SALT DESERT SHRUB - BLACK GREASEWOOD SITES

Site Analysis

These sites are found in valley bottoms and usually have alkaline and saline soils with heavy clay horizons. Sometimes they are impounded with water. The total number of species is generally low, and for many months the sites are very droughty. The dominant species is black greasewood (*Sarcobatus vermiculatus*) with only a few other species. Occasionally you will find mustard weeds (*Descurania* sp.), salt grass (*Distichlis spicata*), squirreltail grass (*Elymus elymoides*), and globe mallow. These soils hold onto soil moisture tenaciously because of the heavy clay horizons. The salinity or alkalinity may impact the kinds of species that can be seeded there.

Species Selection

Even though there are few native adapted species, attempts will be made to select common species found on such sites or species that have similar characteristics and requirements. Woody species (shrubs), grasses and forbs will be included in the specified mixtures. The species listed below are recommended for mixtures to be used on these sites.

Shrubs	lbs.seed/acre
1. Quail bush – *Atriplex lentiformi*	1.0
2. Rubber rabbitbrush – *Chrysothamnus nauseosus*	2.0
3. Greasewood – *Sarcobatus vermiculatus*	2.0
4. Kochia – *Kochia prostrata*	2.0
5. Fourwing saltbush – *Atriplex canescens*	2.0

Grasses

1. Alkali sacaton – *Sporobolus airoides*	1.0
2. Tall wheatgrass – *Agropyron elongatum*	2.0
3. Great Basin wildrye – *Leymus cenereus*	2.0
4. Salt grass – *Distichlis spicata*	1.0
5. Squirreltail – *Elymus elymoides*	0.5

Forbs

1.	Desert globe mallow – *Spaeralcea ambigua*	1.0
2.	Yellow sweet clover – *Melilotus officinalis*	1.0
3.	White evening primrose – *Oenothera pallida*	1.0
		Total 18.5 lbs./acre

Site and Soil Preparation

Importing topsoil may be necessary for initial establishment of these species. Screened soil from nearby material pits or the soil used for the road platform, 1/8 inch or less, would be suitable for topsoil. It is also suggested to apply 250 pounds/acre of horticulture sulfur to reduce the soil pH, making the site more conducive to establishment of the seed mixture. It might be possible to break up these heavy clays with a large chisel or other implement behind a tractor. It might be feasible to provide supplemental irrigation by sprinkling to assist in establishment. This, however, would be somewhat costly unless a water source was near by. It might be possible to bring water in by tanker-truck on a one-time basis. Also a nitrogen fertilizer, such as ammonium sulfate can be applied.

Revegetation Procedures

These areas tend to be relatively flat, and thus a drill might be used to place the mixture into the soil. However, the roadside berms might be too steep for this. In addition to the mixture of seeds, it might be very helpful to acquire some container-grown material of four wing saltbush and rubber rabbitbrush. Container-grown plants would require hand labor to place them in the relatively small areas to be revegetated. In order to reduce competition among the seeded species, it would be appropriate to place the container-grown plants apart from the seeded areas. In some cases different mixtures might be used to develop a pattern with grasses and forbs apart from areas seeded heavily with shrubs.

SAGEBRUSH SITES – LOWEST ELEVATION SITES WITH BIG SAGEBRUSH
Wyoming big sagebrush (Artemisia *tridentata var. wyomingensis)*, basin big sagebrush (*Artemisia tridentata tridentate)* and black sagebrush *(Artemisia nova.*

Site Analysis

The site is dominated by big sagebrush with a number of perennial grasses. Big sagebrush soils are often deep and relatively dark although they usually have little organic matter. The precipitation at the site is approximately 12 inches annually in the form of snow in winter and early spring. The goal of revegetation on disturbed sites will be to compete with noxious weeds, control erosion, and be fire resistance and aesthetically pleasing. In addition, it should not unduly attract wildlife. We have listed a preliminary set of procedures or specifications that could be used on such a site.

Species Selection

	Shrubs	lbs.seed/acre
1.	Big sagebrush – *Artemisia tridentata*	1.0
2.	Antelope bitterbrush – *Purshia tridentata*	1.0
3.	Desert peach – *Prunus andersonii*	1.0
4.	Green ephedra – *Ephedra viridis*	1.0
5.	Green rabbitbrush – *Chrysothamnus viscidiflorus*	1.0
6.	Four-wing saltbush – *Atriplex canescens*	1.0
7.	Skunkbush sumac – *Rhus trilobata*	1.0
8.	Winterfat – *Krascheninnikovia lanata*	1.0
	Grasses	
1.	Blue bunch wheat grass – *Pseudoroegneria spicata*	1.0
2.	Basin wildrye – *Leymus cinereus*	1.0
3.	Sandberg bluegrass – *Poa secunda*	0.5
4.	Big bluegrass – *Poa ampla*	1.0
5.	Indian ricegrass – *Achnatherum hymenoides*	1.0
6.	Desert needlegrass – *Achnatherum speciosum*	1.0
7.	Creeping wildrye – *Leymus triticoides*	1.0
8.	Great Basin wildrye – *Leymus cinereus*	1.0

Forbs

1.	Yellow sweet clover – *Melilotus officinalis*	0.5
2.	Small burnet – *Sanguisorba minor*	0.5
3.	Prairie flax – *Linum lewisii*	0.5
4.	Palmer's penstemon – *Penstemon palmeri*	0.5
5.	Evening primrose – *Oenothera lanceolifolia*	0.5
6.	Scarlet gilia – *Ipomopsis aggregat*	0.5
7.	Goldenrod – *Solidago spectabilis*	0.5
8.	Globe mallow – *Sphaeralcea coccinea*	0.5
9.	Firemaker penstemon – *Penstemon eatonii*	0.5
10.	Lupine – *Lupinus spp.*	0.5
11.	Vetch – *Vicia sp.*	0.5
12.	Alfalfa – *Medicago sativa*	0.5
		Total 21.5 lbs. seed/acre

Site/Soil Preparation

Site preparation may require contour development and/or terracing on steep slopes. The appropriate amounts of soil amendments such as fertilizer and mycorrhizal inoculums may be added to the soil. The combination of fertilizer with a drip irrigation system could be used to assure plant establishment. Additional soil preparation such as disking may be required.

Revegetation Procedures

On steeper sites, the slopes should be shaped to no steeper than 3-to-1. Possibly replace topsoil. The container-grown shrubs should be placed on terraced slopes. Drill at 0.57 pounds/1000 square feet. Broadcast a mixture of forb/grass/shrub seed. Placement and arrangement of seed and container-grown shrubs should be decided with the landscape architect. Apply a portable, one-acre to two-acre drip system to assure establishment of container-grown shrubs. Determine the appropriate number of emitters to irrigate a specific density of shrubs. If the site dictates, possibly add an appropriate fertilizer and mycorrhizal inoculums. A mulch applied to support seeding success should be stabilized with netting or tackifier. Mulch with 68.9 pounds/1000 square feet of straw material that is tacked to the ground with jute netting.

UPPER ELEVATION BIG SAGEBRUSH SITES (Primarily *Artemisia tridentata* var. *vaseyana*) and Low sagebrush (*Artemisia arbuscula* and *A. longiloba*)

Site Analysis

These sites have higher rainfall and often deeper soils, higher in organic matter. However, the growing season is often short. The soils will be variable. Precipitation amounts can vary from 10 inches to 20 inches, and the winters can be cold and long. Snow cover is variable but can be deep during some winters. As a general rule-of-thumb the transition between the low-elevation sagebrush sites and the mountain big sagebrush sites is at about 5800 feet. The vegetation is dominated with mountain big sagebrush (*Artemisia tridentata vaseyana*) except as one crosses over the ridges or passes. Here if a sagebrush taxa is dominant, it usually will be a low sagebrush such as *Artemisia arbuscula* and will have very shallow soils with heavy clay subsoil at about 8 inches to 10 inches. The big sagebrush sites will have a wider variety of perennial grasses and annual and perennial forbs than found in the lower elevation sagebrush sites.

Species Selection

An ideal mix of species should include a combination of a couple species of grass, shrubs, and forbs. It should be emphasized that all of these species do not need to be included in the species selection for vegetation remediation. The number of seeds per pound should be considered in the density of application since, their numbers vary widely. For instance, tall fescue has approximately 225,000 seeds per pounds, while bentgrass has a density of 6 million seeds per pound.

Grasses

		lbs. seed/acre
1.	Bluebunch wheatgrass or beardless bluebunch wheatgrass – *Agropyron spicatum*	1.0
2.	Idaho fescue – *Festuca idahoensis*	1.0
3.	Big/Sherman bluegrass – *Poa ampla*	0.5
4.	Smooth or mountain brome – *Bromus inermis/ Bromus marginatus*	1.0
5.	Pubescen wheatgrass – *Agropyron trichophorum*	1.0
6.	Creeping or Russian wildrye – *Leymus triticoides/ Leymus junceus*	1.0
7.	Thurber's Needlegrass – *Achnatherum thurberianum*	1.0

Forbs

1.	Palmer's penstemon/Firecracher penstemon – *Penstemon palmerii/Penstemon eatonii*	2.0
2.	Woolypod vetch – *Vicia dasycarpa*	0.5
3.	Indian paintbrush – *Castilleya spp*	0.5
4.	Lupine -*Lupinus spp*	1.0
5.	Blue flax -*Linum lewisii*	1.0
6.	Prickly poppy -*Argemone munita*	0.5
7.	Sunflower -*Helianthus annuus*	0.5

Shrubs

1.	Mormon tea, (green) – *Ephedra viridis*	1.0
2.	Douglas rabbit brush – *Chrysothamnus viscidiflorus*	1.0
3.	Mountain big sagebrush – *Artemisia tridentate*	1.0
4.	Bitterbrush – *Purshia tridentate*	1.0
5.	Purple sage – *Salvia dorii*	1.0
	Total	17.5 lbs./acre

Site and Soil Preparation

These sites may lend themselves well to the storage and replacement of topsoil. These soils, when not too rocky, can lend themselves to machine drilling, possibly proceeded by disking, to create a more favorable seedbed for initial establishment. Normally, they would not require fertilization, but this should be determined by soil tests taken at the site. The addition of organic matter would be beneficial for plant establishment. Often it may be necessary to assure establishment with the addition of nitrogen fertilizers, as determined by the soil samples.

Revegetation Procedures

Where feasible, the best procedure would be disking and drilling. In some cases, container-grown species spaced approximately 3-feet apart may be used in conjunction with drilling. Different shrub container species should be alternated at 3-foot spacing for purposes of landscape and aesthetic variety. Planting should occur in either the spring or fall. Planting from containers in the summer would require supplemental irrigation for the first season. Forbs and grasses should be drilled at a density of 20 pounds/acre. Mulches are important on these sites to assure establishment of drilled seed. Straw and other light-colored mulches will reduce the soil temperature during the summer months. An application rate of 2000-3000 pounds/acre of mulch is recommended to reduce erosion and cover seed (R-4 reclamation guide, p. 25). Mulches can be applied by hand on 3-to-1 or greater slopes. Steeper slopes will require a mechanical application of mulch.

PINYON/JUNIPER WOODLAND SITES

Site Analysis

Identify the naturally occurring vegetation as a possible means for assisting with species selection. Examine the vegetation maps and the soil polygons to further determine the natural vegetation. Examine the soils data to determine the natural physical and chemical conditions. This will lead to an analysis of the potential need for certain soil amendments, supplemental irrigation, and mulching to assure success. Examine the physical characteristics of the site such as precipitation, temperature, slope, aspect, and elevation. In some cases it may be necessary to examine the chemical and physical characteristics of the material to be revegetated.

Species Selection

Species selection for pinyon/juniper woodland sites will include species commonly found in the woodland. We will include primarily native species and a mixture of shrubs, grasses, and forbs. Among the forbs, we will include at least one leguminous species for possible nitrogen fixation. The species listed below are recommended for the mixture.

Shrubs	lbs. seeds/acre
1. Black sagebrush – *Artemisia nova*	1.0
2. Mountain big sagebush – *Artemisia tridentata* ***vaseyana***	2.0
3. Green rabbitbrush - *Chrysothamnus nauseosa*	2.0
4. Mormon tea - *Ephedra viridis*	1.0
5. Summercypress - *Kochia prostata*	2.0
6. Skunkbush sumac – *Rhus trilobata*	1.0

Grasses

1. Bluebunch wheatgrass – *Pseudoroegneria spicata*	1.0
2. Sandberg's bluegrass – *Poa sandbergii*	0.5
3. Smooth brome – *Bromus inermis*	1.0
4. Crested wheatgrass – *Agropyron cristatum*	2.0
5. Siberian wheatgrass – *Agropyron fragile*	2.0
6. Giant wild rye – Leymus glaucus	1.0

Forbs

1.	Palmer's penstemon – *Penstemon palmeri*	1.0
2.	Prarie flax – *Linium lewisii*	1.0
3.	Small burnet – *Sanguisorba minor*	1.0
4.	Lupine – *Lupinus spp.*	1.0
5.	Indian paintbrush – *Castilleya spp.*	1.0
6.	Sticky purple geranium – *Geranium viscosissimum*	1.0
	Total	21.5 lbs./acre

Site and Soil Preparation

For most pinyon/juniper sites we would not recommend supplemental irrigation. However, we would recommend that a fertilizer be applied. If the topsoil has been removed, the site analysis would likely lead to the appropriate recommendation for a fertilizer. Since many of these soils have sufficient phosphorous and potassium, we would recommend a formulation of 16-20-0 ammonium phosphate applied at 40 pound/acre. If the material is a homogenous mixture of various materials, a higher nitrogen fertilizer might be recommended. Also in this case a mycorrhizal inoculum would be recommended. Slopes over 3-to-1 would require terracing to help retain soil moisture and provide safe sites for seed. In some cases this would require hand labor.

Revegetation Procedures

For small areas, less than an acre, it would be feasible to hand-seed using a cyclone spreader. This would be followed by the application of mulch. We would recommend the spreading of straw by hand on the terraces and tacking the straw by spreading soil by hand or placing a jute netting over the mulched areas. In some cases we would recommend that a number of container-grown specimens be planted on the site to improve establishment and provide instantaneous landscaping and aesthetics. The container-grown material can be planted in concert with other species of shrubs and the suggested grasses and forbs. To reduce competition between the woody and herbaceous species, we would recommend planting shrubs separate from areas where grasses and forbs are seeded.

MOUNTAIN BRUSH SITES

Site Analysis

These sites are at higher elevations, mostly above 6,000 feet, as the highways cross mountain passes. The typical mountain brush vegetation supports some of the following dominant species: bitterbrush, mountain mahogany, snowberry, serviceberry, mountain big sagebrush, currant, gooseberry, elderberry and chokecherry. Soils are often higher in organic matter and may or may not be rocky. The soil chemistry normally would be neutral to slightly acid but not alkaline. Litter accumulation could be high. Often the road cuts are deep and steep. There may be a cut on one side and a fill on the other side. The cuts and fills can remove topsoil and/or cover it up. The organic matter would often be higher than most of the desert sites and similar to forested areas. The higher organic matter generally provides a greater abundance of nutrients.

Species Selection

Availability and costs will dictate what seed combination to use. We recommend 19 pounds/acre to 20 pounds/acre of a combination of seed from the species list below. Not all of these species should be used, but a combination of these is suggested.

	Shrubs	lbs. seeds /acre
1.	Serviceberry – *Amelanchier alnifolia*	1.0
2.	Mountain big sagebrush – *Artemisia tridentata*	0.5
3.	Chokecherry – *Prunus virginiana*	1.0
4.	Cliffrose – *Cowania stransburiana*(southern passes)	1.0
5.	Gambel's oak – *Quercus gambellii* (Eastern & S.eastern NV)	2.0
6.	Common snowberry – *Symphoricarpus albus*	1.0
7.	Three leaf sumac – *Rhus trilobata*	1.0
8.	Rubber rabbitbrush – *Chrysothamnus nauseosus*	0.5

Grasses

1.	Bluebunch wheatgrass – *Pseudoroegneria spicata*	1.0
2.	Big bluegrass – *Poa ampla*	1.5
3.	Smooth brome – *Bromus inermis*	1.0
4.	Mountain brome – *Bromus marginatus*	1.5
5.	Idaho fescue – *Poa festuca*	0.5
6.	Perennial rye grass – *Lolium perennee*	1.0
7.	Tall wheatgrass – *Agropyron longatum*	1.0
8.	Great Basin wildrye – *Leymus cinereus*	1.0

Forbs

1.	Palmer's penstemon – *Penstemon palmeri*	1.0
2.	Scarlet gilia – *Ipomopsis aggregata*	1.0
3.	Indian paint brush – *Castilleva* spp.	1.0
4.	Lupine – *Lupinus* spp.	1.0
5.	Wild geranium -*Geranium viscosissimum*	1.0
		Total 21.5lbs.seed/acre

Site and Soil Preparation

If slopes are steeper than 3-to-1, we recommend some terracing – either by hand or with a backhoe. Supplemental irrigation may not be necessary for these sites due to higher elevations correlated with more rainfall. Suggested fertilizer would require a formulation of 16-20-0 (16% nitrogen,20% phosphorous, and 0% potassium) applied at 40 pounds/acre. If seeding is done in the early fall or spring, we would not recommend supplemental irrigation. If the material is a homogenous mixture of various soils, possibly a higher nitrogen fertilizer would be recommended. However, this could be determined by site-specific soil tests. Mycorrhizal inoculums would most likely not be needed at these sites due to the high organic matter in these soils.

Revegetation procedures

On many of these sites, we would recommend container-grown shrubs of two or three species placed randomly across the disturbed landscapes to provide plant cover in a reasonable amount of time. Furthermore, container-grown species are conducive to successful establishment as many of these species require some sort of seed stratification for germination and are limited by short growing seasons. Seeding of grasses, forbs, and shrubs (not container-grown) along with mulch and tackifier, should precede the placement of the container-grown shrub species. We recommend the spreading of straw on terraces using a tackifier. Container grown shrub species should be planted in the spring to access more soil moisture.

FORESTED SITES: Forested areas are found primarily in western Nevada, in and around Lake Tahoe, and on a few sites in the spring range in southern Nevada.

Site Analysis

Forest sites and their soils are quite variable. They generally have a neutral to slightly acid reaction and may vary in depth. These sites are usually above 5,500 feet in elevation and are found on every aspect. In the Tahoe area many of the soils are granitic and have poor moisture holding capacity. Often the soils are quite stony, which would preclude revegetation practices involving machinery. Roadside areas can be quite steep requiring contouring or other practices. In the Tahoe Basin winter salting has negatively impacted many of the trees and other vegetation. Some roadside vegetation at higher elevations has been impacted by snow blowing equipment used to clear the highways. The widening, cutting, and filling involved in resurfacing the highways has also had a significant impact on roadside vegetation. The growing seasons are short and snowpack will influence remediation.

Species Selection

Trees and Shrubs. Normally we would not recommend trees close to the highway because of the problems mentioned above and safety concerns they pose by reducing visibility under some circumstances. Therefore our species lists include primarily native shrubs, grasses and forbs.

Shrubs	lbs. seed/acre
1. Snowbush – *Ceanothus velutinus*	1.0
2. Huckleberry oak – *Quercus vaccinifolia*	1.0
3. Serviceberry – *Amelanchier alnifolia*	1.0
4. Chokecherry – *Prunus melanocarpa*	1.0
5. Whitethorn – *Ceanothus integerrimus*	
6. Mountain mahoghany – *Cercocarpus ledifolius*	1.0
7. Manzanita – *Arctostaphylos patula*	
8. Squaw carpet – *Ceanothus prostrates*	
9. Mountain big sagebrush – *Artemisia tridentata vaseyana**	1.0
10. Bitterbrush – *Purshia tridentata**	

*Sagebrush and bitterbrush might be used at slightly lower, drier sites. Bitterbrush has been shown to be well adapted to very dry sites with low nutrients along road cuts. It should be noted, that many of these species do not establish well from seed, and it may be necessary on many sites to purchase and plant container-grown material.

Cost will readily dictate the quantity of species to be used in roadside revegetation procedures. Generally, we recommend planting one shrub species per square yard to allow shrub species to grow without competing against one another. The landscape architect could also suggest spacing for aesthetics and safety purposes.

Grasses

1.	California brome – *Bromus marginatus*	1.0
2.	Smooth brome – *Bromus inermis*	1.0
3.	Tall fescue – *Festuca arundinacea*	2.0
4.	Western wheatgrass – *Agropyron smithii*	1.0
5.	Pubescent wheatgrass – *Agropyron trichorophum*	2.0
6	Sherman big bluegrass – *Poa ampla*	2.0

Forbs

1.	Mules ear – *Wyethia mollis*	0.5
2.	Palmers penstemon – *Penstemon palmeri*	0.5
3.	Mountain lupine – *Lupinus alpestris*	0.5
4.	Columbine – *Aquilegia formosa*	0.5
5.	California bluebess – *Phacelia campanularia*	0.5
		Total 17.5 lbs.seed/acre

Several seed companies provide flower seed mixture for different kinds of habitats. For example, Flagstaff Native Plant and Seed (see appendix 2) has a mixture of flowers adapted to Pinus ponderosa sites that includes eight or ten species and is sold by the ounce. Such mixtures may be appropriate for broadcasting and covering with mulch on many of our forested and mountain sites. On these sites container-grown shrubs would be quite appropriate and so the amount of seed versus seedlings would vary. Approximately 10 pounds to 11 pounds/acre is suggested for broadcast seeding of grasses and forbs. This will be supplemented with grasses planted as ramets.

Site/Soil Preparation

Steep slopes will require contouring or furrowing. A mulch would be recommended, and straw would probably be the best mulch. It might be possible to obtain some local materials, such as mulch made from pine needles or pine cones. In addition wood chips and ground-up Christmas trees might be available to use as mulch material. The mulches would have to be tackified with jute netting or some other product. We would not recommend hydroseeding because of mixed reviews of success. A slow release nitrogen fertilizer might be appropriate at about ½ pound/thousand square feet. This might not be appropriate along stream environment zones because of potential lake and stream pollution.

Revegetation Procedures

Container-grown material would have to be hand planted. Container-grown grasses, such as ramets, could be used in conjunction with the broadcasted grass and wildflower seed for initial establishment. A mixture of wildflowers and grasses could be broadcasted in the interspaces between the container-grown shrub species at some spacing determined by the landscape architect. Mulch should be used to initially establish the container-grown species. Mulch may be applied after the broadcast seeding to protect the seed from wildlife and dehydration.

STREAM CROSSING SITES WITH GALLERY FORESTS OF POPLARS WITH WILLOW AND OTHER STREAMSIDE WOODY AND HERBACEOUS VEGETATION

Site Analysis

Unlike uplands areas, natural and human induced stream meander and channel downcutting result in continuous changes for these vegetation types. This vegetation is often associated with hydric soils. Riparian soils are often the result of streams, seeps, and springs and may not be dependent upon local precipitation. Soils tend to be more organic due to the long history of dense vegetation in these areas. These areas are not elevation dependent but rather dependent upon the presence of streams or riparian areas. Examples include the Humboldt, Truckee, Carson, Walker, Salmon, and the Muddy River drainages. Erosion and periodic flooding are some of the main challenges for the revegetation of these areas. Noxious weeds such as tall white top shown in the lower portion of the photo above often become a problem in these riparian areas.

Species Selection

Trees and Shrubs	lbs. seed/acre
1. Fremont cottonwood – *Populus fremontii*	0.0*
2. Mountain alder – *Alnus tenuifolia*	2.0
3. White alder – *Alnus incana*	2.0
4. Dogwood – *Cornus stolonifera*	1.0
5. Spirea – *Spirea densiflora*	1.0
6. Blue elderberry – *Sambucus coerulea*	1.0
7. Willow – *Salix boothii* (5700' – 9000')	0.0
8. Pacific willow – *Salix lasiandra* (5000'-7800')	0.0
9. Water willow or Seep willow – *Baccharis glutinosa* (*Mohave stream areas*)	1.0
10. Virgin's bower – *Clematis ligusticifolia*	1.0
Grasses	
1. Streambank wheatgrass – *Agropyron riparium*	1.0
2. Fowl bluegrass – *Poa palustris*	1.0
3. Nebraska sedge – *Carex nebraskensis*	1.0
4. Baltic rush – *Juncus Baltic*	1.0
5. Meadow barley – *Hordeum brachyantherum*	1.0
Forbs	
1. Nettleleaf giant hyssop – *Agastache urticifolia*	1.0
2. California false hellebore – *Veratrum californicum*	0.5
3. Small bluebells – *Mertensia longiflora*	0.5
4. Sticky purple geranium - *Geranium viscosissimum*	1.0
5. Columbian monkshood – *Aconitum columbianum*	1.0
6. Mule's ear – *Wyethia mollis*	1.0
Total	19.0 lbs.seed/acre

*Often these species are grown only from cuttings or container-grown plants. Usually seed is not available for poplars and willows.

Site and Soil Preparation

Generally these areas tend to be in moist sites, so adding organic matter to the existing soils may not be required. However, if fill soil is being used, the addition of organic matter is necessary. Irrigation for initial establishment may not be necessary for these soil types due to the prevalence of a high water table. The addition of nutrients will encourage faster establishment of plants. Topsoil should be stockpiled and reapplied after grading of these sites. Special care should be taken to minimize disturbing the existing plants in riparian zones. Soil samples should be taken at the site and compared to the undisturbed adjacent sites before amendments are applied.

Re-vegetation Procedures

In some cases, placement of topsoil on disturbed sites prior to seeding would be beneficial for seed germination. The application of amendments and fertilizers should be based on the results of the soil testing. Many of the shrubby plants, such as willow, for

example can be planted as unrooted cuttings to a depth of 6 inches. This is more practical and cost-effective than using container-grown stock. Seeds should be broadcast at the recommended rate for each species, raked lightly and mulched with a light application of composted bark. Evaluating the success of riparian revegetation efforts may be coordinated with other agencies such as the Bureau of Land Management and the Forest Service, who are actively monitoring these areas. Proper functioning condition (PFC) is one quick and qualitative method to assess stream health and vegetation.

Special attention should be given to areas where roads intersect with streams. Bridges and culverts have traditionally been inadequate at handling 150-year flood events. This results in massive sediment transport downstream, incising channels, and flooding of road surfaces. Planning for large culverts and bridge crossings that will not impede the flow of water during these events is essential in maintaining riparian health and road safety. The structural engineer should consult with a hydrologist on this issue.

SPECIFIC EXAMPLE SPECIFICATIONS

In this section we have taken three specific sites and described specifications that might be followed in order to improve the aesthetics, dust control and other problems on these sites.

Example #1. A sagebrush/grass site in Elko County

REVEGETATION OF A SAGEBRUSH/ GRASS SITE NEAR WELLS, NEVADA

Site Analysis

-The predominate vegetation on this site is big sagebrush and a variety of perennial grasses.

-The soils are fairly high in organic matter and the topsoil can be shallow with heavy clay subsoil.

-The precipitation varies from 10 inches to 20 inches, and much of it comes in the form of snow.

-Revegetation is usually successful, even though the growing season is short. Slopes of more then 3-to-1 are common.

Suggested Reclamation Steps

Step 1: Site Preparation

Shape site to slopes no steeper than 3-to-1.

Additional soil preparation such as disking may be required.

Step 2: Application of Soil amendments
Possibly replace topsoil. Possibly add an appropriate NPK (nitrogen, phosphorous, potassium) fertilizer and mycorrhizal inoculums.

Step 3: Seed Application
Use a drill and seed apply at a rate of 0.57 lbs/1000 sq. ft.

Step 4: Mulching
Apply mulch at a rate of 68.9 lbs/1000 sq. ft of straw material that is tacked to the ground with jute netting.

The Proposed Species Mixture

- Blue bunch wheatgrass – *Pseudoroegneria spicata*
- Basin wildrye – *Leymus cinereus*
- Sandberg bluegrass – *Poa secunda*
- Yellow sweet clover – *Melilotus officinalis*
- Small burnet – *Sanguisorba minor*
- Prairie flax – *Linum lewisii*
- Big sagebrush – *Artemisia tridentata*
- Rubber rabbitbrush – *Chrysothamnus nauseosus*

Example #2 **Robb Drive Interchange**

REVEGETATION PROTOCOL FOR ROBB DRIVE INTERCHANGE ON INTERSTATE 80

Site Analysis

-There are very steep slopes.

-The soils have several layers of chalk or diatomaceous earth.

-Portions of topsoil have been removed.

-Deficient soil development will require tests for additions of mycorrhizal inoculums and fertilizers.

-The site is subject to frequent, high winds.

-It is a relatively droughty site.

-The site has considerable weedy volunteer vegetation.

-There is considerable litter along fences.

-There is a narrow steep soil/earth divider between the on and off ramps.

-The cost of placing aesthetic vegetation on this site is likely to be expensive.

Suggested Reclamation Steps

Step 1: Site Preparation
Contour development and/or terracing on steep slopes.

Step 2: Application of Soil Amendments
Determine and apply appropriate amounts of fertilizer and mycorrhizal inoculums.
Combine fertilizers with drip irrigation systems to ensure plant establishment.

Step 3: Supplemental Irrigation
Apply a portable, 1-to-2 acre drip system to ensure development of container-grown shrubs.
Determine the appropriate number of emitters needed to irrigate a specific density of shrubs.

Step 4: Seeding/Planting of Native Plants
Cold-desert native shrubs will out-compete the existing undesirable weedy vegetation.
Place container-grown shrubs on terraced slopes.
Broadcast a mixture of forb/grass/shrub seed.
Step 5: Mulching
Stabilize mulch applied to support seeding success with netting, soil or another tackifier.
Step 6: Species Selection
Place mixture of native species listed below on the terraces.
Placement and arrangement of seed and container grown shrubs should be decided upon with the landscape architect.

Native Shrub Species

- Antelope bitterbrush – *Purshia tridentata*
- Desert peach – *Prunus andersonii*
- Green ephedra – *Ephedra viridis*
- Green rabbitbrush – *Chrysothamnus viscidiflorus*
- Big sagebrush – *Artemisia tridentata*
- Four-wing saltbush – *Atriplex canescens*
- Skunkbush sumac – *Rhus trilobata*

Native Grass Species

- Big bluegrass – *Poa ampla*
- Sandberg's bluegrass – *Poa secunda*
- Indian ricegrass – *Achnatherum hymenoides*
- Desert needlegrass – *Achnatherum speciosum*
- Creeping wildrye – *Leymus triticoides*
- Great Basin wildrye – *Leymus cinereus*

Native Forb Species

- Palmer's penstemon – Penstemon palmeri
- Evening primrose – *Oenothera tanacetifolia*
- Scarlet gilia – *Ipomopsis aggregata*
- Goldenrod – *Solidago spectabilis*
- Globemallow – *Sphaeralcea coccinea*
- Firemaker penstemon – *Penstemon eatonii*
- Lupine – *Lupinus spp.*
- Vetch – *Vicia spp.*
- Yellow sweet clover – *Melilotus officinalis*
- Alfalfa – *Medicago sativa*

ADDENDUM

DUST CONTROL

Soil productivity is affected by wind erosion in various ways. Areas of erosion and deposition on disturbed sites require more costly and less efficient soil management practices. Wind removes the smaller clay particles and organic matter from the soil while coarser materials are left behind. The continued loss of fine particles reduces soil quality. In shallow soils and soils with a hardpan layer, wind erosion also results in decreased root zone depth and water-holding capacity. Such changes may occur slowly and go unnoticed for many years. Bare soil can lead to dust that may be detrimental to safe driving and so must be considered. Many of the procedures discussed above will lead to good dust control. An number of emergency control methods are available to reduce damage from wind-induced soil erosion that already has started or is anticipated:

tillage to produce ridges and clods;
addition of a mulch;
irrigation to increase soil moisture;
temporary, artificial wind barriers;
soil additives or spray-on adhesives.

Choice of method, or combination of methods, depends on severity of erosion and the relationship to planned remediation procedures that have been prescribed for a site.

MONITORING

Since remediation efforts are somewhat costly, we would recommend that monitoring be done to assess the success and failure of these efforts. This can be done either on an ad hoc basis or by using a more objective methodology to appraise success and/or failure over time. We would strongly recommend that an objective and scientifically based monitoring protocol be adopted to examine revegetated sites for several years after the treatment to assess the success and/or failure of the efforts. A number of excellent monitoring procedures are available. As a minimum we would suggest a series of belt transects where the seeded and volunteer species are counted one, two and five years after the treatment. Each belt should be about 15 meters or 50 feet in length and 1 meter or 3 feet wide. The number of transects would depend upon the size of the disturbed/seeded area. Small areas may require only two or three transects while larger areas may require several more to provide a good statistically valid sample.

Within each belt, a plant density count should be accomplished, counting the number of individual plants per unit area. Density should be determined for both seeded

and volunteer species. The purpose for looking at the density of the volunteer native species is to have some idea of the level of competition with the seeded species. For some superabundant species, i.e., cheatgrass, it would be necessary to use a subsample to obtain a reliable but feasible density count. Plant vigor should also be measured. Vigor can be determined in several ways, e.g. measuring the height of grass culms, leader length in seeded shrubs, and the height and number of leaves of both grasses and forbs. For grasses, a simple count of the number of seed heads signifying reproductive culms would be appropriate. These determinations should be done for all species but especially for seeded species. This can be accomplished in several ways such as by counting the number of seed heads, measuring the height of the plant, and counting the number of new tillers for the perennial grasses. In many cases, a mixture will be used to revegetate and it would be valuable to know which of these species established best and exhibited the greatest vigor on a particular site.

NOXIOUS AND INVASIVE WEEDS

Table 4 is a list of noxious weeds that have been designated by the Nevada State Department of Agriculture. There are a few other species that can be classified as invasive weeds. These might include cheatgrass (*Bromus tectorum*) and halogeton (*Halogeton glomeratus*) in the north and red brome (*Bromus rubens*) and Mediterranean Grass (*Schismus barbatus*) in the south. In some areas species of mustard (*Descurainia spp.* and *Sysimbrium spp.*) are invasive and can contribute to fire hazard. Our assessment of these weeds along Nevada highways in summarized in Table 5 where we have listed those species that we encountered and the location of populations found along Nevada highways. It would be important for those involved in remediation to have a working knowledge of these plant species and be able to identify them in the field. We have examined the records of the State Department of Agriculture. They have documented the location of a number of weeds at specific points along the highways. We have these records and they are available in the offices of the State of Nevada Department of Agriculture, Division of Plant Industry.

Table 4 Nevada's noxious weeds listed by common name and scientific name as of 4/02

(alphabetical by common name)

Common Name	Scientific Name
African Rue	*Peganum harmala*
Austrian fieldcress	*Rorippa austriaca*
Austrian peaweed	*Sphaerophysa salsula / Swainsona salsula*
Black henbane	*Hyoscyamus niger*
Camelthorn	*Alhagi camelorum*
Common crupina	*Crupina vulgaris*
Dyer's woad	*Isatis tinctoria*
Eurasian water-milfoil	*Myriophyllum spicatum*
Goats rue	*Galega officinalis*
Hemlock: (a) Poison (b) Water	*Conium maculatum* *Cicuta maculata*
Horse-nettle: (a) Carolina (b) White	*Solanum carolinense* *Solanum elaeagnifolium*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Klamath weed	*Hypericum perforatum*
Knapweed: (a) Diffuse (b) Russian (c) Spotted (d) Squarrose	*Centaurea diffusa* *Acroptilon repens* *Centaurea maculosa* *Centaurea virgata Lam. Var. squarrose*
Leafy spurge	*Euphorbia esula*
Mayweed chamomile	*Anthemis cotula*
Mediterranean sage	*Salvia aethiopis*
Medusahead	*Taeniatherum caput-medusae*
Perennial pepperweed	*Lepidium latifolium*
Puncturevine	*Tribulus terrestris*
Purple loosestrife	*Lythrum salicaria, L. virgatum & cultivars*
Rush skeletonweed	*Chondrilla juncea*
Saltcedar (tamarisk)	*Tamarix ramosissima*
Sorghum species, perennial, including, but not limited to: (a) Johnson grass; (b) Sorghum alum; and (c) Perennial sweet sudan	
Sulfur cinquefoil	*Potentilla recta*
Thistle: (a) Canada (b) Musk (c) Scotch (d) Sow (e) Iberian star (f) Purple star (g) Yellow star	*Cirsium arvense* *Carduus nutans* *Onopordum acanthium* *Sonchus arvensis* *Centaurea iberica* *Centaurea calcitrapa* *Centaurea solstitialis*

Toadflax, Dalmatian	*Linaria dalmatica*
Toadflax, yellow	*Linaria vulgaris*
Whitetop or hoary cress	*Cardara draba*

(alphabetical by scientific name)

Scientific Name	Common Name
Acroptilon repens	Knapweed: (b) Russian
Alhagi camelorum	Camelthorn
Anthemis cotula	Mayweed chamomile
Cardaria draba	Whitetop or hoary cress
Carduus nutans	Thistle: (b) Musk
Centaurea calcitrapa	Thistle: (f) Purple star
Centaurea diffusa	Knapweed: (a) Diffuse
Centaurea iberica	Thistle: (e) Iberian star
Centaurea maculosa	Knapweed: (c) Spotted
Centaurea solstitialis	Thistle: (g) Yellow star
Centaurea virgata Lam. Var. squarrosa	Knapweed: (d) Squarrose
Chondrilla juncea	Rush skeletonweed
Cicuta maculata	Hemlock: (b) Water
Cirsium arvense	Thistle: (a) Canada
Conium maculatum	Hemlock: (a) Poison
Crupina vulgaris	Common crupina
Cynoglossum officinale	Houndstongue
Euphorbia esula	Leafy spurge
Galega officinalis	Goats rue
Hydrilla verticillata	Hydrilla
Hyoscyamus niger	Black henbane
Hypericum perforatum	Klamath weed
Isatis tinctoria	Dyer's woad
Lepidium latifolium	Perennial pepperweed
Linaria dalmatica	Toadflax, Dalmatian
Linaria vulgaris	Toadflax, yellow
Lythrum salicaria, L. virgatum & cultivars	Purple loosestrife
Myriophyllum spicatum	Eurasian water-milfoil
Onopordum acanthium	Thistle: (c) Scotch
Peganum harmala	African Rue
Potentilla recta	Sulfur cinquefoil
Rorippa austriaca	Austrian fieldcress
Salvia aethiopis	Mediterranean sage
Salanum carolinense	Horse-nettle: (a) Carolina
Solanum elaeagnifolium	Horse-nettle: (b) White
Sonchus arvensis	Thistle: (d) Sow
Sorghum species, perennial, including, but not limited to: (a) Johnson grass (b) Sorghum alum (c) Perennial sweet sudan	

Sphaerophysa salsula / Swainsona salsula	Austrian peaweed
Taeniatherum caput-medusae	Medusahead
Tamarix ramosissima	Saltcedar (tamarisk)
Tribulus terrestris	Punctureving

Attempts were made to record noxious and invasive weeds at mile markers visited along Nevada Highways as a part of this project. They are summarized as to location by Highway number and mile-marker and further summarized by numbers of occurrences along each highway (Table 5). This data is by no means complete and requires further inventory and monitoring. We also are aware of a number of other species as listed in this report that were not seen at the mile-markers that we visited.

WILDFIRE HAZARD

Wildfire is of considerable concern to all Nevadans. Unfortunately many sites along Nevada highways possess vegetation characteristics that have a high potential for wildfire ignition. In this report we are attempting to promote plants that do not constitute high fire hazard. Reference here must be made to the USDA Fire Effects Information System, which has useful information about most of the plants we have listed as possible revegetation species in this report. The FEIS can be accessed at the following Web site (http://www.fs.fed.us/database/feis/). Areas of high fire hazard have been identified on the vegetation maps. Those areas with the highest fire hazard are sites with pure stands of cheatgrass (*Bromus tectorum*), various sagebrush species with understories of cheatgrass, sites with other weeds such as mustards, and other areas where weeds have become commonplace along the rights-of-way. Cheatgrass is the most common fire species found along Nevada highways. These sites can generally be identified by examining the various vegetation polygons on the vegetation maps. Of course, under very dry conditions a wildfire can start anywhere. On especially high fire hazard sites, it may be wise to attempt to establish fire-resistant species along the highways. However, the cost of such endeavors might be prohibitive. It then becomes a situation where the users of the highway system must be informed about fire hazard. While the U. S. Forest Service and Bureau of Land Management are handling this, perhaps the NDOT could somehow add to the message, or work with them to help get the message out.

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Appendices

Appendix #1 Species selection

The species listed in the general ecosystem specifications are those that we selected from advertised seed sources. These species are thought to be adapted to the ecosystems in question. Species selection is of paramount importance and requires several steps. The first step is to evaluate the environment where the revegetation effort is to take place. This would require examining the soil and climatic conditions, topography and microtopography, and competing vegetation which may or may not be native species. Then someone familiar with the natural vegetation would begin the selection process. This would require going to various seed companies and determining just what seed is available and what might best fit into a mixture, considering cost and the desirability to include a species in the mixture. Some western seed companies are listed in Appendix #2. Others are available. For each site there would be a number of species that would be appropriate and desirable. For the major ecosystems along Nevada highways we have listed some of the appropriate species. After the selection process is complete, purchase and delivery can be requested. The species finally selected will be a function of availability and cost. In some cases the cost will preclude the inclusion of a species in the mixture even though it may be desirable. Also the cost and availability of container-grown plants must be carefully considered.

Seeding rates will vary from site to site depending upon the soil, the species used, the price and availability of the selected seed. A reasonable rule of thumb would be to seed at a rate of 19 pounds to 20 pounds/acre of pure live seed. In one of the appendices we have included information on how to convert the acre seeding rates to the weight of seed per square foot or per square meter. In addition, it is important to calculate, based on seed germination percentages, the pounds of bulk seed required to yield one pound of pure live seed. This information is also included in Appendix #3.

Appendix #2 Sources of native seeds

We have listed here only a few of numerous seed companies with emphasis on those who provide seed adapted to Nevada conditions. There certainly may be others that could be used.

Applewood Seed Co., 5310 Vivian Street, Dept. D., Arvada, CO 80002, Phone (303) 431 7333, Fax (303) 467 7886, e-mail applewoodseed@worldnet.att.net.

Comstock Seed, 917 Highway 88, Gardnerville, NV, 89410, Phone: (775) 746-3681, Fax: (775) 746-1701, e-mail ed@comstockseed.com. Web site www.gardenwatchdog.com.

Granite Seed, 1697 West 2100 North, Lehi, UT 84043. Phone: (801) 768-4422 Fax: (801)-768-5967, e-mail info@graniteseed.com. Web site www.graniteseed.com.

Lawyer Nursery, Inc., 950 Highway 200 West, Phone (800) 551 9875, Fax (406) 826 5700, e-mail trees@lawyernursery.com. Web site www.lawyernursery.com

Pacific Coast Seed, 6144-A Industrial Way, Livermore, CA 94550. Phone (925) 373 4417 Fax (925) 373 6855, e-mail pcseed@worldnet.net.

Plants of the Southwest On-Line, Aqua Fria Rt. 6, Box 11-A, Santa Fe, NM 87507. (800)-788-SEED (7333), Web-site www.plantsofthesouthwest.com.

Appendix #3 Bulk pure live seed requirements for seed with specified germination rates.

Percent Germination

% Purity	100	95	90	85	80	75	70	65	60	55	50	45	40
100	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.0	2.3	2.5
95	1.1	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.0	2.2	2.4	2.7
90	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.8	1.9	2.1	2.3	2.5	2.8
85	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.9	2.0	2.2	2.4	2.7	3.0
80	1.3	1.4	1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.3	2.5	2.8	3.2
75	1.4	1.5	1.5	1.6	1.7	1.8	2.0	2.1	2.3	2.5	2.7	3.0	3.4
70	1.5	1.6	1.6	1.7	1.8	2.0	2.1	2.2	2.4	2.6	2.9	3.2	3.6
65	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.4	2.6	2.8	3.1	3.5	3.9
60	1.7	1.8	1.9	2.0	2.1	2.2	2.4	2.6	2.8	3.1	3.4	3.8	4.2
55	1.9	2.0	2.1	2.2	2.3	2.5	2.6	2.8	3.1	3.4	3.7	4.1	4.6
50	2.0	2.2	2.3	2.4	2.5	2.7	2.9	3.1	3.4	3.7	4.0	4.5	5.0
45	2.3	2.4	2.5	2.7	2.8	3.0	3.2	3.5	3.8	4.1	4.5	5.0	5.6
40	2.5	2.7	2.8	3.0	3.2	3.4	3.6	3.9	4.2	4.6	5.0	5.6	6.3
35	2.9	3.1	3.2	3.4	3.6	3.9	4.1	4.4	4.8	5.7	5.8	6.4	7.2
30	3.4	3.6	3.8	4.0	4.2	4.5	4.8	5.2	5.6	6.1	6.7	7.5	8.4
25	4.0	4.3	4.5	4.8	5.0	5.4	5.8	6.2	6.7	7.3	8.0	8.9	10.0
20	5.0	5.3	5.6	5.9	6.3	6.7	7.2	7.7	8.4	9.1	10.0	11.2	12.5
15	6.7	7.1	7.5	7.9	8.4	8.9	9.6	10.3	11.2	12.2	13.4	14.9	16.7
10	10.0	10.6	11.2	11.8	12.5	13.4	14.3	15.4	16.7	18.2	20.0	22.3	25.0

Prepared by Craig Plummer, Soil Conservation Service

Appendix #4 Soil Samples

The following soil sampling suggestions were included from the "Objectives and Guidelines for Revegetation Success Under the Tahoe Bond Act" by Michael Hogan. These methods are necessary to assess the soil properties vital to the success of the establishment and vigor of plant species used in remediation efforts.

Glossary

AESTHETIC The visual appearance or look of an object, view, etc.

AMENITIES Aesthetic characteristics or other features of land development that increase its desirability or its marketability. Amenities may include such things as a unified building design, recreational facilities, security systems, views, landscaping, attractive site design, adjacent open space, or water bodies.

BALANCE Balance in design refers to the equilibrium or equality of visual attraction. Symmetrical balance is achieved when one side of the design is a mirror image of the other side. Asymmetrical balance uses different forms, colors and textures to obtain balance of visual attraction (Ingram, 2006).

BERM A raised and elongated area of earth intended to direct the flow of water, visually screen, redirect out-of-control vehicles, or reduce noise levels by shielding a receiver from the highway (AASHTO, 1991).

BUFFER A strip of land, compatible land uses, fence, or a border of trees, etc., between one use and another that somewhat mitigates negative impacts between uses. An area which provides a degree of insulation from certain highway or transportation effects on adjacent private property or protected natural resources and vice-versa (AASHTO, 1991).

CARRYING CAPACITY The number of individuals in a population that the resources of a habitat can support (Carrying Capacity, 2006).

COMMUNITY IDENTITY Community identity can be broadly defined as a community of interest or an emotional attachment or sense of belonging to a geographic area (Province of Nova Scotia, 2006).

COMMUNITY INTERFACE Community interface zones are characterized by lower travel speeds, frequent curb cuts, cross streets, traffic control devices, and increased pedestrian and other non-vehicular traffic. Adjacent land uses are typically commercial, but may include residential areas, schools, parks, and other civic uses.

COMMUNITY TRANSITION Community transition zones include stretches of highway between the center of a community and its undeveloped edges.

CONNECTIVITY In landscape ecology, the measure of the degree to which a matrix, a corridor, or a network is connected. The fewer the gaps or aberrations, the greater the connectivity.

CONTEXT SENSITIVE Consideration for how a proposed project will fit within its physical location and how it preserves the aesthetic, environment, and historic character of its surroundings.

CONSTRAINT A feature or condition of the built or natural environment that poses an obstacle to design, planning, or construction.

CONTOUR GRADING Transitioned and rounded grading. Moving the earth to form a shape or obtain a smoothness.

CORRIDOR A stretch of road or highway along with its associated facilities, adjacent land uses and visual character.

CORRIDOR PLAN A detailed specific plan that considers land use and transportation issues within a carefully organized, collaborative planning process between local governments, regional entities, and NDOT.

CULTURAL RESOURCES Cultural resources include buildings, landscapes, archeological sites, ethnographic resources, objects and documents, structures and districts. They provide information about people from the past and establish important connections to the present (NPS, 2006).

CURB EXTENSIONS A section of sidewalk extending into the roadway at an intersection or midblock crossing that reduces the crossing width for pedestrians and may help reduce traffic speeds (AASHTO, 2004).

DESIGN The process of taking ideas and producing a work of art. The drawings, models, or action of laying out structures, land activities, recreational facilities, vegetation, land cover, erosion protection, watering methods, etc.

DESIGN GUIDELINES A collection of helpful, interpretive, explanatory recommendations that are intended to provide a framework for design.

DESIGN OBJECTIVES Highway types are categorized according to the type of road, the speed and volume of travel, and the type of access. Design Objectives establish program elements and goals that should always be considered when addressing projects located along roads with similar characteristics.

DESIGN SPIRIT The intent or vision of the design. What the designer hopes to accomplish.

DESIGN THEME A unifying concept throughout the design. A design theme provides a sense of consistency and harmony because it is created by the repetition of forms and materials throughout the design (Booth, 1999).

DISTANCE ZONES Landscapes are subdivided into three distance zones based on relative visibility from travel routes or observation points. The three zones are: foreground, middleground, and background. The foreground zone includes areas where the viewer can perceive details of the landscape and typically extends up to a ¼ mile from the viewer. The middleground zone is located between ¼ mile and three miles from the viewer. The background is the area beyond the middleground extending to the horizon or limit of the area that is seen.

DROUGHT TOLERANCE A term often used to describe plants with low water requirements, the ability to withstand extended periods without water, or plants of a desert region.

FOCAL POINT A noticeable area or spot of attention, activity, or attraction. It may be such a spot because many paths, views, rays, walks, etc. converge or it is of a different color, texture, height, width, brightness, etc.

GABION A wire basket usually filled with stone which is used for erosion control/slope protection (AASHTO, 1991).

GATEWAY An entrance to a city, community, valley, or other large-scale space.

GROUND TREATMENT Treatment to disturbed ground such as seeded revegetation, pavement, stone mulch, etc.

HARDSCAPE The hard surface elements of a planned (designed) landscape that give it definition and style, including walks, driveways, walls, buildings, fences, and large ornamental or sculptural pieces.

INVASIVE A term used to describe plants that vigorously spread, propagate, have rapid unchecked growth, or invade a surrounding landscape area.

LANDMARK A conspicuous object on land that identifies a locality, or a designated preservation site, such as a building, monument, or landscape (AASHTO, 1991).

LANDSCAPE DESIGN SEGMENT Areas of similar character in which the same major design theme is applied.

LANDSCAPE TREATMENT TYPE Is the combination of varying intensities of softscape, structures, and hardscape.

LIGHT POLLUTION Light pollution is excess or obtrusive light. It obscures the night sky, interferes with astronomical observatories, wastes energy, and disrupts ecosystems.

MAINTENANCE COST The cost of maintaining a landscape. May be calculated annually or over the life of the project.

MANAGED LANDSCAPE CHARACTER Highway zone that comprises areas of current growth or planned growth at community edges along interstates or elevated highways. Can be adjacent to a variety of land uses varying from residential to industrial.

MANAGEMENT PLAN A written report of what the management of a project or property hopes to accomplish and how it intends to do so.

MASSING The grouping of plant materials.

SHARED-USE TRAIL A trail used by a combination of users, including pedestrians, roller bladers, horseback riders, bicyclists, etc.

NATIVE PLANTS An original species in a region, as distinguished from an invader, imported or cultured species (AASHTO, 1991).

NATURAL DRAINAGE The flow of water over undisturbed existing surface topography.

NATURAL FEATURES Conditions produced by nature such as surface land forms, geology, slopes, vegetation, water, drainage patterns, aquifers, recharge areas, climate, microclimate, floodplains, aquatic life, wildlife, views, and landscape ecological patterns of path, corridor, or matrix.

NATURAL SYSTEM Natural systems are any type of system found in nature that is not manmade. A key characteristic of a natural system is that we expect its operating rules (laws) to stay the same forever. Examples include ecosystems, physical, or biological systems.

NONSTRUCTURAL DRAINAGE DESIGN Drainage features using organic form and natural materials such as earth and rock vs. pipes and concrete.

NOXIOUS WEED Noxious weed means any species of plant which is, or is likely to be, detrimental or destructive and difficult to control or eradicate (NRS 555.005).

OPPORTUNITIES A feature or condition of the built or natural environment that provides an opportunity to design, planning, or construction.

ORIENTATION The direction a person, structure, or any upright feature with a face is directed, or facing.

ORNAMENTAL SOFTSCAPE Plantings used for decorative qualities.

PEDESTRIAN CONNECTIONS A public walkway not adjacent to a street. It may connect between two public streets, or between a public street and a public facility, such as a school or park. The standard pedestrian connection includes a sidewalk and landscaped buffers on each side (http://www.portlandonline.com/transportation/index.cfm?a=jjbci&c=dgbgh).

PERENNIAL A plant that persists or resprouts year to year for several or many years.

PLACE-BASED KNOWLEDGE Local knowledge. Knowledge gained from direct experience with a geographic location.

PLACE-MAKING Design solutions that use elements unique to the place or new elements to establish a specific style.

PLACE NAME SIGN A sign program that will provide clear and consistent direction from the corridors to scenic areas, points-of-interest, historical sites, and local attractions.

PLAN VIEW A drawing of an item, site, community, city, etc. as viewed from above.

PLANT COMMUNITY All of the plant species within a microclimate, habitat, or environment.

PLANT DIVERSITY The variety of plants found in a given area.

PRESERVE LANDSCAPE CHARACTER Highway zone that consists of agricultural uses or low-density residential and where the potential for significant future growth appears to be low.

PROGRAM A list or outline of the elements and requirements the design solution should incorporate (Booth, 1999).

PROPORTION Ratio of one thing to another (Putnam, 1996).

PUMICE WICK A natural way to harvest rainwater and control erosion. Pumice is extremely hygroscopic and absorbs several times its own weight in water. Trees and shrubs can be planted on either side of the wick. The roots take in water from the underground sponge and establish more quickly with much less supplemental water.

RECOVERY ZONE A clear recovery area free of hazards along the edge of the traveled roadway.

REGIONALLY ADAPTED PLANT SPECIES Species adapted to the soil conditions present on the site and in the region of the state where it will be grown.

REVEGETATION The replacement of plant material on a land area.

RHYTHM Rhythm is achieved when the elements of a design create a feeling of motion which leads the viewer's eye through or even beyond the designed area. Tools like color schemes, line and form can be repeated to attain rhythm in landscape design. Rhythm reduces confusion in the design (Ingram, 2006).

RIGHT-OF-WAY A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation or utility purposes (AASHTO, 1991).

RIPARIAN VEGETATION Plant communities occurring in association with any spring, lake, river, stream, creek, wash, arroyo, or other water body having banks and a bed through which water flows at least occasionally.

RIPRAP A layer of stones, broken concrete, or boulders placed on a slope to stabilize it against slope failure or erosion due to precipitation, natural drainage, waves, or wind.

ROAD SERVICES Areas along the highway that provide travelers with designated spaces to rest, interpret history and geography, and discover information about nearby activities and communities.

SCALE Spatial proportion. Scale refers to the size of an object or objects in relation to the surroundings. Size refers to definite measurements while scale describes the size relationship between adjacent objects (Ingram, 2006). Items at pedestrian scale may be much smaller than those at motor vehicle scale, where speeds are much faster.

SCENIC BYWAY Roads that are outstanding examples of scenic, historic, recreational, cultural, archeological and/or natural qualities (http:// www.upperdeleware.com/route97/whatis.cfm).

SCENIC DESIGNATION Highway zone that includes existing and proposed scenic byways where scenic, cultural, historic, recreational, and/or natural qualities dominate the highway landscape.

SCENIC EASEMENTS The right for a public agency or other group to use an owner's land for scenic enhancement, such as roadside landscaping or vista preservation, by restrictions on the area of the easement.

SCORING PATTERN A pattern cut or scratched into a surface.

SECTION DIAGRAM A drawing of a structure, landform, object, etc., as it would appear if cut by an imaginary plane, showing any internal portions and outer edges along the intersection.

SENSE OF ENTRY An introduction to a site or place. The impression of having arrived at a site or community.

SENSE OF PLACE The unique impressions, perceptions and memories along with physical representations of a site.

SENSE OF SCALE The feeling created or perceived when one is placed next to a very large object (such as a 50-story building 500 feet wide) or a small object (a toolshed six feet tall and eight feet wide).

SEQUENCE OF ARRIVAL Transition between spaces as a destination is approached.

SHADOW PATTERNS Shadow patterns in structures occur due to relief of planes and specific shadow lines and may be part of the ornament of the structure.

SHRUB A plant with many stems or much branching near the ground. It is woody and forms new wood from old wood each year.

SIGNAGE SYSTEM A coordinated system of visual communications in symbols, pictures, letters, drawing, photographs, or words whose function is to communicate directions, identifications, warnings, advertisements, etc. to passersby.

SITE ANALYSIS Observing, considering and evaluating the physical and man-made elements including the environmental, climatic, visual, cultural, historical and other factors relating to a particular location, corridor or region (AASHTO, 1991).

SITE CONTEXT Where the site in question is located in relation to the greater landscape. The surrounding area, whether city, town, wilderness, etc.

SITE PLAN A plan of a site showing the positions, size, and types of elements such as roads, drives, parking lots, play areas, land uses, or structures existing or proposed for a site. It may or may not show dimensions, contours, or have a legend.

SITE RISK ASSESSMENT The process of evaluating the adverse effects caused by a substance, activity, lifestyle, or natural phenomenon.

SITE SPECIFIC Peculiar to only one particular location (AASHTO, 1991).

SITE-SENSITIVE MATERIALS Materials with qualities that blend with the surroundings.

SOFTSCAPE The plantings used in a landscape.

SOFTSCAPE TREATMENT TYPE Softscape treatments are compositions of plant materials including trees, shrubs, perennials, grasses, and ground treatments.

SPIRIT OF PLACE The unique, distinctive and cherished aspects of a place, including both cultural components and physical aspects such as rivers, architectural style and views.

STREET TREE Trees that are tolerant of city conditions, including pollution, poor soils, low soil moisture, strong winds and soil compaction. Many communities have a list of accepted trees for their area.

STRUCTURES AND HARDSCAPES TREATMENT TYPE Varying levels of treatment for bridges, retaining walls, acoustic walls, pedestrian crossings, railings, barrier railings, lighting, and transportation art.

SUB-SEGMENT A portion of a landscape design segment where unique historic, cultural or environmental features may result in a slightly different interpretation of the overall design theme.

SUSTAINABILITY The ability to sustain ecological integrity, including human needs throughout generations. The ability to maintain with little deviation, with little waist, with renewable energy, etc.

SUSTAINABLE DESIGN Landscape designs that work with nature rather than against it (Booth, 1999).

TRACK WALKING A method of erosion and sediment control. Track walking with machinery up and down a slope provides grooves that will catch seed, fertilizer, mulch, and rainfall, and reduce runoff.

TRANSITION A gradual change. Transition can be obtained by the arrangement of objects with varying textures, forms, or sizes in a logical sequential order (Ingram, 2006).

TRANSPORTATION ART Artwork along a transportation route that enhances the travel experience and relates to the surrounding place, the unique culture and environment of the area. Artwork should be of a scale appropriate to highway travel speed.

TRANSPORTATION CORRIDOR A strip of land between two termini within which traffic, topography, environment and other characteristics are evaluated for transportation purposes; also a strip of land for transmission of a utility (AASHTO, 1991).

UNDERSTORY SHRUB The lower canopy in a layered planting.

UNITY The state when independent elements contribute harmoniously to the whole (Williams, 1990).

URBAN BACKGROUND Highway zone within urban regions that comprise areas dominated by commercial and residential development.

URBAN CONFLUENCE Highway zone within urban regions that serves as an important connector for people and commerce.

VERNACULAR FORMS Forms in indigenous styles constructed from locally available materials following traditional building practice and patterns not architect-designed.

VERTICAL DESIGN ELEMENT Site elements such as the facades of buildings, walls, fences, trees and tall shrubs, or steeply sloped ground. Vertical elements may be used as enclosures or for visual interest (Booth, 1999).

VERTICAL DIVERSITY Vertical elements that vary in texture, color, transparency, etc. in order to add visual interest to a site (Booth, 1999).

VIEW POINT A "pulloff" area on a highway where travelers can enjoy a view.

VIEWSHED The total area visible from a point or series of points along a linear transportation facility and conversely the area which views upon the facility (AASHTO, 1991).

VIEWSHED ANALYSIS Scrutinizing a viewshed to determine the positive and negative aspects.

VISUAL RELIEF A unique feature in an otherwise monotonous landscape or structure.

WATER HARVESTING Catching and holding rain where it falls for future use. It may be stored in tanks or used to recharge groundwater.

WATTLES Poles intertwined with reeds or plants (willows, etc.) to create a fence, barricade, etc.

WETLAND An area that is inundated or saturated by surface or groundwater at a frequency, duration, and depth sufficient to support a predominance of emergent plant species (cattails, etc.) adapted to growth in saturated soil conditions.

WILDLIFE CROSSING Structures built to facilitate wildlife crossing highways and minimize wildlife-related automobile accidents.

WILDLIFE HABITAT CORRIDORS Corridors that connect patches of wildlife habitat. These corridors allow wildlife to move between habitats and allow individual animals to move between groups, helping to restore or maintain genetic diversity that is essential both to the long-term viability of populations and to the restoration of functional ecosystems.

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