


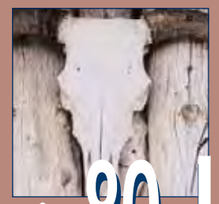


I-80 landscape and aesthetics corridor plan

CORRIDOR PLAN

NEVADA DOT

UNLV

I-80 FROM VERDI TO WEST WENDOVER & US 95 FROM WINNEMUCCA TO MCDERMITT

DESIGN WORKSHOP
Mackay & Somps
JW Zunino & Assoc.
CH2MHill
Jones & Jones

August 5, 2005

MESSAGE FROM THE GOVERNOR OF NEVADA
KENNY C. GUINN

On June 30, 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". Now, the second phase of planning is complete. This I-80 Landscape and Aesthetics Corridor Plan represents a major step forward for the Landscape and Aesthetics program created by the Master Plan. It is significant because it involves local public agencies and citizens in the planning process so that Nevada's highways truly represent the State and its people. The Corridor Plan will be the primary management tool used to guide funding allocations, promotes appropriate aesthetic design, and provides 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
NEVADA DEPARTMENT OF TRANSPORTATION
JEFF FONTAINE, P.E.

It is NDOT's responsibility to ensure that landscaping and aesthetics are an important consideration in building and retrofitting our highway system. This Landscape and Aesthetics Corridor Plan for I-80 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 as well as help Nevada's citizens play an important role in the 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:

Battle Mountain Band
Churchill County
City of Elko
City of Carlin
City of Fernley
City of Lovelock
City of Reno
City of Sparks
City of Wells
City of West Wendover
City of Winnemucca
Da Ka Doiyabe Resource Conservation and Development
Economic Development Authority of Western Nevada
Elko Chamber of Commerce
Elko County
Eureka County
Fernley Chamber of Commerce
Great Basin Community College
Humboldt County
Humboldt River Ranch Association
Keep Truckee Meadows Beautiful
Lander County
Lovelock Paiute Tribe
Lyon County
McDermitt, Desert Inn
National Park Service
Nevada Department of Transportation, District 2
Nevada Department of Transportation, District 3
Nevada Division of Forestry
Nevada Division of State Parks
Nevada Land Conservancy
Nevada Statewide Tree Council
Newmont Mining Corporation, Western Nevada Operations
Northern Nevada Development Authority
Pershing County
Pyramid Lake Paiute Tribe
Regional Transportation Commission of Washoe County
Reno-Sparks Chamber of Commerce
Reno-Sparks Convention & Visitors Authority
Reno-Sparks Indian Colony Planning Department
Scenic Nevada
Sierra Club - Toiyabe Chapter
South Fork Band Te-Moak Tribe
Sparks Chamber of Commerce
Storey County
Tahoe-Pyramid Bikeway
Te-Moak Tribe of Western Shoshone Indians, and Elko Band
Trails West
Truckee Meadows Community College
Truckee Meadows Regional Planning
Truckee Meadows Tomorrow
University of Nevada Cooperative Extension
U.S. Army Corp of Engineers
U.S. Bureau of Land Management
U.S. Department of Transportation - Federal Highway Administration
U.S. Fish & Wildlife Service
Washoe County
Wells Band Te-Moak Tribe
Western Trails Research Association
Winnemucca Convention and Visitors Authority
Winnemucca Indian Colony

ACKNOWLEDGEMENTS

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I-80 CORRIDOR PLAN SUMMARY AND USER'S GUIDE

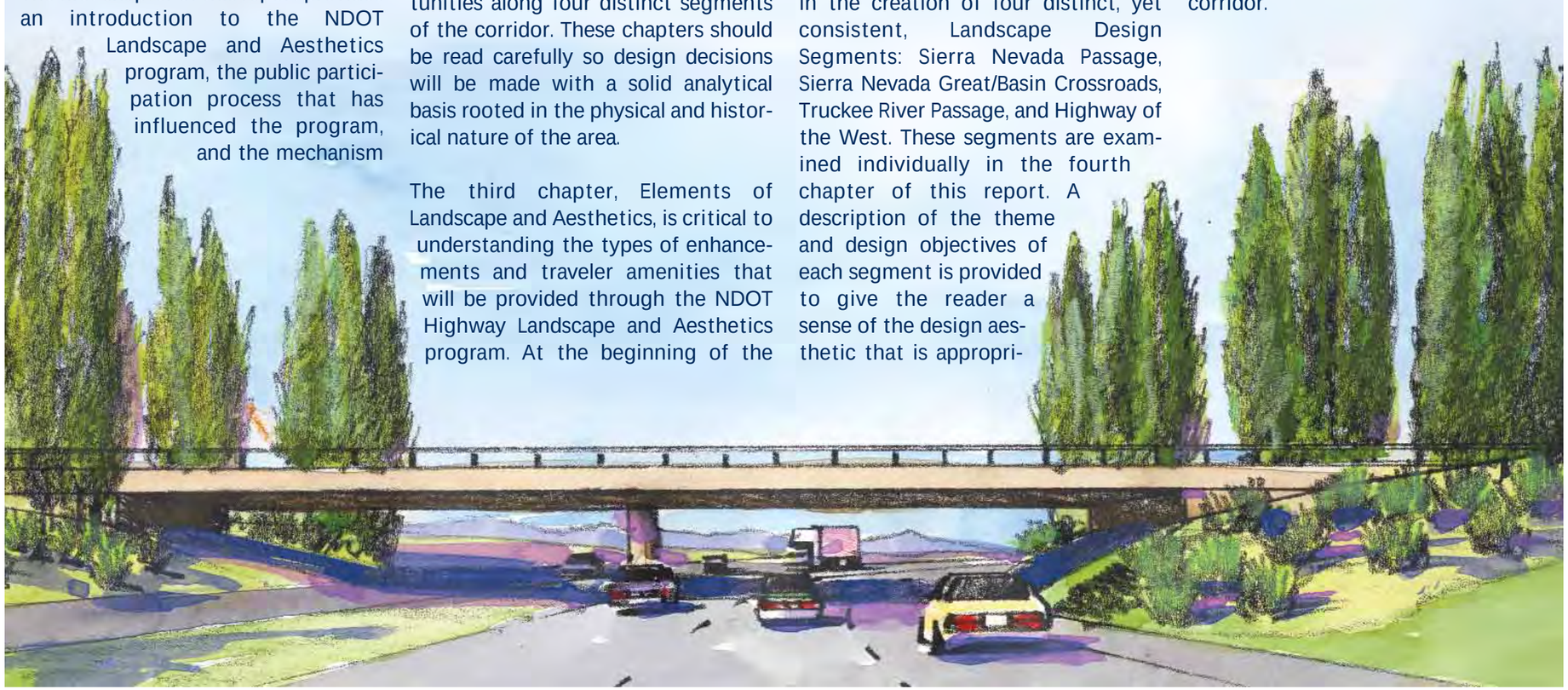
This plan illustrates a detailed vision for the landscape and aesthetics of the I-80 corridor. This vision synthesizes historic, current, and future conditions into a comprehensive guide to improve the visual appearance of the I-80 Urban and I-80 Rural highway corridors from the California stateline at Verdi to the Utah border at West Wendover and US 95 from Winnemucca to McDermitt.

The first chapter of this report provides an introduction to the NDOT Landscape and Aesthetics program, the public participation process that has influenced the program, and the mechanism by which the design of the corridor will be managed. The second chapter sets the foundation for many of the design and project decisions discussed later in the report. In this chapter, information regarding demographics and growth, water availability, land ownership, and natural resources is discussed. A detailed analysis of the terrain surrounding the I-80 corridor, including viewsheds to significant natural features and environmental features, is also presented. This information is then synthesized in a series of Opportunities and Constraints maps that specifically identify project opportunities along four distinct segments of the corridor. These chapters should be read carefully so design decisions will be made with a solid analytical basis rooted in the physical and historical nature of the area.

The third chapter, Elements of Landscape and Aesthetics, is critical to understanding the types of enhancements and traveler amenities that will be provided through the NDOT Highway Landscape and Aesthetics program. At the beginning of the chapter is a description of softscape and hardscape types. These represent increasing levels of visual enhancement, amenity, cost, and maintenance, and have been prescribed across the entire I-80 corridor. Additional items included in the Elements of Landscape and Aesthetics are a roadside signage program, varying degrees of enhanced road services, a native wildflower program, and an effort to minimize the visual impacts of outdoor advertising and billboards.

Detailed analysis and further understanding of the I-80 corridor resulted in the creation of four distinct, yet consistent, Landscape Design Segments: Sierra Nevada Passage, Sierra Nevada Great/Basin Crossroads, Truckee River Passage, and Highway of the West. These segments are examined individually in the fourth chapter of this report. A description of the theme and design objectives of each segment is provided to give the reader a sense of the design aesthetic that is appropriate and desired within the segment. Maps and sections of the individual Landscape Design Segments provide further detail regarding the location of specific projects and where the varying levels of softscape types, structures, hardscape types, and their treatments are to be achieved.

Design guidelines are included in the fifth chapter to articulate qualitative design for all aspects of the corridor. These apply at all levels of engineering, facility planning, and design. The final chapters describe funding and project priorities for each segment of the I-80 corridor.



This Corridor Plan is a management tool that will direct decisions made on Nevada's Interstate Highway system with the goal of considering landscape and aesthetics as an integrated part of all design undertaken by NDOT and the community partners within the state.

How to Use the Corridor Plan for a Segment of I-80:

- *Refer to the section beginning on page 3.1 to determine softscape and hardscape type and treatment.*
- *Refer to the section beginning on page 4.1 to determine the Landscape Design Segment and design theme. .*
- *Refer to the section beginning on page 4.9 for design objectives and intended future context.*
- *Refer to pages 4.13, 4.21, 4.29, and 4.47 for design interpretation.*
- *Refer to the section beginning on page 5.1 for specific design guidelines.*
- *Refer to the section beginning on page 6.1 for the description of funding and costs.*
- *Refer to the section beginning on page 7.1 for project priorities.*

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NDOT HIGHWAY LANDSCAPE AND AESTHETICS - *THE VISION*

Nevada has a renewed commitment to landscape and aesthetics as integral elements of the state's highways. In 2002, the Nevada Department of Transportation (NDOT) adopted the *Landscape and Aesthetics Master Plan* and with it the following vision for the state highway system:

> *"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."*

Today, it is the policy of the State of Nevada to consider landscape and aesthetics along with all other design factors in all transportation projects. Furthermore, local communities, the public, other permitting agencies, and the private sector are encouraged to be involved in the planning, design, construction, and maintenance of transportation projects. Such a partnership will help 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 *I-80 Landscape and Aesthetics Corridor Plan (Corridor Plan)* has been developed. This plan includes landscape and aesthetic recommendations for all of I-80 from the California border at Verdi to the Utah border at West Wendover, and also includes US 95 from Winnemucca north to the Oregon border at McDermitt. The overall corridor is divided into two sections: the I-80 Urban study area and the I-80 Rural study area. The I-80 Urban study area extends from the California border at Verdi to a mile east of Fernley. The I-80 Rural study area continues from Fernley east to the Utah border and includes US 95. These study areas provide opportunities to present information and issues specific to the different sections. The *Corridor Plan* identifies the major design themes and materials to be used in landscape and aesthetic treatments, recommends the level of treatment to be applied to highway features in the corridor, provides a broad cost estimate of treatments, and outlines strategies for funding of construction and long-term maintenance.

The *Corridor Plan* is a means to improve the aesthetic qualities of the I-80 corridor and associated highways, particularly as they relate 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* will be funded from a variety of sources. As a general rule, up to three percent of total highway construction costs on all new construction and capital improvements will be allocated to landscape and aesthetic treatments. Funding for the retrofit of landscape and aesthetic improvements to existing highways is based on matching State funds with a share of local money 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 that

> *"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."*

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*.

Highways are aesthetic entities involving all the senses, much as a piece of architecture or sculpture does. A road is not just a linear element composed of interlocking forms; it has depth and height, and should be considered as a three-dimensional form in all stages of design and construction.

It is important that design and construction of roads fit the country or city where they are sited. This is the only way in which the problem of reconciling human perception with machine speed can be solved.

When a highway is safe to drive on and satisfying to use and observe, the problem of perception has been resolved and the road has both external and internal harmony.

- NDOT 1968 Aesthetics Manual

(1) The first corridors to be planned have been the interstate highway routes across the state: I-15 and I-80. Both of these corridor planning projects included an extensive public participation program.

PUBLIC PARTICIPATION PROCESS

Early and ongoing public involvement was 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 in helping to develop a plan with local support.

Separate public involvement meetings were held for the I-80 Urban and the I-80 Rural study areas. Separate Technical Review Committees (TRC) represented local interests and knowledge for each study area. The rural study area was further divided into two groups—a western group that held TRC and public meetings in Winnemucca and an eastern group that held TRC and public meetings in Elko.

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:

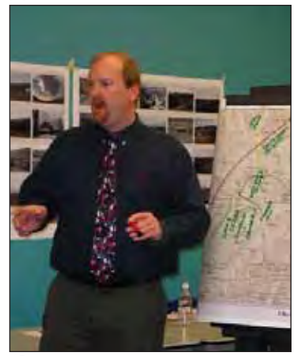
1. Identification of issues and concerns of each community.
2. A method, strategy, and action plan to address community concerns.
3. Opportunities for the public to express their level of support for the *Corridor Plan.*
4. Release of full information about the *Corridor Plan* through public meetings,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

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

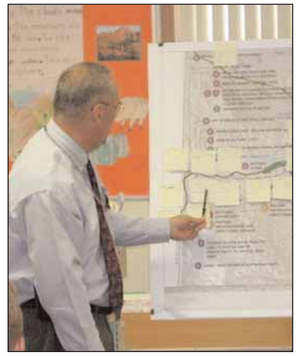
- A Technical Review Committee (TRC), composed of a broad range of stakeholders, contributed significant local agency and community knowledge.
- The public was able to identify issues, ask questions, and provide input at six public meetings—two in each location.
- A fact sheet was widely distributed to provide general information about the *Corridor Plan.*
- The public was able to visit a corridor planning website to learn more about the corridor planning and keep current on 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 ensure the recommendations outlined in this *Corridor Plan* reflect the ideas and suggestions of local community members.

(2)



(3)



(4)

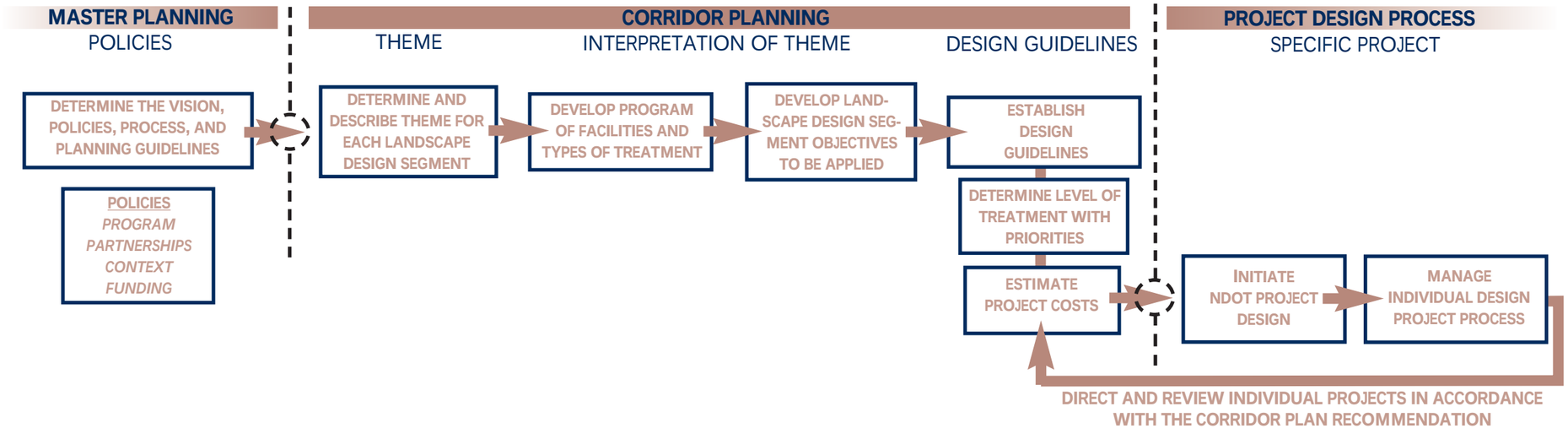
(5) From the inception of the corridor planning process a Technical Review Committee provided knowledgeable input, ideas, and comments on the plan. Workshops have involved stakeholders and community members.

CORRIDOR DESIGN MANAGEMENT

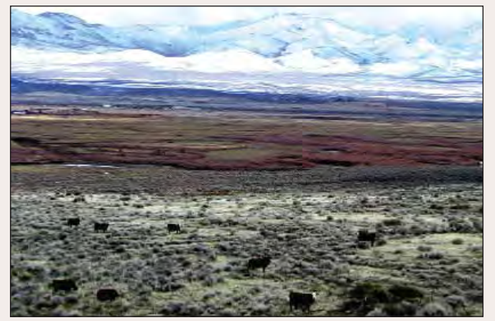
The *I-80 Landcape and Aesthetics Corridor Plan* is a design management tool for NDOT and others who will ultimately design specific highway projects. This plan establishes a context for future projects and, through its recommendations, programs, and description of the intended result, guides the Landscape and Aesthetic program for the I-80 corridor.

Prior to the design of a specific highway project, which may be a new facility, upgraded facility, or a retro-fitted project, the *Corridor Plan* establishes how the project level design would fit within a particular Landscape Design Segment. A theme, or over-arching idea, for the design is established and described. The development of projects within each Landscape Design Segment is guided by its theme, associated design objectives, a program of facilities with common definitions, and examples that illustrate interpretation of the theme. Finally, design guidelines, estimated costs, and project priorities are established. NDOT will use the *Corridor Plan* to manage the design of specific projects. Figure 1, below, describes the steps in this process to direct the outcome of the landscape and aesthetics program for this corridor.

Figure 1



(1) The guidelines will help to direct design decisions throughout the corridor, but they will have particular importance in areas that are positioned to undergo significant growth and change.



(2) Previous phases of the corridor planning process studied the natural landscape of the state in detail and applied recommendations for the highway corridor.

(3) The management plan for the corridor includes suggestions about the preservation of specific segments that will enhance the overall character of the highway.

(1) River corridors and adjacent vegetation patterns provide scenic interest while traveling along western I-80.

Image courtesy of John B. Walker.

(2) The view of various farmsteads, located along the rural portion of I-80, is composed of architecture and vegetation with unique cultural meaning.

OVERVIEW OF CORRIDOR PLAN

In addition to this introduction, the *Corridor Plan* is comprised of seven major chapters:

- Background Information
- Elements of Landscape and Aesthetics
- Landscape Design Segments
- Design Guidelines
- Cost Analysis
- Priority Projects
- Funding and Partnerships

Background Information provides an overview of important data related to the I-80 corridor. This section summarizes past, present, and future community growth along the corridor; describes land ownership patterns; briefly outlines water resource availability for northern Nevada; identifies tourism and travel patterns; and summarizes natural resource information. This section also provides a summary of visual analysis (including viewsheds and distance zones) and environmental analysis that was conducted, and offers an overview of opportunities and constraints along the I-80 corridor. Sections with information specific to the different study areas are separated into the I-80 Urban and I-80 Rural study areas. A complete inventory of data and analysis of opportunities and constraints is included in the following reports:

- *NDOT I-80 Urban Landscape and Aesthetics Corridor Plan: Technical Report Volume One - Background Information*
- *NDOT I-80 Rural Landscape and Aesthetics Corridor Plan: Technical Report Volume One - Background Information*
- *NDOT I-80 Urban Landscape and Aesthetics Corridor Plan: Opportunities and Constraints*
- *NDOT I-80 Rural Landscape and Aesthetics Corridor Plan: Opportunities and Constraints*

All of these documents were published in 2004 and are available through NDOT.

Elements of Landscape and Aesthetics defines the functional purpose and visual intent of highway corridor improvements. The Elements of Landscape and Aesthetics section describes varying levels of treatment for softscape as well as structures and hardscapes to be used in the corridor. This chapter also details a number of programs that should be considered for highways on a statewide basis, including a place name signage program, a road service program, a native wildflower program, an invasive and noxious weed control program, an outdoor advertising program, and a scenic highway designation program.

Landscape Design Segments section describes the four main design segments: the Sierra Nevada Passage, the Sierra Nevada/Great Basin Crossroads, the Truckee River Passage for the I-80 Urban study area, and the Highway of the West for the I-80 Rural study area. This section defines the design themes and objectives for each design segment. In addition, the Landscape Design Segments section outlines the softscape and hardscape types and levels of treatment for specific locations along the corridor, as well as specific corridor features that should be highlighted.

Design Guidelines section provides a framework for improving landscape and aesthetics when designing new and retrofit highway projects. The guidelines are written statements of desired performance to meet the design objectives of each landscape design segment.

Guidelines and Cost Analysis details a minimum level of landscape and aesthetics quality that all NDOT highway projects should meet as described in the design guidelines, along with a breakdown of the costs associated with the level of treatments for each design segment.

Priority Projects outlines the future projects as currently identified by NDOT and the priority associated with them to improve their landscape and aesthetics.

Funding and Partnerships outlines the funding mechanisms and partnership opportunities that exist and/or will be established to implement the *Landscape and Aesthetics Corridor Plan.*

PRESENT & FUTURE COMMUNITY GROWTH

Northern Nevada's historic settlement is tied to travel. A majority of communities along the I-80 corridor were located along the California Emigrant Trail or served as stopping points for the railroad. However, settlement patterns and future growth differs for the I-80 Urban and I-80 Rural study areas.

I-80 Urban Study Area

The majority of growth in the greater Reno-Sparks area has occurred just in the last 100 years. At the time of this report, spring of 2005, Washoe County is estimated to grow at 1.7%. Fernley and Lyon County growth rates had an average annual rate of approximately 12% from 2002-2003. If similar trends continue, Lyon County would have a population of 74,000 by the year 2024.

Settlement patterns along the urban area of the I-80 corridor are characterized by intense urban and suburban development and growth through the greater Reno-Sparks area. The Truckee Meadows appears to be a single, urbanized area with new development on the fringe areas. In addition, Fernley is developing into a significant industrial boomtown in northern Nevada. A growing number of industrial complexes are located along the eastern edge of town.

I-80 Rural Study Area

Along the rural portion of the corridor, communities are characterized by low density residential development with small commercial centers. Communities include Lovelock, Winnemucca, Battle Mountain, Elko, Wells, West Wendover, and McDermitt. Each town has similar development and settlement patterns. Commercial development is typically located within close proximity to the highway, and traditional neighborhood developments with gridded street patterns form the town's infrastructure. Mining, agriculture, ranching, and tourism each play an economic role and influence the rate of growth for the individual towns. On average these communities have a slow growth rate, and according to census data Elko County had a negative growth rate of 2.6% between 2000 and 2003. Outside of the communities outlined here, settlement along I-80 and US-95 remains rural and is characterized by homesteads and/or ranches surrounded by agricultural and open range land.

ANTICIPATED URBAN CHANGES

I-80 Urban Study Area

Within Reno, Sparks, and Fernley, growth and land use development have been significant and will continue to influence the I-80 corridor. The anticipated urbanized changes over the next 20 years most likely to influence the urban study area will occur in the Verdi planning area within Washoe County, the City of Reno, the City of Sparks, and the City of Fernley. The City of Reno will annex land west of Reno up to and including Verdi. Under an existing development plan, residential and commercial suburban growth would extend along the I-80 corridor from Reno's current boundaries into Verdi. This residential and commercial growth will likely replace the current natural landscape and foothill gateway.

I-80 Rural Study Area

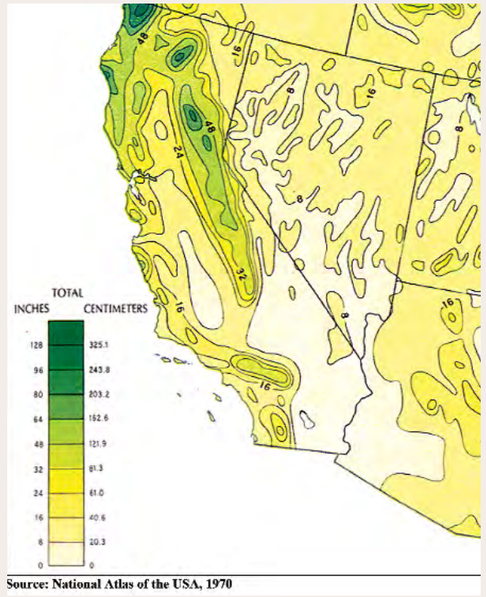
Growth and land use development have been cyclical, reflecting the economic swings of the mining industry. In fact, in most recent years some small settlements, such as Lovelock and Battle Mountain, have experienced an overall decline in population as a result of the reduction of mining and related jobs. Significant efforts have been made in communities, such as Winnemucca and Elko, to improve job opportunities and expand tourism with the towns. However, due to the population swings characteristic of Nevada's rural areas, future population estimates for the communities within the rural study area are difficult to project. Visual impacts will primarily be related to industrial and mining development along the corridor.

LAND OWNERSHIP

The State of Nevada consists of 83% public land, the highest percentage of federal lands among the contiguous 48 states (BLM, 2000). The Bureau of Land Management (BLM) owns the bulk of the federal lands with small and large in-holdings of other public agencies and private landowners. In northern Nevada, land is managed by BLM, U.S. Forest Service (USFS), Bureau of Indian Affairs (BIA), and private landowners. The rural land adjacent to I-80 (outside of NDOT's right-of-way) belongs to the BLM and private landowners. The land within the urbanized Reno-Sparks area and from the border of California to the eastern edge of Sparks is under private ownership. The USFS and BLM manage portions of the landscape in the hills and mountains seen from the road. From the eastern edge of Sparks to Fernley, I-80 traverses a mixture of BLM and private

Total Increase in Population 2003 to 2024	
Carson City	10,408
Churchill County	10,734
Clark County	1,130,334
Douglas County	16,049
Elko County	-2,003
Esmeralda County	-193
Eureka County	-58
Humboldt County	-2,631
Lander County	-1,971
Lincoln County	1,543
Lyon County	33,037
Mineral County	-2,211
Nye County	21,014
Pershing County	181
Storey County	-603
Washoe County	109,645
White Pine County	-1,621
State Total	1,328,916

(1) Population projections per Nevada State Demographer, 2004.



(1) This annual precipitation map reveals how much of Nevada is arid. Nevada is the driest state in the US.

lands. Around Fernley, I-80 passes through the southern tip of the Pyramid Lake Indian Reservation. The small Nevada towns along I-80 are primarily under private land ownership.

Land ownership affects land use and the visual character of the landscape. Public agencies such as BLM and the USFS operate under a multiple-use mandate. From the highway, drivers see evidence of grazing, mining, power generation, and tourism throughout the multiple-use federal lands. In the greater Reno-Sparks area, NDOT may have little influence over the visual character of the landscape outside of the right-of-way. NDOT may have influence over the visual character of public lands adjacent to the right-of-way because of the possibility of interagency agreements. The land ownership pattern that follows the I-80 corridor is a checkerboard pattern because of century-old agreements between railroads and the U.S. government.

WATER RESOURCE AVAILABILITY

The availability of adequate water resources and delivery systems is a significant issue and may constrict developable lands. This is a major issue, and particularly pertinent at the time of this report due to the extended drought period.

I-80 Urban Study Area

Water resources for the majority of the urban study area are administered by the Truckee Meadows Water Authority (TMWA). 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 for development. The conversion of water rights is expected to be exhausted between 2018-2048. The TMWA is embarking on the creation of a Water Resource Plan for 2005-2025, which will influence landscape amenities and the types of plant species now used in developments.

I-80 Rural Study Area

Communities throughout the rural study area are located great distances from one another. Therefore, adequate infrastructure for water distribution is a limiting factor for development along the corridor. Agriculture and mining are the largest water users in Nevada's rural areas. Domestic users generally obtain their water supply from private wells, springs, and/or small community water systems. As in Nevada's metropolitan areas, the uncertain water resource availability will require water-wise design for landscape aesthetic projects.

COMMUNITY SETTLEMENT PATTERNS

Throughout history, people everywhere have developed attachments to various geographic locations, characterized by natural boundaries that are created by physical, biological, social, cultural, and economic systems. (Kent and Baharav, 2002, Kent and Preister, 1999). Unique beliefs, traditions, and stories tie people to a specific place, to the land, and to social/kinship networks, the reflection and function of which is called "culture."

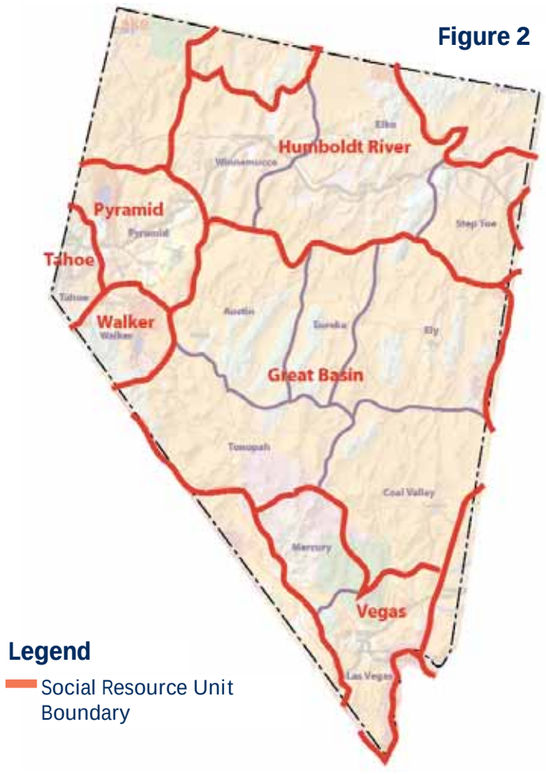
The geography of settlement along Nevada's I-80 corridor has been studied and mapped. The Human Geographic Map of Nevada, included in Figure 2, is based on the published result and definitions of the boundaries (Kent and Schultz, 1993, map updated in 2000.) Social Resource Units are defined as the aggregation of small units characterized by cultural descriptions. Often a river basin, for example, is the basis of shared history, lifestyle, livelihood, and outlook. Social ties are created by action around issues and common values.

Social Resource Units are districts that represent the boundaries within which people already mobilize to protect their social, economic, and social environment (see Figure 2). This group dynamic, known as place-based knowledge, creates and facilitates ownership-in-issue resolution, project planning and implementation, public participation, and public policy development.

TRAVEL AND TOURISM PATTERNS

Northern Nevada provides a host of tourism and travel opportunities ranging from indoor activities, such as gaming or attending conventions, to outdoor recreation, such as hiking or hunting. The I-80 corridor's two study areas each offer unique tourism opportunities.

Figure 2



This figure represents major human geographic divisions in Nevada that reflect common boundaries of the settlement patterns.

I-80 Urban Study Area

The Nevada Commission on Tourism coined the urban study area from California to Wadsworth the "Reno-Tahoe Territory." Fernley, and its immediate surroundings, are referred to as the "Pony Express Territory." Almost half of the visitors to the Truckee Meadows classify their trip as vacation or pleasure. Entertainment and recreation opportunities can be found at one of many casinos, at golf courses, or along the Truckee River. Reno and Sparks also serve as a staging ground, or jumping off points, to other popular tourism destinations such as Lake Tahoe, Pyramid Lake, and Virginia City.

Of the 4.9 million visitors to the Truckee Meadows (2002), over 70% of the visitors travel annually by car along the I-80 corridor. The majority of travelers' destinations is within Reno and Sparks. Less than one percent of visitors are passing through to other destinations, and many decide on which attractions to visit only after they have arrived.

I-80 Rural Study Area

The majority of the I-80 rural study area is dominated by a western culture and is aptly named "Cowboy Country Territory" by the Nevada Commission on Tourism. Communities such as Lovelock, Winnemucca, Battle Mountain, Carlin, Elko, Wells, and West Wendover all have ties to the cowboy lifestyle, and outdoor recreational opportunities are prevalent. Native American and other cultures, such as Basque and Hispanic, create a rich diversity and add to the corridor's character. Tourism and recreational amenities include gaming, golfing, hunting, and other outdoor activities, as well as visiting historical towns, mining facilities, and museums. Towns also serve as a home base for travelers touring the nearby State and Federal recreation areas. In addition, local community events such as the National Cowboy Poetry Gathering in Elko and the Humboldt County Fair and Stampede in Winnemucca draw visitors from across the nation.

I-80 is a vital connection and travel route to communities along the rural study area. Although air travel is accommodated in a few communities, the majority of travelers utilize the interstate as a means of arrival. Providing travel information at rest areas, welcome centers, and viewpoints is vital to improve the compatibility between local communities and the highway.

NATURAL RESOURCES

Topography & Surface Hydrology

Nevada is one of the most mountainous states in the U.S., with over 314 named mountain ranges and 232 basins that create a landscape rich in diversity. Nevada consists of four major ecosystem units, or ecoregions—the Great Basin, Mojave Desert, Columbia Plateau, and Sierra Nevada. Of these, the Great Basin, Sierra Nevada and Columbia Plateau ecoregions are part of the I-80 corridor. The Great Basin covers about 48 million acres (68% of the state) and consists of a series of depressions, flats, dry lakes, marshy salt pans, and sinks that are scattered between ribbons of mountain ranges. The Truckee River is a major river in the I-80 urban study area, and the Humboldt River is a major river in the I-80 rural study area. Numerous perennial and ephemeral creeks and smaller rivers originate in the high elevation ranges and flow down from the mountains. A multitude of springs are located in the lower valleys (Nevada Natural Resources Status Report, 2002).

Vegetation Communities

The physiographic region primarily influencing vegetation along I-80 is the Great Basin of northern Nevada. In general, most of the land along the highway is arid, with the exception of irrigated agricultural fields and areas where rivers and streams sustain pockets of riparian vegetation that includes willows, alders, dogwoods, and cottonwoods. Some areas of salt marsh do not provide fertile grounds for the establishment of vegetation. The majority of I-80 traverses areas of sagebrush and salt desert scrub throughout the lower elevations and pinyon and juniper woodlands in the mountain ranges. The extreme western portion crosses pine forests, and riparian communities are found along rivers and perennial and intermittent streams. Throughout the Reno-Sparks area there is little native vegetation within the right-of-way.

The most prevalent vegetation community found along I-80 is the sagebrush/grass/rabbitbrush that includes Wyoming big sagebrush (*Artemisia tridentata var. wyomingensis*), big basin sagebrush (*Artemisia tridentata tridentata)*, and black sagebrush (*Artemisia nova*) at lower elevations. Higher elevations include big basin sagebrush (*Artemisia tridentata tridentata var. vaseyana*) and low sagebrush (*Artemisia arbuscula* and *Artemisia longiloba*).

Wildlife and Wildlife Habitat

Nevada is renowned for its variety of wildlife and vegetative habitats that include more than 3800 plant and animal species, and some of the most biologically diverse eco-regions in North America. Nevada is inhabited by a large number of species and subspecies that are unique to the state.

Much of the land surrounding the I-80 corridor is part of the Great Basin, and this land provides appropriate habitat for large mammals. Mule deer is the most

(1) Salt desert scrub plant community is adjacent to portions of the I-80 corridor.

(2) The I-80 Corridor passes through a variety of plant communities ranging from salt desert scrub to pinyon and juniper woodlands.

(1) This bridge on I-70 near the continental divide in Colorado was constructed without center piers to frame the view of the mountain range beyond. This underpass window enhances the view for the driver and creates a focus on high visual quality.

common wild ungulate found in Nevada today, with a population of more than 145,000, (NDOW, 2000). Elk are currently found in several locations in northeastern and central Nevada. Elk habitat exists throughout the Ruby and Pequop Mountains and the East Humboldt Range that is bisected by the I-80 corridor near Elko, Wells, and West Wendover. The majority of the rural portion of the I-80 corridor is in close proximity to antelope habitat. There are approximately 16,000 Pronghorn antelope in the state. However, the number has declined over the last several decades due to over-hunting, habitat conversion, and competition with livestock. Habitat is located north of Reno throughout the Spanish Springs Valley and north of Stead. Bighorn sheep are one of the most distinctive and easily recognizable desert animals. A small habitat area is located east of Lovelock in the Stillwater Range, and other Bighorn sheep populations are located throughout the state.

Wildlife movement corridors are composed of contiguous habitat that provides shelter and food sources for resident and migratory wildlife species. Deer corridors cover a large area from the Nevada/California border towards Mogul. Throughout the majority of the rural study area, deer corridors parallel and cross the highway. Numerous movement corridors are located throughout the rural study area. There are no documented wildlife movement corridors that cross I-80 around highly developed areas in Reno and Sparks. An antelope corridor follows the Truckee River from Wadsworth to Pyramid Lake, and wildlife have been observed crossing I-80 through the Truckee River Canyon.

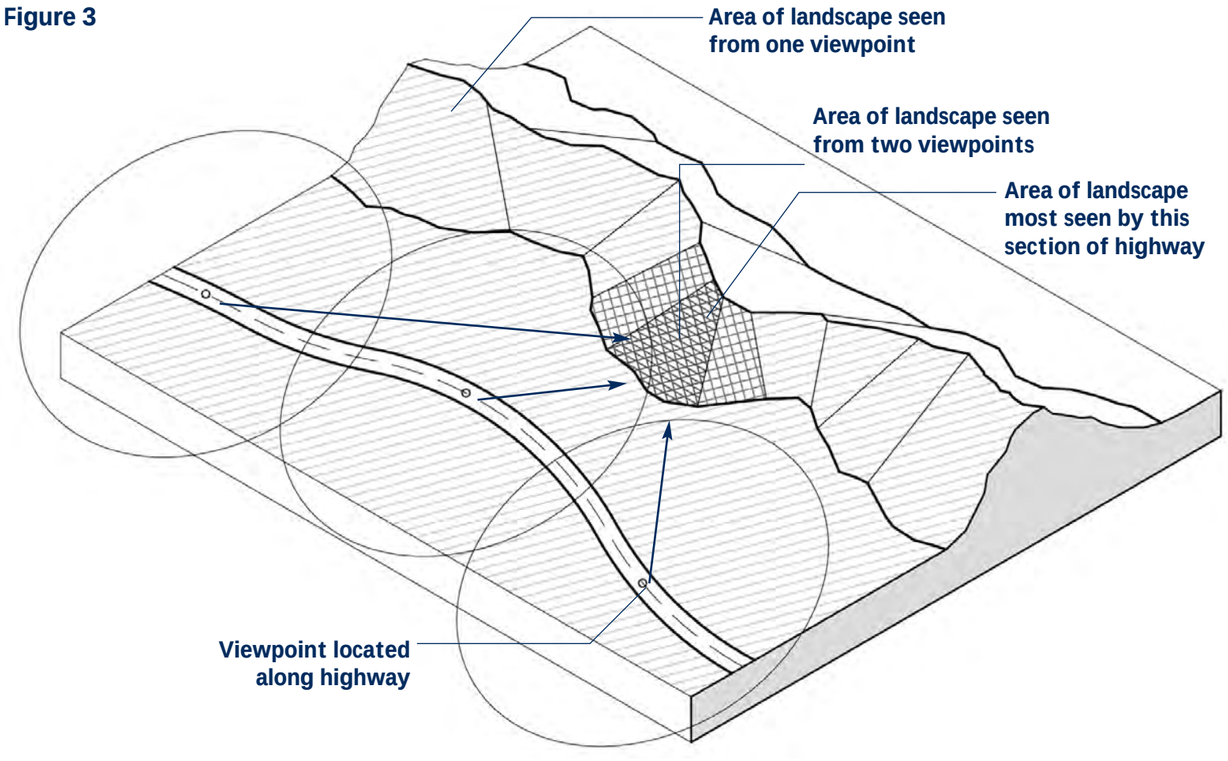
VIEWSHEDS AND DISTANCE ZONES

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. Distance zones, including foreground zones, middle ground zones and background zones, define the viewing distances of the traveler.

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. 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.

Viewsheds and Distance Zones along the I-80 corridor are shown on the maps beginning on page 2.5. Darker shading corresponds to areas that can be seen more often from points along the highway (Figure 3). These areas usually coincide with landscapes of high visual quality and scenic value 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.

Figure 3



This figure describes the concept of a viewshed and how a viewshed analysis is conducted.

VISUAL ANALYSIS

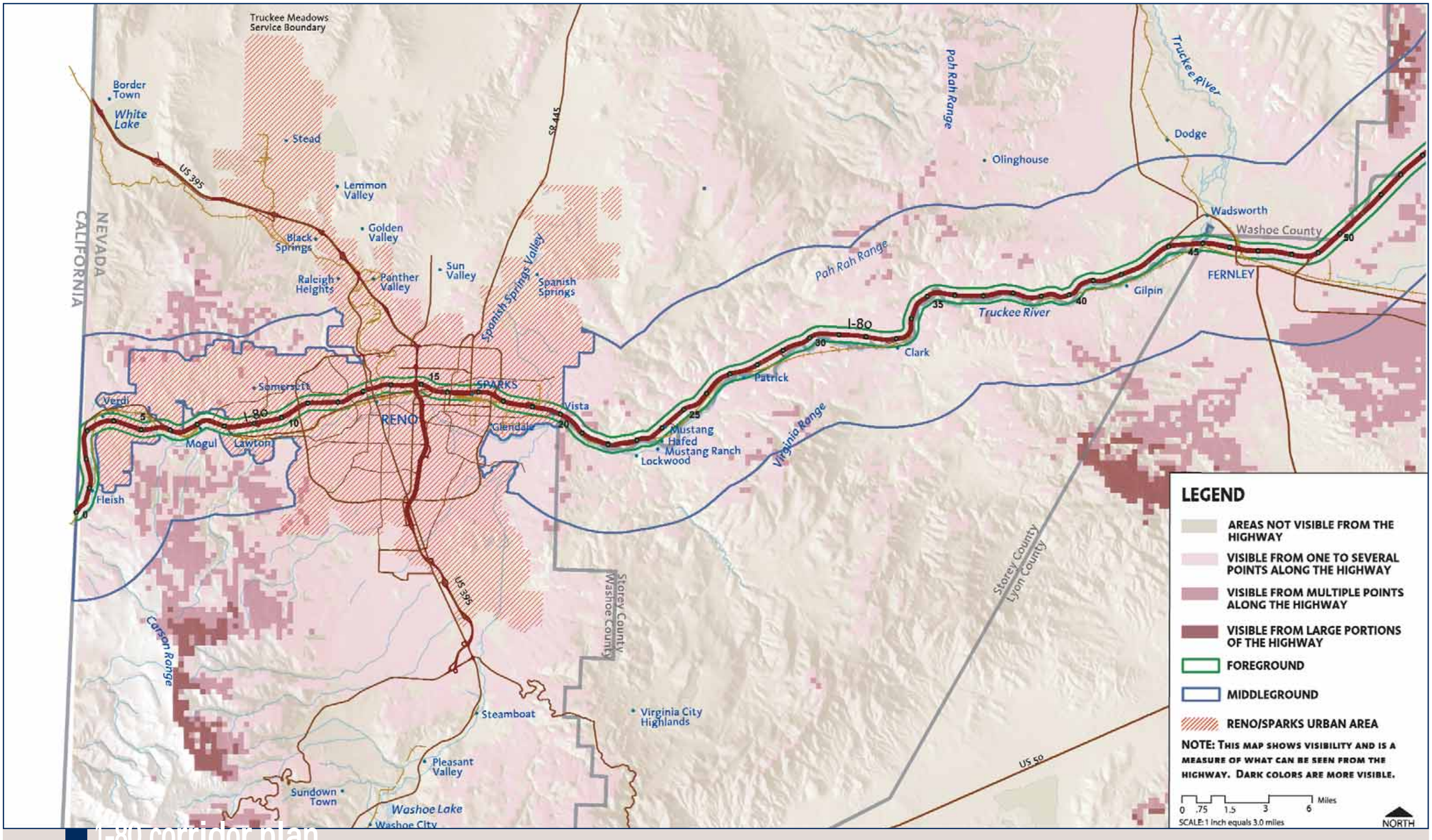
A visual analysis was conducted along the I-80 corridor to evaluate existing views from the highway and rank them relative to their quality. Scenic features are identified and highly visible landforms, such as mountain ranges and unique cliffs, are located. This analyisis is shown on Maps F-J: Visual Analysis. The landscape was divided into *intrinsic landscape districts* based upon spatial characteristics defined by topography. Areas of highest scenic value include:

- The Carson Mountain Range, southwest of Reno
- The Truckee River Canyon
- The West Humboldt Mountain Range and Lone Mountain
- Paradise Valley
- Basin and Range transition scenery

ENVIRONMENTAL ANALYSIS

The landscape of northern Nevada has many special environmental features, including plant communities, rivers, lakes, wetlands, playas, wildlife, rock outcroppings, cliffs, and mountain ranges. To analyze the environmental features, data was gathered from a variety of sources and analyzed according to its relationship to the I-80 corridor. Unique features visible from the highway or that influence the highway were mapped (see Environmental Analysis Maps K-O on pages 2.16-2.20). Environmental features provide an opportunity to create pull-offs to view the feature, preserve natural systems, and enhance wildlife movement corridors.

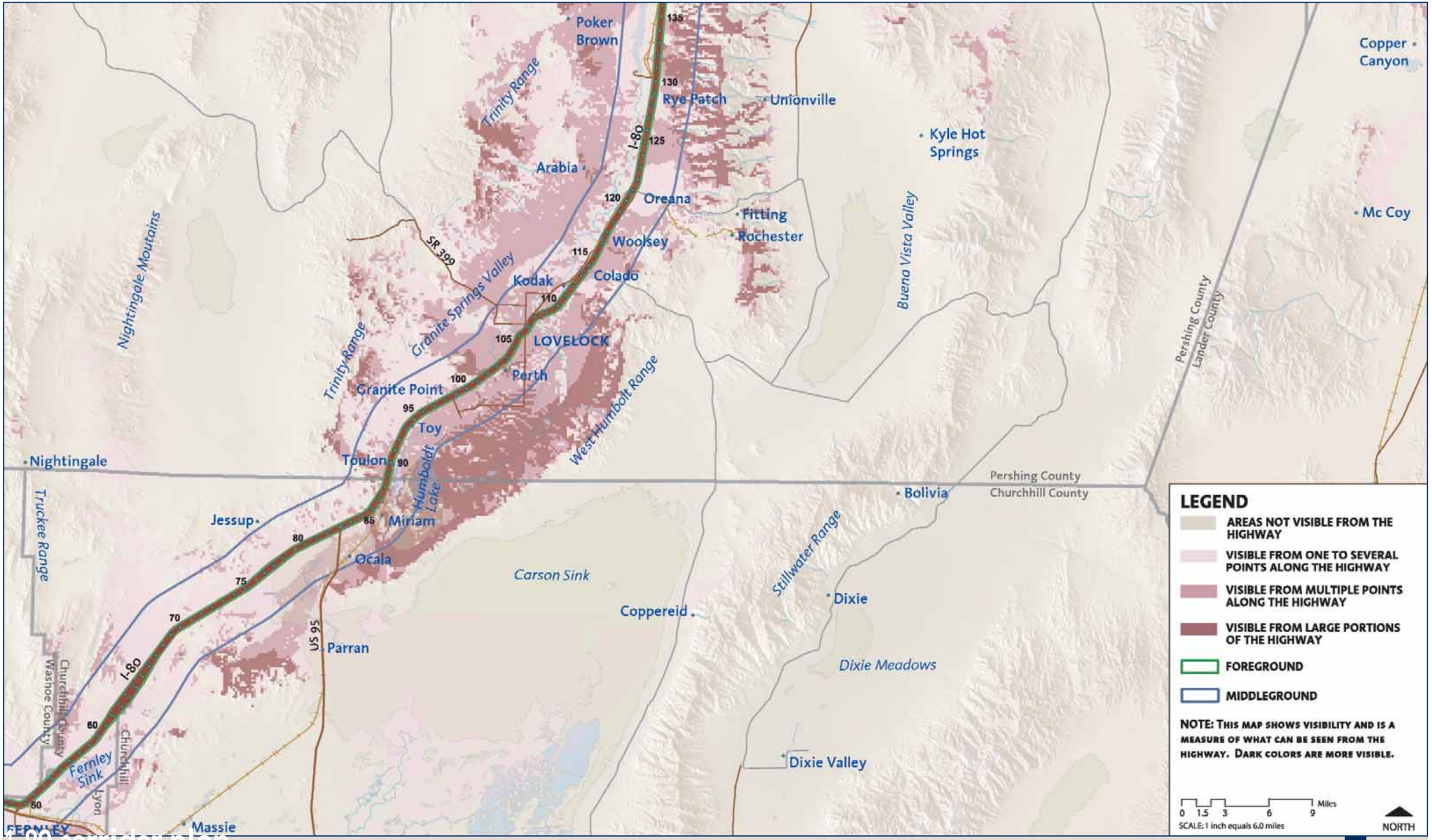
Public agency coordination is essential to maintain visual and environmental quality management. This may affect land use decisions, facility placement, and environmental standards utilized on adjacent lands.



MAP A 2.6

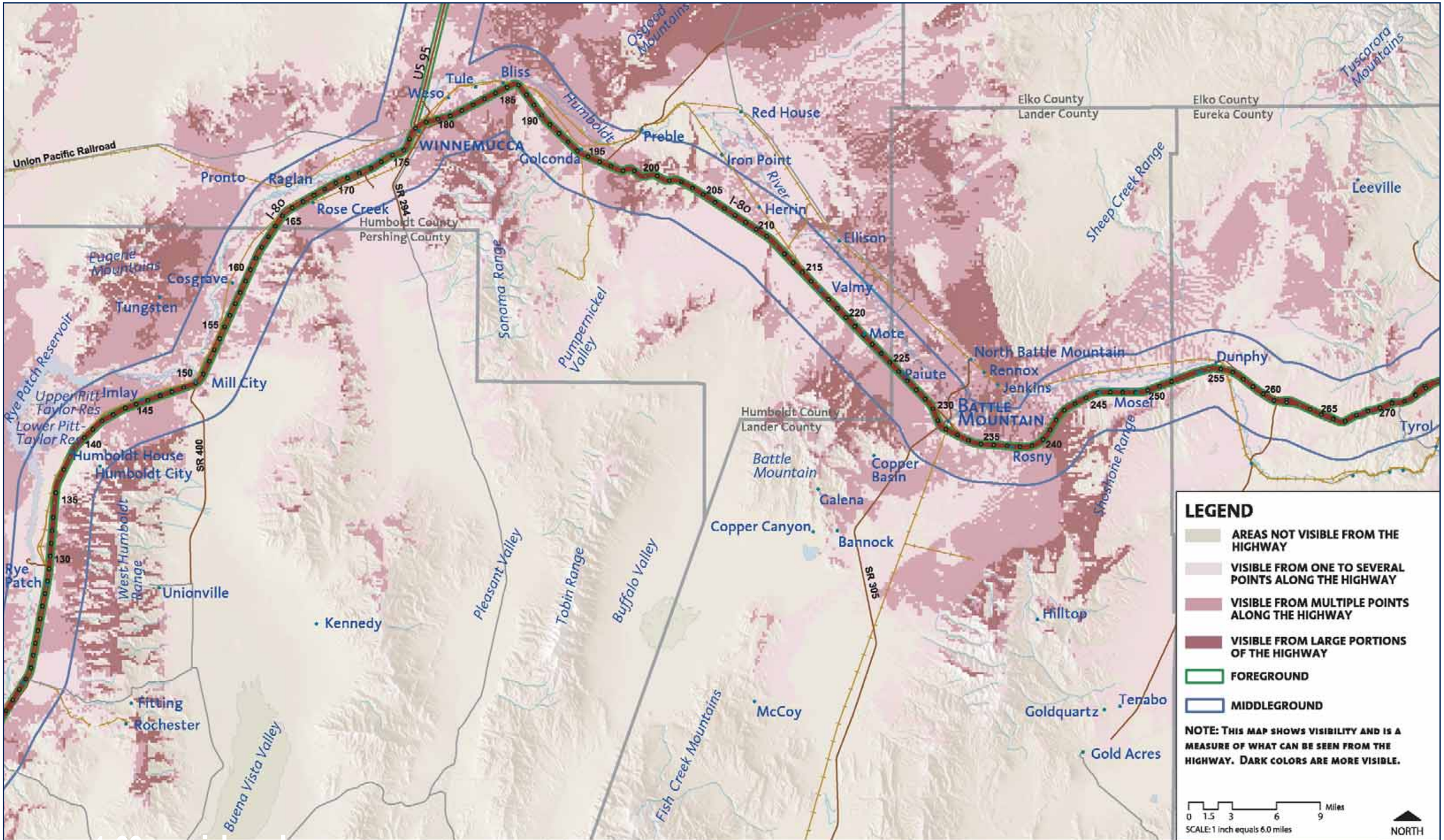
VIEWSHED AND DISTANCE ZONES

I-80: VERDI TO FERNLEY



VIEWSHED AND DISTANCE ZONES

I-80: FERNLEY TO RYE PATCH



LEGEND

- 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
- FOREGROUND
- MIDDLEGROUND

NOTE: THIS MAP SHOWS VISIBILITY AND IS A MEASURE OF WHAT CAN BE SEEN FROM THE HIGHWAY. DARK COLORS ARE MORE VISIBLE.

0 1.5 3 6 9 Miles

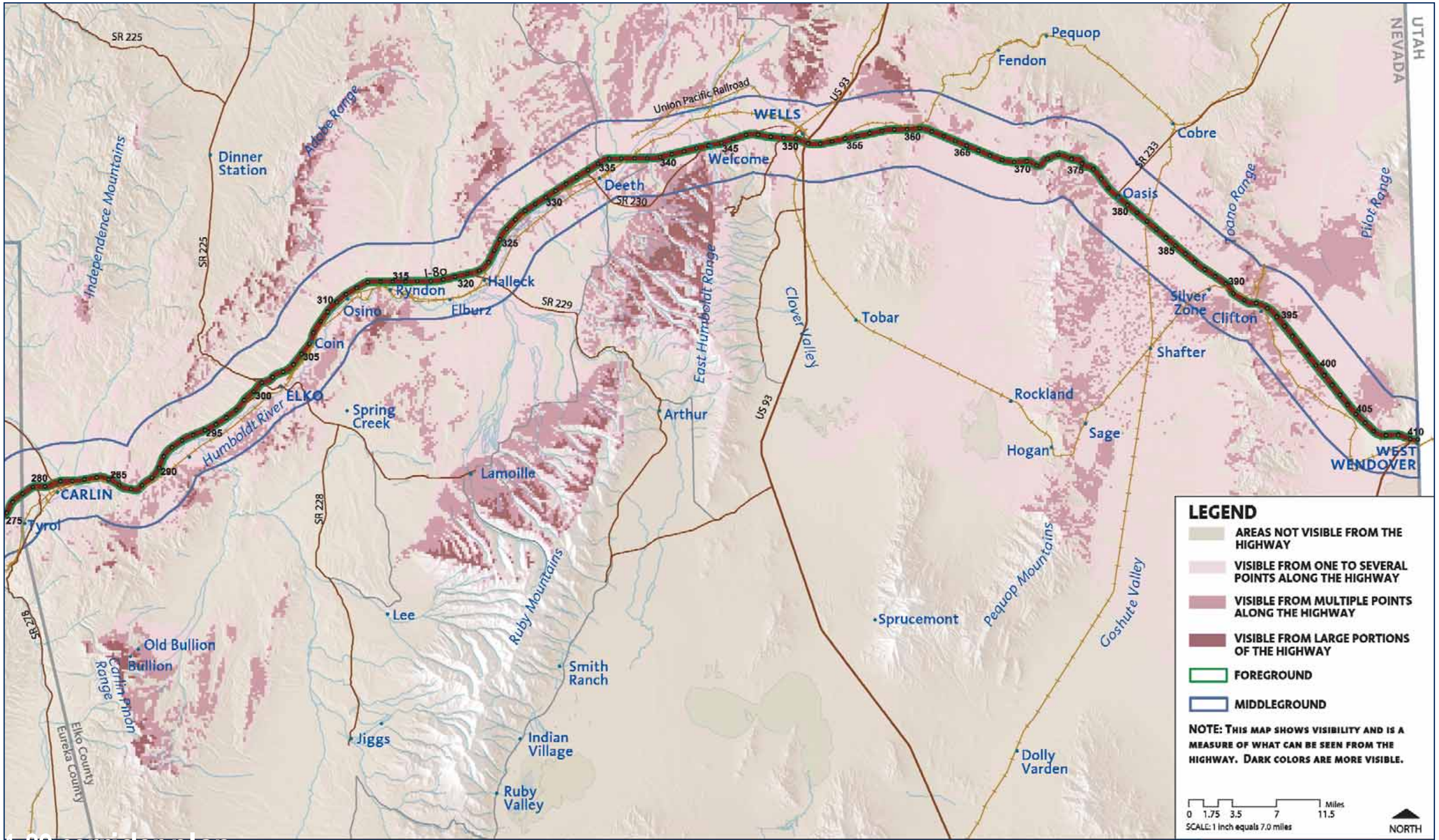
SCALE: 1 inch equals 6.0 miles

NORTH

MAP C 2.8

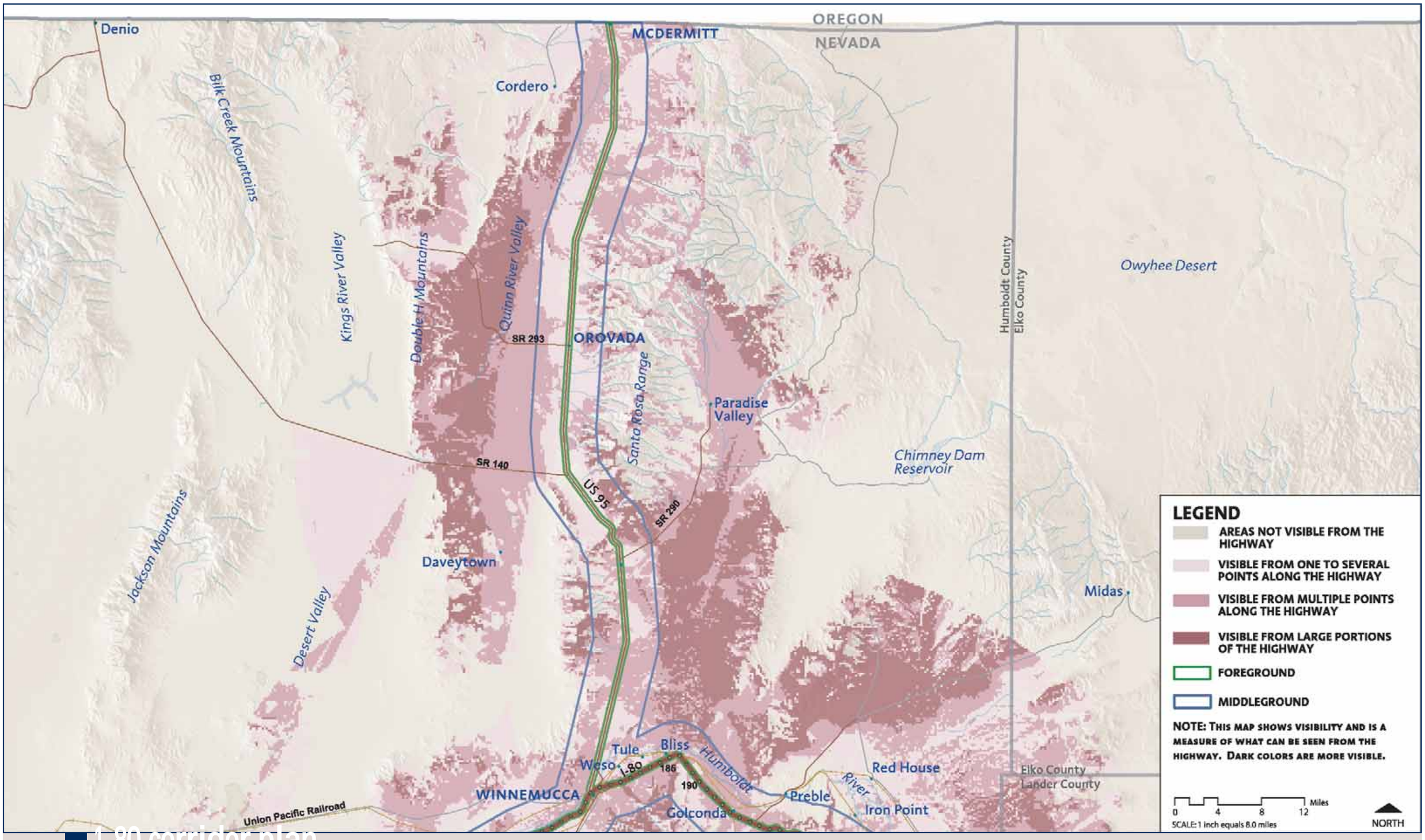
VIEWSHED AND DISTANCE ZONES

I-80: RYE PATCH TO TYROL



VIEWSHED AND DISTANCE ZONES

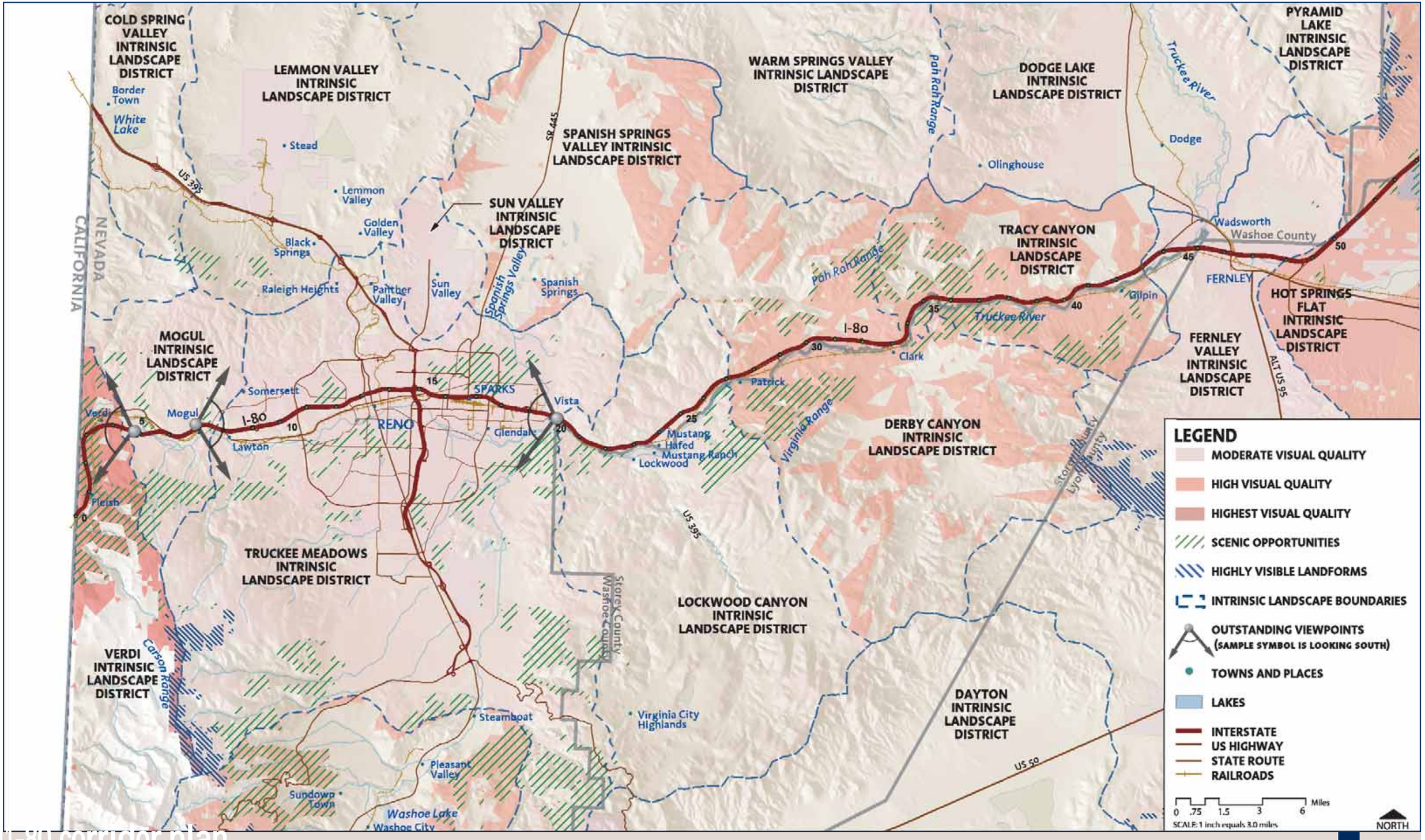
I-80: TYROL TO WEST WENDOVER



MAP E 2.10

VIEWSHED AND DISTANCE ZONES

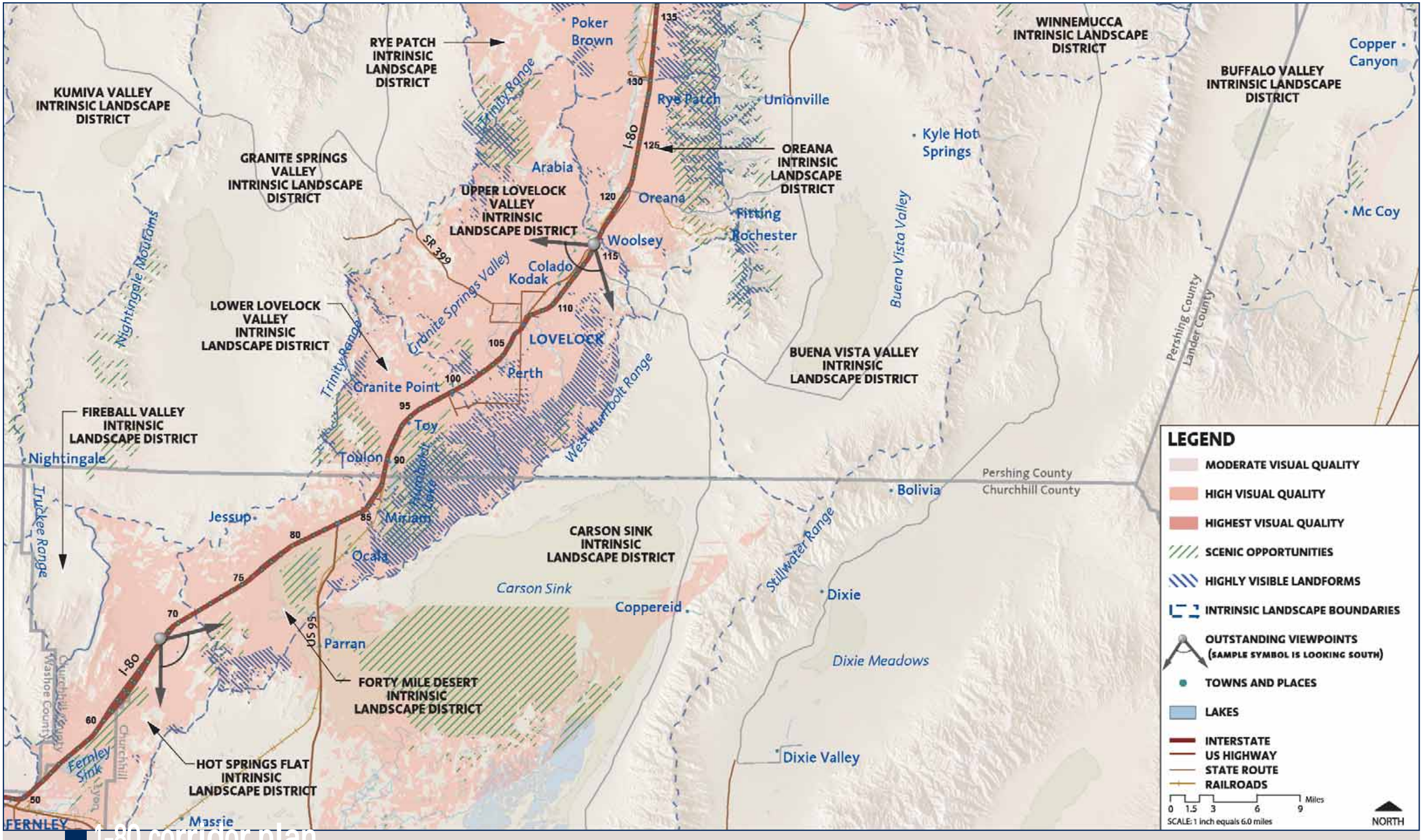
US 95: WINNEMUCCA TO MCDERMITT

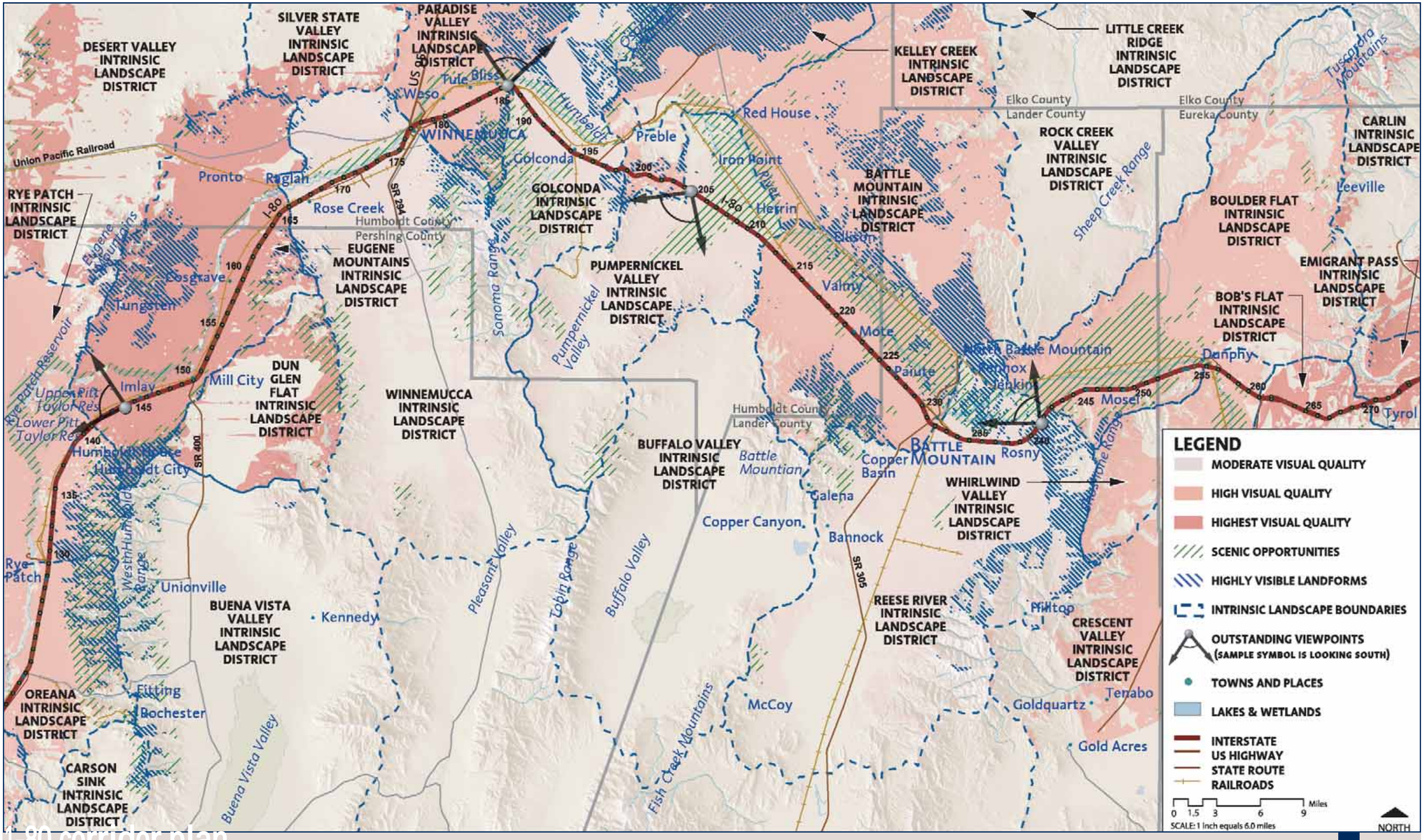


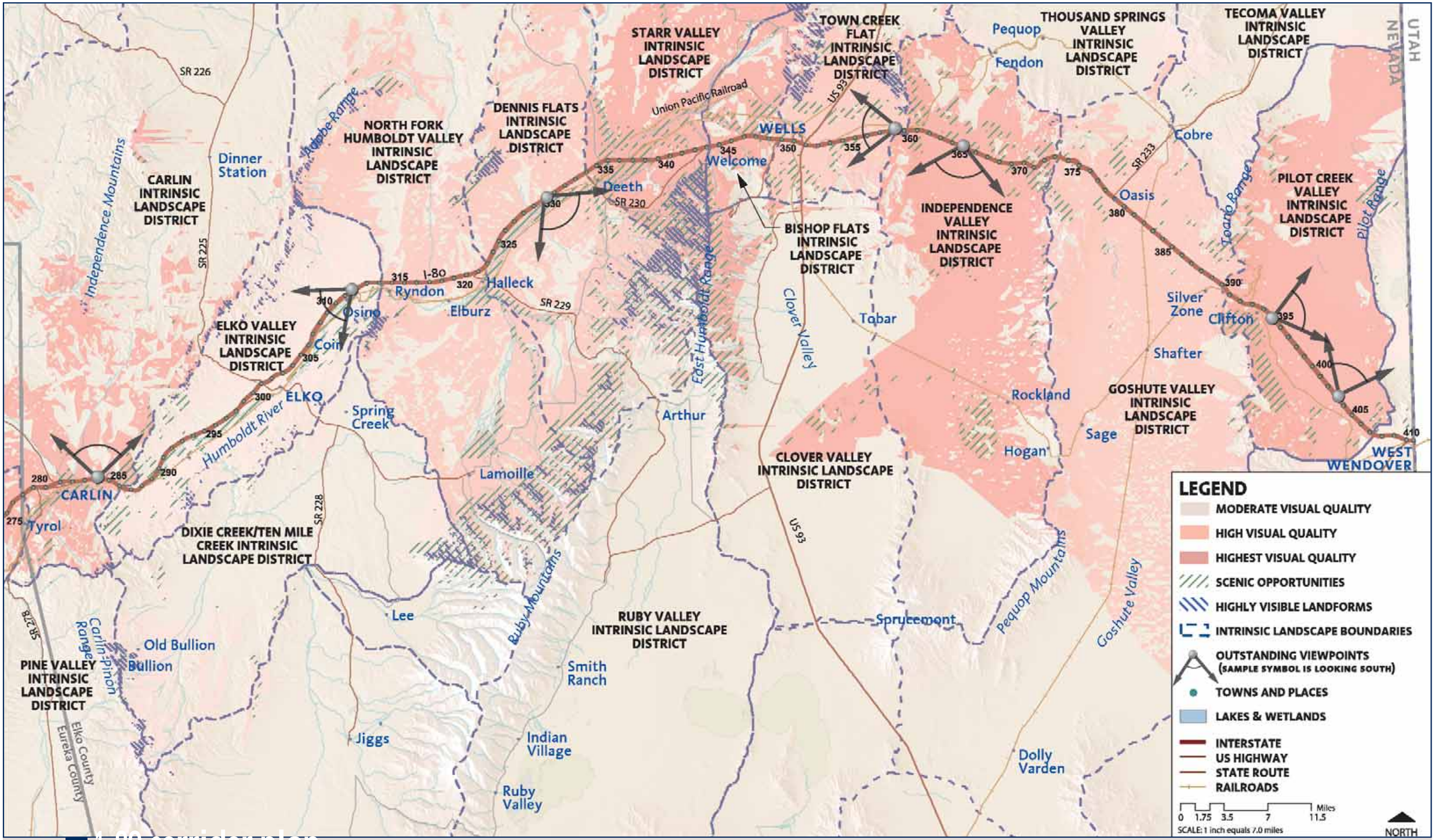
VISUAL ANALYSIS

I-80: Verdi to Fernley

MAP F 2.11


RYE PATCH INTRINSIC LANDSCAPE DISTRICT
KUMIVA VALLEY INTRINSIC LANDSCAPE DISTRICT
GRANITE SPRINGS VALLEY INTRINSIC LANDSCAPE DISTRICT
UPPER LOVELOCK VALLEY INTRINSIC LANDSCAPE DISTRICT
LOWER LOVELOCK VALLEY INTRINSIC LANDSCAPE DISTRICT
OREANA INTRINSIC LANDSCAPE DISTRICT
WINNEMUCCA INTRINSIC LANDSCAPE DISTRICT
BUFFALO VALLEY INTRINSIC LANDSCAPE DISTRICT
BUENA VISTA VALLEY INTRINSIC LANDSCAPE DISTRICT
FIREBALL VALLEY INTRINSIC LANDSCAPE DISTRICT
CARSON SINK INTRINSIC LANDSCAPE DISTRICT
FORTY MILE DESERT INTRINSIC LANDSCAPE DISTRICT
HOT SPRINGS FLAT INTRINSIC LANDSCAPE DISTRICT
Poker Brown
Rye Patch
Unionville
Kyle Hot Springs
Copper Canyon
Arabia
Oreana
Fitting
Rochester
Mc Coy
Woolsey
Colado
Kodak
LOVELOCK
Perth
Granite Point
Toy
Toulon
Nightingale
Jessup
Miriam
Ocala
Parran
Coppereid
Dixie
Dixie Meadows
Dixie Valley
Bolivia
Massie
FERNLEY
Pershing County
Churchhill County
Lander County
Washoe County
Trinity Range
Nightingale Mountains
Granite Springs Valley
Buena Vista Valley
Stillwater Range
Carson Sink
Fernley Sink
Truckee Range
Humboldt Lake
West Humboldt Range
I-80
SR 399
US 95
135
130
125
120
115
110
105
100
95
90
85
80
75
70
60
50
LEGEND
MODERATE VISUAL QUALITY
HIGH VISUAL QUALITY
HIGHEST VISUAL QUALITY
SCENIC OPPORTUNITIES
HIGHLY VISIBLE LANDFORMS
INTRINSIC LANDSCAPE BOUNDARIES
OUTSTANDING VIEWPOINTS
(SAMPLE SYMBOL IS LOOKING SOUTH)
TOWNS AND PLACES
LAKES
INTERSTATE
US HIGHWAY
STATE ROUTE
RAILROADS
0 1.5 3 6 9 Miles
SCALE: 1 inch equals 6.0 miles
NORTH

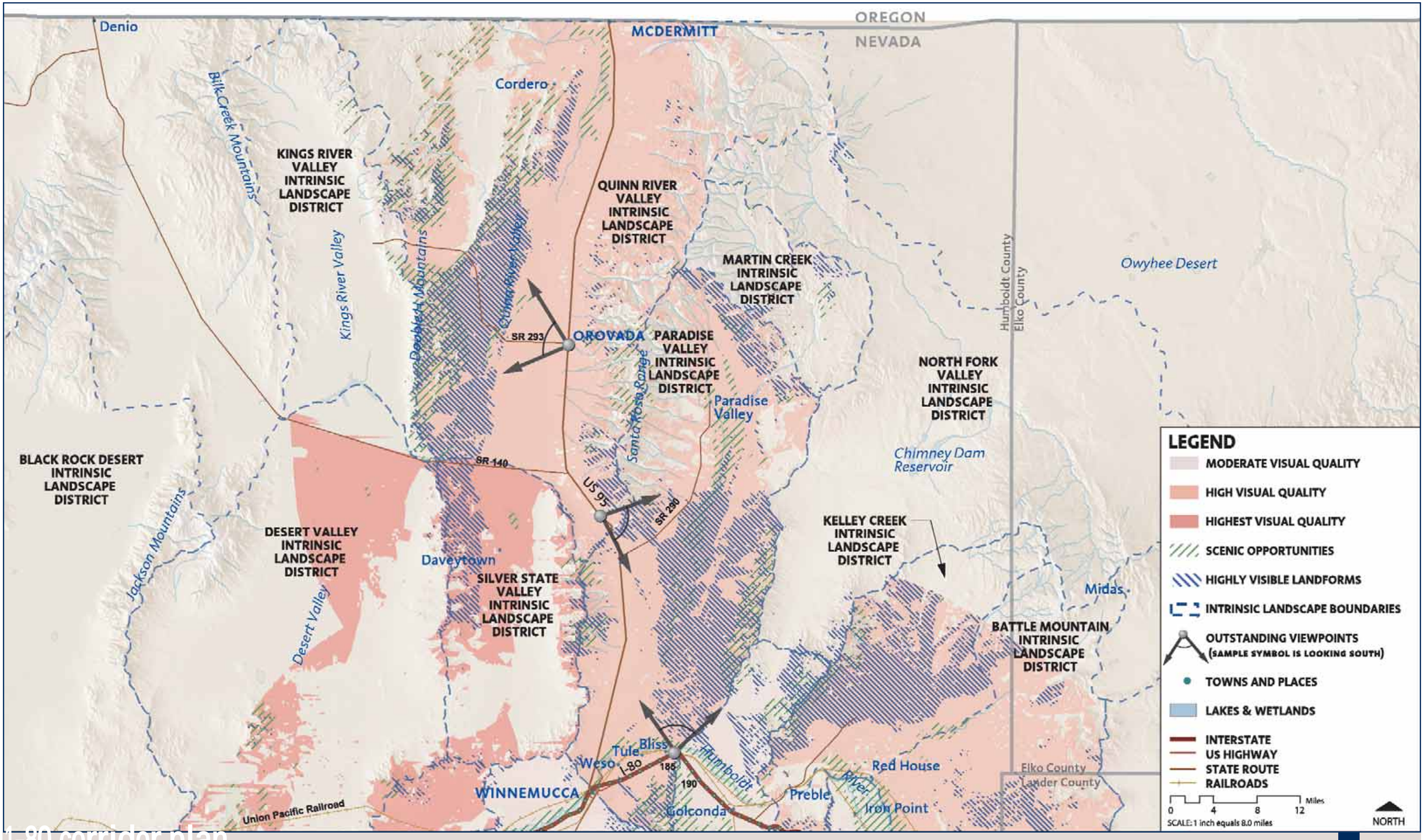

DESERT VALLEY INTRINSIC LANDSCAPE DISTRICT
SILVER STATE VALLEY INTRINSIC LANDSCAPE DISTRICT
PARADISE VALLEY INTRINSIC LANDSCAPE DISTRICT
KELLEY CREEK INTRINSIC LANDSCAPE DISTRICT
LITTLE CREEK RIDGE INTRINSIC LANDSCAPE DISTRICT
ROCK CREEK VALLEY INTRINSIC LANDSCAPE DISTRICT
CARLIN INTRINSIC LANDSCAPE DISTRICT
BOULDER FLAT INTRINSIC LANDSCAPE DISTRICT
EMIGRANT PASS INTRINSIC LANDSCAPE DISTRICT
BOB'S FLAT INTRINSIC LANDSCAPE DISTRICT
RYE PATCH INTRINSIC LANDSCAPE DISTRICT
EUGENE MOUNTAINS INTRINSIC LANDSCAPE DISTRICT
GOLCONDA INTRINSIC LANDSCAPE DISTRICT
PUMPERNICKEL VALLEY INTRINSIC LANDSCAPE DISTRICT
BATTLE MOUNTAIN INTRINSIC LANDSCAPE DISTRICT
DUN GLEN FLAT INTRINSIC LANDSCAPE DISTRICT
WINNEMUCCA INTRINSIC LANDSCAPE DISTRICT
BUFFALO VALLEY INTRINSIC LANDSCAPE DISTRICT
WHIRLWIND VALLEY INTRINSIC LANDSCAPE DISTRICT
REESE RIVER INTRINSIC LANDSCAPE DISTRICT
CRESCENT VALLEY INTRINSIC LANDSCAPE DISTRICT
BUENA VISTA VALLEY INTRINSIC LANDSCAPE DISTRICT
OREANA INTRINSIC LANDSCAPE DISTRICT
CARSON SINK INTRINSIC LANDSCAPE DISTRICT
WINNEMUCCA
Weso
Fule
Bliss
Red House
Preble
Golconda
Iron Point
Herrin
Elison
Valmy
Mote
Paiute
North Battle Mountain
Argenta
Dunphy
Mosel
Tyrol
Pronto
Raglan
Rose Creek
Cosgrave
Tungsten
Imlay
Mill City
Upper Pitt Taylor Res
Lower Pitt Taylor Res
Rye Patch Reservoir
Humboldt Junction
Humboldt City
Rye Patch
Unionville
Kennedy
Fitting
Rochester
Battle Mountain
Copper Basin
Galena
Copper Canyon
Bannock
Rosny
Pinto
McCoy
Goldquartz
Tenabo
Gold Acres
Union Pacific Railroad
I-80
US 95
SR 294
SR 400
SR 305
Humboldt County
Pershing County
Elko County
Lander County
Eureka County
Humboldt County
Lander County
Eugene Mountains
Sonoma Range
Pumpernickel Valley
Sheep Creek Range
Tuscarora Mountains
Battle Mountian
Pleasant Valley
Tobin Range
Buffalo Valley
Fish Creek Mountains
Buena Vista Valley
Humboldt Range
Shoshone Range
LEGEND
MODERATE VISUAL QUALITY
HIGH VISUAL QUALITY
HIGHEST VISUAL QUALITY
SCENIC OPPORTUNITIES
HIGHLY VISIBLE LANDFORMS
INTRINSIC LANDSCAPE BOUNDARIES
OUTSTANDING VIEWPOINTS
(SAMPLE SYMBOL IS LOOKING SOUTH)
TOWNS AND PLACES
LAKES & WETLANDS
INTERSTATE
US HIGHWAY
STATE ROUTE
RAILROADS
0 1.5 3 6 9 Miles
SCALE: 1 inch equals 6.0 miles
NORTH



MAP I 2.14

VISUAL ANALYSIS

I-80: TYROL TO WEST WENDOVER



VISUAL ANALYSIS

US 95: Winnemucca to McDermitt

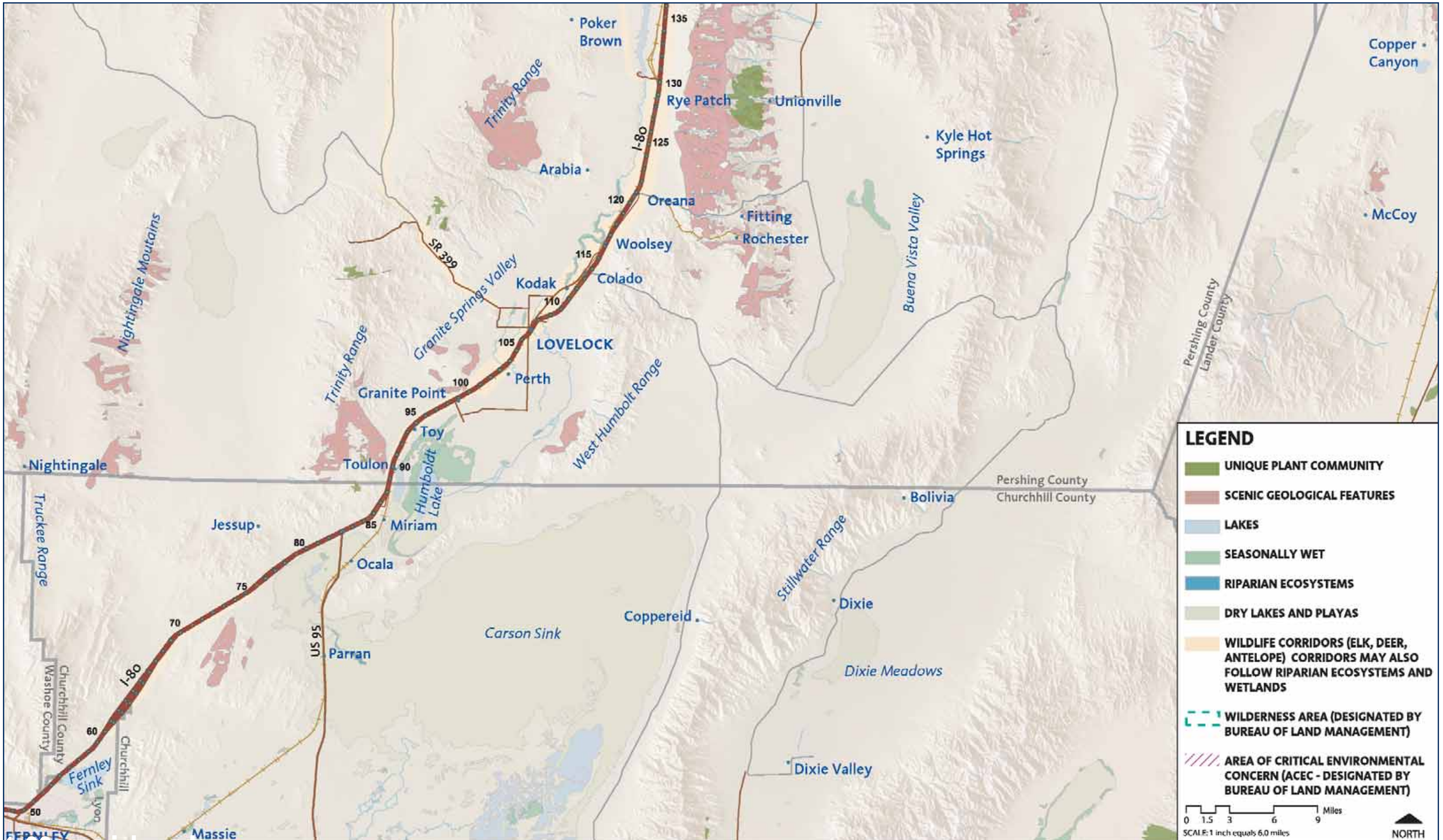
MAP K 2.16

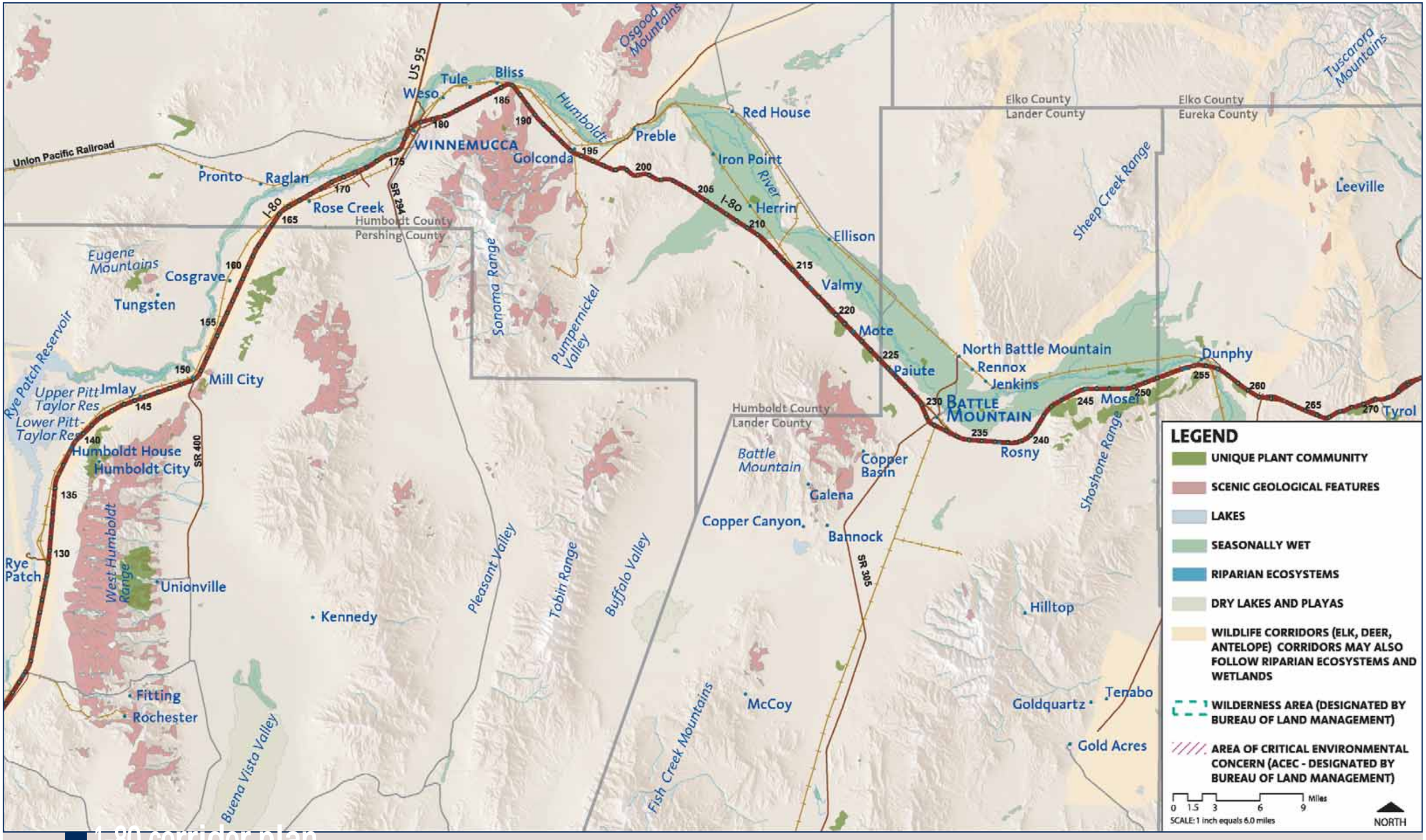
ENVIRONMENTAL ANALYSIS

I-80: VERDI TO FERNLEY

ENVIRONMENTAL ANALYSIS

I-80: Fernley to Rye Patch



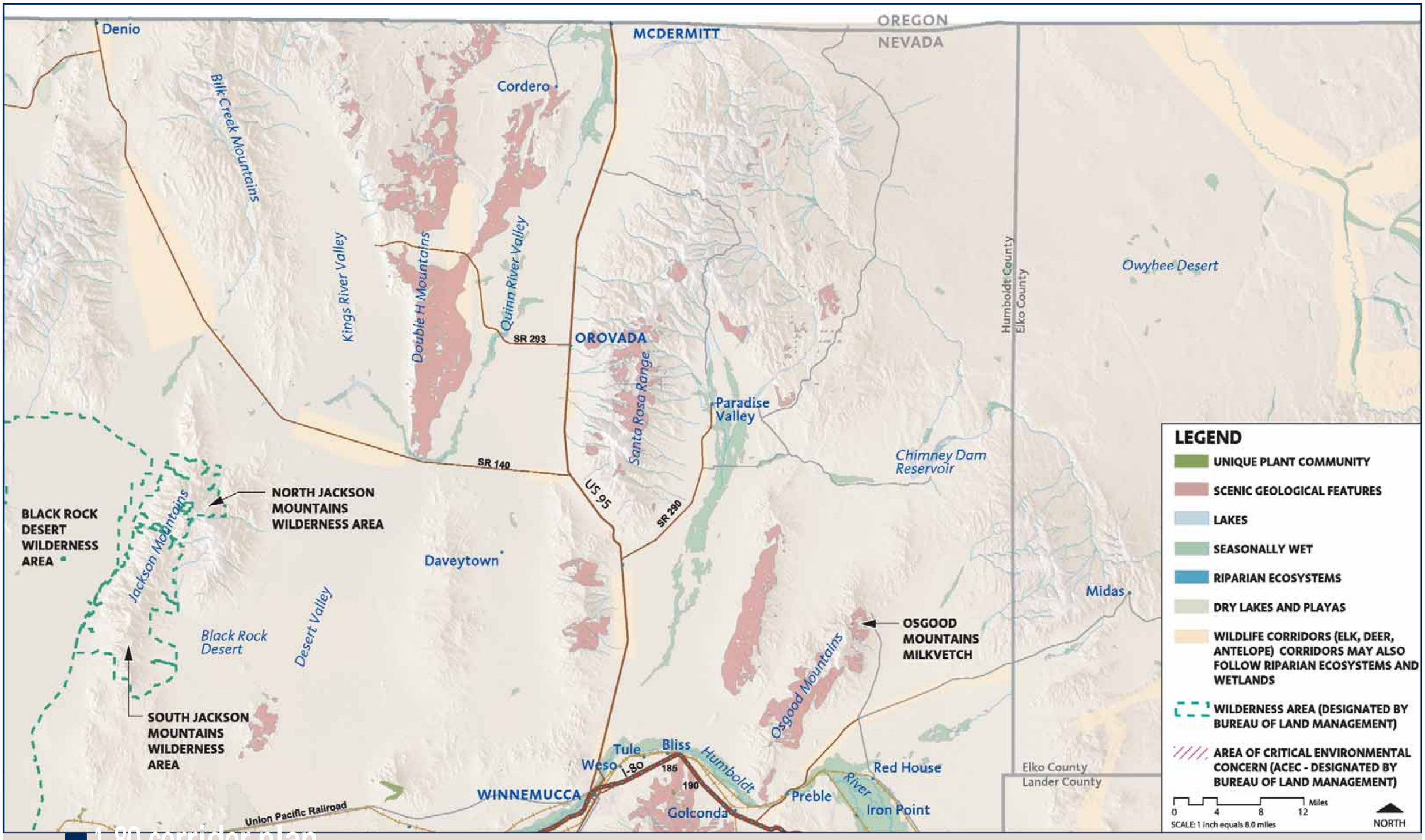


MAP M 2.18

ENVIRONMENTAL ANALYSIS

I-80: Rye Patch to Tyrol


WILDLIFE CORRIDOR
Union Pacific Railroad
SR 225
Adobe Range
Independence Mountains
Dinner Station
WELLS
Welcome
Deeth
SR 230
US 93
Pequop
Fendon
Cobre
SR 233
Oasis
Toano Range
Pilot Range
UTAH
NEVADA
I-80
Ryndon
Halleck
Elburz
SR 229
Osino
Coin
East Humboldt Range
Clover Valley
Tobar
Silver Zone
Clifton
Shafter
Rockland
Sage
Hogan
WEST WENDOVER
ELKO
Humboldt River
Spring Creek
Arthur
Lamoille
CARLIN
Tyrol
SR 228
Lee
Ruby Mountains
Sprucemont
Pequop Mountains
Goshute Valley
Old Bullion
Bullion
Carlin-Pinon Range
Elko County
Eureka County
Smith Ranch
Jiggs
Indian Village
Ruby Valley
Dolly Varden
LEGEND
UNIQUE PLANT COMMUNITY
SCENIC GEOLOGICAL FEATURES
LAKES
SEASONALLY WET
RIPARIAN ECOSYSTEMS
DRY LAKES AND PLAYAS
WILDLIFE CORRIDORS (ELK, DEER, ANTELOPE) CORRIDORS MAY ALSO FOLLOW RIPARIAN ECOSYSTEMS AND WETLANDS
WILDERNESS AREA (DESIGNATED BY BUREAU OF LAND MANAGEMENT)
AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC - DESIGNATED BY BUREAU OF LAND MANAGEMENT)
0 1.75 3.5 7 11.5 Miles
SCALE: 1 inch equals 7.0 miles
NORTH



MAP O 2.20

ENVIRONMENTAL ANALYSIS

US 95: WINNEMUCCA TO MCDERMITT

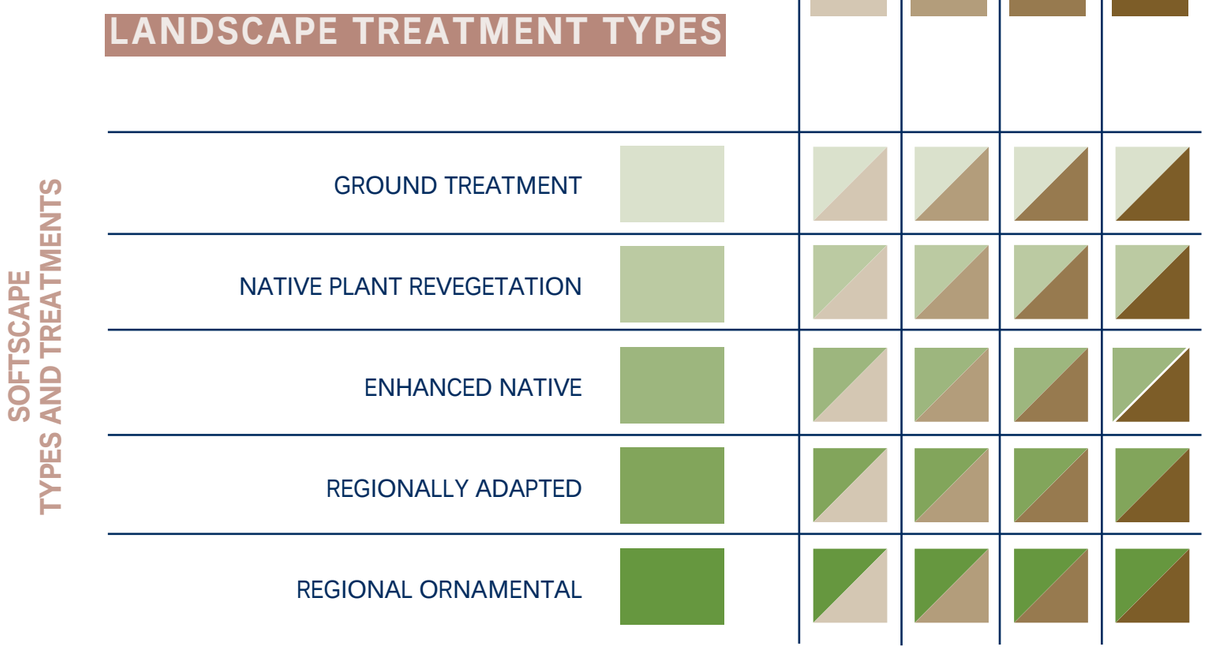
ELEMENTS OF LANDSCAPE AND AESTHETICS

The Elements of Landscape and Aesthetics define the functional purpose and visual intent of highway corridor improvements. The elements are represented by a variety of different components, including varying intensities of softscape, structures and hardscape; state-wide signage; rest area facilities; and many other items that affect visual quality within the corridor. To create a standardized understanding of the *Corridor Plan*, the following pages describe each of the elements.

While NDOT currently incorporates some of these elements, the descriptions in this section redefine the application of existing programs and establish new facility types. Following the component descriptions, each Landscape Design Segment is detailed. Design objectives, specific to each segment, are introduced at the beginning. Landscape and aesthetic elements that support the design objectives are then explicitly located and identified within each design segment.

Identifying a specific Landscape Treatment type is the first Element of Landscape and Aesthetics and is composed of a softscape designation and a structures and hardscape type. Every square foot of NDOT right-of-way has a Landscape Treatment type associated with it to define its design character and maintenance requirements. Softscape types are defined by a hierarchy of treatment levels, each with an established design intent. In a similar way, structures and hardscape treatments have been defined from the standard type to those with landmark quality for all NDOT right-of-way areas, from the standard type to those with landmark quality. Used in combination, these treatment levels will 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



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 including naturally occurring patterns of geology, vegetation, and soils. The successful emulation of these patterns will result in a landscape environment that includes the highway avoiding the distinctive separation between road and land.

In urban interstate highway segments, the highway is a major component of the character of the city. In fact, our perception of urban places is shaped by a highway's design and its features. Respecting adjacent communities and creating a coherent visual environment that builds unity into the urban fabric are key to the success of the urban highway system. The highway should provide a composition of focused punctuation at important places and transitional edges compatible to surrounding urban communities.

SOFTSCAPE TYPES AND TREATMENTS

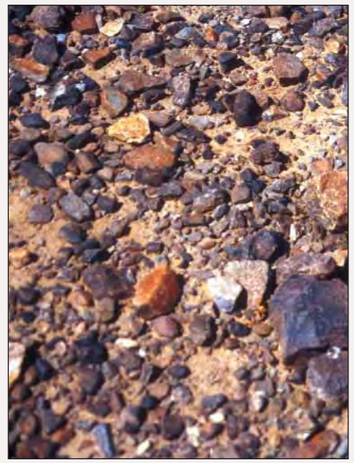
The following softscape treatments are descriptive planting types that define the design intent for future projects. These treatments are compositions of plant materials that include trees, shrubs, perennials, grasses, and ground treatments. The descriptions and photographic examples define the specific softscape types that may be utilized in a section of the corridor.

GROUND TREATMENT SOFTSCAPE

Erosion control and dust control are a major function of all ground treatments along the roadway. Rock mulches should be used beneath all softscape treatments, including native seed and container-planted natives and/or ornamentals. Uniform applications of rock mulch or variable sizes of stone and textures are available to match the existing environment. Example palettes are derived from natural patterns found in playas, foothills, or ephemeral drainages. In urban settings, various forms of aesthetic rock treatments are used to create patterns and textures. Irrigation is not included in this treatment. Soil stabilizer may be used in conjunction with these methods.

Total Cost: $1.15 - $1.35 sf L & A Cost: $0.00 sf


(1)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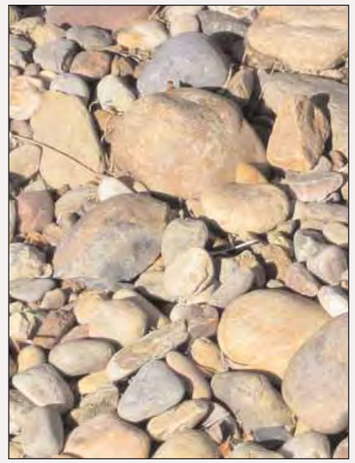

(3)


(4)

NATIVE PLANT REVEGETATION SOFTSCAPE

Returning roadway construction disturbance back to its native desert condition requires the use of a native Great Basin plant palette. This palette includes native communities such as the Sagebrush/Rabbitbrush or Pinyon/Juniper. The spacing and frequency of native plant distributions is sparse and individual plants are widely separated by scattered native rock mulch. Temporary irrigation may be needed to assure plant establishment, however this softscape type does not rely on permanent irrigation. Preparation techniques such as roughening grade for seed siting and amendments like top soil and mulch are required to enrich soil and protect against winds. Along with seeding, some mature plants may be used to provide an established plant community character.

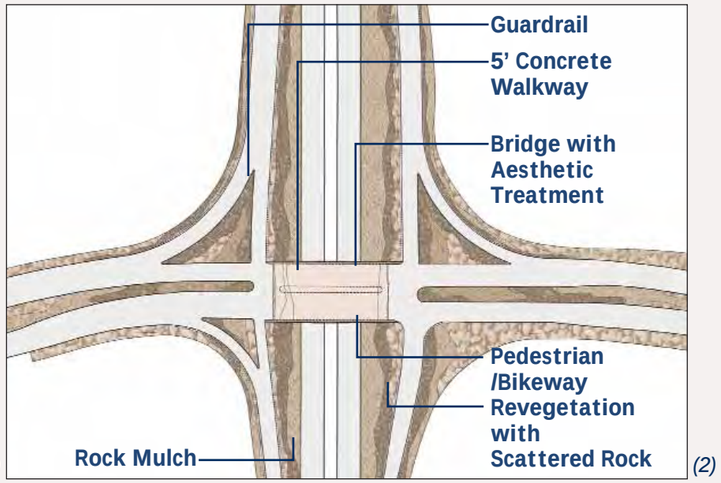
Total Cost: $1.15 - $1.35 sf L & A Cost: $0.00 sf


(1)

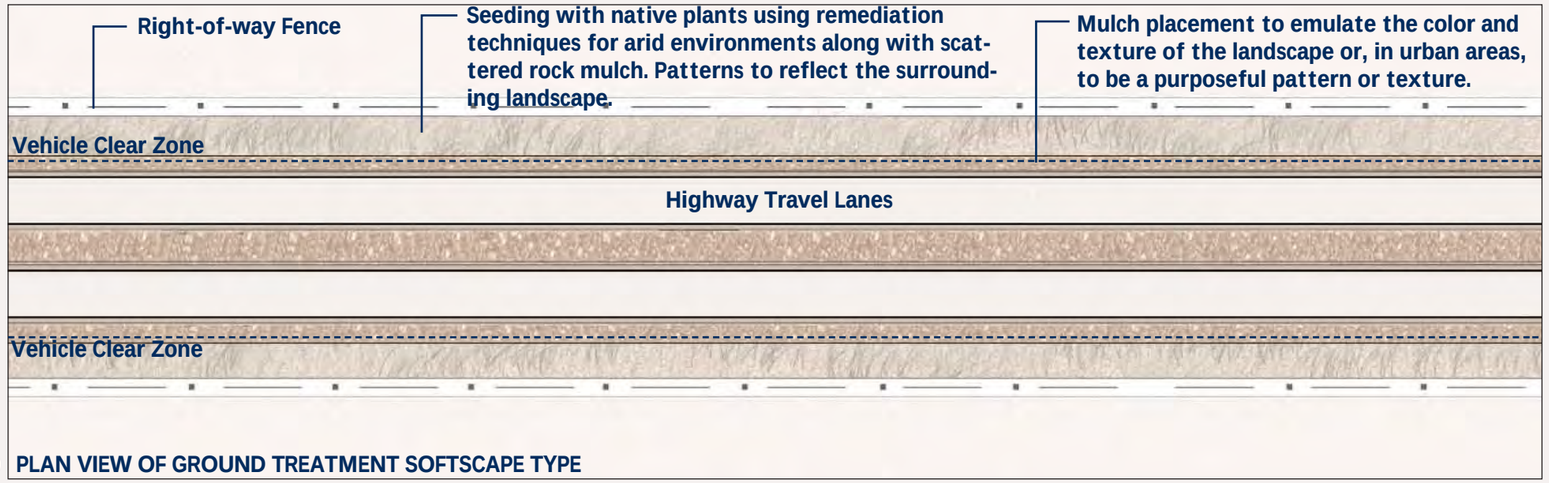

(2)


(3)

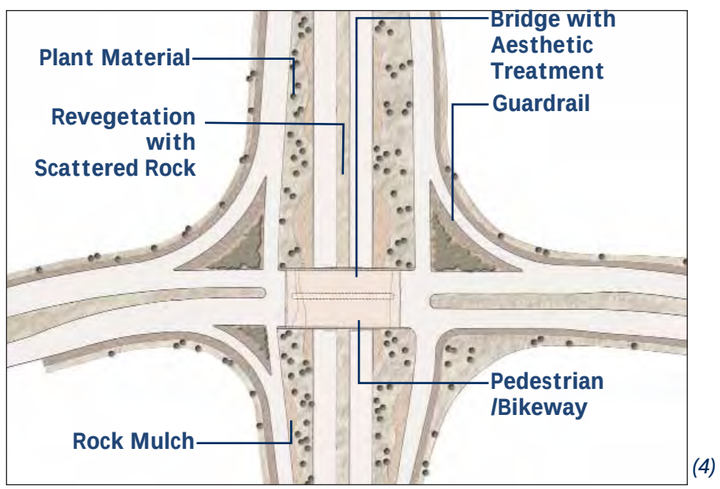
Note: These photographs are illustrative examples of the softscape types and treatments.



(1)

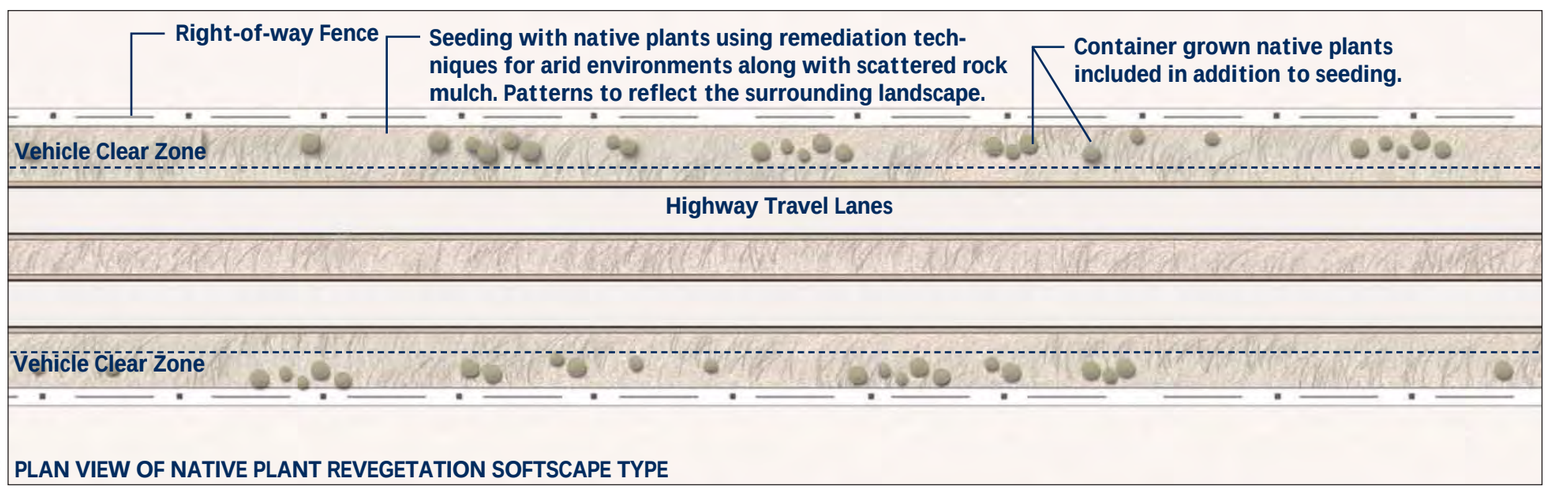


(2) PLAN VIEW OF GROUND TREATMENT SOFTSCAPE TYPE



(3)

PROTOTYPICAL INTERCHANGE



(4) PLAN VIEW OF NATIVE PLANT REVEGETATION SOFTSCAPE TYPE

PROTOTYPICAL INTERSTATE HIGHWAY DESIGN SEGMENT

SOFTSCAPE TYPES AND TREATMENTS

ENHANCED NATIVE SOFTSCAPE

This treatment accentuates change by introducing more types and species of plants to the Great Basin/Sierra Nevada revegetation plant palette, providing greater coverage and plant densities along with scattered native rock mulch. Adapted trees are used to increase vertical diversity. Special ground treatments are included for drainage and erosion control such as rip-rap and soil stabilizers. Supplemental irrigation is required to assure plant survival.

Total Cost: $1.40 - $1.60 sf L & A Cost: $0.25 sf


(1)


(2)


(3)

REGIONALLY ADAPTED SOFTSCAPE

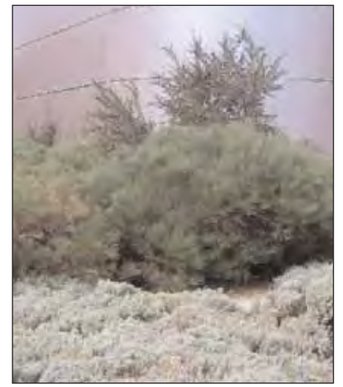
Combinations of Great Basin plants and those from other dry land environments form this landscape palette. Plants are combined in greater density and with layers of overstory trees, understory shrubs or perennials, and scattered native rock mulch. The expanded plant palette includes plants selected for form, seasonal change, special texture, and color. Great Basin adapted plants in this softscape type offer a desert garden quality and provide a full array of enriched landscape character. Drip irrigation to individual plants is required for this softscape type.

Total Cost: $2.25 - $2.75 sf L & A Cost: $1.10 - $1.60 sf


(1)


(2)


(3)


(4)

REGIONAL ORNAMENTAL SOFTSCAPE

Regional ornamental softscape is delineated by a high diversity of plant species, including those which are imported to this region. Ornamental softscape introduces taller and denser plant materials such as landmark deciduous trees similar in form to cottonwoods and poplars. Regional ornamental softscapes include shade from overstory trees, contain a wide variety of form and color, and create dynamic contrasts to the arid landscapes of naturally occurring plant species, along with scattered rock mulch. Patterns of plants and compositions of arrangements are not derived from naturally occurring communities. Rather, they are intended to be landscapes of cultural meaning. Drip irrigation systems are required for individual plants.

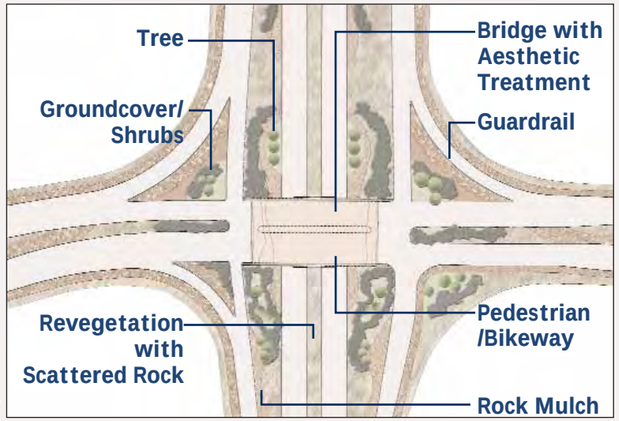
Total Cost: $3.50 - $6.00 sf L & A Cost: $2.35 - $4.85 sf


(1)

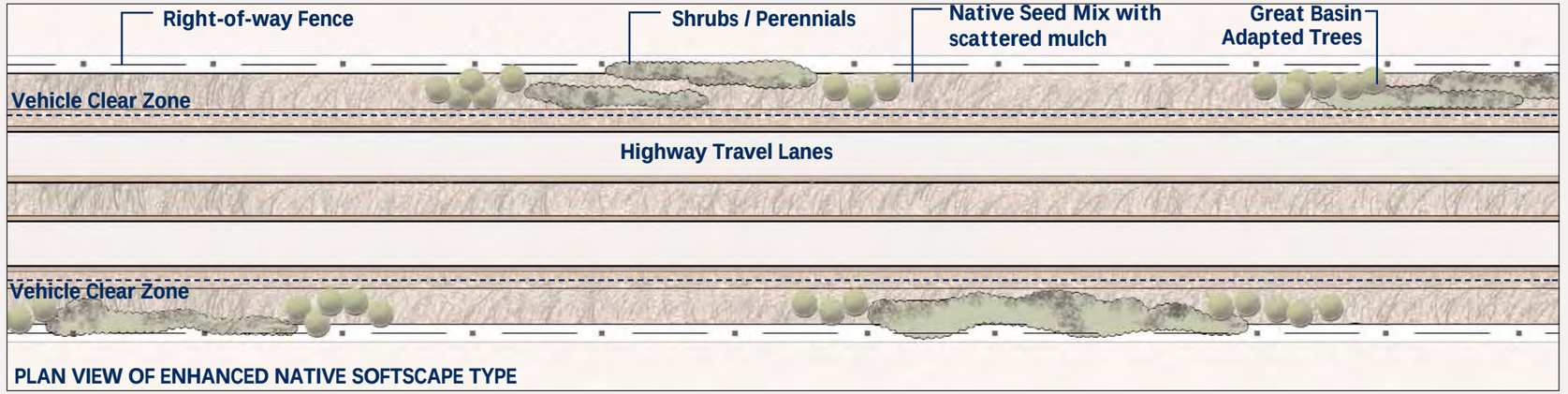

(2)


(3)

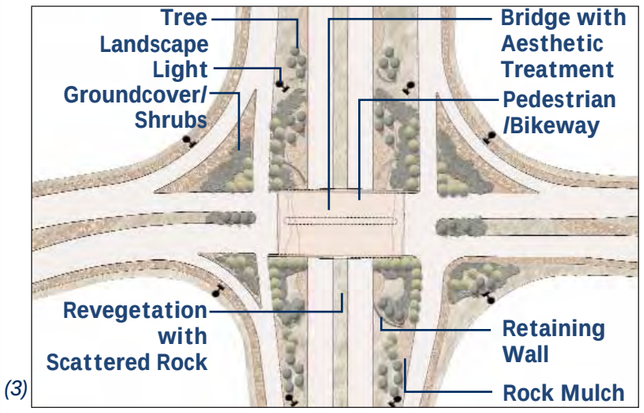
Note: These photographs are illustrative examples of the softscape types and treatments.



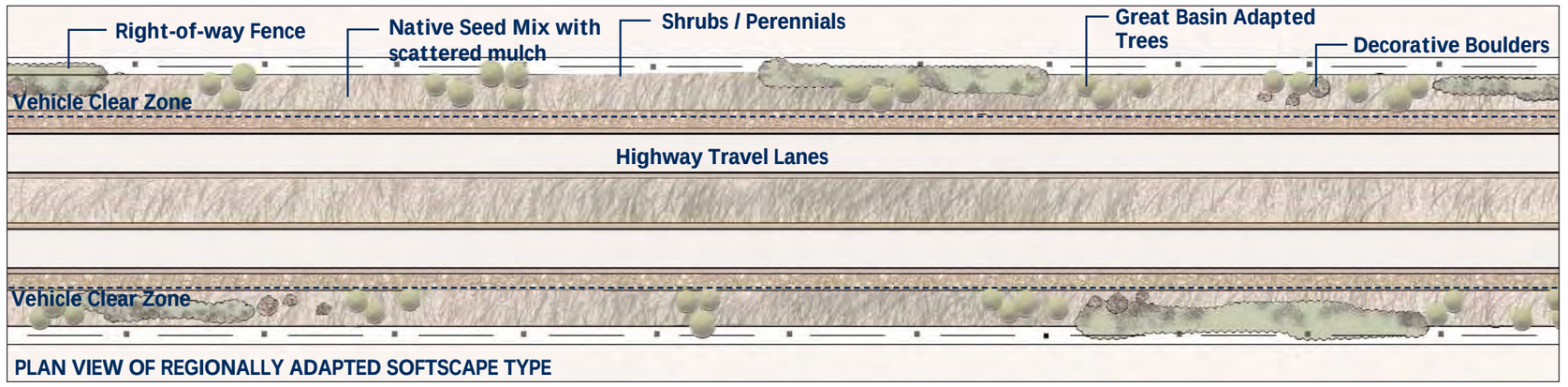
(1)



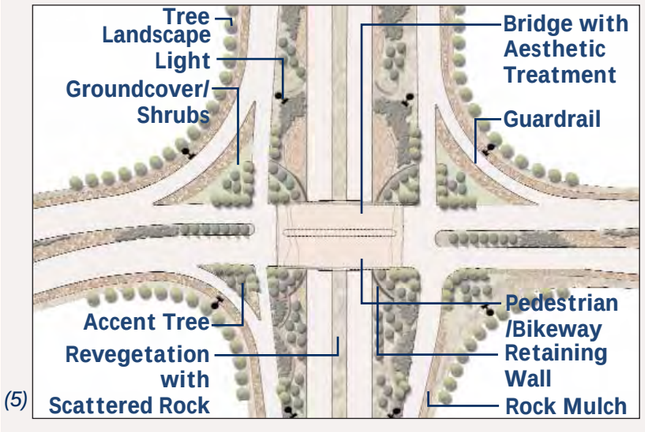
(2) PLAN VIEW OF ENHANCED NATIVE SOFTSCAPE TYPE



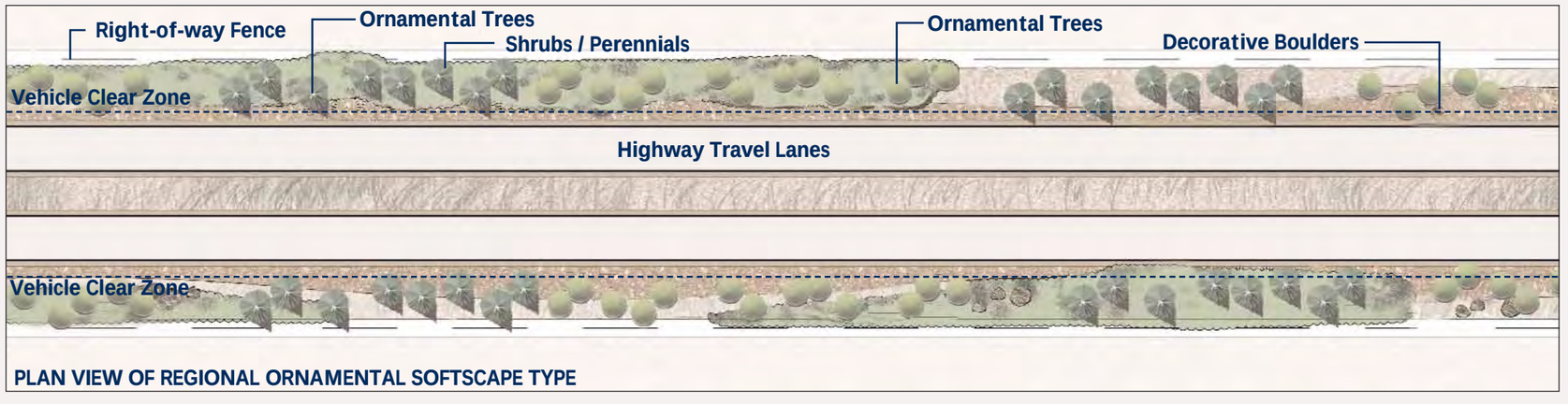
(3)



(4) PLAN VIEW OF REGIONALLY ADAPTED SOFTSCAPE TYPE



(5)



(6) PLAN VIEW OF REGIONAL ORNAMENTAL SOFTSCAPE TYPE

PROTOTYPICAL INTERCHANGE

PROTOTYPICAL INTERSTATE HIGHWAY DESIGN SEGMENT

Note: Refer to Cost Analysis pages 6.1 - 6.5 for more information on these illustrations.

STRUCTURES AND HARDSCAPE TYPES AND TREATMENTS

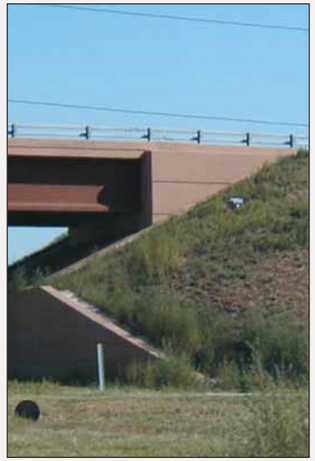
The following classifications are a common language for aesthetics of highway facility design. The treatments included are for bridges, retaining walls, acoustic walls, pedestrian crossings, railings, barrier railings, lighting, and transportation art.

STANDARD STRUCTURES AND HARDSCAPE

A standard treatment is simple, straightforward, and functional. Attention to color and proportion can improve aesthetic quality without increasing cost. Standard structures are economical in their design and satisfy the requirements of vehicle movement, but elaborate little on the establishment of design character or place-making. A regular maintenance program for trash and graffiti removal is imperative. A stained finish on concrete or a painted finish on steel are the standard NDOT surface treatments.

Total Cost: $110 - $115 sf L & A Cost: $0 sf


(1)


(2)


(3)

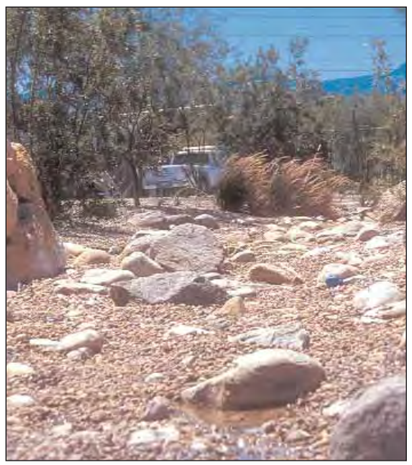

(4)

ACCENTUATED STRUCTURES AND HARDSCAPE

This type of treatment builds place character and enhances appearance by adding special accents and finishes to built structures. A unified system of materials and textures define corridor pattern design. Transportation art may be applied and upgraded finishes and colors for structures are included. Decorative rock for drainage or aesthetics is included. Special contour grading is used to create desired land shape, and drainage features that harvest water may be features of the hardscape design.

Total Cost: $125 - $135 sf L & A Cost: $15 - $25 sf


(1)


(2)


(3)


(4)

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

FOCAL STRUCTURES AND HARDSCAPE

Focal structures and hardscape type treatments provide a singular expression for a project with a specific design character. Structures are constructed of self-weathering materials, integrated color or textural finishes, and may include the use of form liner imprints on structural surfaces. Patterns may be created by using multiple surfaces. Barrier rails utilize custom construction and include designs that are artistically incorporated into the structure, elevating engineering to an art form. Upgraded lighting includes lighting with decorative elements serving both a functional and aesthetic purpose.

Total Cost: $170 - $185 sf L & A Cost: $60 - $75 sf


(1)


(2)


(3)

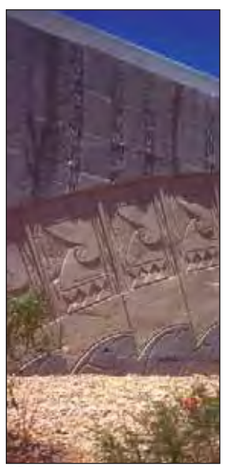

(4)

LANDMARK STRUCTURES AND HARDSCAPE

Landmark, the most enhanced level of structures and hardscape treatments, truly explores the possibilities of the place. Landmark treatment calls attention to custom features and highlights unique elements. Extensive aesthetic treatments are used on all bridge structures, retaining walls, acoustic walls, barrier rails, and pedestrian crossings. Special significance is exhibited through one-of-a-kind form liner treatments on structural surfaces. Transportation art is prominent and evocative in subject and composition. Elaborate lighting includes special effects for night time beyond what may be necessary to provide for safety.

Total Cost: $210 - $250 sf L & A Cost: $100 - $140 sf


(1)

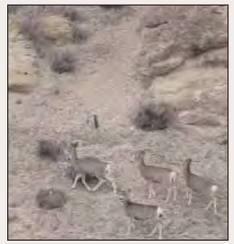

(2)


(3)


(4)


(5)

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



(1) Wildlife Viewing

(2) Ghost Town: Metropolis

(3) Pilot Peak was an important landmark for Emigrant Trail travelers.

(4) Railroads helped shape communities along I-80.

NEVADA PLACE NAME SIGN PROGRAM

As part of the Elements of Landscape and Aesthetics, a new statewide place name and point-of-interest sign program distinctive to the State of Nevada will be designed to better connect people to places.

Benefits of the Program

The State of Nevada is a large geographic area with diverse and sometimes well-hidden features. The sign program will provide clear and consistent direction from the corridors to scenic areas, points-of-interest, historical sites, and local attractions. The signs will welcome visitors and inform residents, drawing attention to these important assets and affirming the rich history and physical attributes of the state while stimulating local economies. The sign program will encourage visitors and residents to gain a better understanding of the history, culture, and geology of the state. The signs, consistent in color and material, will unify the roadway. Place name signs will be of high quality and will be as durable as other standard highway signs.

How the Program Will Work

Utilizing the current Federal Manual on Uniform Traffic Control Devices (MUTCD) as a base, a customized and distinctive set of iconic symbols specific to Nevada will be designed for use on standardized directional and identification signs. To insure uniformity and consistency, a State managed and controlled policy manual for the signs will be implemented. The manual will be referred to as the Nevada Place Name Sign Manual. The program will be promoted through informational brochures available at welcome centers, identification on state maps, and other locally based advertisements. Symbols used to provide directions and mark points of interest will be recognizable pictorials that are specific to the special point of interest. Federal Highway Administration (FHWA) approval for the Nevada Place Name Sign Program will be gained prior to installation.

Eligibility

With a State managed and controlled program, an initial inventory of categories common to the state, as well as features specific to each interstate corridor, will be established and approved by NDOT. After the initial inventory is confirmed, state and local entities will be permitted to apply for inclusion based on specific criteria.

Anticipated Categories

Possible categories for sign icons common to the State of Nevada include, but are not limited to:

- Historical Features and Sites such as railroads, mines, mining towns, logging flume, Comstock Lode, ghost towns, explorers, emigrant trails, etc.
- Wildlife Viewing Areas
- Flora
- Geographic Features
- Geological Places of Interest
- Landmarks
- Cultural Resources
- Museums

Specific areas of interest in I-80 corridor include, but are not limited to:

- Truckee River
- California Emigrant Trail
- Mount Rose
- Virginia City
- Pyramid Lake
- Lake Tahoe
- Reno Downtown
- Victoria Square
- University of Nevada
- Derby Diversion Dam
- Forty-mile Desert
- Applegate-Lassen Cutoff Trail
- Rye Patch State Recreation Area
- Wild Horse State Reservoir
- South Fork State Recreation Area
- Humboldt River
- Humboldt Toiyabe National Forest
- Unionville (silver mining)
- Ruby Mountains Wilderness
- Pilot Peak
- Wendover Air Force Auxiliary Field
- Metropolis (ghost town)

Associated Cost

The sign program is expected to have a direct economic benefit to smaller communities and local attractions. Through increased tax revenue, the State will recognize a tangible return on its investment. Partnering with businesses is possible through sponsorship providing partial cost offsets.

Signs Included in the Program

Exit to Area of Interest or Town

This primary sign type will be used as an informational listing located in advance of interstate exits. It will illustrate iconic symbols and descriptions as well as the interstate exit number (see illustration 7, page 3.9).

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

(4) symbols will be used on each sign. Written descriptions are required to accompany iconic symbols.

Directional Sign On State or County Road

This secondary sign type will be used as an informational listing located on state or county roads or intersections. It will feature iconic symbols, descriptions, and a directional arrow (see illustration 8).

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 (4) symbols to be used on each sign—one (1) per panel. Written descriptions are required to accompany iconic symbols.

Scenic Area or Outlook Pull-off

This sign type will be located prior to pull-offs, illustrating iconic symbols and descriptions as well as the distance to the pull-off (see illustration 9).

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 (2) symbols to be used on each sign. Written descriptions are required to accompany iconic symbols.

(1) Sign for Deer (Viewing Area)

(2) Sign for Mining Area

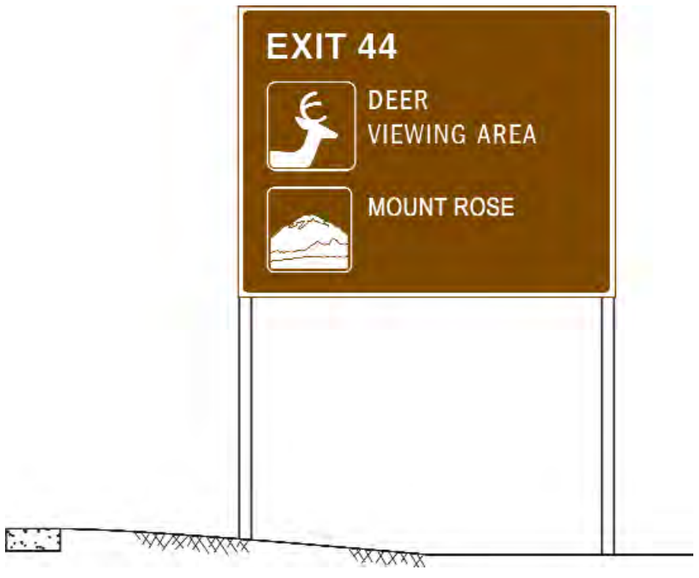
(3) Sign for Truckee River

(4) Sign for Historic Rail

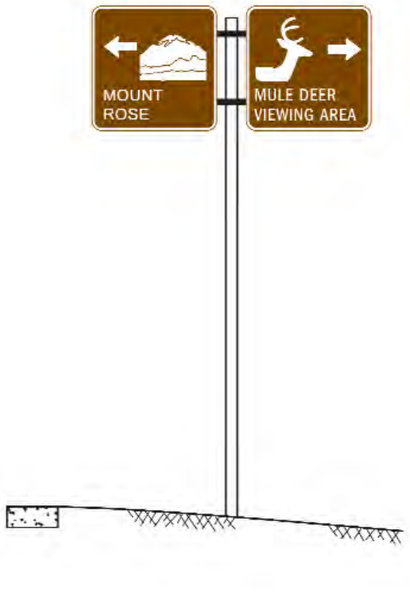
(5) Sign for Humboldt River

(6) Sign for Mount Rose

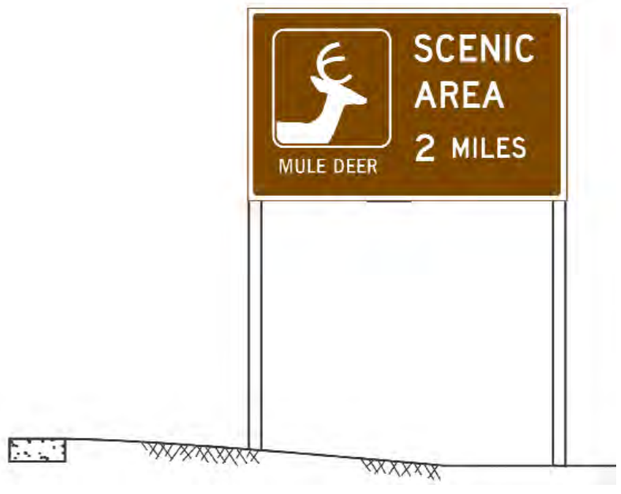
CUSTOM SIGN ICONIC SYMBOLS



(7) Sign for exit to area of interest or town

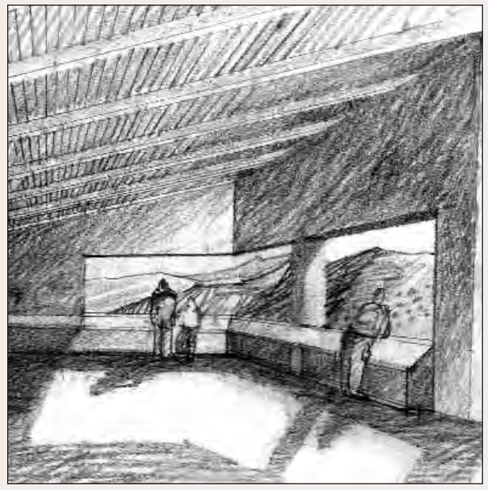


(8) Place name sign on a state or county road



(9) Sign for scenic area or outlook pull-off

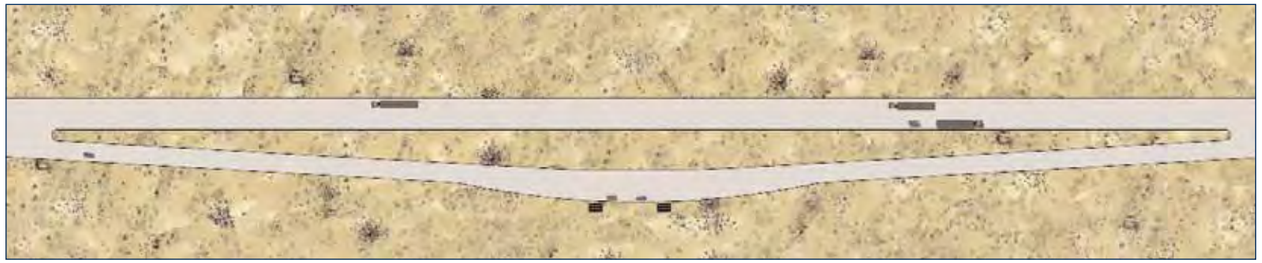
(1) This illustration depicts facilities that would make up the elements of a basic rest area.



(2) This illustration reveals how to take advantage of scenic vistas by controlling views with window cut-outs integrated within the rest area structure.

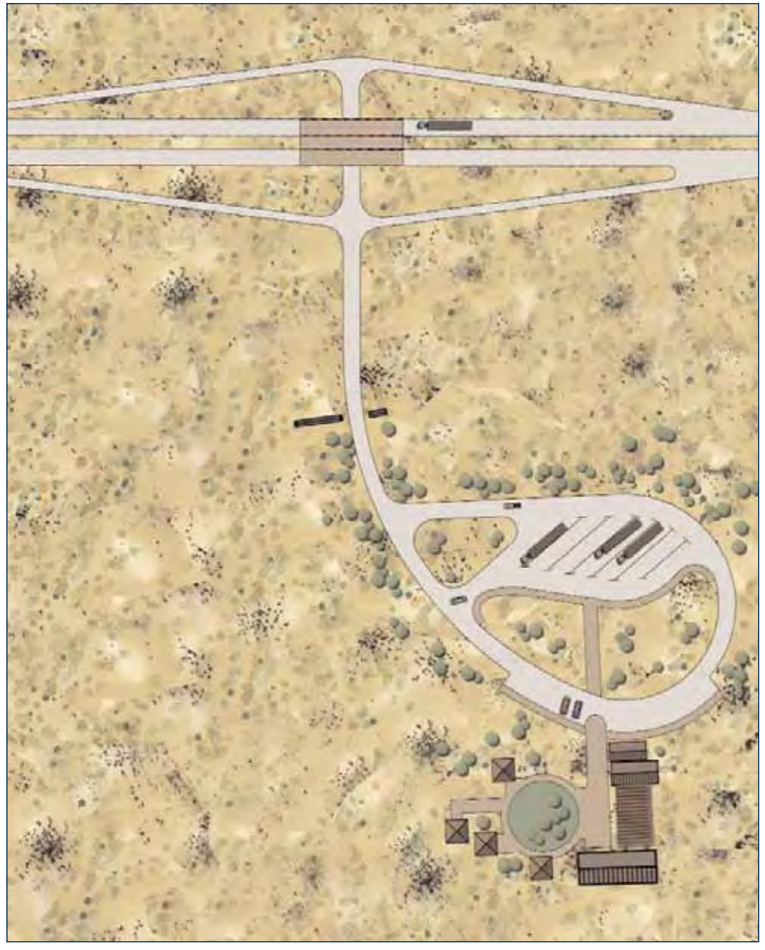
ROAD SERVICES PROGRAM

Road services are an important part of the experience along any roadway corridor. They are even more critical in areas of Nevada where long distances separate developed areas. The road service matrix on the facing page (3.11) describes varying levels of service stops that could be included in the corridor. From the limited softscape treatment and program of the Roadside Pull-off to the landmark quality of the Welcome Center, these service areas will provide travelers with designated spaces to rest, interpret history and geography, and discover information about nearby activities and communities. Additional information regarding rest areas and road services is described on pages 5.6 and 5.7 in the Design Guidelines chapter.



(3) This illustration depicts facilities that would make up the elements of a roadside pull-off.

(4) This illustration depicts facilities that would make up the elements of a viewpoint and point of interest site.



(5) This illustration depicts facilities that would make up the elements of a complete rest area.

ROAD SERVICES PROGRAM

	Description	Landscape Treatment	Program Elements	
ROADSIDE PULL-OFF	Roadside pull-offs provide facilities for drivers to exit the highway for a brief period. Facilities that respond to the landscape character 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 softscape types • Standard hardscape type	• Site-specific interpretive signage • Toilets/no running water (where associated with truck pull-offs) • Trash containers • Limited car and recreational vehicle parking • Limited/temporary truck parking	• Scenic overlooks • Located according to travelers' needs and unique features • Shade canopy (vegetation or structure)
VIEWPOINTS AND POINTS OF INTEREST	Viewpoints and points of interests present opportunities to view unique vistas, special natural resources, historical 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. Travelers are provided with a detailed look at the site or point of interest.	• Native plant revegetation to enhanced native softscape 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) • Limited/temporary truck parking (if conditions permit)
BASIC REST AREA	Basic rest areas are located throughout the state offering site specific interpretive information. They have limited rest room facilities which may or may not include running water, depending on availability. Typically, these rest areas are located to take advantage of scenic views, unique historical, cultural or environmental features, and to provide travelers' resting places enroute.	• Enhanced native softscape type • Standard to accentuated hardscape types	• Located according to traveler's needs and unique site features • Site-specific interpretive signage • Toilets/no running water (only where available) • 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 located at 60-mile intervals throughout the state and are typically situated outside of developed areas. They feature modern facilities along 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 softscape type • Accentuated to 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 & waste dispensers • Shade canopy (vegetation or structure) • Local community information
GATEWAY REST AREA	As entryways, the gateway facilities convey first and last impressions and identity. Special features may be incorporated into the design to highlight the area through design interpretation of the place and gateways may be associated with any level of rest area 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 softscape type • Focal 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 where travelers can have access to useful travel information. Welcome centers include a staffed information kiosk.	• Regionally adapted softscape type • Landmark hardscape type	• Located at major entry routes to state • Informational services • Staffed visitor center • Statewide 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 and recycle containers • Bicycle storage units • Paved car and recreational vehicle parking • Paved truck parking • Improved trails • Children's play area • Pet rest facilities & waste dispensers • Shade canopy (vegetation or structure) • Telescopes/viewfinders

Image courtesy of Ronald J. Taylor.

(1) The Sagebrush Steppe along I-80 provides a continuous plant palette and reduces the maintenance costs associated with roadsides.

NATIVE WILDFLOWER PROGRAM

Inspired by a vision of native plant species along rights-of-way to enhance the beauty and connectivity to the land, the Federal Highway Administration has adopted two programs to promote the use of forbs and grasses that naturally occur in a particular region, state, or ecosystem. In 1987, the Surface Transportation and Uniform Relocation Assistance Act (STURAA) required that at least one-quarter of one percent of funds expended for any Federal-aid highway system landscape project be utilized for native wildflowers plantings. In addition to improved aesthetics, 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.

A revegetation study conducted by the University of Nevada supports the use of forbs and grasses along highway right-of-ways. A list of forbs and grasses that are appropriate to specific regions and ecosystems and require “little or no maintenance…(and) create defensible space for wildfire along the highway corridors” was provided (Tueller, Post Noonan, 2002). As part of the wildflower program, these suggested plants should be utilized with others that do not create a fire hazard or overly attract wildlife.

INVASIVE AND NOXIOUS WEED CONTROL

Introduction of invasive species can deteriorate economic and environmental quality and cause harm to human health. Invasive species decrease diversity and are strong competitors to native species. The Nevada State Department of Agriculture has identified a list of noxious weeds that should be addressed in a revegetation program along the corridor. The list can be referenced at the following site and is also listed in the Technical Appendix A.

www.agri.state.nv.us/nwac/nv_noxweeds.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 need to be factored into new landscape design projects including following the best procedures and management practices for successful revegetation. Examples of these procedures include:

- Tailoring revegetation procedures to specific plant community types.
- Making recommendations for site and soil preparation.
- Including site appropriate revegetative practices.

OUTDOOR ADVERTISING

Outdoor advertising, specifically billboards, provides opportunities for businesses, community groups, and other organizations to inform travelers along the interstate about the various establishments and available services. However, billboards impact the visual quality of the highway because they obstruct views of scenic features and the natural landscape. As a result, community groups are committed to the restriction 0f new billboards and the removal of existing billboards from areas near and within their communities.

The Highway Beautification Act

The Highway Beautification Act (HBA) was passed in 1965 with the intent to control billboard construction along Federal-aid highways and to 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 the limitation of signage that is visible and intended to be read from the roadway to include only:

- Informational and directional signs pertaining to distinctive natural, scenic, or historical attractions
- On-site real estate signs
- On-site business signs
- Landmark signs associated with historic, natural, or artistic purposes
- Free coffee signs promoted by nonprofit organizations

Limitations

In the almost 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 of Section G of the law, which 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 of the HBA is the allowance of billboard construction in areas zoned for commercial and industrial uses, as well as in unzoned areas with commercial or industrial uses. The provision also acknowledges that the State has authority over the zoning laws. It is this entitlement that allows the State to implement zoning regulations that 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. The amendment to the HBA, passed by Congress in 1995 with the 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 to utilize only local restrictions for billboard control. Therefore, areas of lower scenic quality continue to become more unattractive and reduce the overall scenic character of the byway.

Nevada Statutes

Removal of 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 and further defines the methodology to determine "just compensation" as including the uniqueness of the property as well as the income generated from the sign rather than the traditional cost approach. This revision creates a cost prohibitive solution to sign removal.

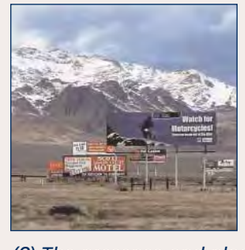
Although control of outdoor advertising seems daunting, there are regulations that provide restrictions to billboard construction. NRS 405.050 allows counties to deny permits for billboards that may “measurably destroy the natural beauty of the scenery or obscure a view of the road ahead.” Additionally,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

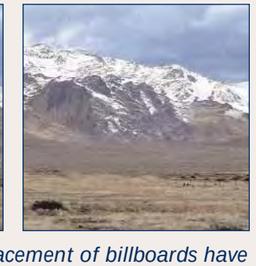
The Role of Local Government

Cities and counties have the ability to regulate the location and, to a limited degree, the type of billboard erected within their jurisdiction. The development of design standards that address height, size, color, and context in which the billboards are located is a valuable method of directing outdoor advertising. The visual impact of billboards in the rural landscape is much greater than the impact generated by billboards in an urbanized location. The choices local communities make to regulate the location of billboards can reduce the scenic impact of billboards and improve the 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.

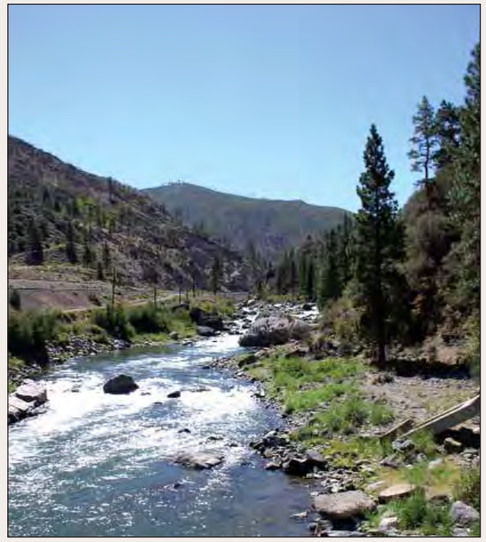
(1) Existing outdoor advertising in a natural landscape setting has a significant negative effect on the visual quality of the state’s highways.

(2) At many points in the corridors, multiple outdoor advertising signs are located adjacent to the right- of-way.





(3) The presence and placement of billboards have a significant negative impact on the visual quality of the corridor. Outdoor advertising should be carefully controlled to preserve existing vistas and reduce visual clutter.



(1) *State and Federal designation of scenic byways can contribute to the successful resolution of the conflict between outdoor advertising and scenic growth.*

(2) Scenic byway signage coordinates with byways designated on state maps.

SCENIC HIGHWAY DESIGNATION

Twenty-one scenic byways have been designated in Nevada since legislation established the state's Scenic Byways program in 1983, including two National Scenic Byways and one All-American Road. Prominent byways that may be accessed from I-80 include Mount Rose Highway (SR 441), a National Scenic Byway; Pyramid Lake Road (SR 445); Angel Lake Road (SR 231), and Lamoille Canyon (SR 227).

According to the FHWA, scenic roadway designation has four significant benefits: preservation, promotion, pride, and partnerships. Preservation of vistas, roadside scenery, and historic buildings can be facilitated through the program. The Highway Beautification Act of 1965 prohibits new billboards along designated scenic byways that are interstate, part of the National Highway System, or federally-aided primary roads. The National Highway Designation Act of 1995 amends the law and allows portions of the byway to be segmented if sections of the roadway fail to meet the criteria set for a scenic byway. These segments are controlled by local regulations rather than the stricter federal billboard controls. This exception allows new billboards to be erected, subject only to existing State or local controls. The preservation of scenic quality can also be facilitated through the use of scenic or conservation easements. In addition to preserving the landscape character, these measures also provide the participating entity with a one-time tax deduction equal to the foregone value of the use of the land.

Scenic byways are promoted through NDOT, the Nevada Commission on Tourism, and the FHWA. Tourism related facilities such as visitor centers, rest areas, and the place name signage program can be coordinated with informational materials to create an integrated roadway system. Local awareness about the roadway is increased through the scenic designation. Enhanced pride attracts 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

Finally, the opportunity for partnerships may be expanded with scenic designation. Public and private partnerships may be formed to make the goals of the byway a reality. The America's Byways Resource Center provides technical assistance and joins with the FHWA to provide seminars and workshops to further facilitate the partnering process.

The scenic roadway plan consists of federal, state, and local programs that provide methods for roadways to be eligible for scenic designation in Nevada.

- The federal BLM Back Country Byways and USFS Scenic Byways programs focus on roads less frequently traveled that lead to back country or wilderness. They include paved, unpaved, and four-wheel drive roads.
- The Nevada Scenic Byways program focuses on roadways that are accessible year-round to the average motorist. 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 is established on a statewide level and allows communities to promote special roadways and other modes of travel (like boat, balloon and train rides, bicycling or rafting trips) that do not fit under any of the other three programs.

Local groups and agencies nominate and manage scenic byways and local tourism routes. The "Scenic Byway" designation is reserved for routes approved by NDOT. The Director of NDOT makes the final designation after review and approval of the road by the State Scenic Byways Committee, which is composed of representatives from NDOT, the Nevada Commission on Tourism, the Nevada Division of State Parks, and the BLM. 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 or 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 that are not available with basic designation. The advanced designation requires a corridor management plan and has a five year re-certification obligation.

Interstate highways have not been included in the state program because a prime objective of the program is to encourage travelers to take non-interstate routes through the state as a means of increasing 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, including interstates. The *Corridor Plan* recommends that this designation occur in areas of high scenic quality to limit the number of billboards and signs that obstruct views. Areas of high visual quality recommended for this designation have been identified on the Specific Corridor Features map for each landscape design segment (pages 4.12, 4.20, and 4.28).

ANTI-LITTERING CAMPAIGN AND SIGNAGE

Fast food containers, plastic drink bottles, trash bags, and rusty kitchen appliances found along the roadside impact the scenic quality of the Nevada landscape and negatively affect the experience of the traveler. In fact, so pervasive is litter along the roadside in northern Nevada that its removal may be the single most significant factor in improving the visual quality of the I-80 corridor. A statewide anti-littering campaign would represent a significant step towards cleaning up Nevada's highways and interstates. The campaign should be advertised in an edgy and straight-forward fashion to command the attention of residents and travelers. Similar to the "Don't Mess with Texas" anti-littering campaign, this program has the potential to become a marketing concept for the State of Nevada. The program would be promoted through several modes of communication, including roadway signage, magazine advertisements, and bumper stickers.

Distribution of campaign materials would be focused at travel-oriented locations such as statewide welcome centers, rest areas, and truck stops. Coupled with the promotional materials, an "Adopt-A-Highway" program would engage the residents of Nevada and allow them to take an active role in keeping their highways clean and beautiful. This plan recommends the implementation of an anti-littering campaign that is made highly visible through signage, and includes easily distributed collateral materials and an active volunteer clean-up program.

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

(2)

(3)

(4)

(5) 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.

(6) Trash clean-up enhances the scenic quality of the corridor.

LANDSCAPE DESIGN SEGMENTS

Landscape design segments define areas of similar character in which the same major design theme is applied. Topography, plant communities, and urban development influence how the segments are delineated. Within landscape design segments, sub-segments are identified where there are changes in landscape or cultural dimensions that influence the design application. These detailed sub-segments represent districts that have the same design intent as the overall theme, but may display different design interpretations, plant selections, or other features.

Theme of Landscape Design Segments

Each design theme provides a unifying concept throughout the design segment. Each theme, as described below, is intended to be the overarching idea that will guide future design projects and interpretations.

1. Sierra Nevada Passage

From the Nevada stateline near Verdi, the arrival into Nevada through the Carson Range descends into the Truckee Meadows area of Reno and Sparks.

The gateway to the state creates an important impression and introduces the state to visitors. Sculpted and carved from the landscape, this entry also speaks to the culture, history, and natural features of Nevada, such as the Truckee River. A gateway feature marks the transition from California to Nevada, and includes a welcome center that is carefully integrated into its surroundings and provides travel services and statewide visitor information.

The corridor weaves through the lightly forested foothills and valley as an integrated component of the landscape. Disturbed mountain slopes are softened into the natural landform through repair, restoration, and re-coloration.

The preservation and management of the corridor's mountain valley character can be a legacy. Further along the corridor, where future growth and expansion of the city are likely to occur, this segment is managed to retain its rugged, mountainous character. Highway structures utilize muted color tones and reflect hues of the Carson Range. Design of highway features such as bridges and barriers will be simple, and the landscape will rely on native plant revegetation or enhanced native planting.

2. Sierra Nevada Great Basin Crossroads

The Sierra Nevada Great Basin Crossroads represents an area of transition between two major geographic areas of the state—the Sierras and the Great Basin. Beginning at Mogul, the gradual transition from the pine forests of the Sierras to the sage expanses of the Great Basin is accompanied by a rapid increase in urbanization.

Throughout the urban areas of Reno and Sparks, a unified palette of Sierra and Great Basin materials are integrated in the highway features. The juncture of the two regions is emphasized at the interchange of I-80 and US 395. The Sierra palette enters from the west and the Great Basin palette from the east. Movement and energy are represented through a landmark softscape.

Landscape types for the corridor segment are expressed through regionally adapted plantings, and the hardscapes types are enhanced to signify their importance along this segment. Art expression within and along the highway provides meaning to the place through representations of cultural, historical, and natural resources.

Softening constricted areas with vegetation and incorporating cultural transportation art into the corridor reflects the close-knit character of the communities. Integrating a regional trail system and eliminating barriers by bridging separations will create a network that will be an alternative regional transportation route that co-exists with highways.

3. Truckee River Passage

Beginning at the urbanized edge of Sparks, the segment follows the Truckee River to its northerly bend near Fernley. The roadway is sensitively carved into the confined canyon, disturbed slopes are repaired and restored, and rock cut and slope cut transitions are softened. Guardrails and barriers are designed so that they still offer views to the riparian corridor below where feasible. This helps create visual relief, reveals the visually contrasting landscape, and defines elements of the Truckee River.

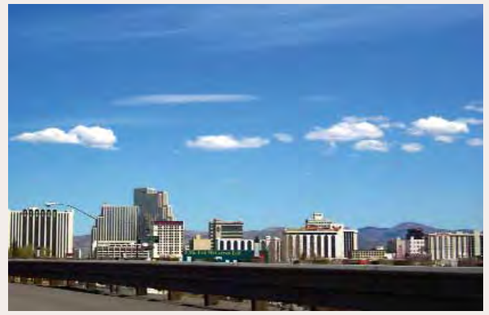
The canyon's intrinsic qualities are managed through scenic designation as well as visual mitigation and screening of industrial uses. Design intent is focused on connecting the highway to the unique cultural, historical, and biological features of the Truckee Canyon and Great Basin.

The community character of Fernley is highlighted with the creation of two gateways. Design objectives are met through the utilization of native plantings to revegetate disturbed lands and the enhancement of highway features with accentuated hardscape types.

4. Highway of the West

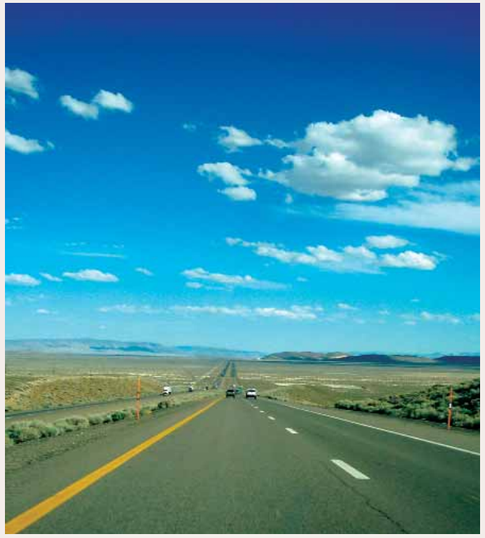
The overarching vision and design context for both I-80 from Fernley to West Wendover and US-95 from Winnemucca to McDermitt focuses on the history of the area, the timelessness of the landscape, and the connection of the people to the place. Both highways

(1) Extending from the California/Nevada border to Mogul, the Sierra Nevada Passage Design Segment provides a dramatic entry into the Reno/Sparks urbanized area.



(2) The Sierra Nevada Great Basin Crossroads Design Segment includes the urban interstate routes of Reno/Sparks and extends east from Mogul to Vista.

(3) The Truckee River Passage Design Segment winds its way through the Truckee River canyon and provides a natural gateway to the urbanized portions of the corridor.



(1) Bisecting vast stretches of undeveloped land and framed by rugged mountain ranges, the Highway of the West Design Segment is characterized by a rural quality that reflects the historic, cultural, and geologic forces that shaped the landscape.

follow historic pioneer trails, traverse open ranges and working landscapes that have traditionally exemplified the West, and serve as the lifeline for the neighboring homesteads and communities.

The rugged environmental character of the land and simple agrarian lifestyle of residents in this region define the spirit of the Highway of the West. Beginning at the Forty-mile Desert just east of Fernley, the expansive landscape is defined by a series of alternating mountain ranges and valleys. Materials, textures, and colors take their cue from the desert setting and reflect the regional vernacular form of homesteads and the ideals of western independence. Ornate embellishments and ostentatious colors are rejected in favor of organized straightforward solutions. Scenic views are punctuated with clustered plantings, such as shelter belts, and associated architectural elements, including windmills and barns.

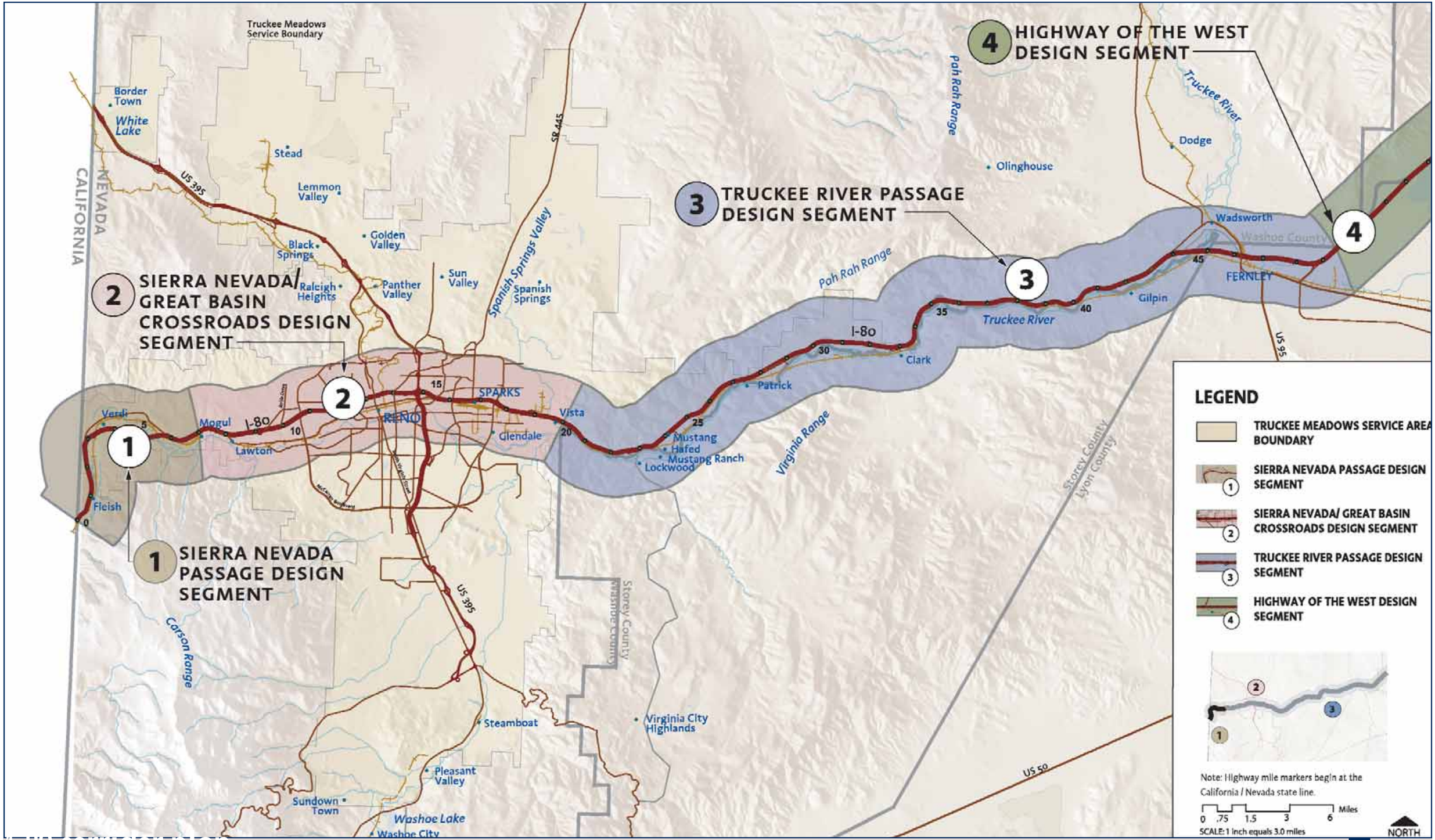
Design decisions for this portion of the corridor provide a welcome to the state, utilize native plantings to reconnect lands disturbed by the highway to the environment, announce communities with enhanced gateways, highlight recreational access and opportunities, and enhance traveler amenities.

The highway passes through the valleys and mountain ranges of northern Nevada with little impact on cultural, natural, or scenic resources. Areas of high visual quality are managed to maintain the undisturbed, natural quality of the landscape. Disturbance to the roadside is repaired and restored through the use of native flora and rock mulches that blend with hues and textures of the desert floor.

The character and growth of adjacent communities and the highway system occur in consideration of one another. Emphasis is placed on increasing the visibility of communities by the development of enhanced gateways at entry points. Information about community events is incorporated into highway signage, and interpretive programs help strengthen the relationship between the highway and community.

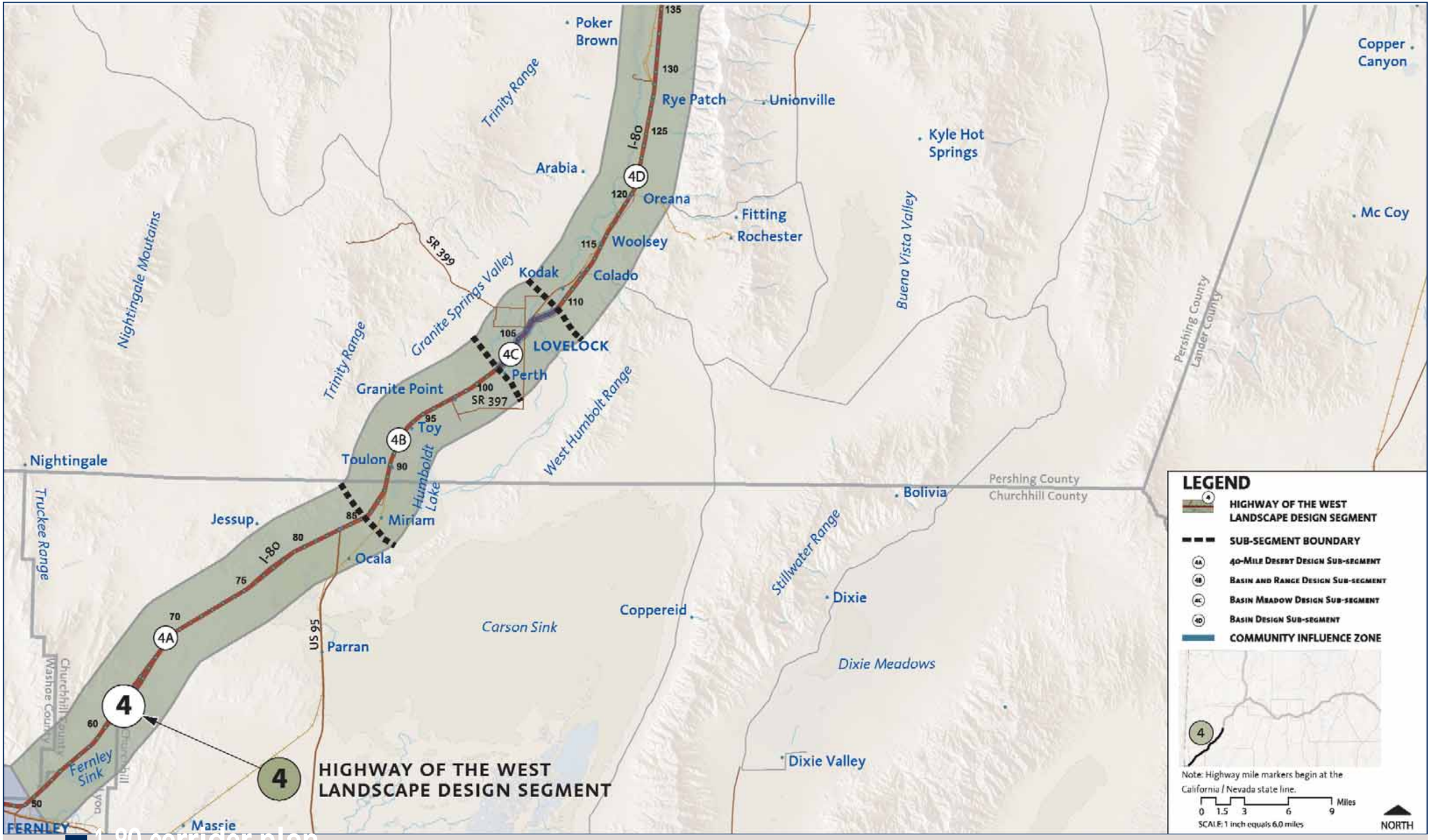
The highway system provides access to significant recreational assets throughout northern Nevada. Increasing the already growing tourism industry within the state is important for the economic stability of rural communities. Amenities are enhanced through the improvement of recreational access points and appropriate signage, information, and interpretive opportunities. A hierarchy of highway facilities, ranging from viewpoints to complete rest areas, are designed to fit seamlessly into the environment and to serve as a respite for motorists. A regional bike trail runs parallel to the highway and provides a safe alternative transportation route for the region.

This corridor is rich in history, culture, and wildlife. The California Emigrant Trail, railroad, ranching, mining, and natural features all play a role in creating the unique and exciting landscape character of the region. Roadway structures and features, including bridges, barrier walls, pull-outs, and rest areas, are designed to 'fit' the landscape and reflect an interpretation of these defining features. Overall emphasis is placed on integrating the highway system with the larger landscape.



LANDSCAPE DESIGN SEGMENTS

I-80: Verdi to Fernley



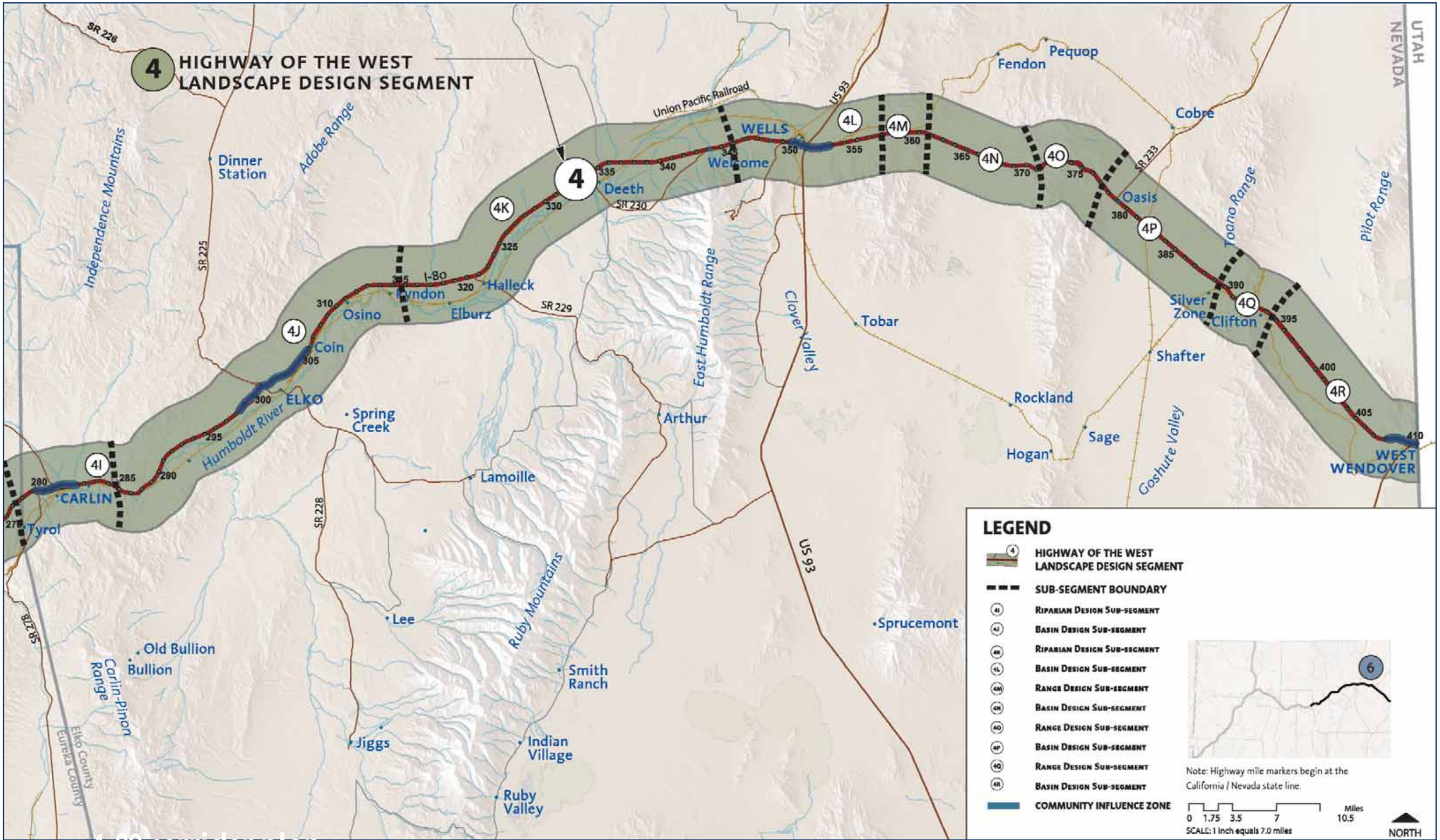
MAP Q 4.4

LANDSCAPE DESIGN SEGMENTS

I-80: Fernley to Rye Patch

LANDSCAPE DESIGN SEGMENTS

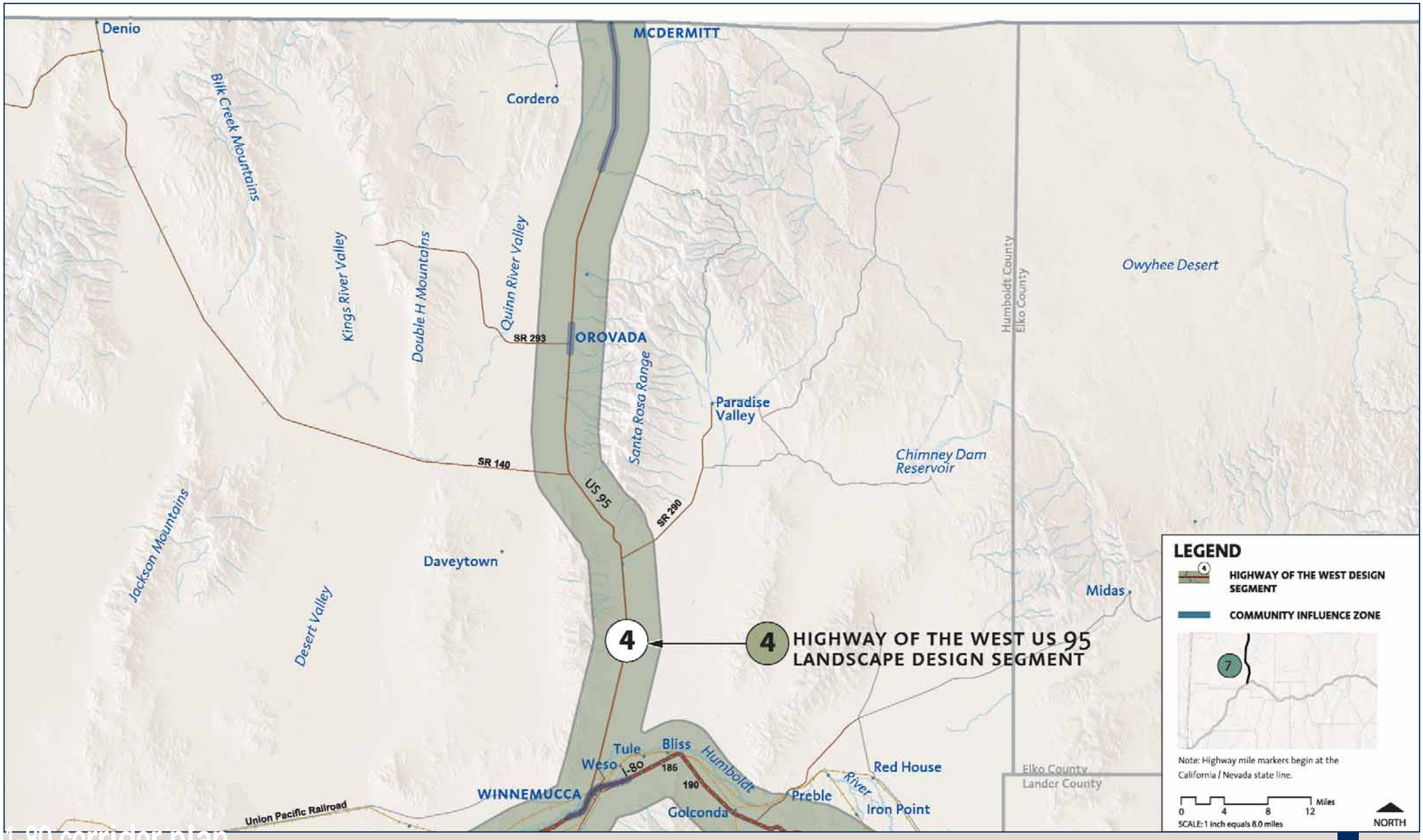
I-80: Rye Patch to Tyrol



MAP S 4.6

LANDSCAPE DESIGN SEGMENTS

I-80: TYROL TO WEST WENDOVER



LANDSCAPE DESIGN SEGMENTS

US 95: Winnemucca to McDermitt

(1) Sagebrush communities dominate the landscape, which is framed by mountain ranges.

LANDSCAPE DESIGN SEGMENT DESCRIPTIONS

The I-80 corridor is divided into four landscape design segments (Sierra Nevada Passage, Sierra Nevada Great Basin Crossroads, Truckee River Passage, and Highway of the West) whose overall design themes are described in the previous section. This section examines each landscape design segment individually and further refines its character and features. The following information is provided for each of the four landscape design segments:

- Design objectives for the sub-segments
- Map illustrating the overall segment, its sub-segments, and important road service sites
- Section diagram revealing the topographic character of the segment and providing more detailed descriptions of its features
- Map identifying additional program opportunities in each segment
- Design interpretation for each segment

OPPORTUNITIES AND CONSTRAINTS

The opportunities analysis identifies specific locations of physical opportunities and where new design standards may be applied to establish the framework for the *Corridor Plan* recommendations. Opportunities for the I-80 corridor were separated into two categories: (1) physical improvement opportunities and (2) design standards opportunities. Within each of these categories, the opportunities were further organized under five major headings:

1. Community
2. Travel and Tourism
3. Natural Resources and Wildlife
4. Views and Landmarks
5. Roadway Practices and Structures

The many opportunities were further refined and shown in the Specific Corridor Features Maps (Maps 1B, 2B, 3B, 4B, 5B, 6B, and 7B on pages 4.12, 4.20, 4.28, 4.37, 4.40, 4.43, and 4.46, respectively) of the Landscape Design Segment section of the *Corridor Plan*.

Constraints identified along the I-80 corridor include:

- Lack of land within the right-of-way
- Limited economic resources
- Reliance on partnerships to fund retrofit projects
- Limited water resources and arid climate
- Sensitive natural resources
- Alkali soil

SIERRA NEVADA PASSAGE

The Sierra Nevada Design Segment provides a dramatic entrance to the state by capitalizing on the scenic and wild character of the surrounding mountainous landscape. It is divided into three design categories, each with its own character and purpose along the corridor. These are Statewide Gateway, Preserved and Managed Landscape character, and Interpretation of Cultural Resources.

DESIGN OBJECTIVES

Statewide Gateway and Welcome Center

- Mark the passage from California into Nevada and provide a symbolic entry into and exit from the state.
- Create a gateway and a welcome center that have similar visual characteristics but are physically separated.
- Preserve the scenic and rugged character of the landscape through the design of a gateway and a welcome center that blends seamlessly into the landscape.
- Partner with local art communities under the Transportation Art Program.
- Emphasize the sequence of arrival and signify the importance of the gateway by using substantial building materials such as native stone and timber.
- Provide accessibility to travel services, immediate information, and statewide travel planning information at the welcome center.
- Use the welcome center to connect travelers with the natural landscape and scenic views of the Truckee River and adjacent areas.

Preserved and Managed Sierra Nevada Landscape Character

- Apply design criteria to highway design and the retrofit of existing facilities that maintain the color, texture, and forms of the Sierra Nevada and Great Basin landscape palette. These criteria include landform, native revegetation, and natural drainage management.
- Preserve scenic views of the mountain ranges and Truckee River.
- Apply scenic designation to manage the structure and placement of advertising and land use so it is secondary to the natural landscape.
- Integrate highway facilities into the Sierra Mountains by using naturalized grading, non-structural drainage design, and native plant revegetation.
- Establish design continuity to help ensure a uniform landscape treatment throughout the corridor.
- Cultivate roadside edges to re-establish native flora and minimize the build-up of materials that would fuel wildfires.
- Soften the visual transition from travel lanes to roadside vegetation through the use of rock mulches that are integrated into the colors of the existing environment. These rock mulches provide a change in texture that help minimize the risk of unpredictable wildlife movement directly adjacent to and across the roadway.
- Create partnerships with local trail advocacy groups, such as the Tahoe Pyramid Bikeway, to provide existing and potential trail systems along the corridor.
- Design and manage the corridor to maintain the Sierra Nevada character while accommodating new growth and development.

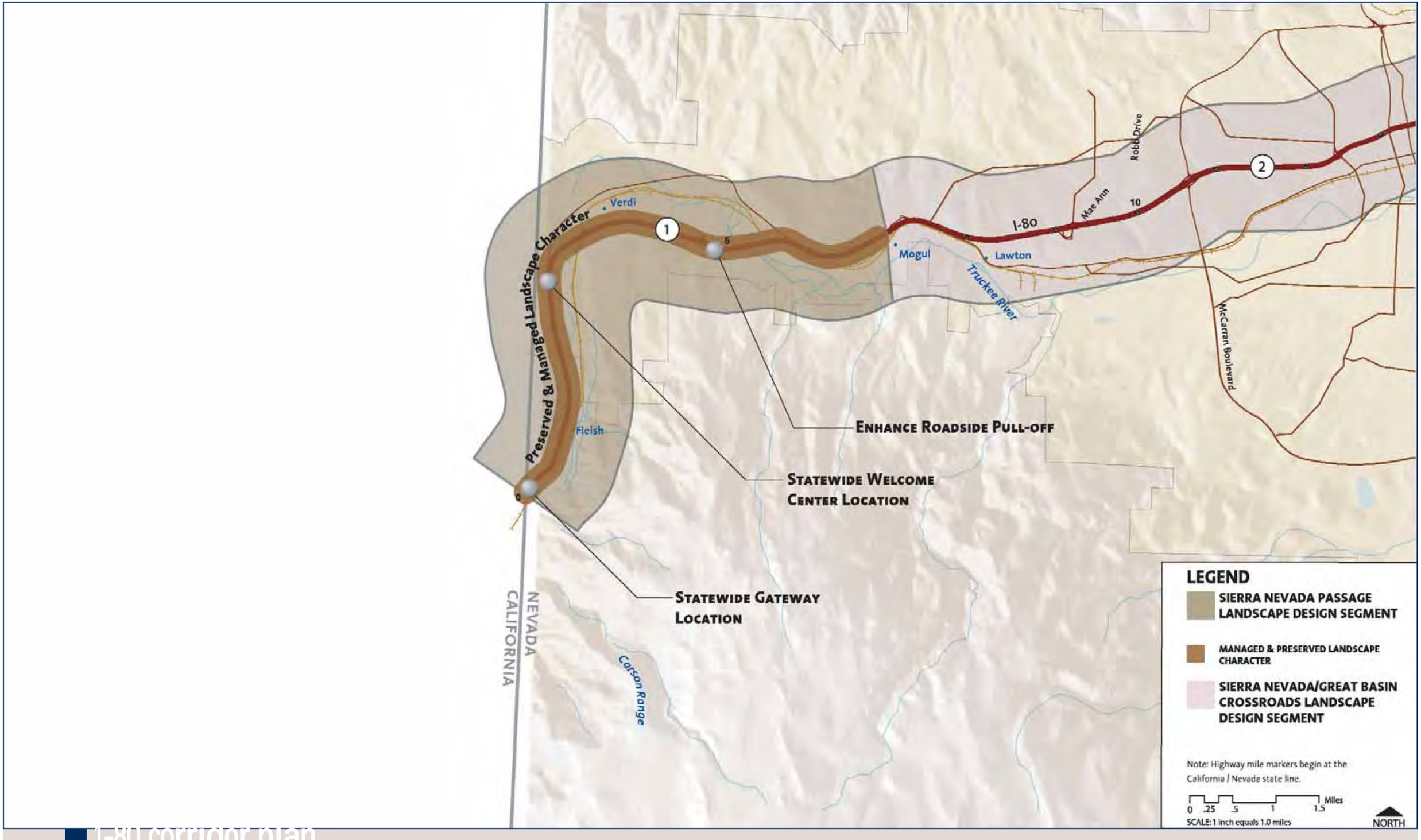
Interpretation of Cultural Resources

- Provide visitors with opportunities to discover the stories and history of the region.
- Integrate place name signage, travel information, and other statewide programs into the highway system in order to enhance the traveler's understanding of the place.
- Develop trails and other alternative modes of transportation that integrate within the existing infrastructure of towns along the corridor.
- Make the mining, logging, and pioneer legacy of the region a predominant focus of interpretive efforts.

(1) Segment 1 Sierra Nevada Passage Keymap

(2) Views to the Truckee River and towering mountains above help to establish a natural gateway into the state from California.

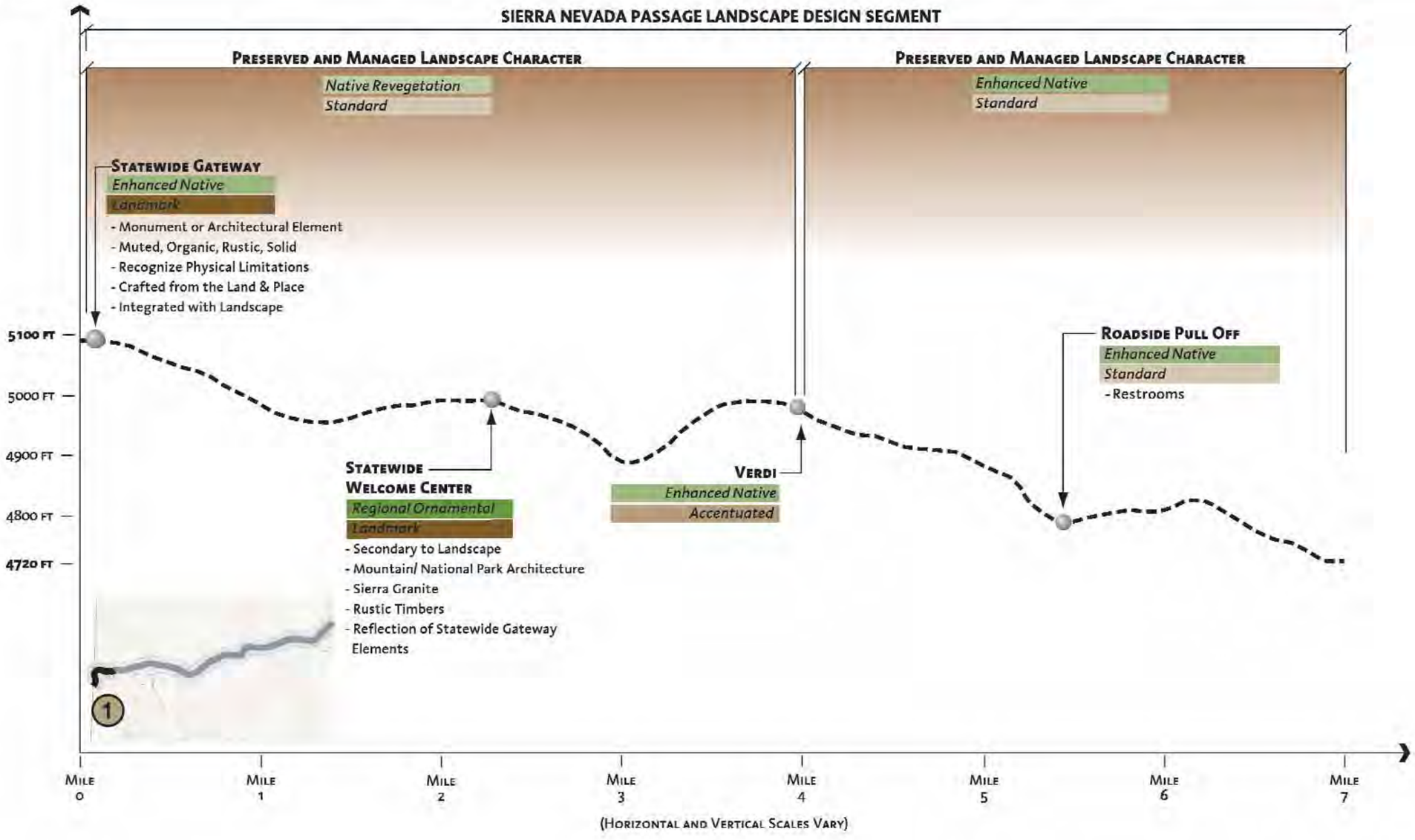
(3) Future design decisions made within the corridor should respect the Sierra Nevada landscape character by minimizing visual impacts along the roadway.



MAP 1A

SIERRA NEVADA PASSAGE LANDSCAPE DESIGN SEGMENT

I-80: Verdi to Mogul



DESIGN OBJECTIVES

Statewide Gateway and Welcome Center

1. Mark the passage from California into Nevada and provide a symbolic entry into and exit from the state.
2. Create a gateway and a welcome center that have similar visual characteristics but are physically separated.
3. Preserve the scenic and rugged character of the landscape through the design of a gateway and a welcome center that blends seamlessly into the landscape.
4. Partner with local art communities under the Transportation Art Program.
5. Emphasize the sequence of arrival and signify the importance of the gateway by using substantial building materials such as native stone and timber.
6. Provide accessibility to travel services, immediate information, and statewide travel planning information at the welcome center.
7. Use the welcome center to connect travelers with the natural landscape and scenic views of the Truckee River and adjacent areas.

Preserved and Managed Sierra Nevada Landscape Character

1. Apply design criteria to highway design and the retrofit of existing facilities that maintain the color, texture, and forms of the Sierra Nevada and Great Basin landscape palette. These criteria include landform, native revegetation, and natural drainage management.
2. Preserve scenic views of the mountain ranges and Truckee River.
3. Apply scenic designation to manage the structure and placement of advertising and land use so it is secondary to the natural landscape.
4. Integrate highway facilities into the Sierra Mountains by using naturalized grading, non-structural drainage design, and native plant revegetation.
5. Establish design continuity to help ensure a uniform landscape treatment throughout the corridor.
6. Cultivate roadside edges to re-establish native flora and minimize the build-up of materials that would fuel wildfires.
7. Soften the visual transition from travel lanes to roadside vegetation through the use of rock mulches that are integrated into the colors of the existing environment. These rock mulches provide a change in texture that help minimize the risk of unpredictable wildlife movement directly adjacent to and across the roadway.
8. Create partnerships with local trail advocacy groups, such as the Tahoe Pyramid Bikeway, to provide existing and potential trail systems along the corridor.
9. Design and manage the corridor to maintain the Sierra Nevada character while accommodating new growth and development.

Interpretation of Cultural Resources

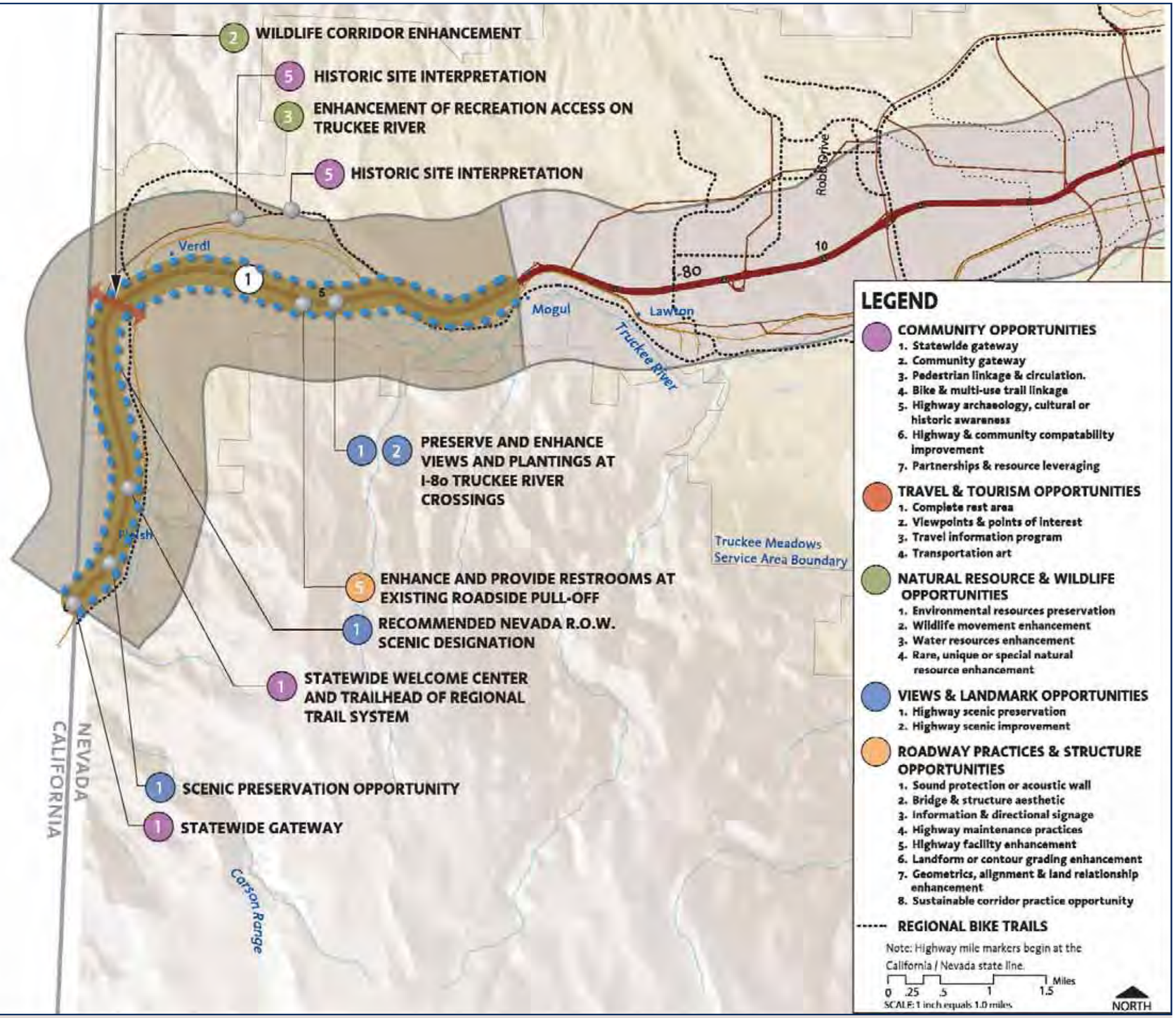
1. Provide visitors with opportunities to discover the stories and history of the region.
2. Integrate place name signage, travel information, and other statewide programs into the highway system in order to enhance the traveler's understanding of the place.
3. Develop trails and other alternative modes of transportation that integrate within the existing infrastructure of towns along the corridor.
4. Make the mining, logging, and pioneer legacy of the region a predominant focus of interpretive efforts.

FEATURES ALONG ENTIRE CORRIDOR

- 2 ANALYZE WILDLIFE MOVEMENTS AND PROVIDE APPROPRIATE CROSSING STRUCTURES
- 2 PAINT/STAIN RETROFIT OF BRIDGES AND STRUCTURES
- 3 STATEWIDE PLACE NAME SIGNAGE
- 4 ROAD CORRIDOR TRASH CLEAN-UP

FEATURES ALONG THE SIERRA NEVADA LANDSCAPE DESIGN SEGMENT

- 4 TAHOE PYRAMID BIKE TRAIL
- 1 PRESERVE SCENIC QUALITY THROUGH COORDINATION WITH APPROPRIATE AGENCIES AND ORGANIZATIONS
- 2 SCREEN INDUSTRIAL USES WHERE FEASIBLE



LEGEND

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

TRAVEL & TOURISM OPPORTUNITIES
1. Complete rest area
2. Viewpoints & points of interest
3. Travel information program
4. Transportation art

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

VIEWS & LANDMARK OPPORTUNITIES
1. Highway scenic preservation
2. Highway scenic improvement

ROADWAY PRACTICES & STRUCTURE OPPORTUNITIES
1. Sound protection or acoustic wall
2. Bridge & structure aesthetic
3. Information & directional signage
4. Highway maintenance practices
5. Highway facility enhancement
6. Landform or contour grading enhancement
7. Geometrics, alignment & land relationship enhancement
8. Sustainable corridor practice opportunity

REGIONAL BIKE TRAILS

Note: Highway mile markers begin at the California / Nevada state line.

0 .25 .5 1 1.5 Miles

SCALE: 1 inch equals 1.0 miles.

NORTH

SIERRA NEVADA PASSAGE LANDSCAPE DESIGN SEGMENT

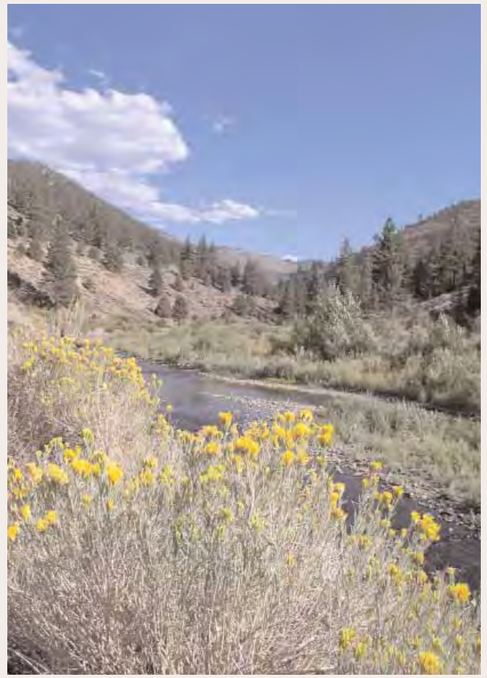
I-80: Verdi to Mogul - Specific Corridor Features

DESIGN INTERPRETATION SUMMARY

Interpretation of the segment's design themes will occur when individual project design is undertaken. The *Corridor Plan* establishes the direction for design to be completed at the project level. Examples of interpretation are included to illustrate forms that could be used to accomplish the design objectives stated. Examples are from other locations for the proposed program type.

Image courtesy of Garven Woodland Gardens, Hot Springs, AR

(1) Viewpoints along the corridor should be designed to highlight the dramatic natural landscape.



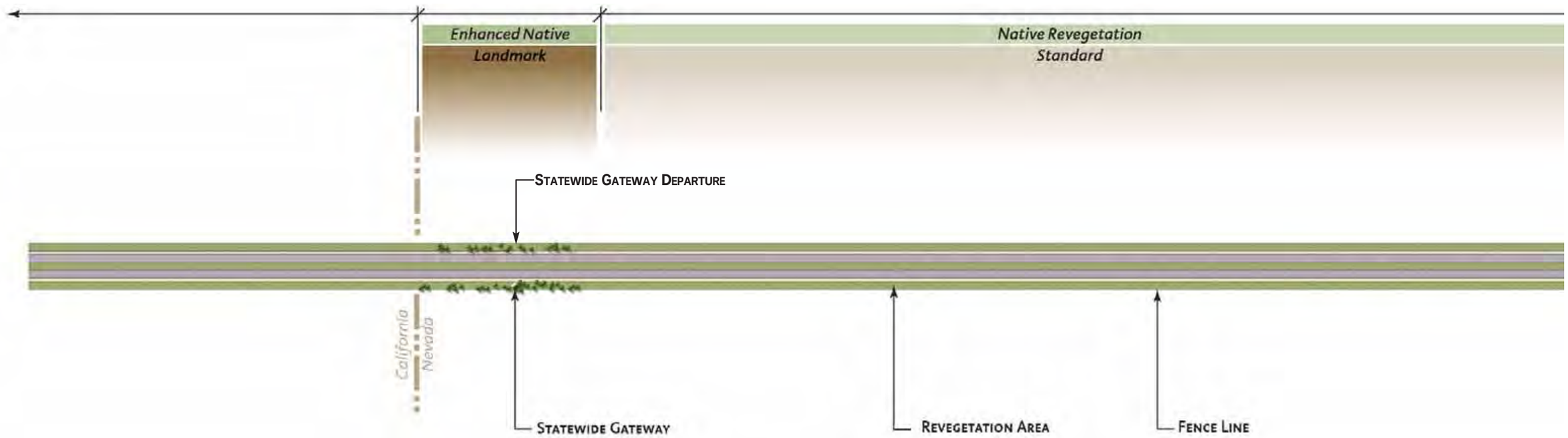
(6) Preservation of the Sierra plant palette helps reinforce the visual quality of the highway environment.

Image courtesy of David Marlow

(2) The statewide welcome center could utilize materials and forms that recall the historical significance of the corridor, while minimizing negative visual impact on the environment.

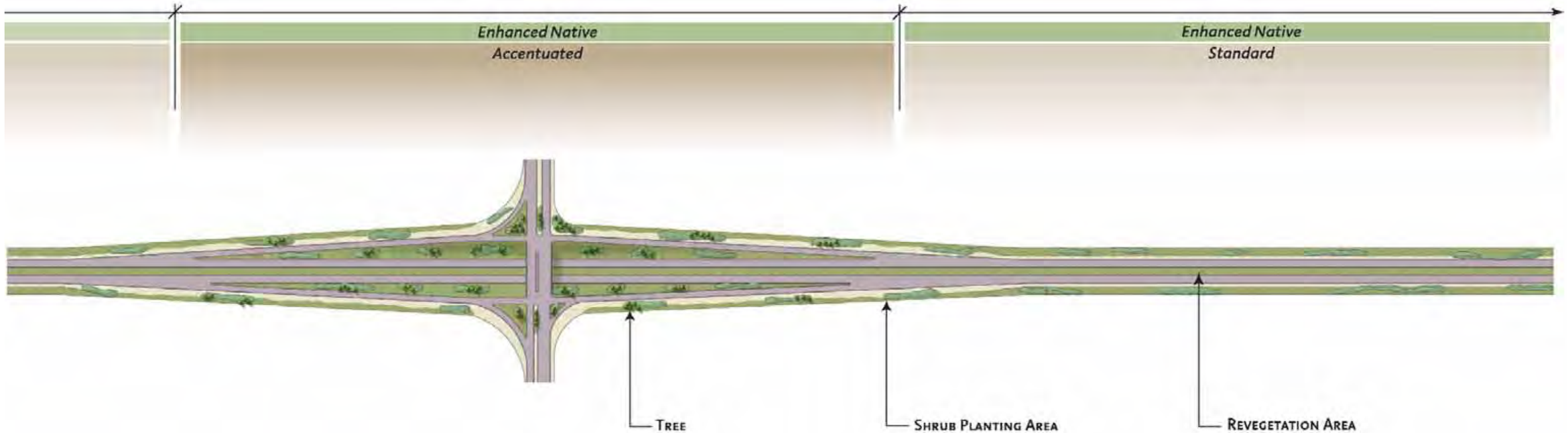
(3) , (4), (5) Materials and architectural styles of structures should reflect the cultural history and natural features of the region.

SIERRA NEVADA PASSAGE



(1) This is the existing entry into Nevada from California along I-80.

(2) The Statewide Gateway into Nevada is a subtle announcement and welcome to the state. Constructed from local stone and framed by native vegetation, the gateway blends seamlessly into the surrounding rugged landscape and should be sited outside of the clear zone.



(1) Enhanced native landscape accentuates the corridor in the section between Verdi and Mogul.

4.16

SIERRA NEVADA GREAT BASIN CROSSROADS

The Sierra Nevada Great Basin Crossroads represents the significance of this segment as a cultural meeting point and an environmental transition zone. The segment is divided into five design categories, each with its own character and purpose along the corridor: Visual Gateway, Managed Urban Background, Urban Extension, Urban Background, and Urban Mitigation.

DESIGN OBJECTIVES

Visual Gateway

- Select the Sierra Nevada Great Basin Crossroads visual gateway based on geographic location and surrounding landforms as they provide the first view of the valley.
- Emphasize the entire valley as a scenic unit that includes both built and natural elements.
- Create a simple gateway that utilizes materials and vegetation associated with the Sierra Nevada and Great Basin regions.

Managed Urban Background

- Future expected growth and land use decisions that determine the placement of major facilities and development in the segment will become a new future design context.
- Design and manage the corridor to maintain the Sierra Nevada and Great Basin character while accommodating new growth and development.
- Expand the visual area of the right-of-way to create adjacent space that allows for naturalized earth forms, native revegetation planting, and the avoidance of retaining or acoustic structures.
- Apply design criteria that integrate the Sierra Nevada and Great Basin palette, including landform, native revegetation, natural drainage management, and color.
- Require design continuity to establish a uniform corridor treatment.
- Create highway structures that are well proportioned, simple in their design expression, uniformly applied throughout the segment, and utilize colors harmonious with the Sierra Nevada and Great Basin palette.
- Create partnerships with local trail advocacy groups to accommodate existing and potential trail systems along the corridor.

Urban Extension

- Provide a connective fabric to downtown areas through the use of pedestrian bridges that link neighborhoods, commercial centers, and educational facilities.
- Partner with local art communities under the Transportation Art Program.

Urban Background

- Integrate the Sierra Nevada and Great Basin plant and material palette to create a corridor landscape that is unified, continuous, and patterned to emphasize consistency.
- Create a continuous, linear visual composition between project segments by emphasizing consistency in landscape material and application.
- Utilize transportation art or other landmark elements to highlight the “Crossroads” theme.
- Retrofit existing facilities to be in harmony with design criteria and bring continuity to the corridor.

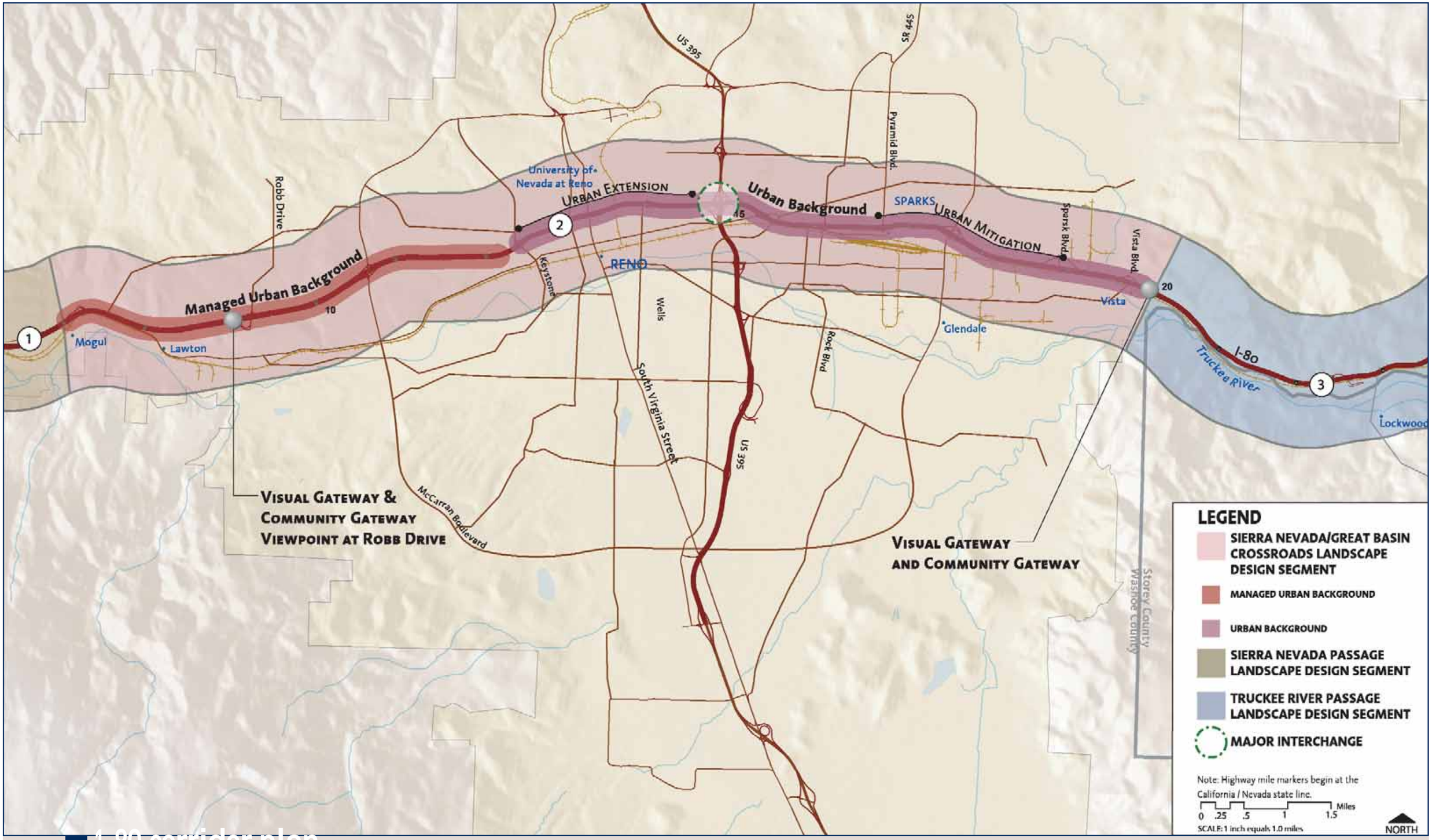
Urban Mitigation

- Enhance views to scenic and culturally significant areas such as Victorian Square and Sparks Marina.
- Screen views to industrial or unsightly areas along the corridor through the use of vertical landscape material.

(1) Segment 2 Sierra Nevada Great Basin Keymap

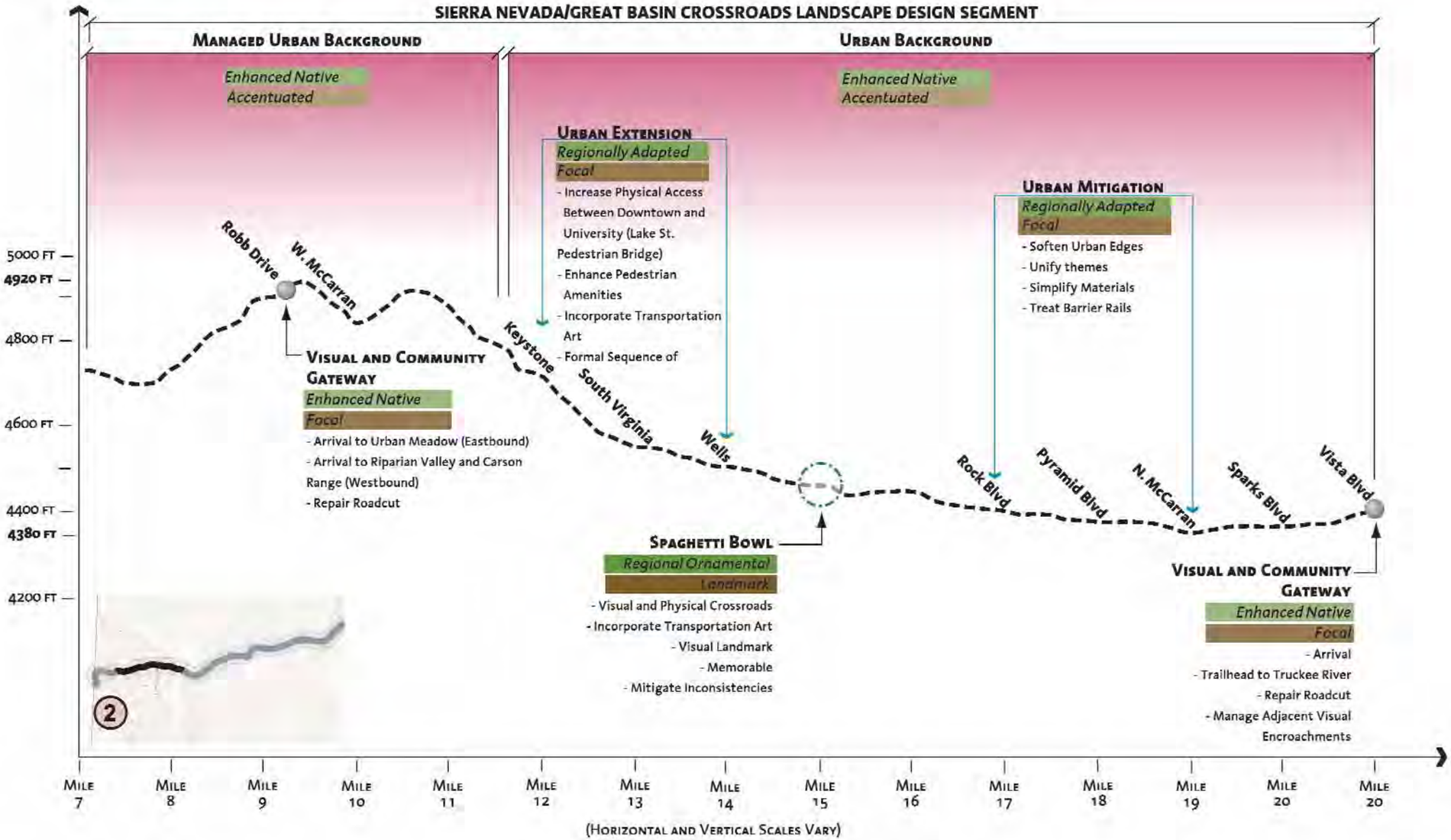
(2) The visual gateway should provide a dramatic view into the Truckee Meadows and surrounding mountain ranges.

(3) Certain areas identified as “Urban Mitigation” require landscape treatments to reduce their visual impact and add to the consistency of the corridor.



SIERRA NEVADA GREAT BASIN CROSSROADS LANDSCAPE DESIGN SEGMENT

I-80: MOGUL TO VISTA



Softscape Type/Treatment

Structures and Hardscape Type/Treatment

DESIGN OBJECTIVES

Visual Gateway

1. Select the Sierra Nevada Great Basin Crossroads visual gateway based on geographic location and surrounding landforms as they provide the first view of the valley.
2. Emphasize the entire valley as a scenic unit that includes both built and natural elements.
3. Create a simple gateway that utilizes materials and vegetation associated with the Sierra Nevada and Great Basin regions.

Managed Urban Background

1. Expected growth and land use decisions that determine the placement of major facilities and development in the segment will become a new future design context.
2. Design and manage the corridor to maintain the Sierra Nevada and Great Basin character while accommodating new growth and development.
3. Expand the visual area of the right-of-way to create adjacent space that allows for naturalized earth forms, native revegetation planting, and the avoidance of retaining or acoustic structures.
4. Apply design criteria that integrate the Sierra Nevada and Great Basin palette, including landform, native revegetation, natural drainage management, and color.
5. Design continuity to establish a uniform corridor treatment.
6. Create highway structures that are well proportioned, simple in their design expression, uniformly applied throughout the segment, and utilize colors harmonious with the Sierra Nevada and Great Basin palette.
7. Create partnerships with local trail advocacy groups to accommodate existing and potential trail systems along the corridor.

Urban Extension

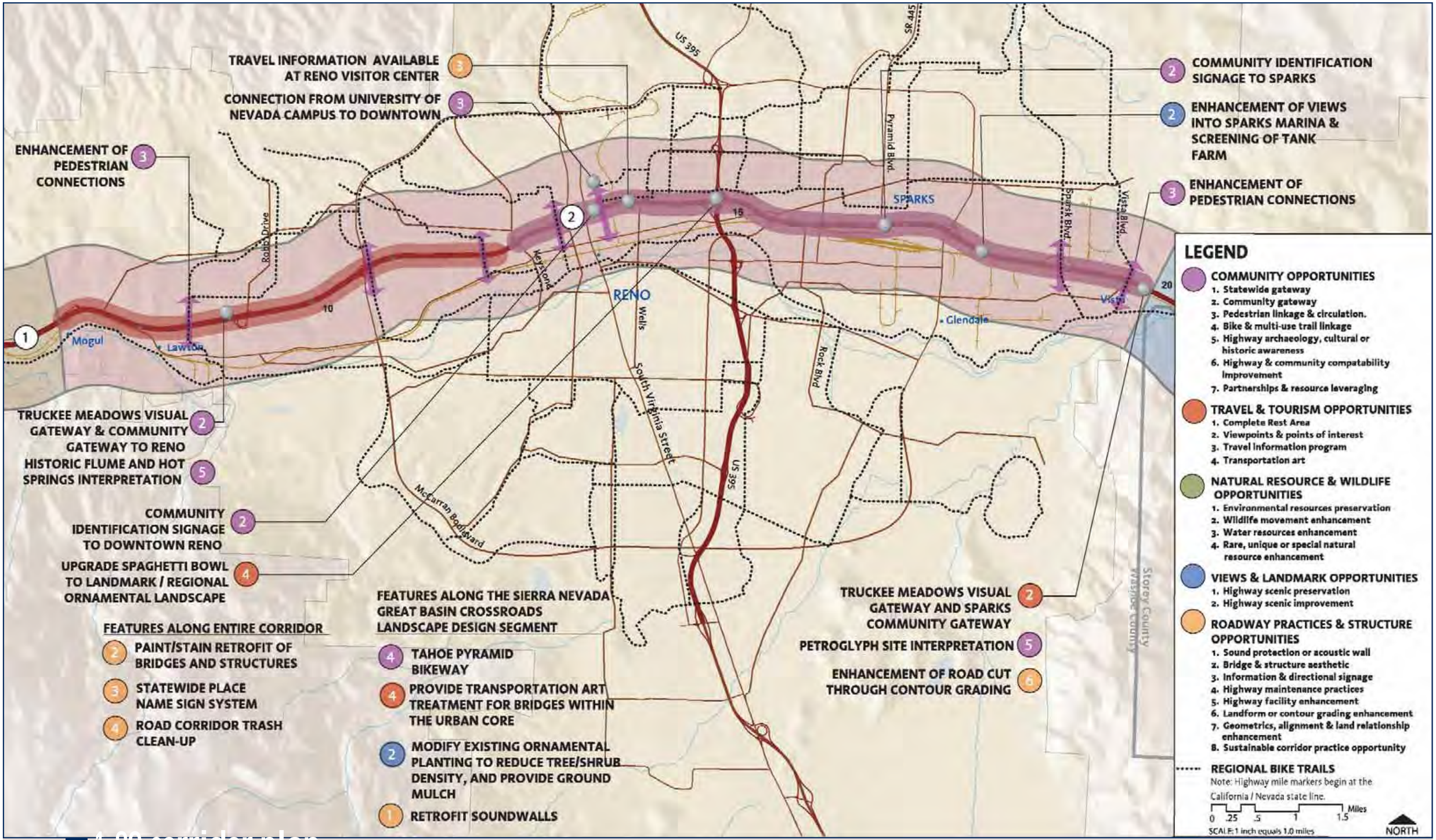
1. Provide a connective fabric to downtown areas through the use of pedestrian bridges that link neighborhoods, commercial centers, and educational facilities.
2. Partner with local art communities under the Transportation Art Program.

Urban Background

1. Integrate the Sierra Nevada and Great Basin plant and material palette to create a corridor landscape that is unified, continuous, and patterned to emphasize consistency.
2. Create a continuous, linear visual composition between project segments by emphasizing consistency in landscape material and application.
3. Utilize transportation art or other landmark elements to highlight the “Crossroads” theme.
4. Retrofit existing facilities to be in harmony with design criteria and bring continuity to the corridor.

Urban Mitigation

1. Enhance views to scenic and culturally significant areas such as Victorian Square and Sparks Marina.
2. Screen views to industrial or unsightly areas along the corridor through the use of vertical landscape material.



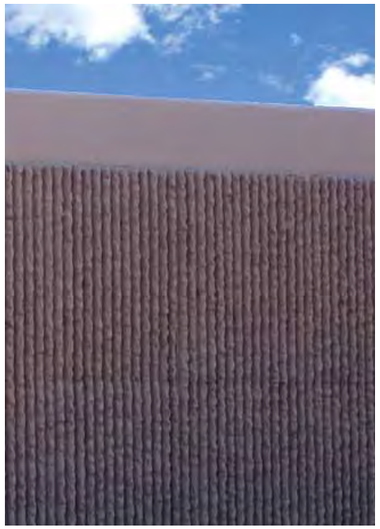
MAP 2B

4.20

SIERRA NEVADA GREAT BASIN CROSSROADS LANDSCAPE DESIGN SEGMENT

I-80: Mogul to Vista - Specific Corridor Features

DESIGN INTERPRETATION



(1) , (2), (3) Muted colors, simple design expression, and regionally appropriate plant material help to simplify, unify, and soften the existing landscape.

(4) The integration of the Sierra Nevada and Great Basin plant palette helps humanize structural surfaces and contrasts with the urban environment.

Image courtesy of John Hudson

(5) Transportation art that symbolizes the ideals of a community could also be used to help reinforce the gateway experience of entering a city.

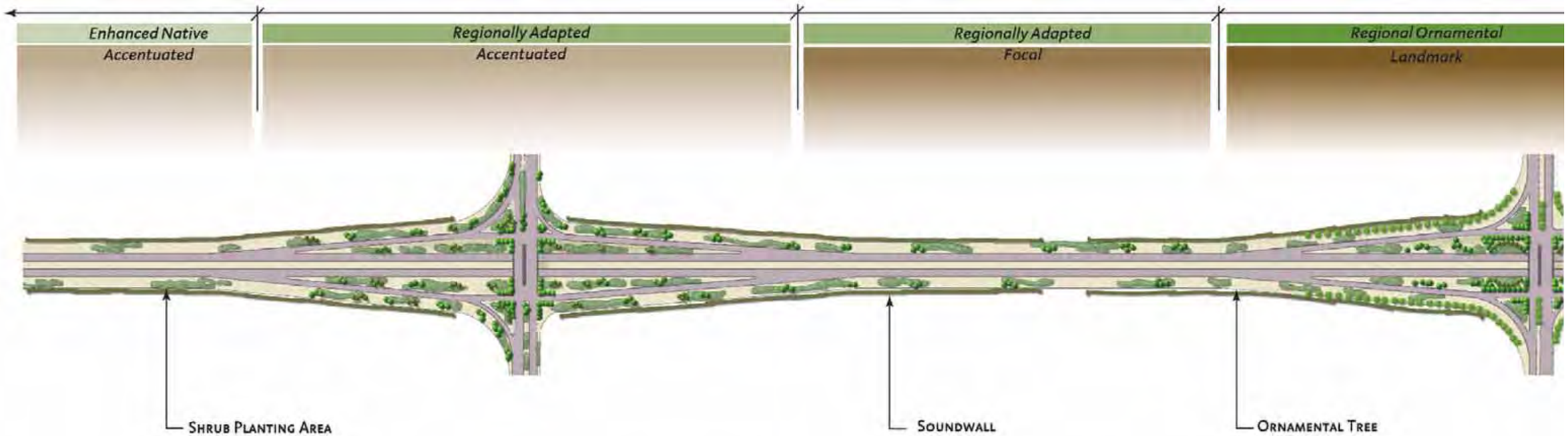
Artwork by and image courtesy of John Boak ©2000, www.boakart.com

(6) Murals and other forms of wall art enhance the urban experience and provide a means for community identity.

(7) Design interpretations throughout the Sierra Nevada Great Basin Crossroads Design Segment should reflect the urban quality of the corridor.

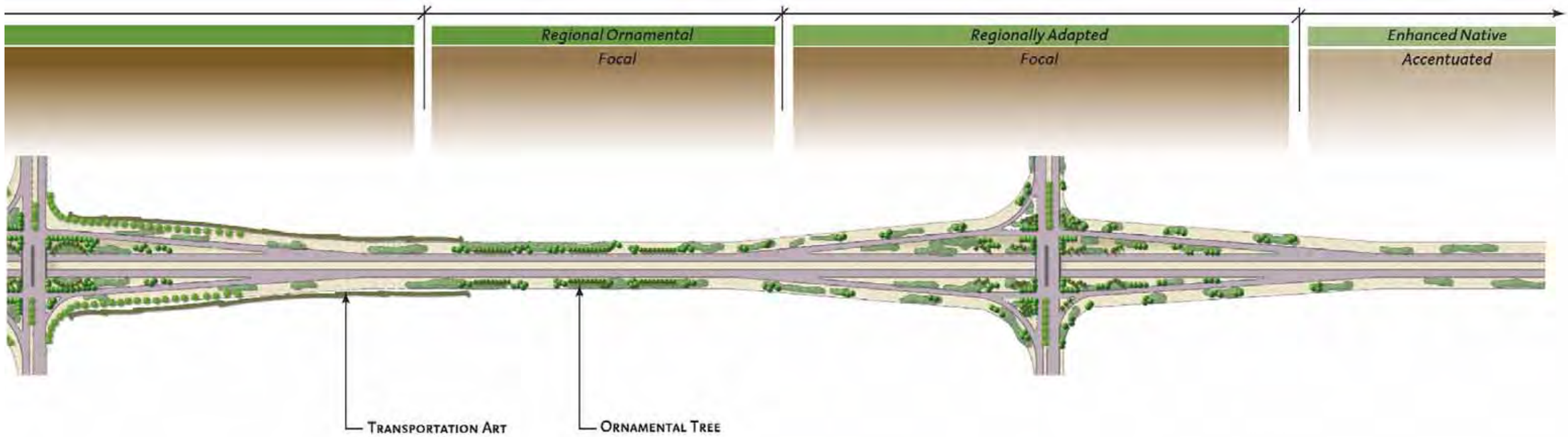
(8) Artistically designed pedestrian bridges will help to join the disconnected portions of the city and add to the character of the design segment.

SIERRA NEVADA GREAT BASIN CROSSROADS



(1) This is an example of existing conditions along I-80.

(2) The visually unattractive right-of-way within this section of the corridor is mitigated through the use of a material and plant palette that unifies and emphasizes the consistency of the Sierra Nevada Great Basin Crossroads Design Segment.



(1) The blending of vegetation from both the Sierra Nevada and Great Basin plant palette characterizes the Sierra Nevada Great Basin Crossroads Design Segment. The major interchanges within the segment will receive a focal treatment to accentuate the importance of this section of the urban corridor.

4.24

TRUCKEE RIVER PASSAGE

Winding its way through a narrow canyon, the Truckee River Passage is the transition zone between the Great Basin and the Truckee Meadows. The segment is divided into three design categories, each with its own character and purpose along the corridor: Managed Truckee River Passage Landscape Character, Rest Area, and Community Gateway.

DESIGN OBJECTIVES

Managed Great Basin Landscape Character

- Design and manage the corridor to maintain the character of the Truckee River Canyon while accommodating new growth and development.
- Apply design criteria to highway design and the retrofit of existing facilities that maintain the color, texture, and forms of the Truckee River Canyon landscape palette. These criteria include landform, native revegetation, and natural drainage management.
- Apply design criteria that reflect the Great Basin palette, including landform, native revegetation, natural drainage management, and color.
- Create highway structures that are well proportioned, simple in their design expression, uniformly applied throughout the segment, and utilize colors that are harmonious with the Great Basin palette.
- Maintain the visual quality of the corridor by preserving scenic views of the Truckee River.
- Apply scenic designation to manage the structure and placement of advertising and land use so they are secondary to the natural landscape.
- Design guardrails and barriers so that they still offer views to surrounding landscapes.
- Stain and regrade unnatural rock cuts to enhance the connection between the highway and environment.
- Examine ways to minimize the conflicts that exist between wildlife and motorists.
- Create partnerships with local trail advocacy groups to accommodate existing and potential trail systems along the corridor.

Road Services Program

- Integrate facilities with the statewide signage program to highlight natural features, cultural history, and wildlife within the corridor.
- Maximize views and provide access to the Truckee River and the adjacent riparian corridor where feasible.
- Upgrade rest areas with regionally adapted softscape and focal structures and hardscapes. Emphasis is placed on providing amenities that invite the traveler to relax, rest, and access local community information.

Growth Center

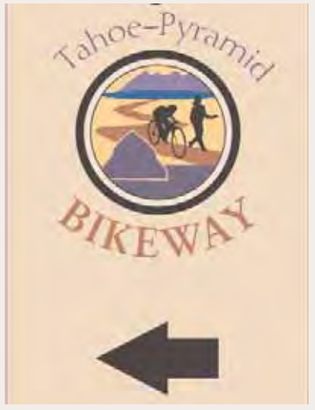
- Establish two community gateways on either end of the central business district of Fernley. These are enhanced with signage, regional ornamental softscape, and landmark structures and hardscapes.
- Establish partnerships with state, county, and local authorities to develop criteria for maintaining the visual quality of the corridor.
- Utilize place name signage to highlight Fernley as a significant recreational gateway to Pyramid Lake and Lahonton Reservoir.

Interpretation of Cultural Resources

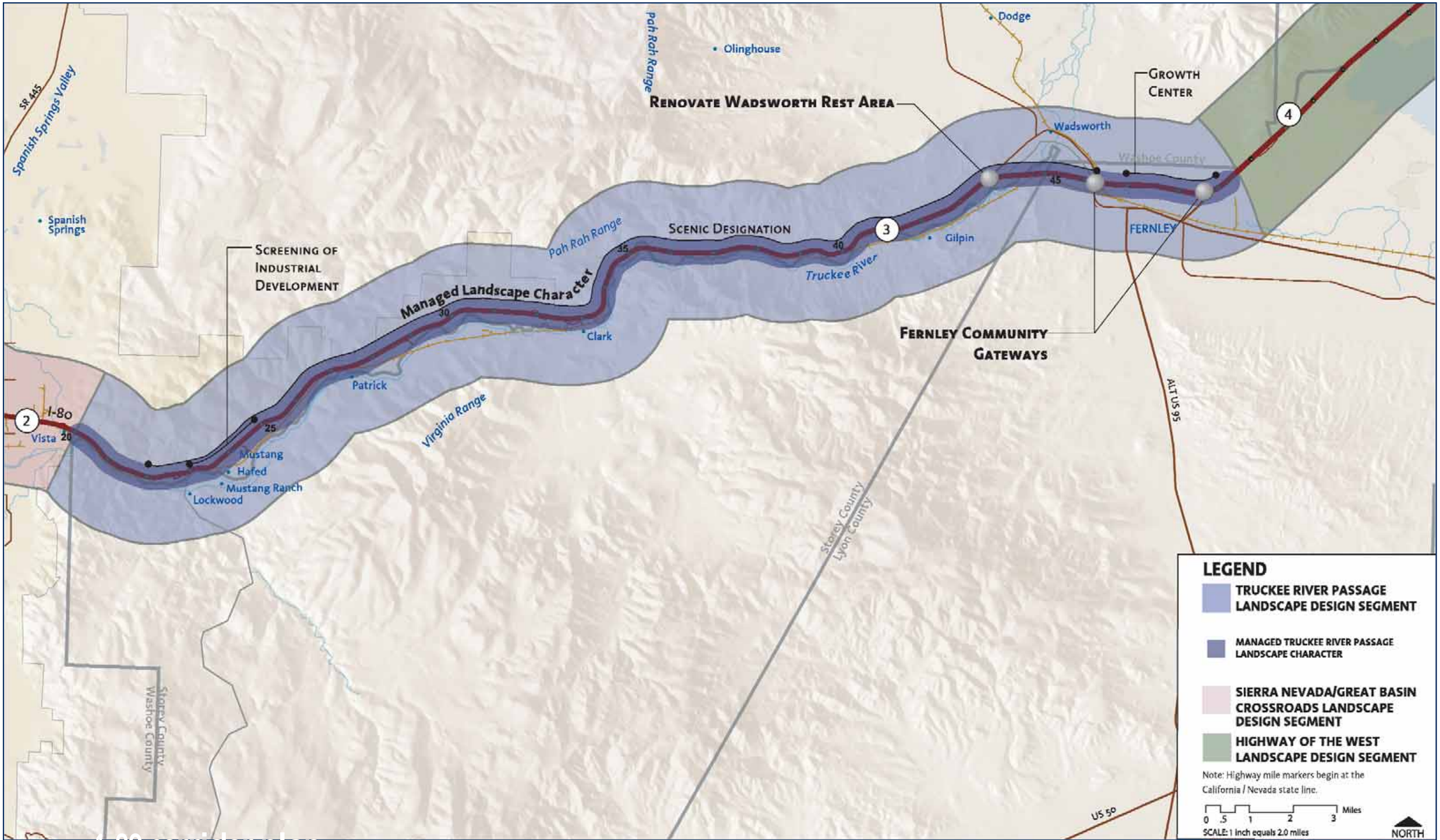
- Provide visitors with opportunities to discover the stories and history attached to the region, including Native American history.
- Integrate place name signage, travel information, and other statewide programs into the highway system in order to enhance the traveler's understanding of the place.
- Develop trails and other alternative modes of transportation that integrate within the existing infrastructure of towns along the corridor.
- Make the mining, logging, and pioneer legacy of the region a predominant focus of interpretive efforts.

(1) Segment 3 Truckee River Passage Keymap

(2) Views to the riparian corridor along the Truckee River and the surrounding arid landscape provides a striking contrast that highlights the Truckee River Passage Design Segment.



(3) The integration of the proposed Tahoe Pyramid Bikeway with the I-80 corridor has the potential to enhance community linkages, generate partnerships with local trail advocacy groups, and provide access to destinations such as Pyramid Lake.

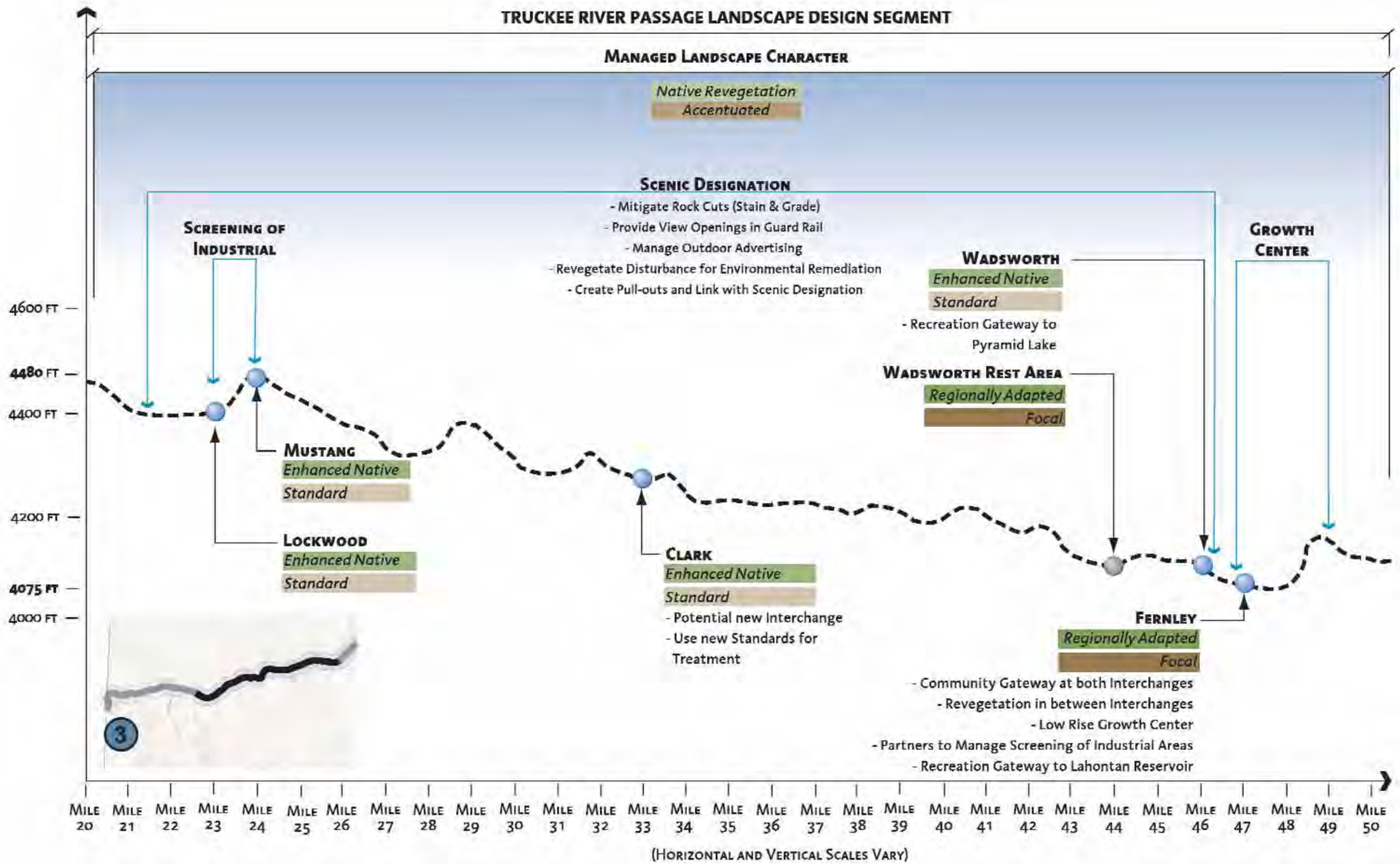


MAP 3A

4.26

TRUCKEE RIVER PASSAGE LANDSCAPE DESIGN SEGMENT

I-80: Vista to Fernley



DESIGN OBJECTIVES

Managed Great Basin Landscape Character

1. Design and manage the corridor to maintain the character of the Truckee River Canyon while accommodating new growth and development.
2. Apply design criteria to highway design and the retrofit of existing facilities that maintain the color, texture, and forms of the Truckee River Canyon landscape palette. These criteria include landform, native revegetation, and natural drainage management.
3. Apply design criteria that reflect the Great Basin palette, including landform, native revegetation, natural drainage management, and color.
4. Create highway structures that are well proportioned, simple in their design expression, uniformly applied throughout the segment, and utilize colors that are harmonious with the Great Basin palette.
5. Maintain the visual quality of the corridor by preserving scenic views of the Truckee River.
6. Apply scenic designation to manage the structure and placement of advertising and land use so they are secondary to the natural landscape.
7. Design guardrails and barriers so that they still offer views to surrounding landscapes.
8. Stain and regrade unnatural rock cuts to enhance the connection between the highway and environment.
9. Examine ways to minimize the conflicts that exist between wildlife and motorists.
10. Create partnerships with local trail advocacy groups to accommodate existing and potential trail systems along the corridor.

Road Services Program

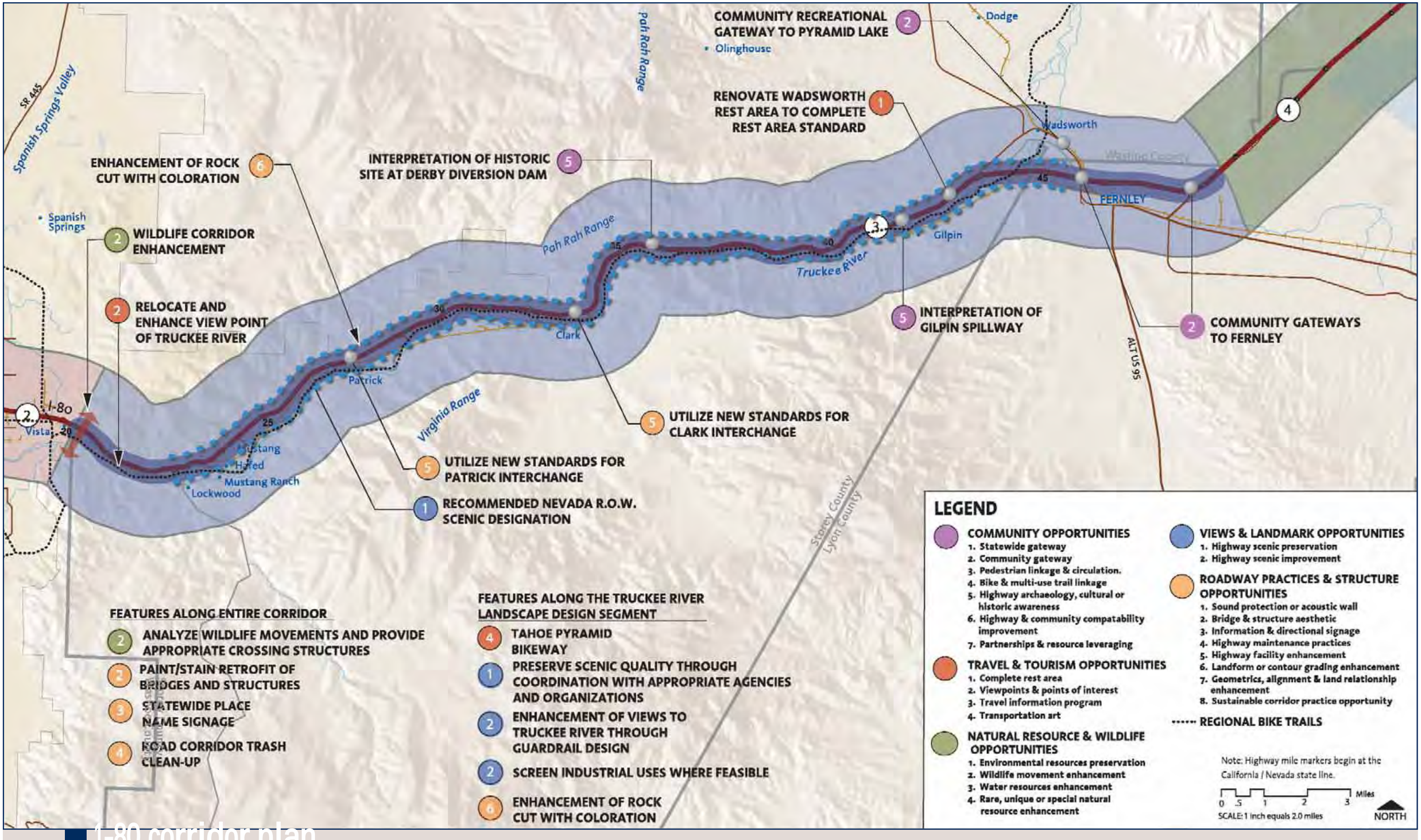
1. Integrate facilities with the statewide signage program to highlight natural features, cultural history, and wildlife within the corridor.
2. Maximize views and provide access to the Truckee River and the adjacent riparian corridor where feasible.
3. Upgrade rest areas with regionally adapted softscape and focal structures and hardscapes. Emphasis is placed on providing amenities that invite the traveler to relax, rest, and access local community information.

Growth Center

1. Establish two community gateways on either end of the central business district of Fernley. These are enhanced with signage, regional ornamental softscape, and landmark structures and hardscapes.
2. Establish partnerships with state, county, and local authorities to develop criteria for maintaining the visual quality of the corridor.
3. Utilize place name signage to highlight Fernley as a significant recreational gateway to Pyramid Lake and Lahonton Reservoir.

Interpretation of Cultural Resources

1. Provide visitors with opportunities to discover the stories and history attached to the region, including Native American history.
2. Integrate place name signage, travel information, and other statewide programs into the highway system in order to enhance the traveler's understanding of the place.
3. Develop trails and other alternative modes of transportation that integrate within the existing infrastructure of towns along the corridor.
4. Make the mining, logging, and pioneer legacy of the region a predominant focus of interpretive efforts.



TRUCKEE RIVER PASSAGE LANDSCAPE DESIGN SEGMENT

I-80: Vista to Fernley - Specific Corridor Features

DESIGN INTERPRETATION

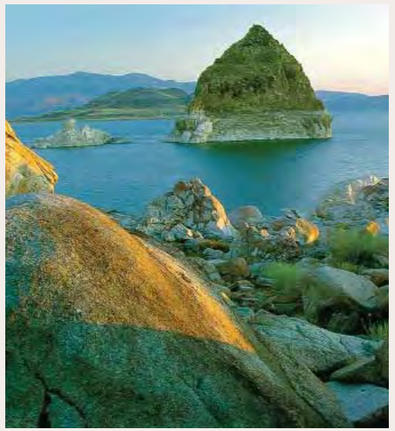
Image courtesy of Rammed Earth Tasmania

(1), (2) Material and texture of walls reflects the geologic history that has shaped the corridor segment.

Image courtesy of Eric Peterson

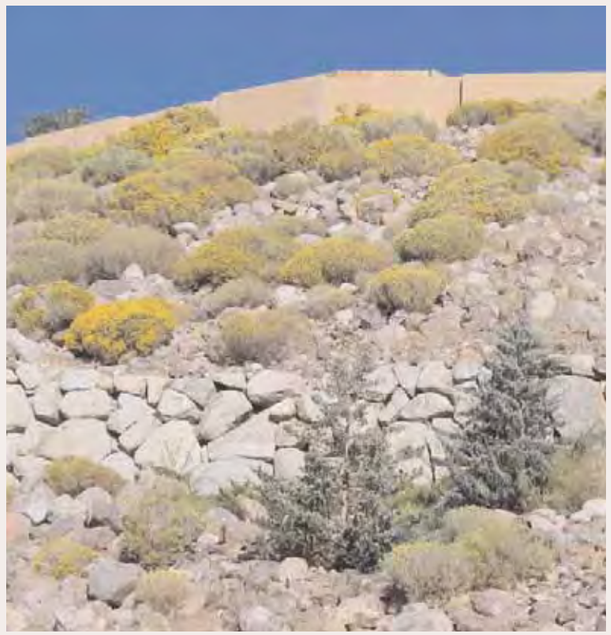
(3) Revegetation of disturbed areas contributes to the unity of the highway corridor.

(4) Viewpoints and point-of-interest along the corridor enhance the highway experience by providing interpretive information.



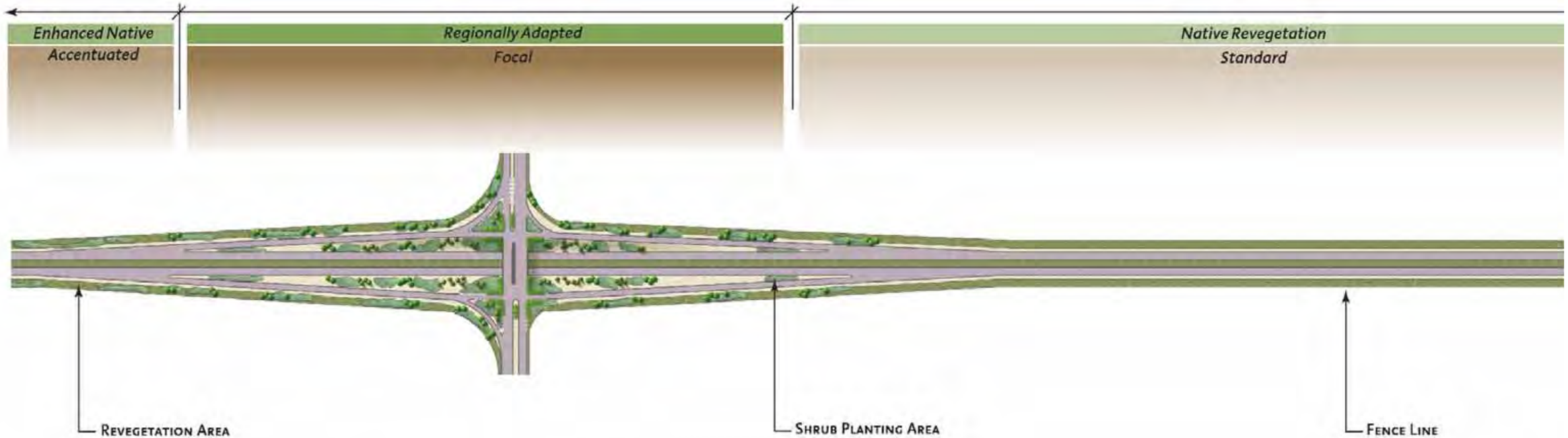
(5) Signage along the corridor should provide information and direction to adjacent recreational areas.

(6) The preservation of high quality scenic areas adds to the overall character of the Truckee River Passage Design Segment.

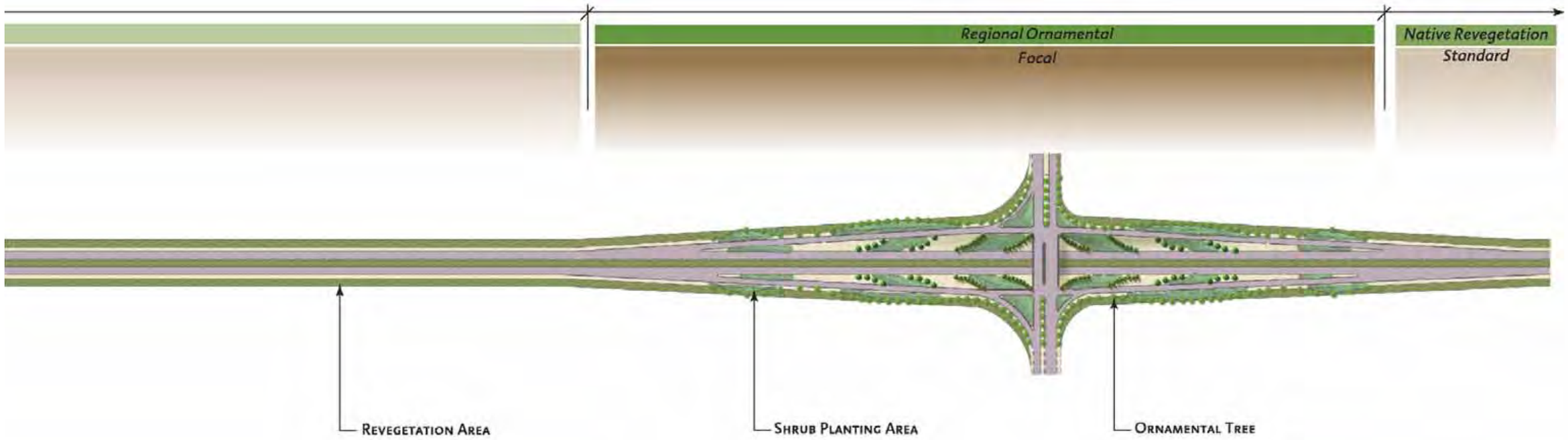


(7) Regrade unnatural rock cuts to enhance the connection between the highway and environment..

TRUCKEE RIVER PASSAGE



(1) Vegetation softens soundwalls throughout urbanized areas.



(1) At Fernley, two community gateways, one on each end of the community, are included in the theme. These would receive regionally adapted softscape and focal hardscape.

4.32

HIGHWAY OF THE WEST

Bisecting vast stretches of undeveloped land and framed by rugged mountain ranges, the Highway of the West is characterized by a rural quality that reflects the historic, cultural, and geologic forces that shape the landscape. The corridor stretches from the Utah/Nevada border and extends 360 miles to Fernley. It also includes US 95 from Winnemucca to McDermitt at the Oregon/Nevada stateline.

DESIGN OBJECTIVES

Statewide Gateway and Welcome Center

- Develop a state entry gateway that marks the passage from Utah into Nevada and provides a symbolic entry into the state.
- Design the entry gateway feature so that it is visually prominent and takes an abstract, architectural approach to convey the overall theme of "Highway of the West."
- Utilize the entry gateway to make the arrival into the state a notable experience for visitors.
- Emphasize the sequence of arrival by using structures and materials that are integrated with natural landforms.
- Construct a welcome center associated with the city of West Wendover that includes simple architectural forms consistent with the pioneer spirit and the oasis feeling of the community.
- Provide visitors to the welcome center with a better understanding of opportunities to experience the natural and cultural resources within the state.

Community Gateways

- Develop gateways for each major community along the corridors in order to help increase visibility and mark the entry into each community. The gateway for Lovelock should reflect the agricultural character of the community and surrounding areas. The gateway for Mill City focuses on the mining and agricultural history of the area. The gateway to Winnemucca reflects the agricultural theme of the community and the ranching, mining, and recreation activities that characterize the area. The gateway to Battle Mountain recognizes the integration of mining in the community. Tucked within a series of mountain ranges, the gateway for Carlin is simple and elegant, and reflects the importance of the gold mining in the area. Elko is a town of diverse culture and heritage, and the atmosphere and gateway of the town reflects the western cowboy and Basque cultures. Wells is a town of local pioneer and rail history, and this is interpreted through signage, monuments, transportation art, and ornamental planting at the community gateway.
- Inform visitors about opportunities within a specific community and encourage them to exit the highway.
- Incorporate vertical elements and architectural styles as parts of the gateways that are in keeping with the selected theme for each community.

Interpretation of Cultural Resources

- Emphasize architectural elements that utilize small simple forms, are self-reliant and functional, are organized as part of a complex, and are secondary to the landscape.
- Augment architectural structures with clustered plantings, punctuated vertical elements, and associated architectural features that 'fit' the region.
- Utilize materials that have a regional connotation, such as wood, stone, galvanized tin roofs, and metals related to mining heritage, for highway related structures and facilities.
- Provide visitors with opportunities to discover the stories and history attached to the region, and interpret the importance of the Basque culture in northern Nevada.
- Make the pioneer legacy of the region a predominant focus of interpretive efforts.
- Integrate place name signage, travel information, and other statewide programs into the highway system in order to enhance the traveler's understanding of the place.
- Utilize interpretative signage that describes current mining, agricultural, historical, and recreational practices in the region as well as the methods initiated to restore the landscape and reduce the visual and environmental impacts.
- Research approaches to accommodate movement of elk and deer across the interstate.
- Provide opportunities to view and interpret the importance of wildlife habitat areas and movement corridors.
- Develop trails and other alternative modes of transportation that integrate with the existing infrastructure of towns along the corridor.

Preservation of Great Basin Landscape Character

- Preserve views of mountain ranges to maintain overall ruggedness and scale of the landscape.
- Include special scenic designations to manage the

(1) Segment 4 Highway of the West Keymap

(2) A lone cottonwood stands out as a landmark in the scenic basin, serving as a vertical design element that punctuates the generally flat basin.

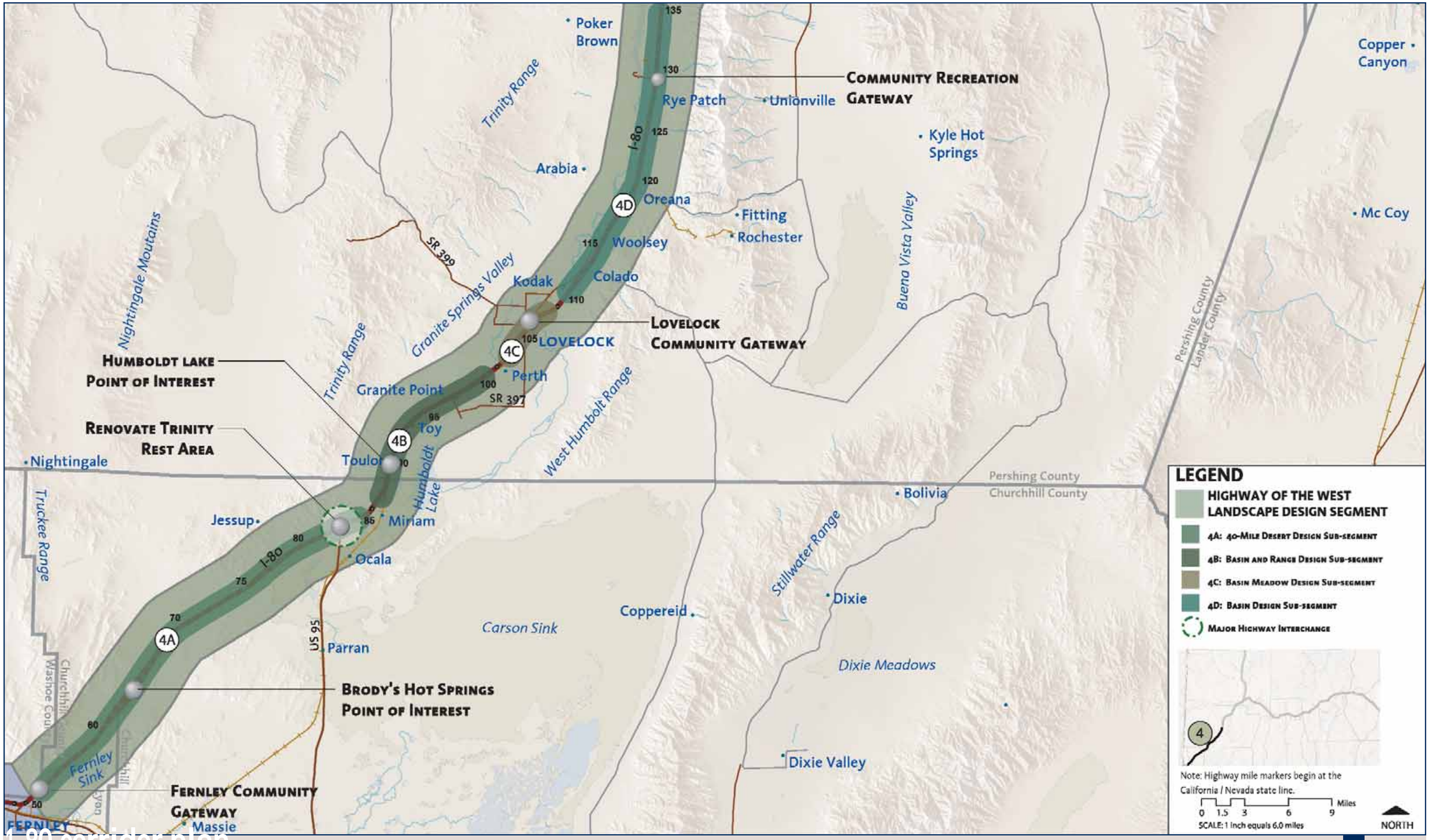
(1) The Great Basin landscape palette provides direction for design criteria of highway structures.

(2) The preservation of the rural landscape character is a key design objective along the I-80 rural corridor.

structure and placement of advertising and land use in order to minimize negative visual impacts.
- Visually blend highway facilities into the Great Basin landscape by using naturalized grading, non-structural drainage design, and native revegetation.
- Utilize colors on highway structures that are consistent with those in the Great Basin landscape.
- Retrofit existing facilities by applying colors to structures and color staining techniques to disturbed lands that are visually consistent with the Great Basin landscape.
- Develop rest areas and other road service facilities that offer an opportunity for visitors to relax and to gain a better understanding of surrounding features through interpretive elements.
- Determine program requirements, site plan, orientation of buildings, and interpretive elements on a site specific basis in order to respond to unique landscape features and specific traveler needs.

Management of Landscapes within the Great Basin

- Design and manage the corridor to maintain the Great Basin character while accommodating new growth and development.
- Blend the visual extent of the right-of-way into the landscape. Create a visual buffer that takes into account future change and allows for naturalized earth forms, native revegetation, and the avoidance of retaining walls or acoustic structures.
- Apply design criteria to highway design that maintains the color, texture, and forms of the Great Basin landscape palette. These criteria include landform, native revegetation, and natural drainage management.
- Establish design continuity to help ensure a uniform landscape treatment throughout the corridor.
- Design highway structures that are well-proportioned, simple in their design expression, uniformly applied throughout the segment and harmonious with the palette of the Great Basin landscape.
- Cultivate roadside edges to re-establish native flora and minimize the build-up of materials that would fuel wildfires.
- Establish wildlife food and water sources (habitat decoys and guzzlers) away from roadways to minimize conflicts between wildlife and motorist.
- Soften the visual transition from travel lanes to roadside vegetation through the use of rock mulches that are integrated into the colors of the existing environment. These rock mulches provide a safe recovery zone and the change in texture will help minimize the risk of unpredictable wildlife movement directly adjacent to and across the roadway.



HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Fernley to Rye Patch

MAP 4A

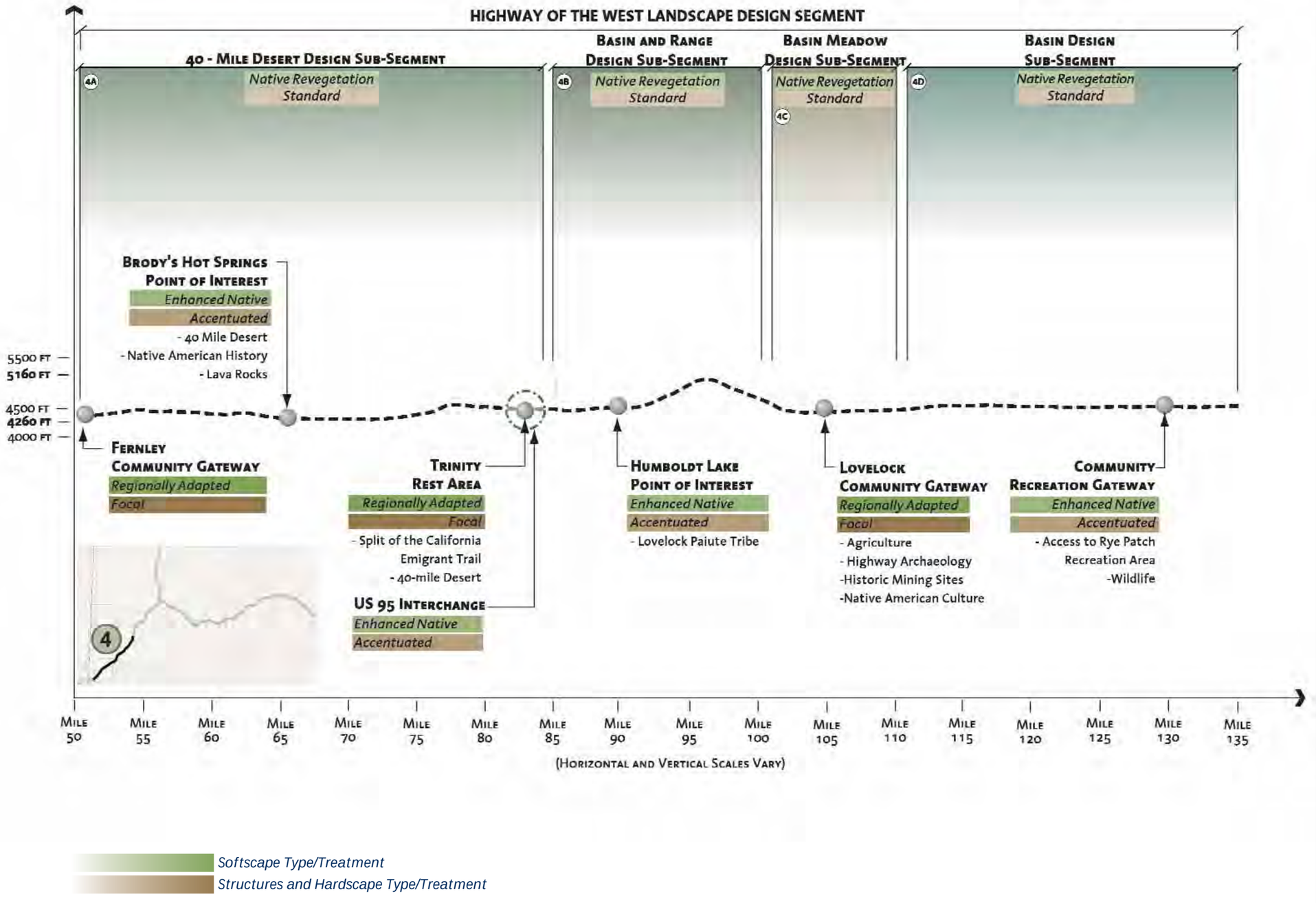
DESIGN OBJECTIVES

Community Gateways

1. Develop gateways for each major community along the corridors in order to help increase visibility and mark the entry into each community. The gateway for Lovelock should reflect the agricultural character of the community and surrounding areas. The gateway for Mill City focuses on the mining and agricultural history of the area. The gateway to Winnemucca reflects the agricultural theme of the community and the ranching, mining, and recreation activities that characterize the area. The gateway to Battle Mountain recognizes the integration of mining in the community. Tucked within a series of mountain ranges, the gateway for Carlin is simple and elegant, and reflects the importance of the gold mining in the area. Elko is a town of diverse culture and heritage, and the atmosphere and gateway of the town reflects the western cowboy and Basque cultures. Wells is a town of local pioneer and rail history, and this is interpreted through signage, monuments, transportation art, and ornamental planting at the community gateway.
2. Inform visitors about opportunities within a specific community and encourage them to exit the highway.
3. Incorporate vertical elements and architectural styles as parts of the gateways that are in keeping with the selected theme for each community.

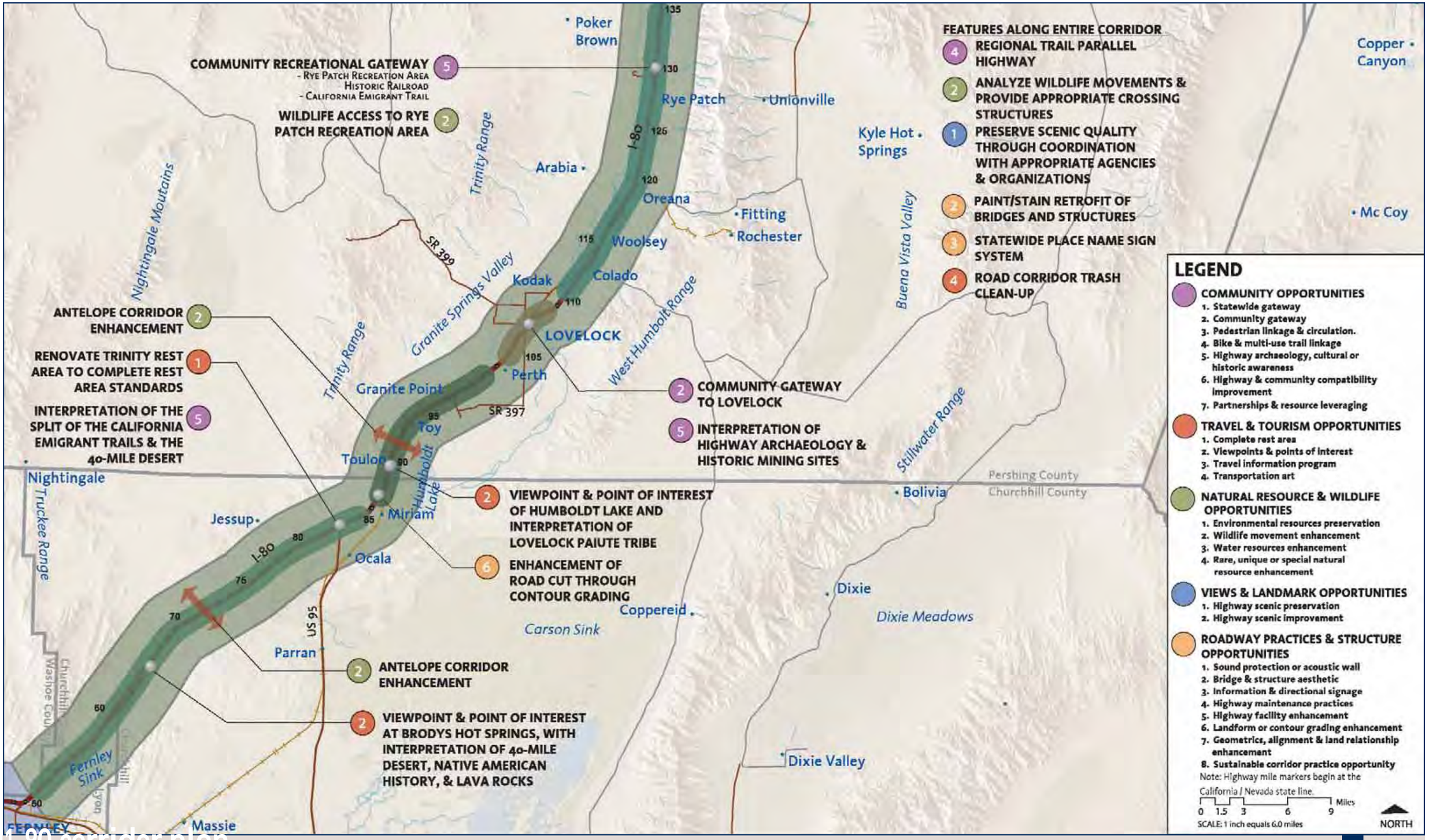
Management of Landscapes within the Great Basin

1. Design and manage the corridor to maintain the Great Basin character while accommodating new growth and development.
2. Blend the visual extent of the right-of-way into the landscape. Create a visual buffer that takes into account future change and allows for naturalized earth forms, native revegetation, and the avoidance of retaining walls or acoustic structures.
3. Apply design criteria to highway design that maintains the color, texture, and forms of the Great Basin landscape palette. These criteria include landform, native revegetation and natural drainage management.
4. Establish design continuity to help ensure a uniform landscape treatment throughout the corridor.
5. Design highway structures that are well-proportioned, simple in their design expression, uniformly applied throughout the segment and harmonious with the palette of the Great Basin landscape.
6. Cultivate roadside edges to re-establish native flora and minimize the build-up of materials that would fuel wildfires.
7. Establish wildlife food and water sources (habitat decoys and guzzlers) away from roadways to minimize conflicts between wildlife and motorists.
8. Soften the visual transition from travel lanes to roadside vegetation through the use of rock mulches that are integrated into the colors of the existing environment. These rock mulches provide a safe recovery zone and the change in texture will help minimize the risk of unpredictable wildlife movement directly adjacent to and across the roadway.



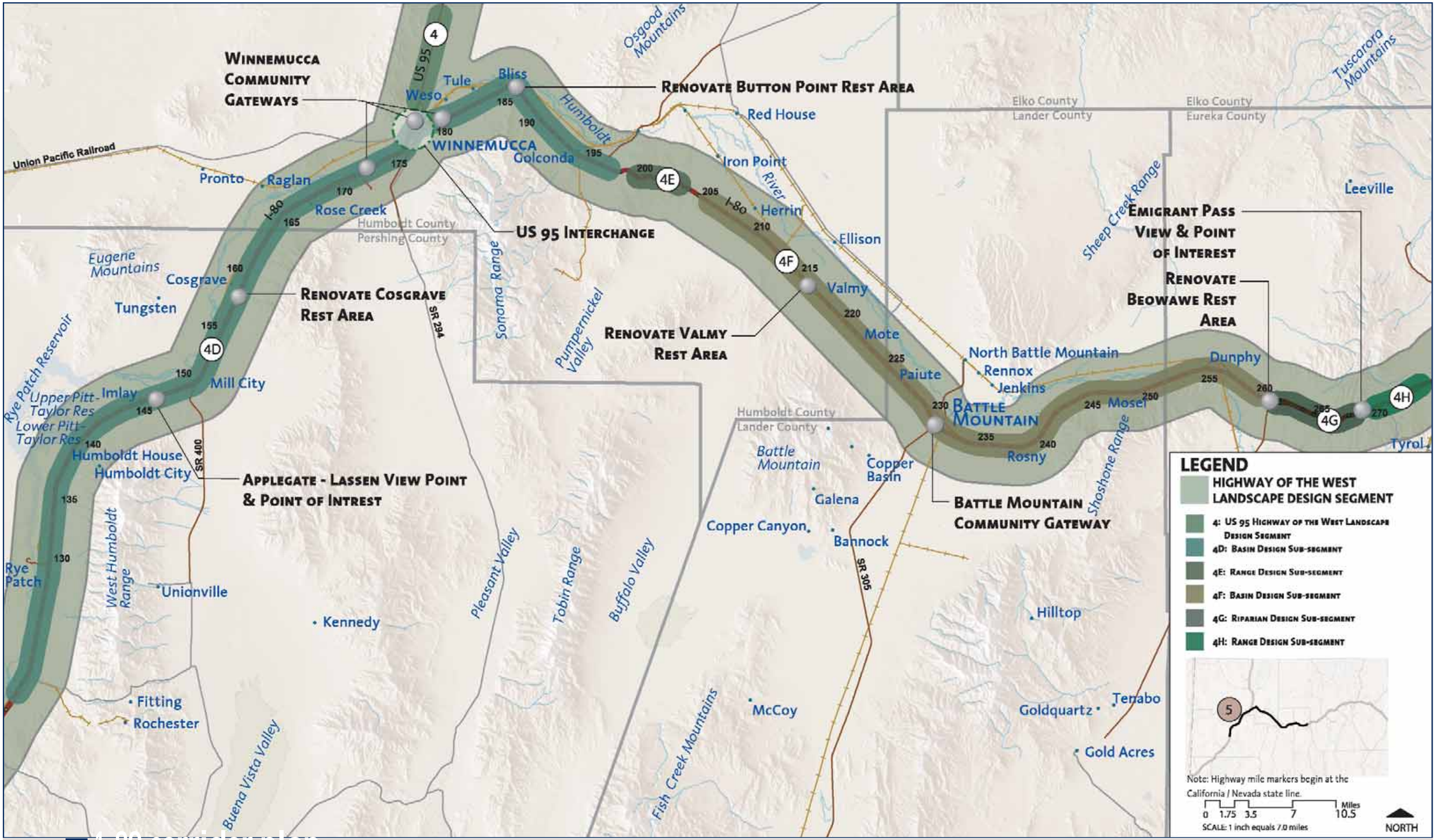
HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Fernley to Rye Patch - Longitudinal Section



HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Fernley to Rye Patch - Specific Corridor Features

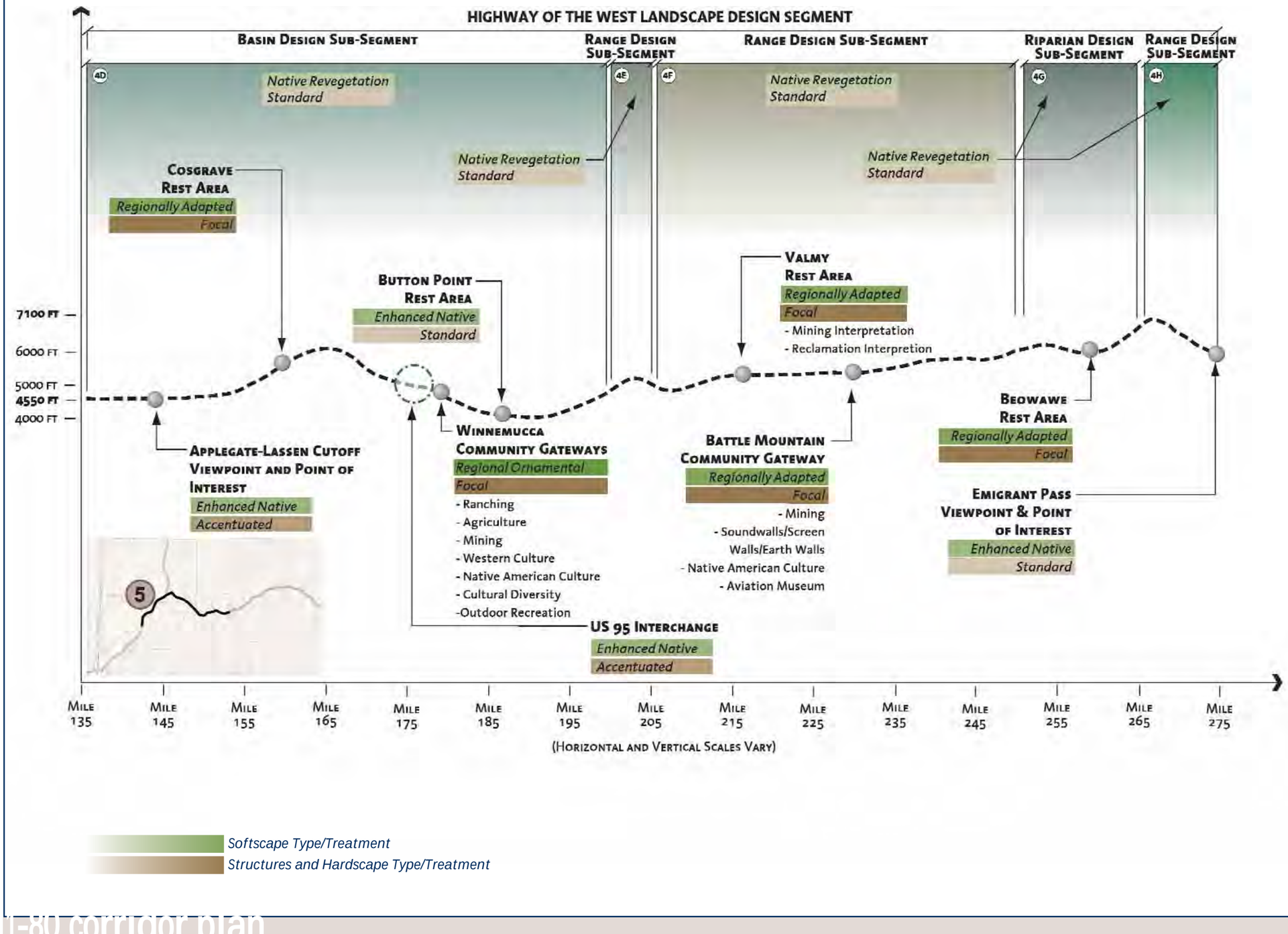


MAP 5A

4.38

HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: RYE PATCH TO TYROL



DESIGN OBJECTIVES

Interpretation of Cultural Resources

1. Emphasize architectural elements that utilize small simple forms, are self-reliant and functional, are organized as part of a complex, and are secondary to the landscape.
2. Augment architectural structures with clustered plantings, punctuated vertical elements, and associated architectural features that 'fit' the region.
3. Utilize materials that have a regional connotation, such as wood, stone, galvanized tin roofs, and metals related to mining heritage, for highway related structures and facilities.
4. Provide visitors with opportunities to discover the stories and history attached to the region, and interpret the importance of the Basque culture in northern Nevada.
5. Make the pioneer legacy of the region a predominant focus of interpretive efforts.
6. Integrate place name signage, travel information, and other statewide programs into the highway system in order to enhance the traveler's understanding of the place.
7. Utilize interpretative signage that describes current mining, agricultural, historical, and recreational practices in the region as well as the methods initiated to restore the landscape and reduce the visual and environmental impacts.
8. Research approaches to accommodate movement of elk and deer across the interstate.
9. Provide opportunities to view and interpret the importance of wildlife habitat areas and movement corridors.
10. Develop trails and other alternative modes of transportation that integrate with the existing infrastructure of towns along the corridor.

Preservation of Great Basin Landscape Character

1. Preserve views of mountain ranges to maintain overall ruggedness and scale of the landscape.
2. Include special scenic designations to manage the structure and placement of advertising and land use in order to minimize negative visual impacts.
3. Visually blend highway facilities into the Great Basin landscape by using naturalized grading, non-structural drainage design, and native revegetation.
4. Utilize colors on highway structures that are consistent with those in the Great Basin landscape.
5. Retrofit existing facilities by applying colors to structures and color staining techniques to disturbed lands that are visually consistent with the Great Basin landscape.
6. Develop rest areas and other road service facilities that offer an opportunity for visitors to relax and to gain a better understanding of surrounding features through interpretive elements.
7. Determine program requirements, site plan, orientation of buildings, and interpretive elements on a site specific basis in order to respond to unique landscape features and specific traveler needs.

COMMUNITY GATEWAYS TO WINNEMUCCA AND RECREATIONAL GATEWAY TO BLACK ROCK DESERT (2)

ENHANCEMENT OF FOREGROUND VIEW (1)

DEER & ANTELOPE WILDLIFE CORRIDOR ENHANCEMENT (2)

RENOVATE COSGRAVE REST AREA TO COMPLETE REST AREA STANDARDS (1)

VIEWPOINT & POINT OF INTEREST AT APPLEGATE-LASSEN CUTOFF TRAIL (2)

RENOVATE BUTTON POINT REST AREA TO BASIC REST AREA STANDARDS & PROVIDE VIEWS OF SONORA RANGE (1)

RENOVATE TRUCK PULL OFF WITH ENHANCED NATIVE SOFTSCAPE (5)

RENOVATE VALMY REST AREA TO COMPLETE REST AREA STANDARDS (1)

INTERPRETATION OF MINING ACTIVITIES (5)

COMMUNITY GATEWAY TO BATTLE MOUNTAIN (2)

PEDESTRIAN CONNECTIONS TO LINK COMMUNITY DISTRICTS (3)

CONNECTION TO REGIONAL BIKE TRAILS (4)

INTERPRETATION OF COPPER, BORITE, & GOLD MINING AT OLD BATTLE MOUNTAIN (5)

PRESERVATION OF VIEWS TO BATTLE MOUNTAIN (1)

SOUND PROTECTION FOR RESIDENTIAL AREAS (1)

VIEWPOINT & POINT OF INTEREST AT EMIGRANT PASS WITH TRAVEL INFORMATION (2)

HISTORIC INTERPRETATION OF EMIGRANT TRAIL SPRING CAMP & WATER SUPPLY AS WELL AS THE HUMBOLDT RIVER & RAILROAD (5)

WILDLIFE CORRIDOR ENHANCEMENT (2)

RENOVATE BEOWAWE REST AREA TO COMPLETE REST AREA STANDARDS

FEATURES ALONG ENTIRE CORRIDOR

- (4) REGIONAL TRAIL PARALLEL HIGHWAY
- (2) ANALYZE WILDLIFE MOVEMENTS AND PROVIDE APPROPRIATE CROSSING STRUCTURES
- (1) PRESERVE SCENIC QUALITY THROUGH COORDINATION WITH APPROPRIATE AGENCIES AND ORGANIZATIONS
- (2) PAINT/STAIN RETROFIT OF BRIDGES AND STRUCTURES
- (3) STATEWIDE PLACE NAME SIGN SYSTEM
- (4) ROAD CORRIDOR TRASH CLEAN-UP

LEGEND

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

TRAVEL & TOURISM OPPORTUNITIES
1. Complete rest area
2. Viewpoints & points of interest
3. Travel information program
4. Transportation art

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

VIEWS & LANDMARK OPPORTUNITIES
1. Highway scenic preservation
2. Highway scenic improvement

ROADWAY PRACTICES & STRUCTURE OPPORTUNITIES
1. Sound protection or acoustic wall
2. Bridge & structure aesthetic
3. Information & directional signage
4. Highway maintenance practices
5. Highway facility enhancement
6. Landform or contour grading enhancement
7. Geometrics, alignment & land relationship enhancement
8. Sustainable corridor practice opportunity

Note: Highway mile markers begin at the California / Nevada state line.

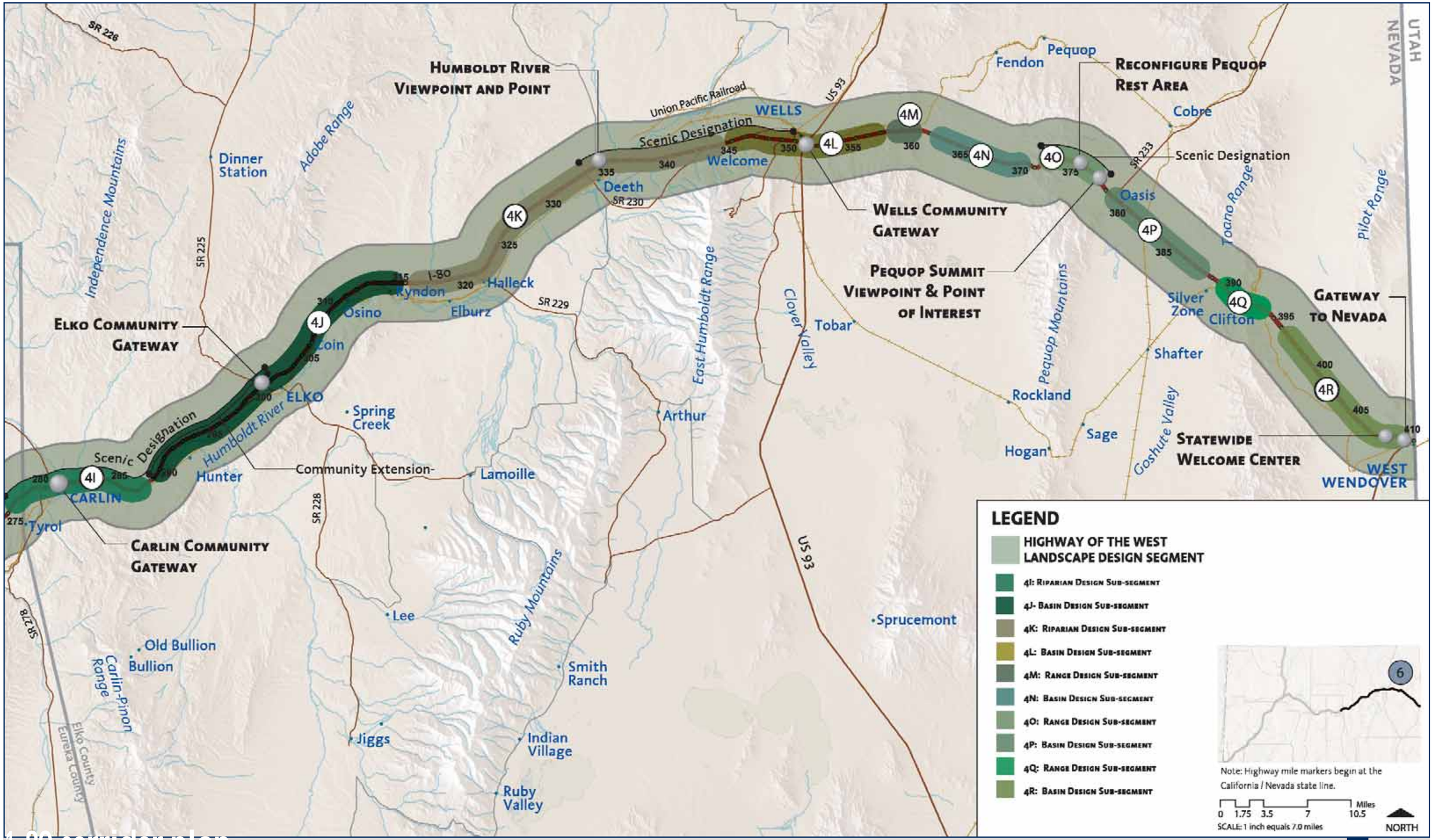
0 1.5 3 6 9 Miles

SCALE: 1 inch equals 6.0 miles

NORTH

HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Rye Patch to Tyrol - Specific Corridor Features



HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Tyrol to West Wendover

MAP 6A

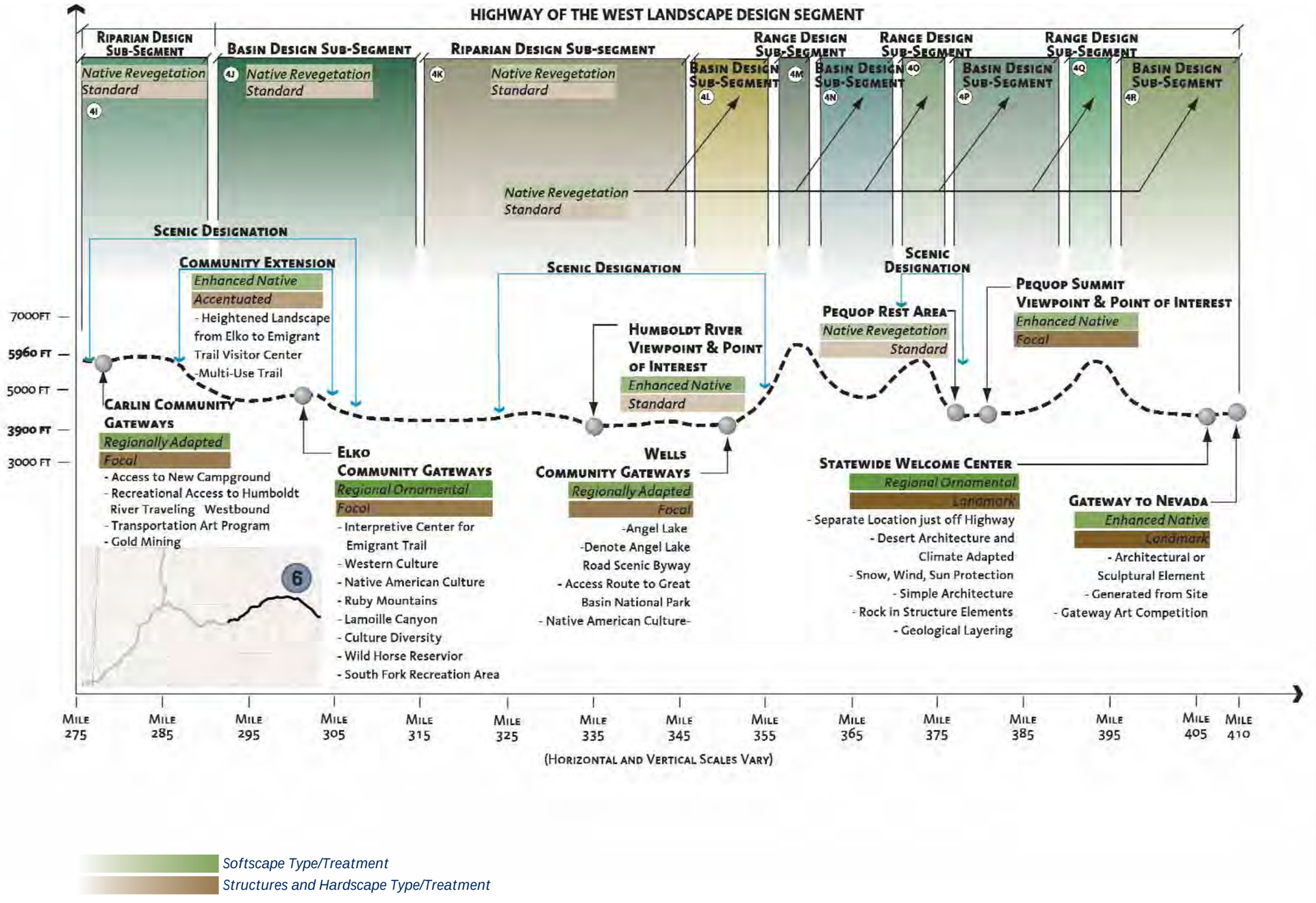
DESIGN OBJECTIVES

Statewide Gateways

1. Develop a state entry gateway that marks the passage from Utah into Nevada and provides a symbolic entry into the state.
2. Design the entry gateway feature so that it is visually prominent and takes an abstract, architectural approach to convey the overall theme of "Highway of the West."
3. Utilize the entry gateway to make the arrival into the state a notable experience for visitors.
4. Emphasize the sequence of arrival by using structures and materials that are integrated with natural landforms.
5. Construct a welcome center associated with the city of West Wendover that includes simple architectural forms consistent with the pioneer spirit and the oasis feeling of the community.
6. Provide visitors to the welcome center with a better understanding of opportunities to experience the natural and cultural resources within the state.

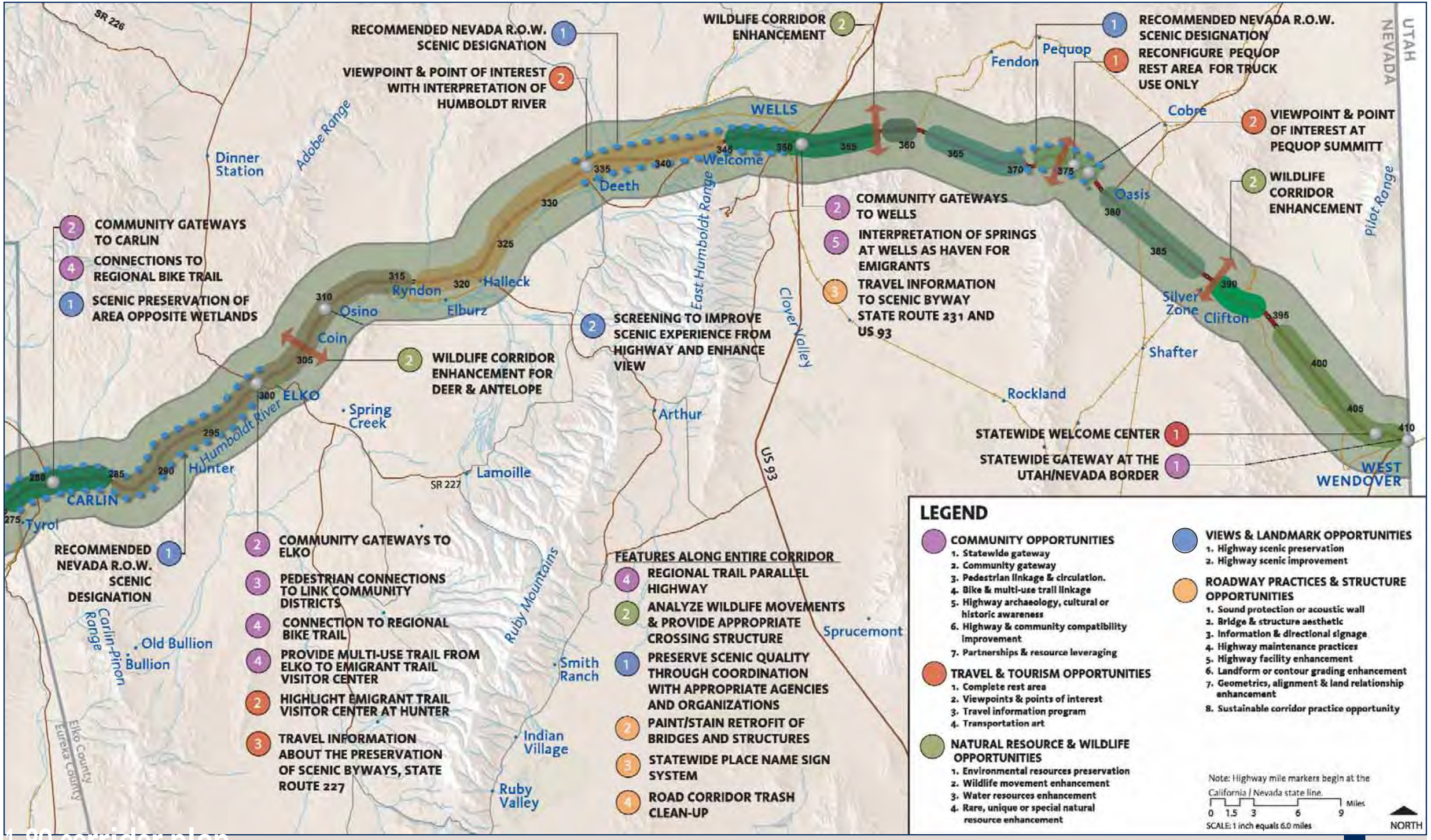
Community Gateways

1. Develop gateways for each major community along the corridors in order to help increase visibility and mark the entry into each community. The gateway for Lovelock should reflect the agricultural character of the community and surrounding areas. The gateway for Mill City focuses on the mining and agricultural history of the area. The gateway to Winnemucca reflects the agricultural theme of the community and the ranching, mining, and recreation activities that characterize the area. The gateway to Battle Mountain recognizes the integration of mining in the community. Tucked within a series of mountain ranges, the gateway for Carlin is simple and elegant, and reflects the importance of the gold mining in the area. Elko is a town of diverse culture and heritage, and the atmosphere and gateway of the town reflects the western cowboy and Basque cultures. Wells is a town of local pioneer and rail history, and this is interpreted through signage, monuments, transportation art, and ornamental planting at the community gateway.
2. Inform visitors about opportunities within a specific community and encourage them to exit the highway.
3. Incorporate vertical elements and architectural styles as part of the gateways that are in keeping with the selected theme for each community.



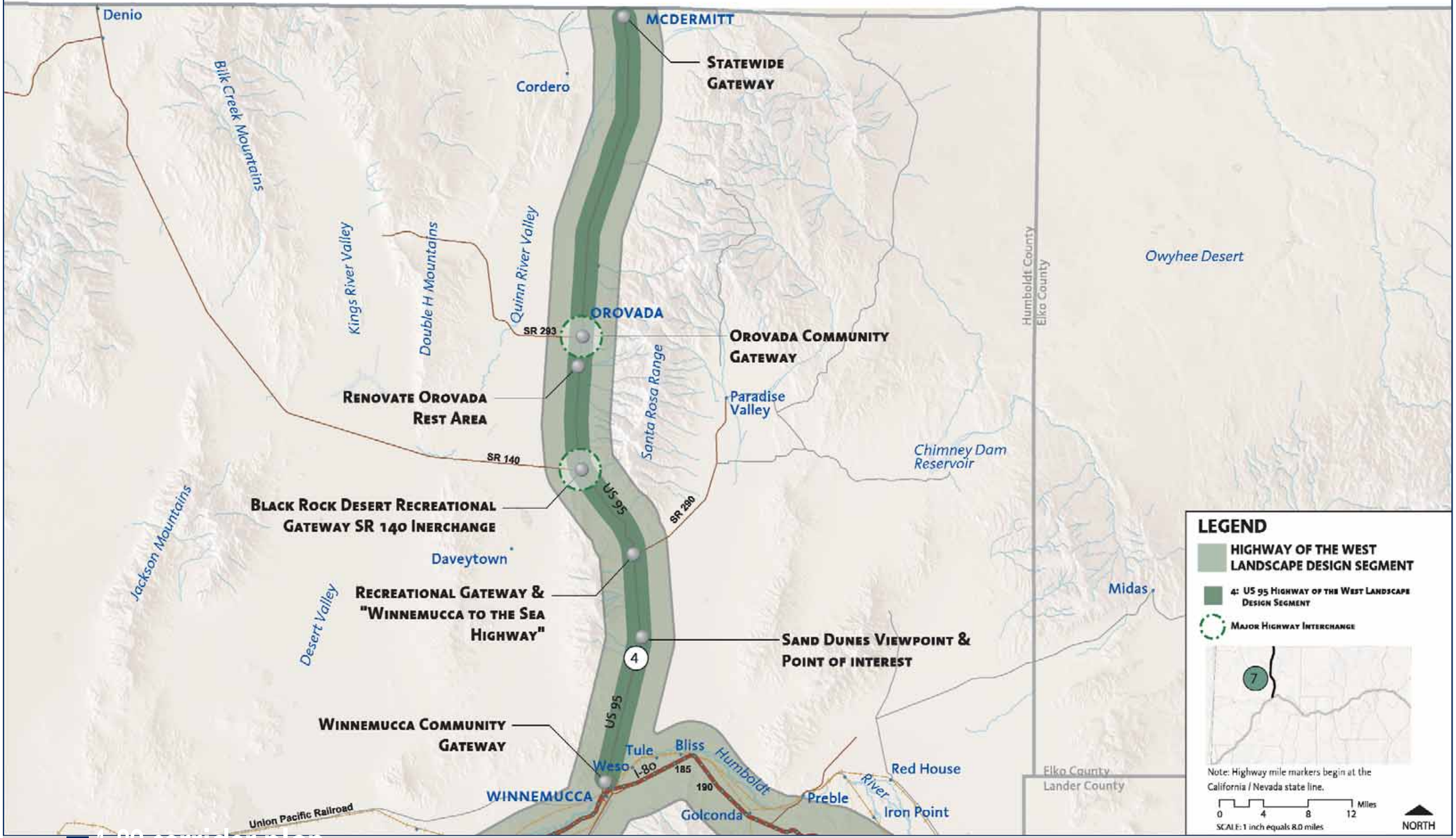
HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Tyrol to West Wendover - Longitudinal Section



HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: TYROL TO WEST WENDOVER - SPECIFIC CORRIDOR FEATURES



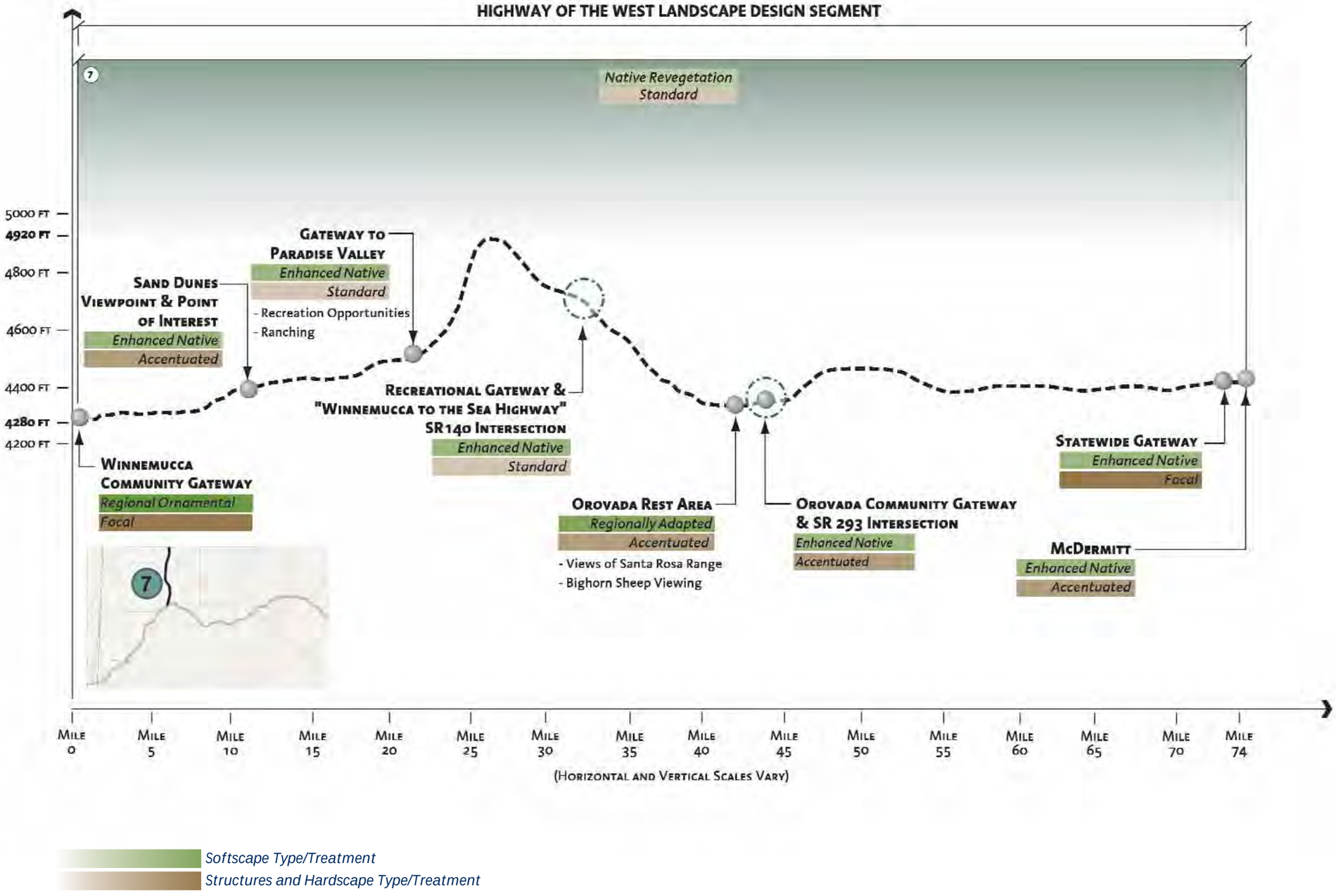
MAP 7A

4.44

HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

US 95: Winnemucca to McDermitt

HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT



Softscape Type/Treatment

Structures and Hardscape Type/Treatment

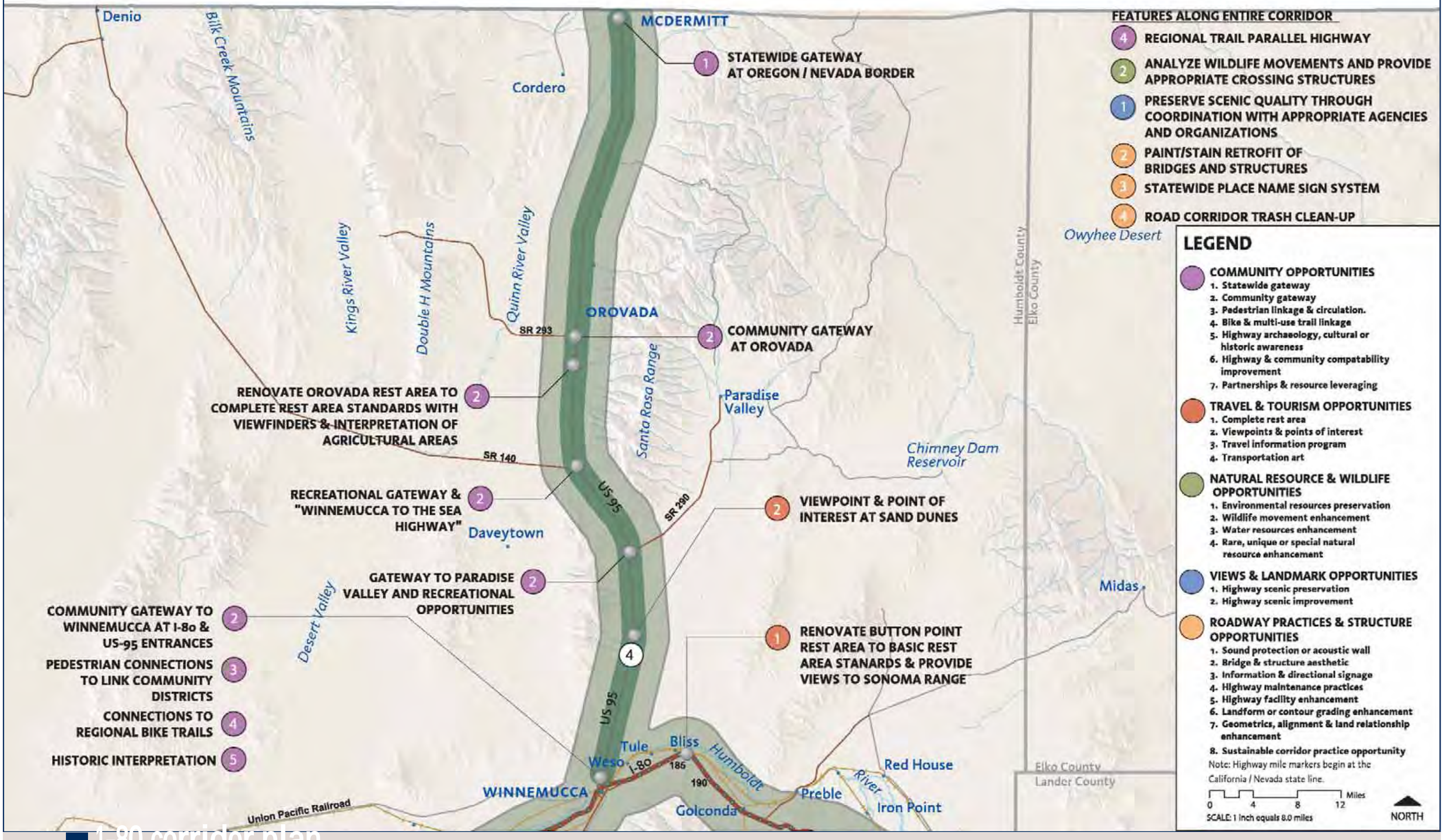
DESIGN OBJECTIVES

Preservation of Great Basin Landscape Character

1. Preserve views of mountain ranges to maintain overall ruggedness and scale of the landscape.
2. Include special scenic designations to manage the structure and placement of advertising and land use in order to minimize negative visual impacts.
3. Visually blend highway facilities into the Great Basin landscape by using naturalized grading, non-structural drainage design, and native revegetation.
4. Utilize colors on highway structures that are consistent with those in the Great Basin landscape.
5. Retrofit existing facilities by applying colors to structures and color staining techniques to disturbed lands that are visually consistent with the Great Basin landscape.
6. Develop rest areas and other road service facilities that offer an opportunity for visitors to relax and to gain a better understanding of surrounding features through interpretive elements.
7. Determine program requirements, site plan, orientation of buildings, and interpretive elements on a site specific basis in order to respond to unique landscape features and specific traveler needs.

Management of Landscapes within the Great Basin

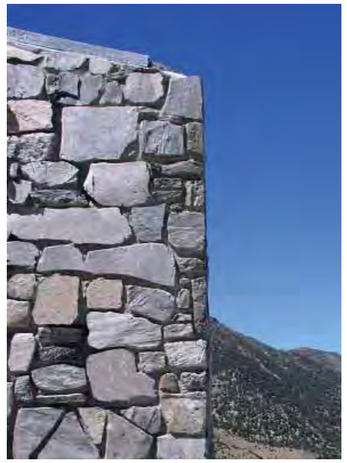
1. Design and manage the corridor to maintain the Great Basin character while accommodating new growth and development.
2. Blend the visual extent of the right-of-way into the landscape. Create a visual buffer that takes into account future change and allows for naturalized earth forms, native revegetation, and the avoidance of retaining walls or acoustic structures.
3. Apply design criteria to highway design that maintains the color, texture, and forms of the Great Basin landscape palette. These criteria include landform, native revegetation, and natural drainage management.
4. Establish design continuity to help ensure a uniform landscape treatment throughout the corridor.
5. Design highway structures that are well-proportioned, simple in their design expression, uniformly applied throughout the segment, and harmonious with the palette of the Great Basin landscape.
6. Cultivate roadside edges to re-establish native flora and minimize the build-up of materials that would fuel wildfires.
7. Establish wildlife food and water sources (habitat decoys and guzzlers) away from roadways to minimize conflicts between wildlife and motorists.
8. Soften the visual transition from travel lanes to roadside vegetation through the use of rock mulches that are integrated into the colors of the existing environment. These rock mulches provide a safe recovery zone and the change in texture will help minimize the risk of unpredictable wildlife movement directly adjacent to and across the roadway.



HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

US 95: Winnemucca to McDermitt - Specific Corridor Features

DESIGN INTERPRETATION



(1), (2), (3), (4) Roadside services include complete rest areas that have the highest level of services. In keeping with the pioneer and western culture of the region, rest areas along the highway should utilize materials, colors, and tones that reflect the rural character of the Highway of the West Design Segment.

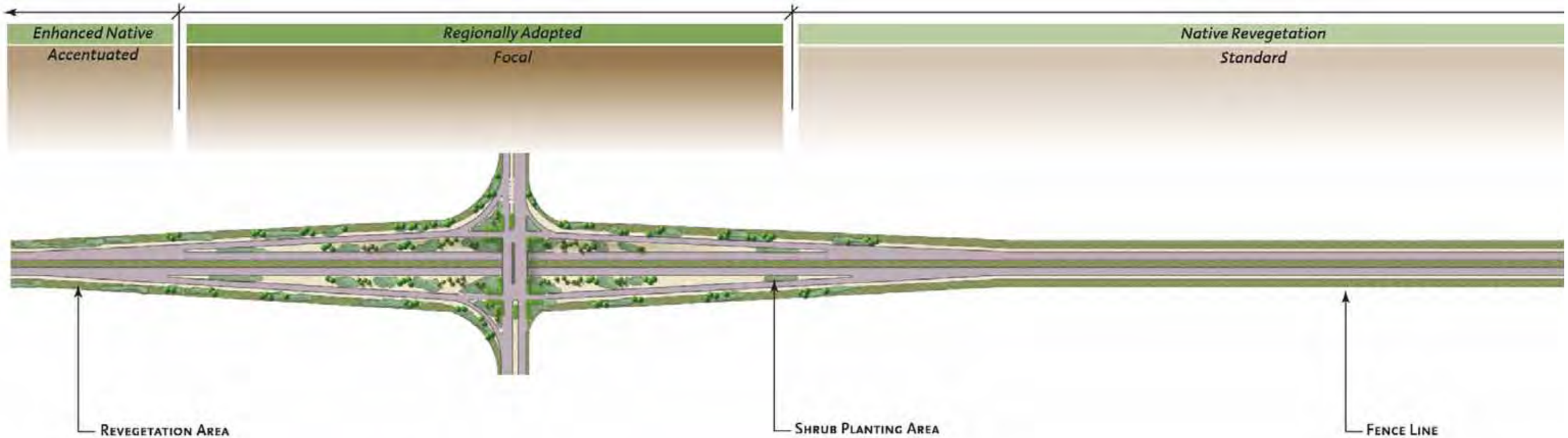
(5) The statewide welcome center should subtly blend into the surrounding landscape in order to capitalize on the natural beauty of the corridor.

(6) The cultural history of the region is a story that can be revealed as interpretive elements along the corridor.

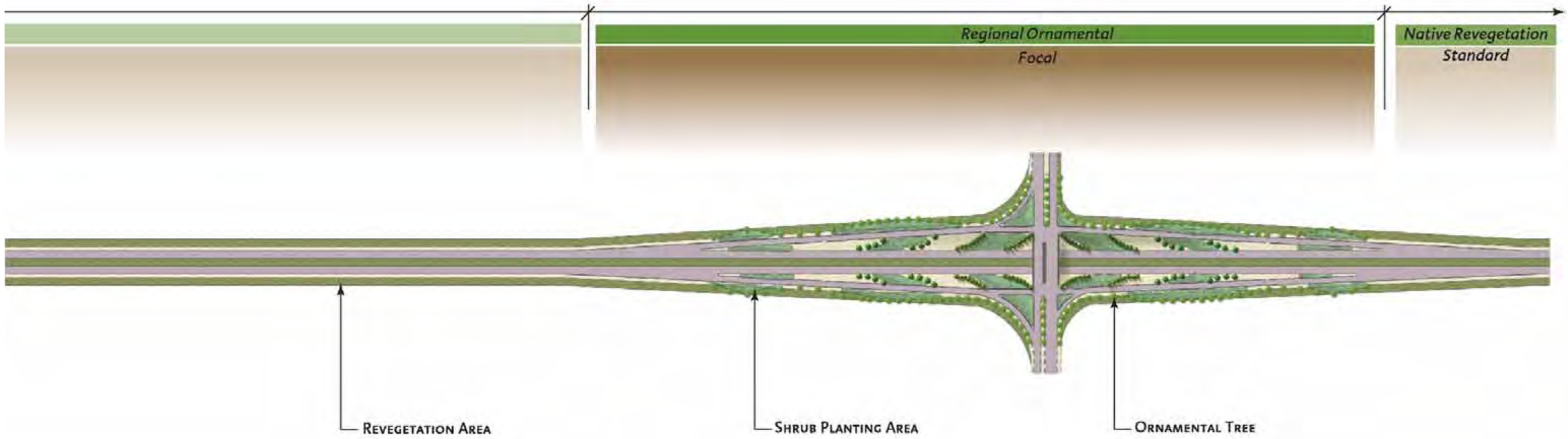
(7), (8) The native vegetation contributes significantly to the rural character and vastness of the landscape.

(9) The night sky provides a unique interpretive dimension to the Highway of the West Design Segment

HIGHWAY OF THE WEST



(1) Community gateways range from regionally adapted to regional ornamental softscape treatment types. Vegetation that evokes cultural meaning frames the entries.



(1) The statewide gateway from the Utah border at West Wendover is defined with local stone materials.

CORRIDOR DESIGN GUIDELINES FOR I-80

Purpose of Design Guidelines

These landscape and aesthetics guidelines are intended to guide physical changes for existing and new highway projects. The result will be a cohesive highway corridor that is compatible and sensitive to this context. These guidelines will accomplish better design for Nevada's highways.

Design guidelines provide a framework for improving landscape and aesthetics when designing new and retrofit highway projects. The guidelines are written statements of recommended performance that establish qualitative levels of design to meet the objectives of each Landscape Design Segment. Some of the guidelines are accompanied by concept diagrams, sketches, or photographs. These images are illustrative and are intended to demonstrate ways the design intent could be achieved. Ultimately, these design guidelines will assist in successful revitalization and overall landscape and aesthetic improvement of the I-80 highway corridor.

These design guidelines have been prepared to assist in the development of design solutions that:

- Guide the interpretation of the design themes for each landscape design segment.
- Create a visual design unity among all highway structures and facilities.
- Select finish, color, and surface patterns to coordinate structures with the surrounding landscape.
- Apply a consistent color palette for all structures.
- Incorporate transportation art motifs and media that depict the Sierra Nevada Passage, the Sierra Nevada/Great Basin Crossroads, the Truckee River Passage, and the Highway of the West Landscape Design Segment themes.

These guidelines outline ways to achieve the enhancement of the highways' most valuable assets, including scenic views, important cultural and environmental features, and the surrounding Great Basin landscape.

Corridor Plan Guidelines

NDOT, designers, and communities are strongly encouraged to use these guidelines to ensure that individual projects comply with the design spirit and literal intent of the *Corridor Plan*. NDOT will review each project design for consistency with these guidelines and the overall *Landscape and Aesthetics Corridor Plan*. When designing a highway project, the full design team should:

1) Become familiar with design guidelines for the design segment in which a project is located. The guidelines are intended to direct the design toward the objective of aesthetic cohesiveness for the design segment.
2) Understand the context of the project site. The landscape surrounding the proposed project provides directions for enhancement. These include predominant materials, colors, and enhancement to structures, as well as natural and cultural resources and social elements.
3) Seek early review of the project. Making changes at the beginning of the project is far easier than at the end. Involving others early in the planning/design process helps ensure that the project is feasible, both economically and aesthetically.

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

These design guidelines are directed at avoiding project to project design in favor of comprehensive corridor design.

1.0 PROJECT DESIGN PROCESS

1.1 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 the theme guides the project design. Understand the context of the site, including viewshed analysis and Landscape Design Segment objectives as described. Ensure project design successfully interprets the landscape design segment theme.

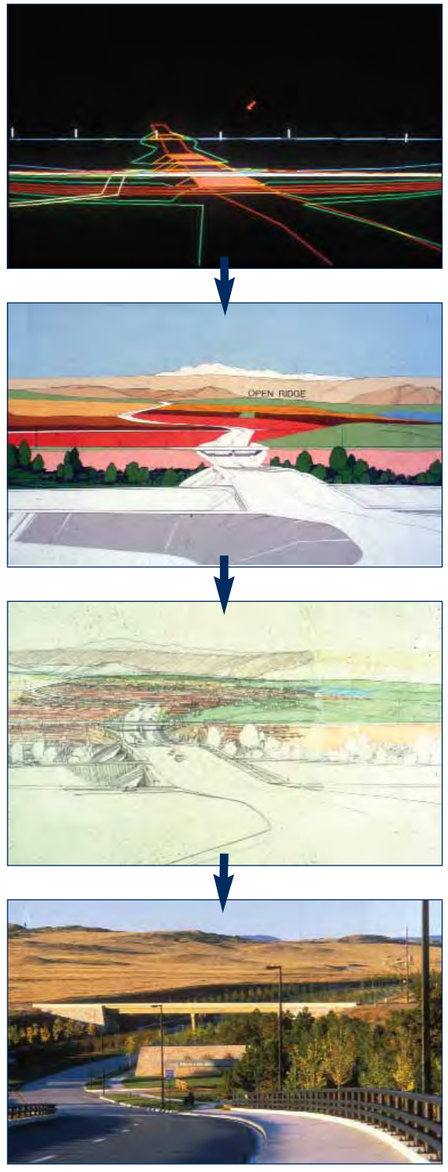
1.2 Understand the site context, including the surrounding landscape, and conduct a comprehensive analysis. Conduct a comprehensive environmental analysis for each project. The site inventory for each project should extend past the project boundaries to analyze the site and surrounding landscape. Ensure the planning and design of the highway project respond 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, both on the site and surrounding the site.

1.3 Visualize design concepts for highway improvements. Utilize sketches, models, and digital visualization tools to understand design concepts from a three-dimensional perspective. Plan view design alone does not accurately represent the experience of the traveler along the highway or illustrate issues of visual design. “Roadway Explorer” is an excellent tool for this purpose.

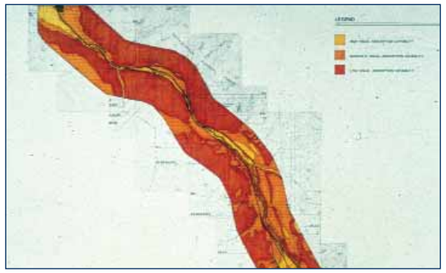
1.4 Integrate landscape and aesthetics at the onset of planning, design, and engineering of all highway projects. Landscape and aesthetics should not be an afterthought to a highway project. Rather, landscape and aesthetics need to be considered at the onset of the planning, design, and engineering of all highway projects. NDOT’s STET report regarding type, size, and location of highway structures should include information on landscape and aesthetics. Engineering design should incorporate landscape and aesthetics to create highway structures and facilities that are effective, safe, and aesthetically appealing. The ability of a roadway and roadway facilities to blend successfully into the surrounding landscape or integrate appropriately with surrounding land uses should be fundamentally addressed at the outset.

1.5 Consider landscape and aesthetics costs alongside 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.

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



(1), (2), (3), (4) This series of highway design studies shows the process of visualization from computer modeling to the built project.



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

(6) Computer simulation of a planned highway at the conceptualization of the project.

(7) Photo simulation of a highway project allows visualization of physical design.

2.0 WELCOME CENTERS AND STATEWIDE GATEWAYS

2.1 Provide vibrant, visually rich gateway welcome centers. Promote and provide information about statewide travel opportunities and services in a gateway welcome center at the California boundary near Verdi and at the Utah border in West Wendover (pages 4.10-4.12 and 4.41-4.43). Promote the gateway welcome centers as important civic facilities and ensure that these centers have strong visual presence. The gateway welcome centers should convey the identity of Nevada and make the entry into the state a notable and memorable experience. Welcome centers should also signify the departure from Nevada and leave the traveler with a positive memory. Program elements offered at centers include interpretation of time, history, and the Sierra Nevada and Great Basin landscapes. Conduct a feasibility study to determine the appropriate location for the welcome center and potential partnerships for construction, operation, and maintenance.

2.2 Provide statewide gateway features crafted from the land and place. The state gateway at the California border near Verdi (pages 4.10-4.12) should reflect the character of the Sierra Nevadas as shown in sketch 6. The statewide gateway at West Wendover and McDermitt (pages 4.41-4.46) should capture the visual character of sketch 5. Each statewide gateway shall include the Nevada name and State seal, feature stone materials from the local region of the state, and planting type as identified in the landscape design segment. Engage adjacent State agencies and representatives to coordinate implementation of the gateway features where space is constricted due to existing development.

2.3 Coordinate with local agencies to preserve scenic quality from the California/ Nevada state line to Mogul. The I-80 corridor from the California state line to Mogul is currently not highly developed and offers vistas of the Carson Range as it transitions from the Great Basin. As noted in the visual analysis, this portion of the highway provides special scenic features and provides an attractive entrance to the state. Control over the landscape and aesthetics of this section of roadway may require collaboration with federal, state, and local governments and adjacent land managers concerning landscape and aesthetic matters.

(1) Welcome centers provide outdoor space amenities and facilities such as nature trails and viewing areas.

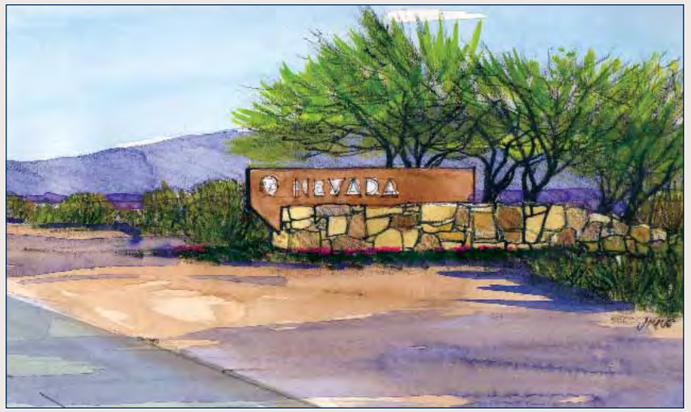
Image courtesy of Elizabeth Murrell, Fabric Structures Inc.

(2) The National Park architecture found in the Sierra Nevadas is reflected in materials.

Image courtesy of Robb Williamson, NREL Center for Buildings

(3) The architectural style strongly reflects the surrounding landscape.

(4) Materials for the Welcome Center at Verdi respond to the Sierra Nevada landscape.



(5) Required design elements illustrated for the West Wendover and McDermitt statewide gateways.

(6) Required design elements illustrated for the statewide gateway at the California border near Verdi.

3.0 COMMUNITY GATEWAYS

3.1 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. Mark the entrances and exits to communities using enhanced native, regionally adapted, or regional ornamental softscape types, and accentuated, focal or landmark structures and hardscape. Community gateways are intended to be visually impressive. Maintain and enhance important community features through careful gateway planning and design. Use appropriate landscape and/or structural techniques to screen unsightly land uses.

3.2 Locate gateways accordingly. A community gateway for the Sierra Nevada Passage Landscape Design Segment should be located at Verdi (Map 1B, page 4.12). The gateway should be highlighted with enhanced native softscape and accentuated hardscape types.

Community gateways for the Sierra Nevada/Great Basin Crossroads Landscape Design Segment should be located at the west and east McCarran Boulevard interchanges. Visual gateways should be located at Robb Drive and Vista Boulevard. Identification signage should be provided for downtown Reno and Sparks. Section 2 (page 4.19) indicates the types of structure and hardscape features and softscape for each gateway.

Community gateways for the Truckee River Passage Landscape Design Segment should be located at Wadsworth and Fernley. Identification signage should be provided for Lockwood, Mustang, and Clark. Section 3 (page 4.27) indicates the types of gateway features and landscape plantings that should be used to mark these gateways.

Community gateways for the Highway of the West Landscape Design Segment should be located at Lovelock, Winnemucca (both I-80 interchanges and entering from US 95), Battle Mountain, Carlin, Elko, Wells, and Orovada. West Wendover should be highlighted by a gateway welcome center as discussed in Guideline 1.0 (page 5.3). Sections 4, 5, 6, and 7 (pages 4.36, 4.39, 4.42, and 4.45) indicate the types of structure and hardscape features and softscape for each gateway.

3.3 Integrate the gateway into the highway facilities. Free standing signs are not allowed in the right-of-way. Community gateways need to be integrated with highway structures and landscape. Refer to Softscape and Hardscape Types and Treatments (pages 3.2 & 3.7) and Softscape Type Guidelines (pages 5.26-5.32) for more details about the types of features and plants to consider for community gateways.

3.4 Ensure community gateways contribute to community identity and clearly define community identity points. Accentuate community entrances with clear and attractive signage and with a landscape that reflect the community character. Ensure travelers recognize they have entered a special place. Community identification 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. Ensure landscape plantings are appropriately designed and include layers of plant material arranged to enhance the architectural elements and develop the transition from the highway into the community. Architectural elements may include transportation art, rock walls, accent lighting, and signage. In areas where pedestrian connections are important, bridges can provide community identity. Ensure community gateways are distinctive, memorable, and functional. Defined levels of softscape treatments and structure and hardscape treatments, along with the suggested community themes, are described as follows:

Image courtesy of Town of Estes and Rotary Club of Estes Park

(1) Community identification signage should be appropriately sized and integrated with other architectural elements.

(2) The incorporation of architectural elements that reflect cultural meaning accentuate the sense of arrival.

(3) Accentuate community entrances with attractive signage and landscape that is integrated into all site features, including bridges and walls.

(4) Community gateway incorporated into retaining wall and bridge structure are appropriate for town entries along the rural study area.

(5) Example of a community gateway incorporated into retaining wall and bridge structure.

3.0 COMMUNITY GATEWAYS CONT.

Verdi: Softscape Treatment: Enhanced Native
Hardscape Treatment: Accentuated

Reno: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character: Connections to Downtown, Transportation Art

Sparks: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character: Victorian Square, Spark's Marina

Fernley: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character: Low Rise Growth Center, Recreation

Lovelock: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character: Agricultural, Native American Heritage, Emigrant Trail

Winnemucca: Softscape Treatment: Regional Ornamental
Hardscape Treatment: Focal
Character: Mining, Native American Heritage, Ranching, Western Culture, Outdoor Recreation

Battle Mountain: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character: Mining, Aviation, Native American Heritage

Carlin: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character: Humboldt River, Gold Mining, Emigrant Trail, Carlin Canyon

Elko: Softscape Treatment: Regional Ornamental
Hardscape Treatment: Focal
Character: Emigrant Trail, Western Culture, Ruby Mountains, Lamoille Canyon, Basque Culture, Wild Horse Reservoir, South Fork State Recreation Area, Native American Heritage

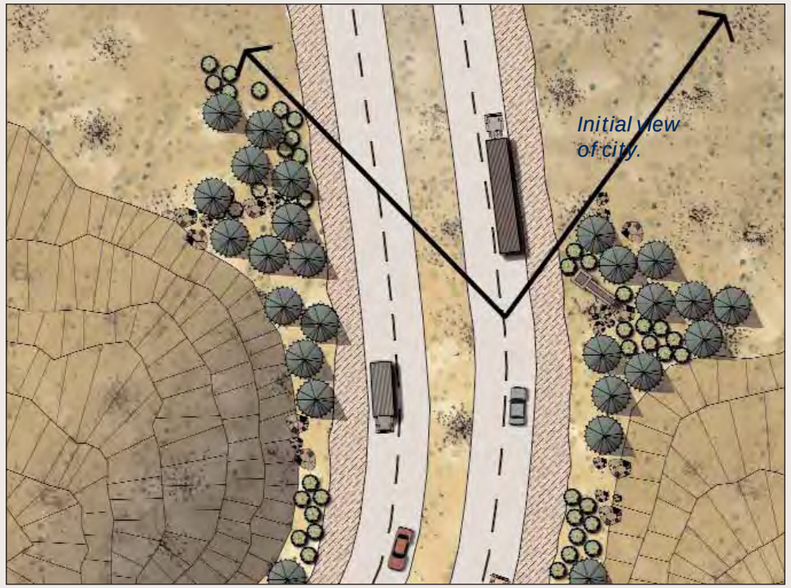
Wells: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character: Angel Lake, Great Basin National Park, Emigrant Trail, Ghost Towns, Native American Heritage

West Wendover: Softscape Treatment: Regionally Adapted
Hardscape Treatment: Focal
Character:: Entertainment, Outdoor Recreation, Air Force Auxiliary Airfield

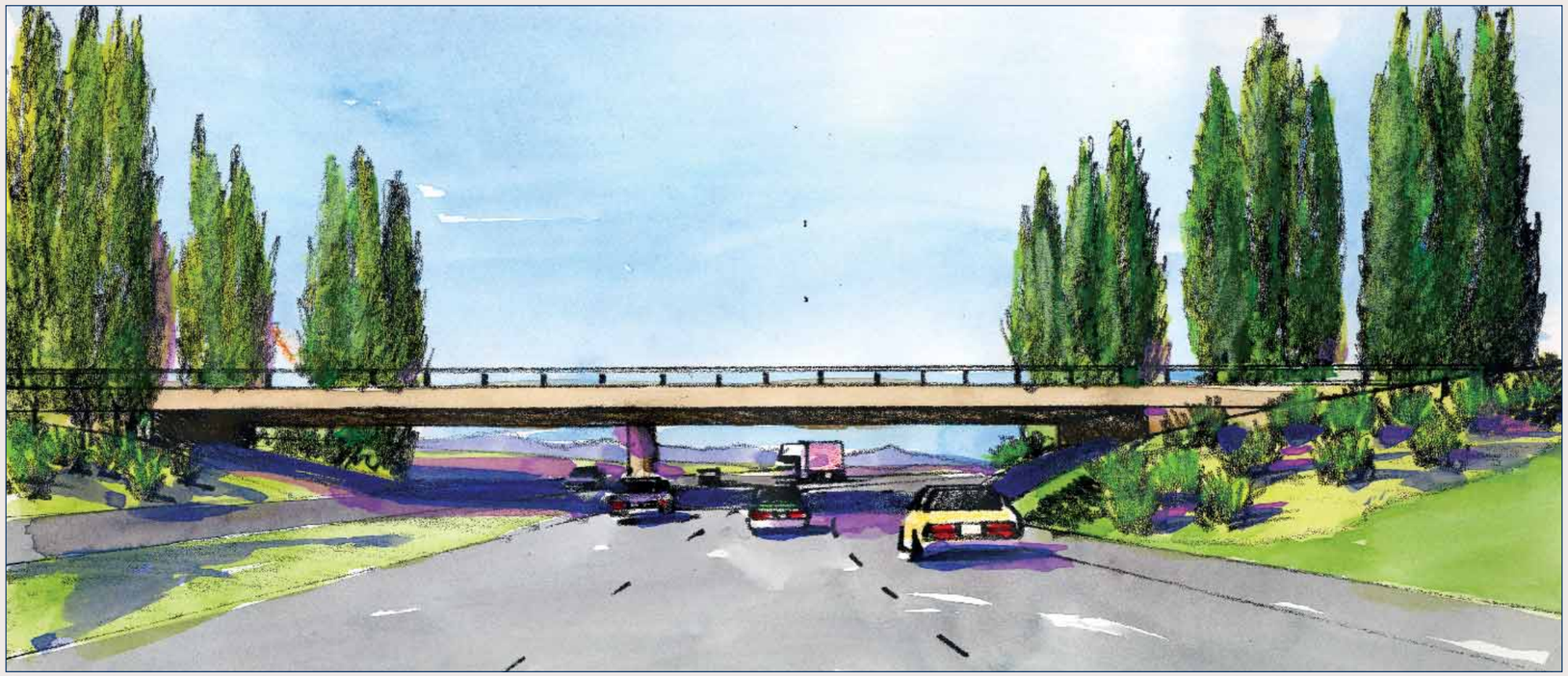
Orovada: Softscape Treatment: Enhanced Native
Hardscape Treatment: Accentuated
Character: Ranching, Recreation, Santa Rosa Range

McDermitt: Softscape Treatment: Enhanced Native
Hardscape Treatment: Accentuated
Character: Native American Heritage, Ranching

3.5 Ensure visual gateways frame the entry view of the community. Emphasize the sequence of arrival into the Reno/Sparks area by extending the sense of entry into the Truckee Meadows. Increase landscape densities along a designated segment of the highway and incorporate sculptural and architectural elements to heighten the expectation of arrival. Accentuate the reveal of the city, and emphasize and clearly mark the transition into the urban environment by using landscape plantings and architectural features to frame and focus views.



(1) Visual gateways frame the entry view of the city through the use of vegetation, landform, and architectural elements.



(2) The landmark qualities of this Highway of the West community gateway is an example that represents the highest level of treatment identified within the landscape design segments.

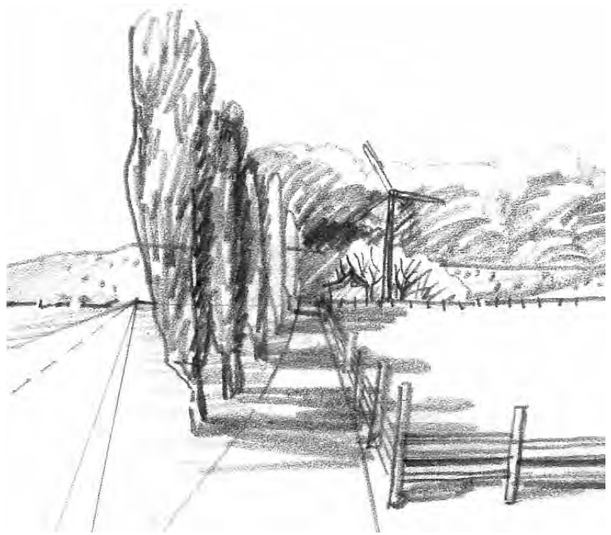
4.0 REST AREAS, VIEWPOINTS, AND PULL-OFFS

4.1 Implement a comprehensive roadside service program. Roadside services are key components of the highway corridor, particularly where long distances separate developed areas. Implement a comprehensive roadside service program throughout the corridor. Refer to Road Services Program for a detailed description of road services (page 3.10). Locations for road service sites are located on the Specific Corridor Features maps (pages 4.12, 4.20, 4.28, 4.37, 4.40, 4.43, and 4.46). All roadside services must be located off the highway or served by acceleration/deceleration lanes or service roads.

4.2 Ensure rest area design reflects the local setting. Ensure highway rest areas and other such facilities reflect the landscape and natural setting of the local area. All rest areas, viewpoints, and pull-offs should readily accommodate travel needs and reflect the corridor's design theme. Avoid using makeshift, adapted site facilities with no distinctive architectural style. Concrete barriers should not be used for parking delineation or site boundaries at rest areas and pull-offs. Ensure all built facilities, such as restrooms, information signs/services, and shade, are rooted in the local landscape. Sustainable architecture or green building design is highly suitable to many highway rest areas and other such facilities where water, energy, and landscape resources are difficult to secure and maintain (refer to Sustainable Highway Environments, page 5.35).

Analyze existing rest area structures, buildings, amenities, and layout in regards to their visual interest. Provide a renovation schedule to improve the aesthetics and user comfort of existing facility structures, amenities, and materials. 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.

The layout of rest areas should include major site resources and features such as topography, views and vistas, unique vegetation, geological features, wetlands, and other inherent qualities of the site and its surroundings. The amount of required truck parking should be analyzed and, where possible, should be minimized and/or sited as to not disrupt views and other features.



(1) Elements of rest areas include vegetation and architectural features that reflect the culture of the area.

(2) Shade structures at interpretive rest area with table, benches, and shade structure that frames significant views.

(3) A complete rest area provides facilities that are part of an integrated architectural approach.

(4) Architectural shade structure provides visual interest within the landscape.

(5), (6) Prototypical shade structure for all types of road service areas protects users from the wind and sun.

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

4.0 REST AREAS, VIEWPOINTS, AND PULL-OFFS cont.

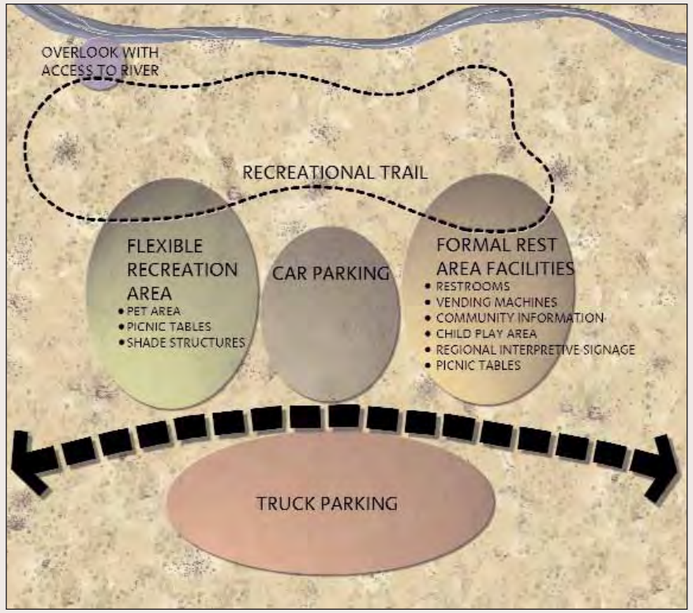
4.3 Locate viewpoints and points of interest accordingly. Special attention should be given to existing or potential views, vistas, and cultural or historical attractions that are unique to the site or have outstanding resource value, such as Native American heritage and emigrant history. Viewpoints should be located at the following locations:

I-80 Urban Study Area
- Renovate existing viewpoint eastbound near mile post 5
- Relocate existing viewpoint near Lockwood

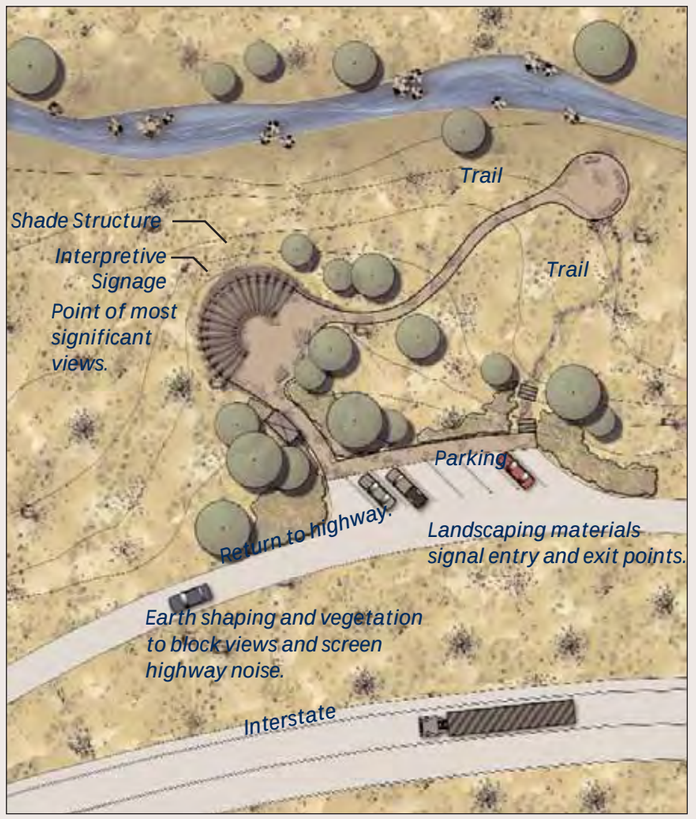
I-80 Rural Study Area
- Brody's Hot Springs
- Emigrant Pass
- Applegate-Lassen Cutoff
- Pequop Summit
- Winnemucca Sand Dunes
- Deeth: Humboldt River

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. Manage the construction of outdoor advertising and other elements and structures that detract from the quality of the landscape. Program elements to be included at viewpoints and the levels of softscape, structures, and hardscape treatments are listed in Road Services Program (page 3.10).

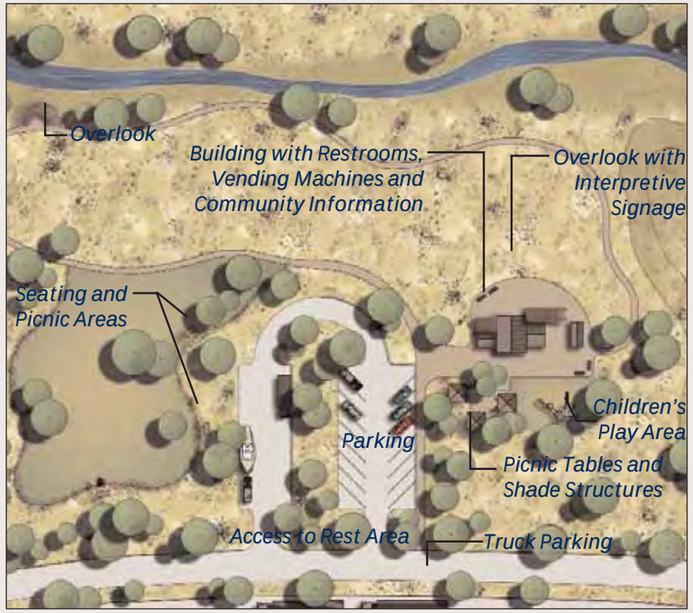
(1) Viewpoints and points-of-interests incorporate interpretive signage.



(2) Conceptual layout of rest area amenities responds to environmental context.



(3) Develop viewpoints that reflect the surrounding setting and unique features. Viewpoints should be separated from the highway and provide amenities for viewing, resting, and accessing natural resources.



(4) 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.

5.0 SIGNAGE

5.1 Provide a standard, cohesive system of service signage. NDOT will manage the location of Tourist Oriented Directional Signage (TODS) along the highway in a cohesive, understated manner. A cohesive set of standard TODS is encouraged over numerous private individual business signs and billboards. Work with local community agencies and businesses to develop and locate TODS. Refer to Outdoor Advertising Program (page 3.13) for more information about billboards along the corridor.

5.2 Implement a Statewide Place Recognition Sign Program. A comprehensive place recognition signage program should be implemented through partnership initiatives with local communities and agencies.

Areas of interest within the I-80 Urban Study Area's design segments that could be highlighted include:

- **Historic Features:** Derby Dam, historic flumes, railroads, emigrant trails, National Auto Museum, State Railroad Museum, and V&T Railroad (from Virginia City to Carson City and to Reno)
- **Wildlife and Natural Areas:** Fernley Wildlife Management Area and wildlife viewing areas
- **Geographic Features:** Truckee River, Truckee Canyon, Lahontan Reservoir, Pyramid Lake, and Lake Tahoe
- **Cultural/Recreational Resources:** Mount Rose Scenic Byway (SR 431), Pyramid Lake National Scenic Byway (SR 445), Pyramid Lake Indian Reservation, petroglyph site near Vista Boulevard, University of Nevada, Nevada Museum of Art, Tahoe Pyramid Bikeway, and Virginia City National Historic District

Areas of interest within the I-80 Rural Study Area's design segment that could be highlighted include:

- **Historic Features:** Native American history, Toulon Historic Mill, Mill City ruins, Unionville, Emigrant Trail, Hastings Cutoff and California Trail, Applegate-Lassen Cutoff Trail, Winnemucca Historical Museum, springs at Wells, Lovelock Caves, Thunder Mountain, and Veterans Memorial Park
- **Wildlife and Natural Areas:** Humboldt Wildlife Management Area, bioenhancement of Humboldt River, Rye Patch Dam, Pinyon-Juniper forests in the Pequop Range, and wildlife viewing areas
- **Geographic Features:** Fernley Sink, Carson Sink, 40-mile Desert, Lava Rocks, Tufa Rock Formations, Thunder Mountain, Eugene Mountains, Humboldt River, Snake Mountains, Pilot Peak, Sonora Range, Osgood Mountains, Buffalo Mountains, Winnemucca Sand Dunes, and Wild Horse Reservoir
- **Geological Places of Interest:** quarry/mining sites, Brody's Hot Springs, mining restoration sites, Mercury Mine near Cordero, Sleeper Mine near Daveytown, Pequop Caves, Denio Opal Mine, and historic lake levels
- **Cultural/Recreational Resources:** Rye Patch Recreational Area, Mining Center for Copper, Borite, and Gold near Battle Mountain, Lamoille Canyon Scenic Byway (SR 227), Angel Lake Scenic Byway (SR 231), Emigrant Trail Visitor Center, Sand Dune Recreation Area, Ruby Mountains, Bloody Shins Trail, South Fork State Recreation Area, Native American tribes, Native American heritage, Eisenhower Highway (I-80), and Veterans Memorial Highway (US 95)

5.3 Icon Representation. The features and points of interest to be recognized in this program will be approved by the NDOT signage committee. The image icons depicting each feature to be recognized on the sign should be derived from the actual physical shape of the point of interest as shown in illustrations 1, 2, 3 and 4 on this page. Name and labels included shall be consistent with State archives and map naming conventions. Final icon and name approval will rest with NDOT.

5.4 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.

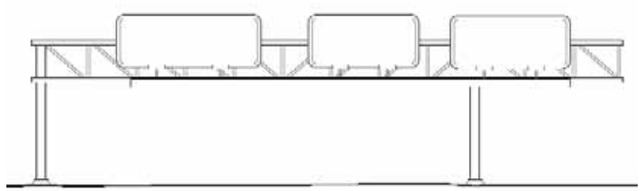
5.5 Implement an Audio Interpretation Program. Develop an audio/multimedia interpretative program that would tie into the Statewide Sign Program. This program could be implemented via broadcast radio, CD or DVD programs, wireless Internet hotspots, satellite transmission, or other media that allows travelers to access additional information about cultural and natural resources, tourist opportunities, and services along the corridor from their car. Link the Audio Interpretation Program to the Statewide Place Recognition Sign Program and state welcome centers so that travelers will be able to access specific information on selected sites. Utilize synchronous technologies that allow the 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 be coordinated with AMBER alert and 511 traveler information messages. Partner with other groups, organizations, agencies, and municipalities along the corridor and explore ways to expand the Audio Interpretation Program.

(1) Truckee River

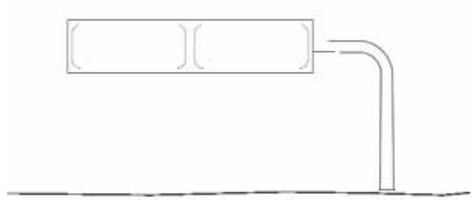
(2) Truckee River depicted on the Nevada sign program.

(3) Pilot Peak

(4) Pilot Peak depicted on the Nevada sign program.



(5) Sign bridge with numerous trusses are visually cluttered.



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

6.0 TRANSPORTATION ART

6.1 Create regionally appropriate, meaningful art. For the roadway user, an artscape enhances the travel experience and the impression of place. Transportation art should be authentic and should evoke clear meaning and purpose that relates to the surrounding place, the unique culture and environment of the area, and the travel experience. Patterns imprinted on a highway structure should be designed with an artistic composition of objects, imprints, or patterns. While complementing other highway structures in form and color, patterns should offer a level of complexity and interest that responds to the unique experience of the place and roadway travel. Artwork should be of a scale appropriate to highway travel speed. Consider artwork that expresses the element of light, involving both sunlight and artificial light. Select sculpture that captures the desert sun as an element of its design. To engage the viewer, patterns and objects should be used thoughtfully. Even abstract elements can and should evoke a response to the physical reality of travel, time, and the uniqueness of the site and surrounding landscape to depict appropriate character and meaning. Avoid monotony in the duplication of repetitive literal pictorial applications, such as profiled mountains rendered in concrete texture.

6.2 Ensure artwork expresses an excellence of craftsmanship, quality, truthfulness, and originality. Elements of highway art should not be obvious nor inauthentic. Avoid the use of ready-made, randomly placed, stand-alone objects or imprints that depict little meaning. Rather, transportation art should have an excellence of craftsmanship, quality, truthfulness, and originality. Use evocative artistic expressions that complement highway structures and the surrounding landscape and that engage observers. Rather than imprints of obvious subject matter, select more complex artistic expressions that encourage viewers to "fill in the blanks" and in so doing evoke a higher level of meaning.

6.3 Consider each art piece as part of a larger whole. Highway art can be carefully crafted, and the simplest of all elements have a very powerful effect. When planning transportation art, the entire length of each design segment and the corridor should be considered. Each design segment is planned around views and vistas to the surrounding landscape to which the art is complementary.

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

Sierra Nevada Passage:

- Celebration of arrival to and departure from Nevada
- Ranching
- Railroads
- Mining
- Outdoor recreation
- Sierra Nevada landscape and wildlife features

(1) Culturally important mural along roadside created as a tile mosaic.

Image courtesy of Catherine Widgery

(2) Cultural symbols sandblasted into stone mark aspects of the historic emigrant travel.

(3) Towering metal sculpture as part of a bridge is intended to be seen from a distance and is appropriate for the I-80 urban study area.

6.0 TRANSPORTATION ART cont.

Sierra Nevada/Great Basin Crossroads:

- Travel / Tourism
- Entertainment industry and gaming
- History of community and of transportation
- Outdoor recreation
- Railroads
- Virginia City National Historic District
- Truckee River and Pyramid Lake
- Community and cultural events
- Sierra Nevada and Great Basin landscape and wildlife features

Truckee River Passage:

- Outdoor recreation
- Native American heritage
- Riparian system
- Canyon features
- Emigrant trails
- Railroads
- Historical and present-day mining
- Pyramid Lake and Lahontan Reservoir
- Great Basin landscape and wildlife features

Highway of the West:

- Celebration of arrival to and departure from Nevada
- Native American heritage
- Emigrant Trail; pioneer heritage
- Entertainment culture
- Mining
- Railroads
- Basque culture
- Ranching
- Agriculture
- Mountain ranges
- Ghost towns
- Outdoor recreation
- Environmental features
- Great Basin landscape and wildlife features

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

6.5 Engage local agencies and organizations in the planning process. Significant transportation art opportunities exist in each design segment of the I-80 corridor. Artwork can be included as a component of landscape and aesthetic projects, or as free-standing art installations. A relationship with the Nevada Arts Council should be developed as a statewide contact. Local relationships should be developed with agencies, such as Reno Arts and Culture Commission, the Sierra Arts Foundation, the Churchill Arts Council, and the Western Folklife Center, to assist in the review and implementation of proposed transportation art projects. Consider transportation art at the onset of project development. Engage community members, artists, landscape architects, and architects early in the design and development stages of highway projects to ensure an integrated and comprehensive art program. For Community Matching Fund and Transportation Art programs, refer to NDOT's guidelines outlined in the Landscape and Aesthetics Procedures Manual: Guidelines, Applications, Instructions and Forms for the Community Matching Funds, and Transportation Art Program.

Image courtesy of Scottsdale Public Art and Erik Gonzales, artist.

(1) Art incorporated into pedestrian bridge.

Image courtesy of Scottsdale Public Art and Erik Gonzales, artist.

(2) Art along roadside that reflects the color palette of the surrounding environment.

Image courtesy of PS Engineering and Lee Kelly, artist.

(3) Sculptural art in urban setting stands out as part of a rural community gateway.

Image courtesy of Mick Winter

(4) Iconic sculpture reflects the working nature of the landscape.

Image courtesy of Scottsdale Public Art and Jeff Englemann

(5) Sound wall with decorative imprint motif created with custom form liner. This is both imprint as well as "additive relief" to project beyond the wall surface.

Image courtesy of Miami-Dade County and Ed Carpenter, Mike McCulloch, and John Rogers, artists.

(6) Glowing wall panels reflect light and create a bright, colorful art piece.

7.0 COLOR PALETTE APPLICATION

7.1 Use a uniform, consistent color palette for all highway structures. Standard NDOT practice should use 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 I-80 Corridor have been selected. For color reference purposes, the colors have been matched to the Dunn-Edwards system and are shown below.

From the palette below, each highway structure should use a selection of one base color and up to two accent colors. Ensure roadway structures within a single Landscape Design Segment use the same base color and accent color(s). As existing structures require refinishing, they should be stained or repainted to be consistent with the selected color palette. Specific logos and transportation art are exempt (refer to Transportation Art guideline, page 5.9).

7.2 Ensure accent colors highlight structural aspects. Accent colors should be used to 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.

7.3 Blend new rock cuts and/or soil with the surrounding landscape. Match new rock and soil treatments with existing rock and soil color. Where possible, application shall occur in a central location and away from sensitive receiving waters. Treatments should blend newly excavated soil and rock with existing weathered rock. Any corridor project in which rock cuts are included should use this process.

BASE COLORS

Sierra Nevada Passage
#6215

Sierra Nevada/Great Basin Crossroads and Truckee River Passage
#6137

Highway of the West
#6194

ACCENT COLORS

#5264
#6097
#6040
#5936
#6223
#6258

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

(1) The proposed color palette refers to the Dunn-Edwards paint system, for reference purposes only.

(2) The landscape inspires the color palette for each landscape design segment. A different base color is used for each segment of the corridor.

(3) Field testing of color palette in different light, orientation, and settings.

(4) The following images demonstrate existing roadway structures before and after color palette application. Color application can be retrofitted to existing-in-place structures.

7.0 COLOR PALETTE APPLICATION cont.

7.5 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 be accent colors. Steel bridge spans should use an accent color.

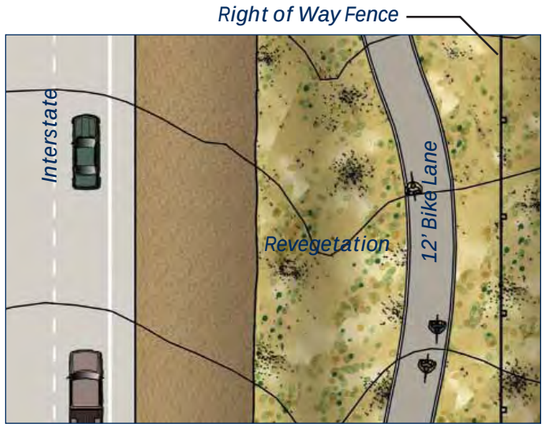
(1), (2) Appropriate coloring of bridge enhances visually quality

8.0 NON-MOTORIZED TRANSPORTATION SYSTEMS (NMT)

8.1 Engage agencies and organizations in the planning and design process. 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 proper planning conveniently accommodates NMT while minimizing adverse safety and environmental impacts. Consult the statewide bicycle and pedestrian plans prepared by NDOT.

8.2 Integrate NMT into the right-of-way. NMT systems can be accommodated and should be encouraged within some areas of the highway right-of-way. Where right-of-way topography, site conditions, and land use warrant, separate bicycle paths may be built. Where possible, ensure that direct connections are made to existing and future trail systems and multi-use pathways.

(3) An appropriate combination of color treatments, lighting, and scale helps to create a comfortable pedestrian environment.



(5) Coordinate with local agencies to integrate regional trail systems into the highway right-of-way and provide crossing structures that connect to neighborhoods.

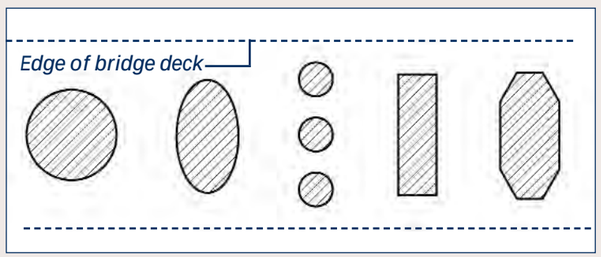
(4) Custom pedestrian bridge rail highlights a crossing point.

(6) Native materials can be used to create unique pedestrian undercrossings. In this example, the height of the opening allows light into underpass.

9.0 BRIDGES

9.1 Use a consistent bridge design. Use bridge structures of similar proportions, finish, and barrier rail design consistently throughout the corridor. In the Sierra Nevada/Great Basin Crossroads segment, street names should be embossed on the bridge span, providing place identification for the motorist. Community names may be embossed in the Highway of the West segment. Where special conditions arise and larger or different bridge spans or types are required, ensure the new bridge is compatible with the type used elsewhere in the corridor.

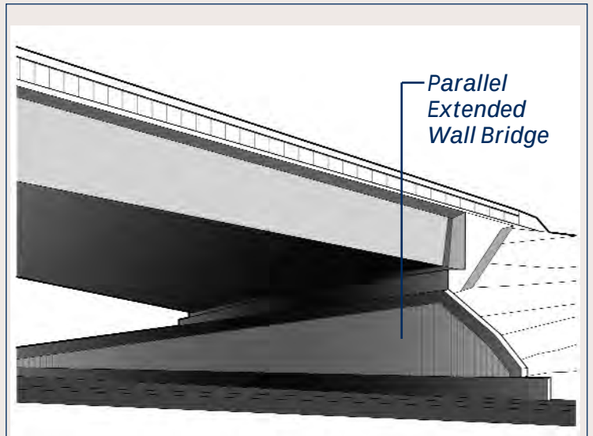
9.2 Use simple sub-structure and support features. where possible, avoid "V," "Y," or flared support shapes in sub-structure and support features. Instead, use simple sub-structure and support features with strong proportional relationships in bridge design. Use simple geometric shapes to minimize support profile as well as the number of supports required. Generally, piers should not be the focal point of a bridge composition. When bridge supports involve stream crossings, column shape must account for bridge scour.



(1) Sample bridge support cross sections.

9.3 Use visually light bridge rail structures. Consider open rail design of steel rail or concrete barrier and steel to create a more refined bridge with a lighter appearing span. Maintain scenic views and views of the surrounding landscape where possible. Where a solid concrete barrier is required for safety consideration, use shadow lines and patterns to avoid blank surfaces.

9.4 Consider fill embankments and approach rails as part of the bridge design. Consider fill embankments and approach rails in concert with the abutment, bridge barrier rail, and superstructure. Materials, height, and attachment details should be carefully considered when connecting guardrails to the bridge. Minimize slope pavement at bridge embankments and consider flattening slopes to 3H:1V. Use rock mulches, stone riprap, or decorative slope paving (minimally) to stabilize steep banks immediately below the bridge.



(2) Avoid bridge structure design that creates walls parallel to the travel lane. Utilize graded slope and abutments.

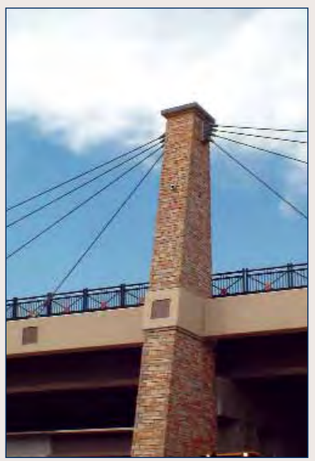
(3) Simple bridge design integrated into embankment with landscape planting.

(4) Bridge design with focal hardscape features in urban setting.

(5) Bridge features reflect local stone materials.

(6) Landmark bridge detail in urban areas.

(7) Emboss names on the bridge span to provide wayfinding for the motorist in the urban Reno/Sparks area.



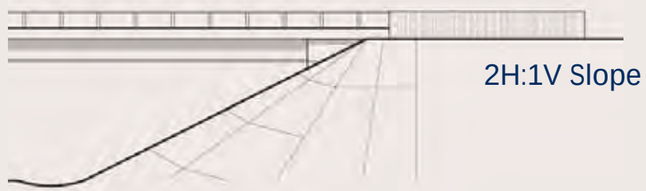
(8) Special bridge design elements to create a focal feature.

(9) Bridge design with simple sub-structure and support feature.

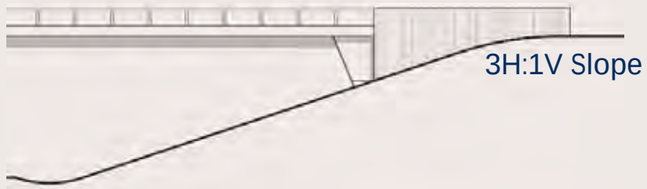
9.0 BRIDGES cont.

9.5 Use landscape or rock mulch to stabilize embankments. Contour grade embankments and use landscape planting to maintain embankment where possible. Use 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 5.11). Rock mulches, stone riprap, or decorative slope paving (minimally) are appropriate to stabilize abutments below the bridge. When slope pavement is used, include integral color to match base color palette.

9.6 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 5.11) and vandalism-resistance. All exposed surfaces should be treated with non-sacrificial anti-graffiti finishes. Color and finish selections will assist in reinforcing the design intent of the bridge structure. Use "fine surface finish" as needed to apply color stains and anti-graffiti coatings.



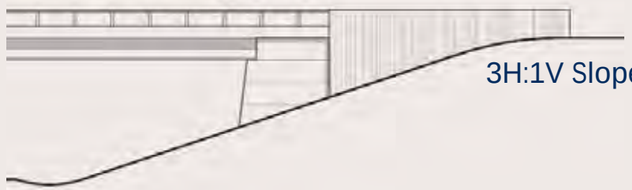
(1) Avoid 2:1 slope as primary bridge abutment and the need for slope pavement to stabilize steep slope.



(2) Avoid weak proportions in bridges with shallow or undersize abutments.

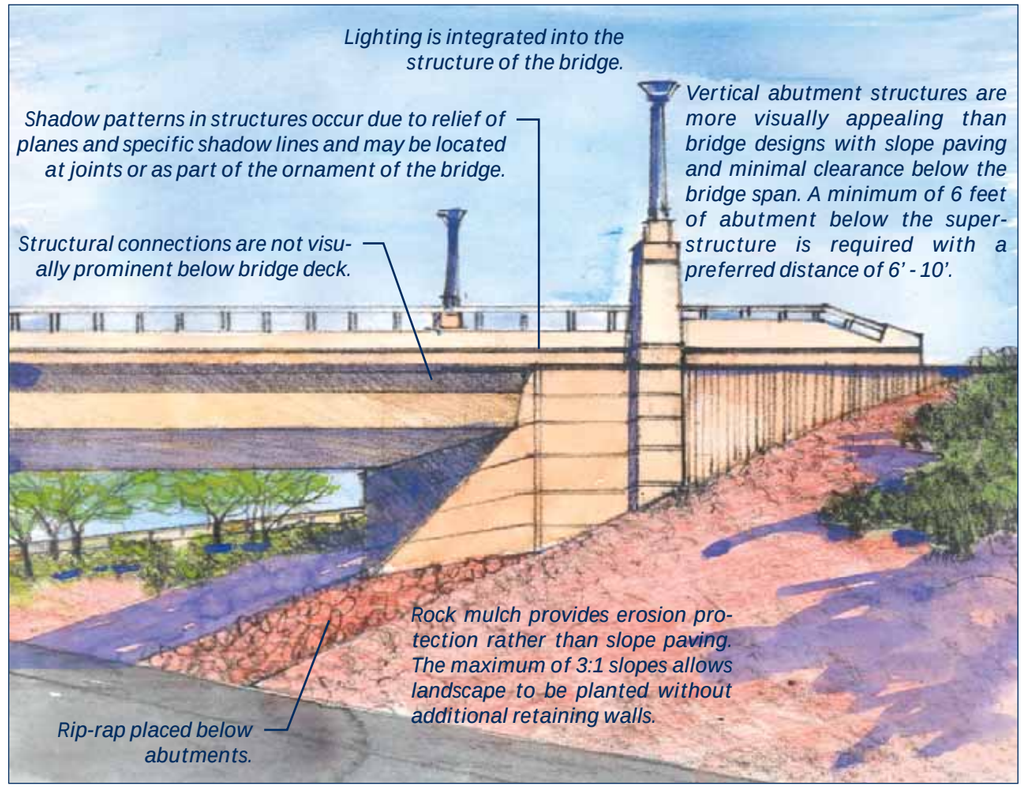
(3) Avoid characteristic shapes that don't allow the structure to be visually supported.

(4) Preferred use of bridges with retaining wall abutment and 3:1 slope is intended for the corridor.



(5) Preferred use of a batter to the abutment is a desirable feature.

(6) Proportions significantly affect the visual appeal of the structure.

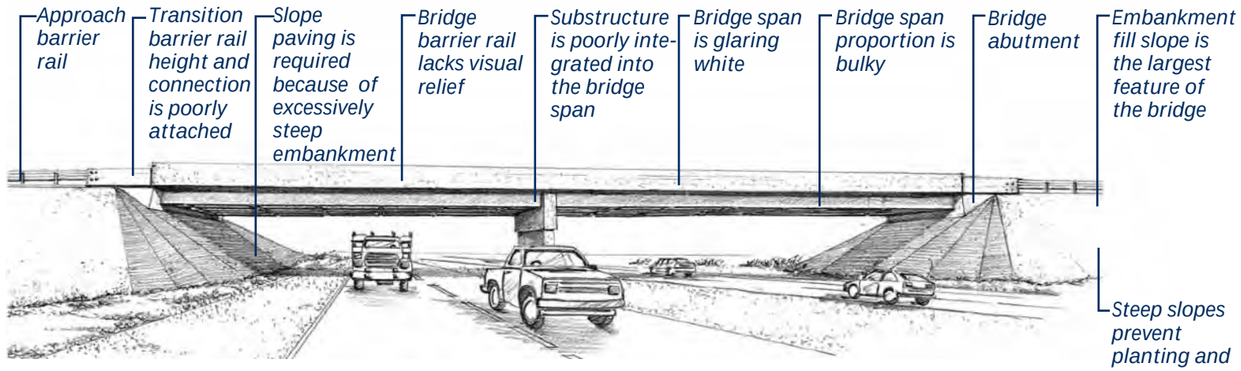


(7) Bridge abutment and barrier rail designed as a composition with jointing and materials consistently applied into a well proportioned bridge

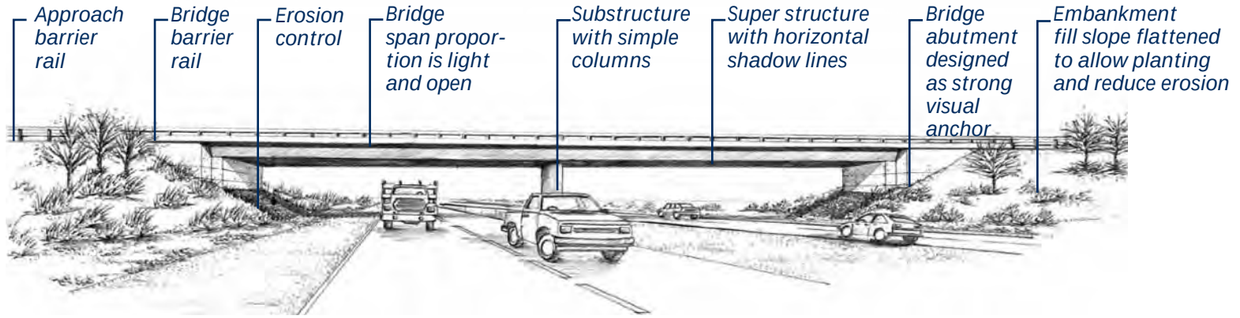
9.0 BRIDGES cont.

9.7 Create a visual design unity among all existing and new structures. Coordinate visual aspects of bridges with sound walls, retaining walls, and other highway structures. Create a visual design relationship that includes coordinating materials, patterns, color, and other design elements of structures. Establish visual design continuity of existing bridges and other structures by implementing a paint/stain retrofit program to unify color schemes where they vary within a corridor.

9.8 Integrate landscape and aesthetics at the onset of project planning. NDOT's initial report on type, size, and location of highway structures should include information regarding landscape and aesthetics elements.

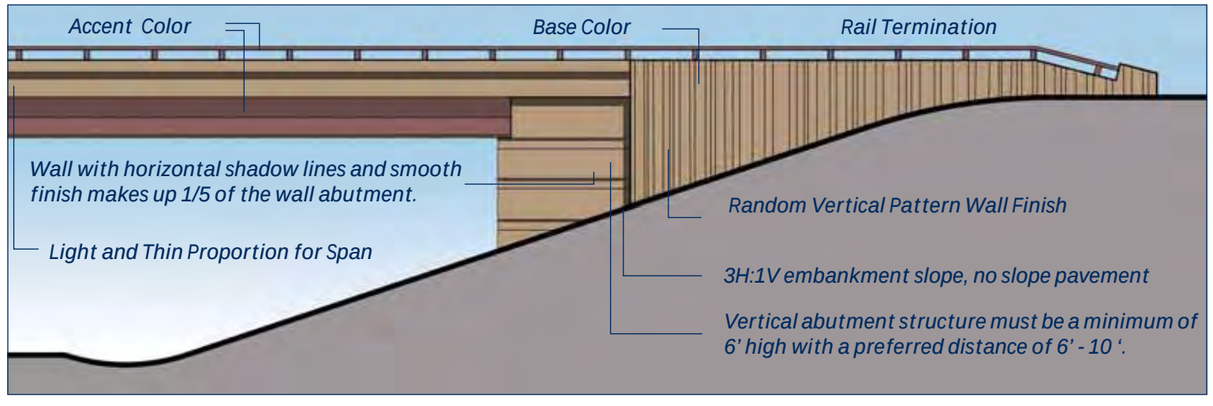


(2) Typical components and proportions lack visual appeal.



(3) Landscape and aesthetic treatments improve the appearance of the bridge when applying design guidelines from this section.

(1) This is an example of a standard bridge in the Highway of the West segment.



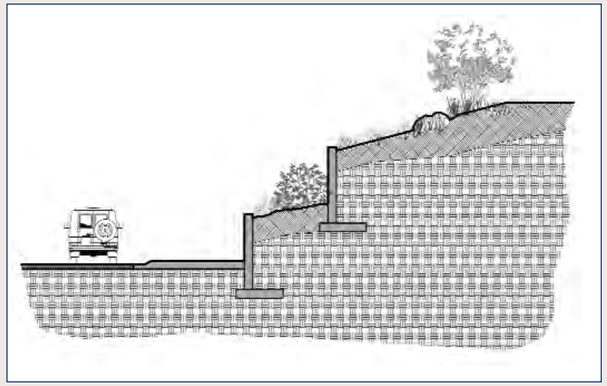
(4) Preferred bridge design elements for I-80 corridor.

10.0 RETAINING WALLS

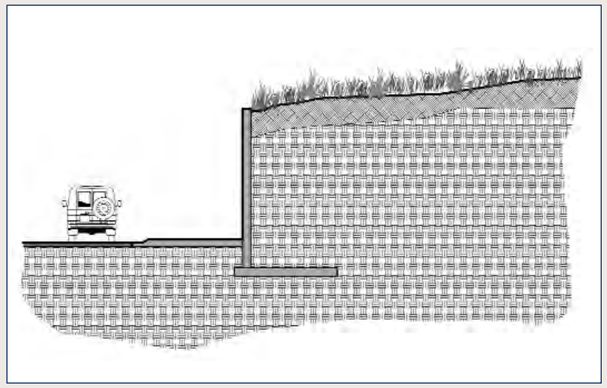
10.1 Consider grading to minimize wall height. Along steep embankments, terraced grades and low retaining walls to avoid the need for high walls and/or expansive facades are recommended. On gradually sloping grades, ensure the top of wall transitions appropriately with the slope. Match the top of wall with the adjacent contour. Use a step or change of plane where walls exceed 14-feet exposed vertical height above finish road surface (illustrations 1 and 4).

10.2 Provide landscape planting. Landscape plantings in front of walls will soften the appearance of large wall faces. When planning and designing retaining walls, landscape planting and maintenance space should be provided. Landscape planting space at the wall base should occur wherever retaining walls are included.

10.3 Anchor retaining walls to the earth. Turn the end portions of retaining walls into cut-slopes to provide greater stability to the wall's surface and to create the positive visual effect that the wall is "anchored" to the earth. Avoid over-steepened slope transition at retaining wall ends or introduction of rip-rap to correct this condition. Extend each wall return to accommodate graded slope (illustrations 7 and 8).



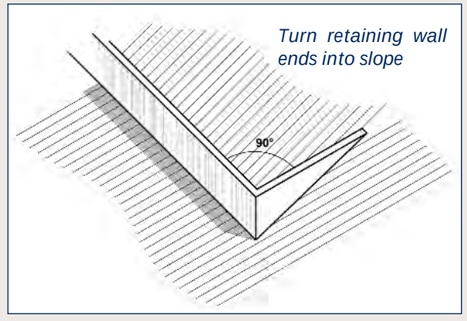
(1) An example of a step or change of plane for a retaining wall greater than 14 vertical feet.



(4) An example of the tunnel effect created by a retaining wall greater than 14 vertical feet.

(2) An example of a cantilevered retaining wall with a simple, consistent use of materials. Vertical joints are most compatible with the finish.

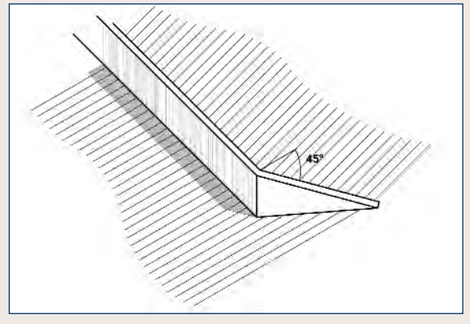
(5) Simple retaining wall patterning, railing design, and landscape palette. The wall is separated from the concrete barrier with the space and planting area.



(7) Turning the ends of retaining walls "anchors" them into the earth and creates a finished end to the retaining wall.

(3) Bridge design integrated into retaining wall with landscape planting creates gentle slopes and area for landscape planting.

(6) Retaining walls provide space for pedestrian walkways.

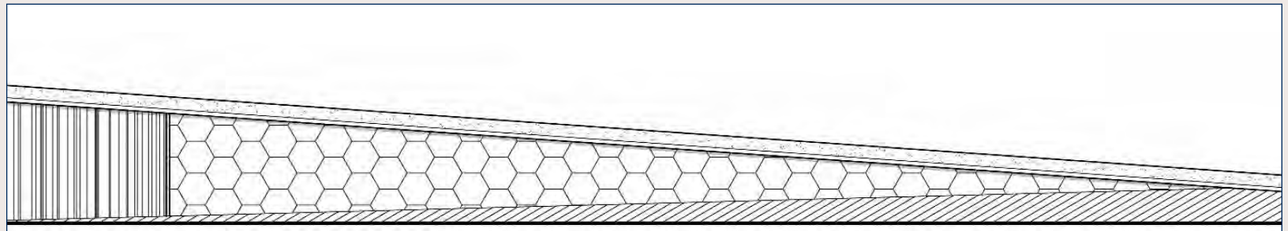


(8) Retained slopes with walls should return to meet uphill grade.

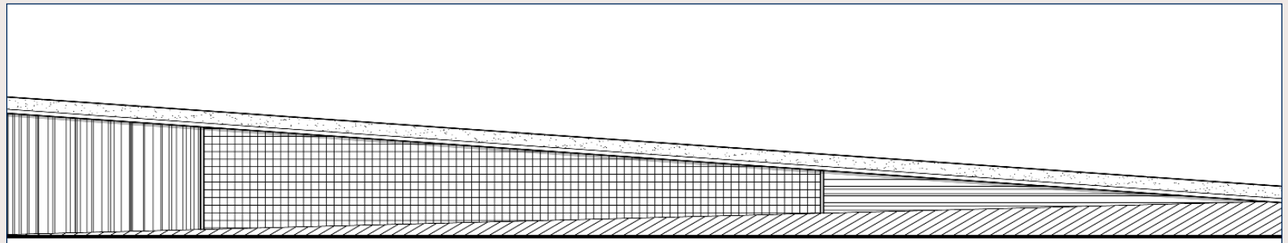
10.0 RETAINING WALLS cont.

10.4 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. Maintain consistent use of the selected material, pattern, color, and texture. Avoid using multiple materials, such as steel, concrete, keystone block, or CMU on walls. (Refer to Color Palette guideline, page 5.11, and Transportation Art guideline, page 5.9, for more information about appropriate patterns). Exterior finish for retaining walls should have the same visual appearance independent of the type of wall. For MSE walls, 50 square foot size panels are preferred with vertical joints and a rectangular shape. All panels should have a rusticated variable vertical pattern that extends across the entire surface. The prototypical surface finish is shown in illustration 3 and is detailed in illustration 6 on page 5.18.

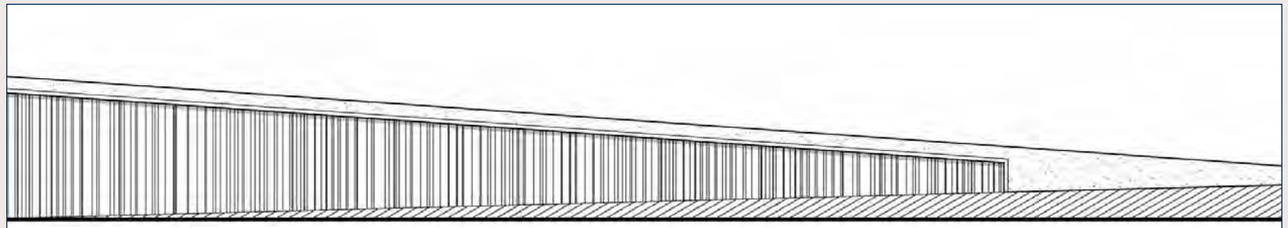
10.5 Choose an appropriate visual design subject. Use visual design themes and/or pictorial motifs comprised of simple patterns and distinct surface texture. Carefully design the compositions of motifs (height and position) on the wall. Ensure that visual design themes and/or pictorial motifs are an appropriate subject and scale for the highway segment in which they are located (refer to Transportation Art guideline, page 5.9, for more information about appropriate subject matter).



*(1) **Avoid** small scale joints, octagon, or cruciform shaped panels. These are only acceptable when textured with a rusticated variable vertical pattern.*



*(2) **Avoid** multiple materials, shapes, and joint patterns.*



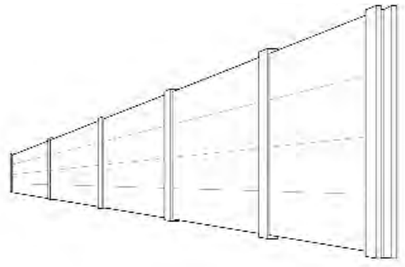
*(3) **Preferred** finish is rusticated variable vertical texture and pattern. Surfaces should have a single finish whether MSE, cast-in-place, or other wall type is used. Consistency with other structures is required.*

11.0 SOUND WALLS AND VISUAL SCREEN WALLS

11.1 Consider grading to minimize wall height. This guideline is not intended to change or supercede federal sound wall requirements. Aesthetic improvements for sound walls should be considered in concert with specific site characteristics, available space, cost, and noise protection procedures. When possible, free-standing sound walls should not exceed 14-feet in height without a step in the wall plane. Where possible, consider an embankment slope to buffer sound, or use a combination of earth berms and sound walls to achieve structural integrity and buffer sound while limiting actual wall height. Walls used only for visual screening should not exceed 10-feet.

11.2 Provide landscape planting and setback space between the vehicle recovery zone and the sound wall. Landscape plantings in front of walls will soften the appearance of large wall faces. Ensure planting and planting maintenance is accommodated both in front of and behind the wall.

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 sound walls. Maintain consistent use of the selected material, pattern, color, and texture. The required prototypical surface pattern is shown in illustration 6. Avoid using multiple materials, such as steel and concrete or CMU, on continuous spans of wall. Post and panel systems are not recommended for permanent sound wall construction and should be used only for temporary applications. If a post and panel system is used, then it should be constructed of a single material, preferably pre-cast concrete.



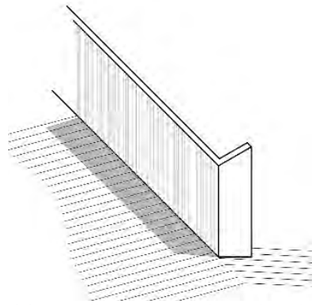
(1) Avoid post and panel system for permanent sound wall application.

(2) The integration of vertical vegetation softens sound walls.

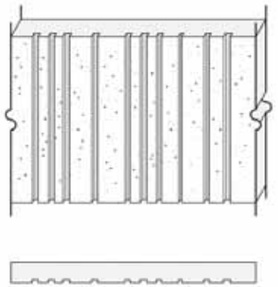
(3) Form liners can produce details in wall patterns.

(4) Focal sound wall imprint adds visual interest.

Image courtesy of Scottsdale Public Art and Jeff Englemann



(5) A wall return of three feet is recommended for sound walls outside the clear zone at the beginning of the wall facing the driver.



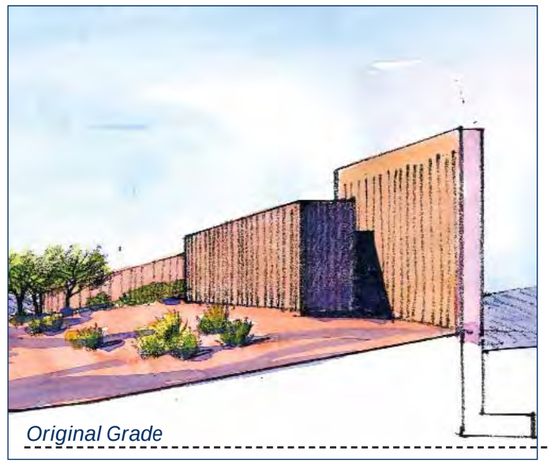
(6) Required prototypical surface pattern is rusticated variable vertical ribbing. Dimensions vary between 2"-8" apart.

(7) Rusticated variable vertical patterning adds visual interest.

(8) Motif patterned retaining wall and sound wall considers the location of the pattern on the wall.

(9) Sound wall materials reflect local materials.

(10) Integrate sound 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.



(11) Grading in combination with walls will reduce the height of walls while still meeting federal noise standards.

(12) Earth berms or embankment slopes are effective as sound barriers and should be used along or in combination with partially depressed road profiles. This can avoid walls where sound attenuation is required.

11.0 SOUND WALLS AND VISUAL SCREEN WALLS cont.

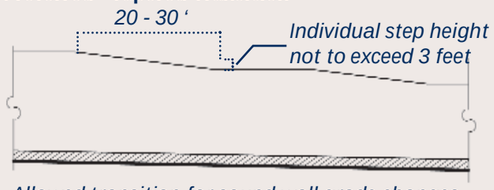
11.4 Choose an appropriate visual design subject. Use visual design themes and/or pictorial motifs comprised of simple patterns and distinct surface texture, and carefully design the compositions of motifs (height and position) on the wall. Ensure that visual design themes and/or pictorial motifs are an appropriate subject and scale for the highway segment in which they are located. Sound walls over 12-feet in height require special graphic or pattern treatment (refer to Transportation Art guideline, page 5.9, for more information about appropriate subject matter).

11.5 Create visual breaks and interruptions to avoid monotony along walls. Use staggered and/or curved walls of varying lengths to provide visual interest where there are extended stretches of sound wall. Prototypical sound wall layout designs are illustrated on page 5.20. Battered walls, which are inclined walls, can provide additional interest. Shadow patterns can be introduced to create visual interest that shifts and changes throughout the day. Configure walls as illustrated in drawings and photos below.

11.6 Separate walls from other highway structures and set back from travel lanes where possible. When practical, avoid attaching walls to concrete barriers and/or retaining structures. When walls are attached to such structures, avoid mixing materials and incompatible forms. Ensure walls are carefully planned for and integrated with the design of the highway and/or bridge. Set walls back a minimum of 30-feet from edge of travel lane where possible. Walls may be placed on top of concrete barriers only when no other practical solution exists.

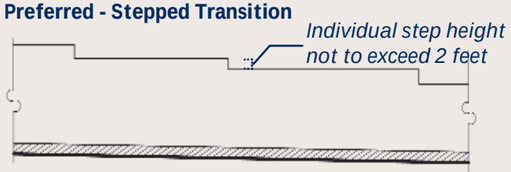
11.7 Encourage noise compatible land uses adjacent to highway corridors. At the planning level, encourage land uses adjacent to highways that are more compatible with highway noise such as commercial and light industrial areas. Noise sensitive receptors, such as residential areas, schools, hospitals, and recreation facilities require sound abatement strategies while other types of uses may not. Coordination at the planning stages is critical to avoid conflicts.

Preferred - Tapered Transition



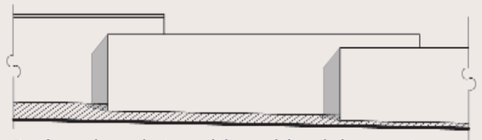
Allowed transition for sound wall grade changes

Preferred - Stepped Transition



Allowed grade transition with steps between 8" and 2'

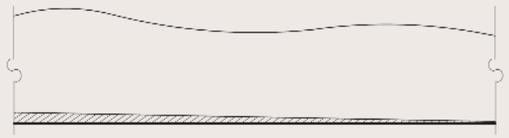
Preferred - Stepped Transition with Staggered Walls



Preferred grade transition with minimum stagger of 24" between wall planes

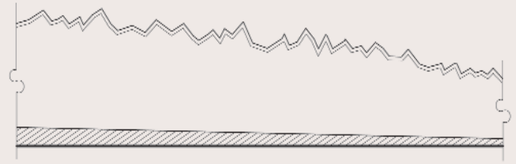
(1)

Preferred - Curved



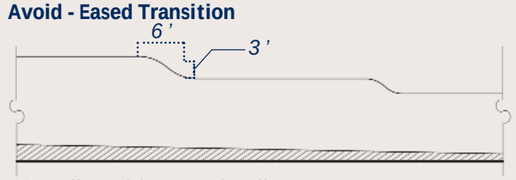
Allowed transition for sound wall top

Avoid - Angular Wall Top



Not allowed for sound wall top

Avoid - Eased Transition



Not allowed for sound wall top

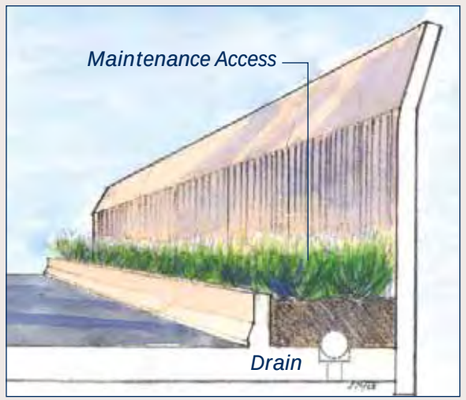
(2)

(3) This sequence of travel over approximately 1000 feet illustrates the sound wall design for the corridor. Characteristics include staggered wall planes, landscape planting in front of the wall face, and patterning on the wall face.

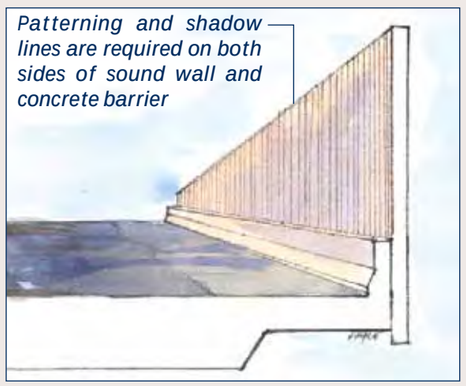
11.0 SOUND WALLS AND VISUAL SCREEN WALLS cont.

11.8 Utilize berming and landscape plantings to reduce the need for sound walls. The rural corridor of I-80 is characterized by open vistas. As such, sound walls appear out of context in many applications. Where noise abatement is required, analyze the necessity for sound walls. Utilize a combination of earthwork and layered landscape plantings prior to constructing a sound wall where possible.

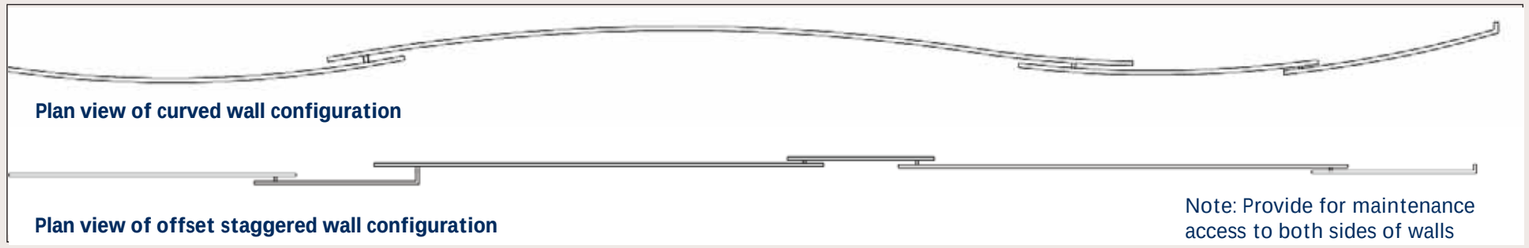
11.9 Establish a retrofit program for existing walls in the I-80 Urban study area. Existing walls that do not meet the aesthetic requirements of these guidelines should be analyzed for possible retrofit. Design solutions should not impact the quality of the wall's structural integrity or noise abatement. Retrofitted walls should respond to the corridor's environmental and cultural context. Consider the use of texture finishes, the integration of transportation art, and the use of landscape planting, such as vines. Patterns and wall height should be of appropriate scale and in accordance with the guidelines.



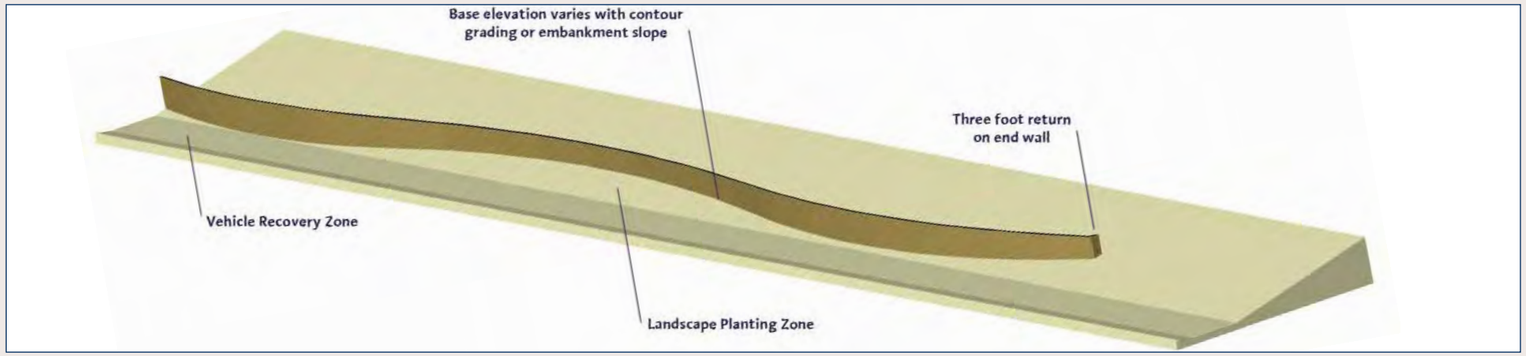
(1) Walls approaching bridges can be adapted with a setback and planting strip. A flare of the upper one-fourth of the wall further prevents an enclosed, narrow passage.



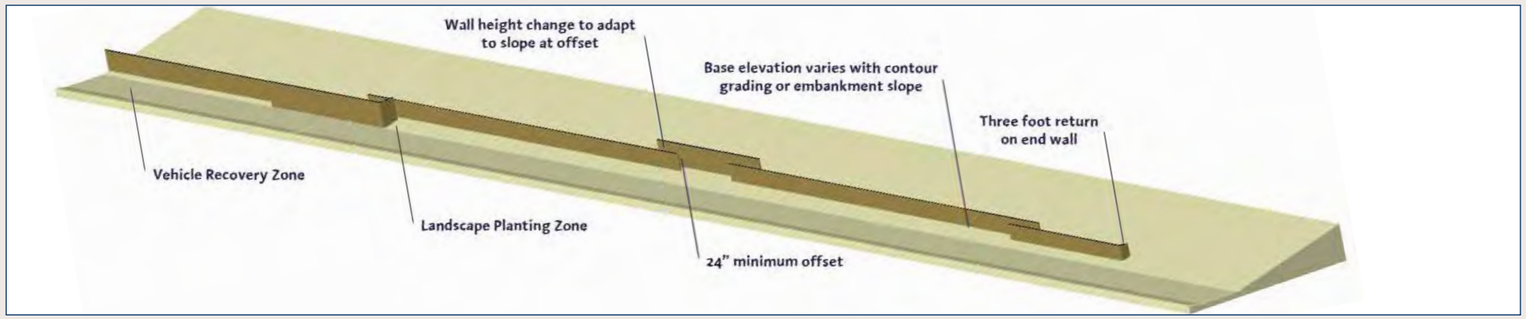
(2) When concrete barrier and sound walls co-exist without buffer space, wall is integrated into concrete barrier rail.



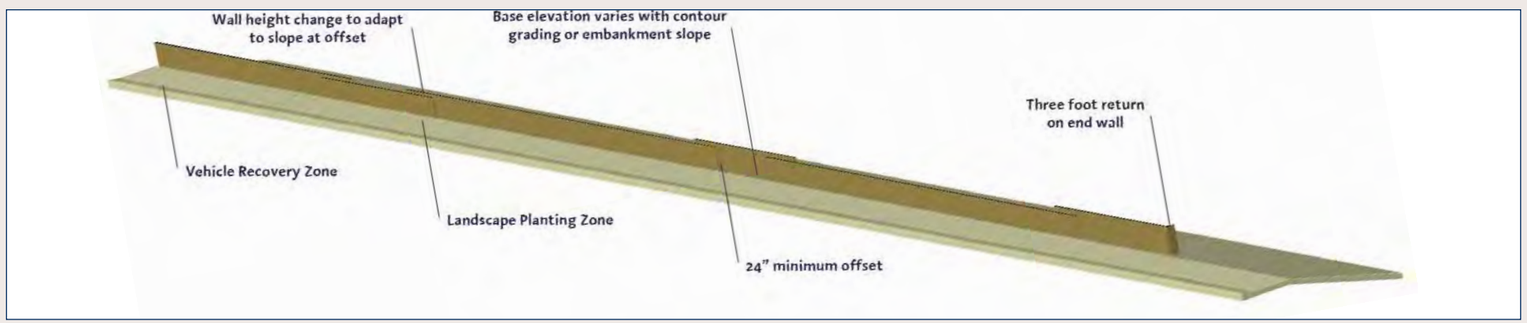
(3) Using curved and/or staggered sound walls creates visual interest and reduces the impact of a monolithic structure.



(4) Uphill Condition



(5) Uphill Condition



(6) Downhill Condition

12.0 CONCRETE BARRIERS AND GUARD RAILS

12.1 Stain concrete barriers. Concrete barriers should be stained to match the segment's base color (refer to Color Palette guideline, page 5.11, for more information on color selection).

12.2 Avoid bright, shiny steel appearance in visually sensitive areas. Use acid washed steel guardrails where appropriate to reduce gloss.

(1) Acid washed steel guardrail should be used in remote locations.

(2) Stained concrete barriers should use colors from the design segment's color palette.

13.0 LIGHTING

13.1 Analyze lighting requirements. Excessive high mast lighting can create light pollution along a corridor, and excessive height masts can impact the view of surrounding vistas. Avoid overlighting facilities. Study lighting level standards currently in place and determine levels needed for safety only. Adjust current standards, if necessary, and use a minimum height, illumination, and number of light masts required. Focus attention on luminance vs. illumination (i.e. how bright is the pavement vs. how bright is the light).

13.2 Avoid high-mast lighting. Along all sections of the corridor, use lighting fixtures that minimize light pollution and provide even light dispersion. Eliminate lighting where not necessary. High mast lighting should be avoided in favor of cobra head or shoe box type pole and fixtures.

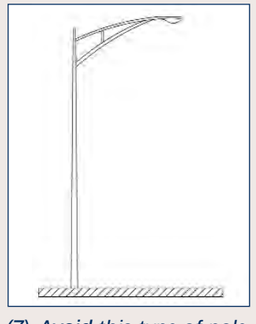
13.3 Use a consistent lighting fixture and pole. In urban areas, use a durable, powder-coated finish for light poles of a color that matches other structures and the surrounding landscape. Use accent color palette for poles (refer to Color Palette guideline, page 5.11, for more information). The desired pole configurations are shown at right. Allow for context sensitive design in fixtures and poles where appropriate in areas such as historic sites.

(3) Lights are incorporated in bridge design as a feature of the approach.

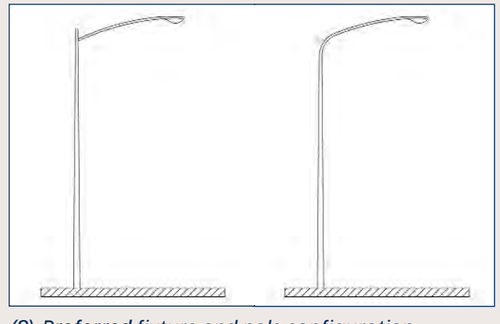
(4) Powder coat coloring blends into surrounding environment.

(5) This is an example of a monumental light incorporated into road design.

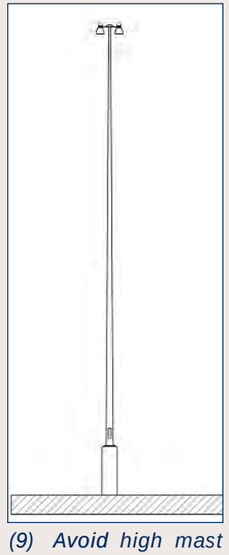
(6) This is an example of a shoebox style fixture on a steel pole.



(7) Avoid this type of pole design in favor of more streamlined attachments.



(8) Preferred fixture and pole configuration.



(9) Avoid 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. Where appropriate use three-strand wire fencing. Ensure right-of-way fencing is well maintained. Where fencing is required in urban areas, use powder coated or stained colored powder coated or stained galvanized fencing.

(1) Three-strand fencing should be used within the rural segments of the corridor.

15.0 GRADING

15.1 Avoid creating steep slopes. Smooth, moderate ly inclined slopes will blend more readily with the surrounding arid landscape, are safer to maintain, and are less vulnerable to erosion. Place top soil salvaged from construction site on cut/fill slopes. Flattened fill slopes can assist in slowing down the erosion process. Grade slopes to provide for water harvesting (reclaimed surface runoff) wherever feasible. In addition, flatter slopes reduce the need for guardrails and provide better accident recovery in the roadside clear zone. Where site conditions and cost analysis permit, acquire adequate right-of-way to provide enough land to design and build 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. Finish-grading techniques such as slope rounding at the top and bottom of cuts should be used to create smooth landform transitions that blend with the natural terrain. Carefully grade slopes around natural outcrops and abrupt topography to improve aesthetics and allow for easier and more cost-effective maintenance. Ensure all constructed slopes are revegetated (refer to Native Plant Revegetation Softscape Type guideline, page 5.27). Use fill material to reduce the visual rigidity of the constructed slope geometry. In addition, soil-coloring treatments that blend newly cut or filled soil with existing soils should be implemented.

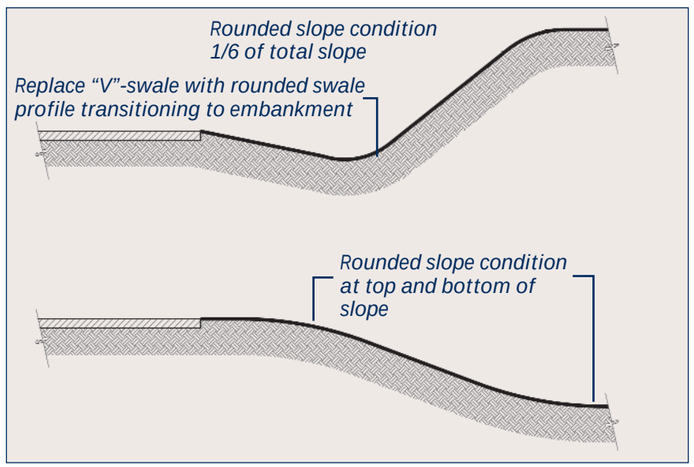
15.3 Create artful earthwork. Grading is the foundation of all aspects of the corridor. In addition to grading for effective roadway alignment, carefully consider contour grading. Create landforms that respond to the uniqueness of the site, the surrounding landscape, and the roadway travel experience. Contour grade to create effective planting embankments, shadow patterns, and artful earthwork.

15.4 Blend earthwork with existing slope conditions. Patterns of topography should be considered with proposed grading. Valleys, high points, and ridges require graded transitions, rather than abrupt embankment cuts or fills.

(2) A model shows an example of naturalized contour grading.

(3) The travel route sequence is defined by earthwork which defines space.

(4) Artful earthwork and contour grading will create landscapes that integrate with Nevada's existing topography.

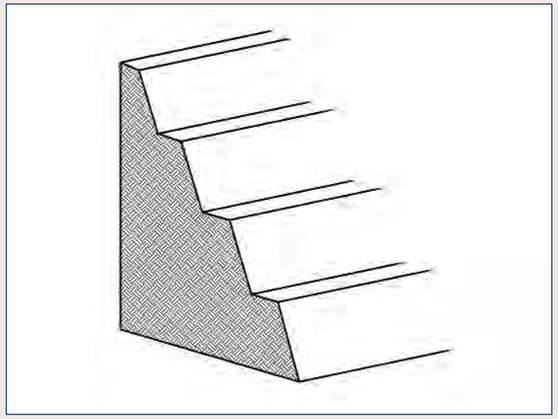


(5) Smooth transitions between cut and fill slopes and existing conditions can be accomplished by rounding the slopes.

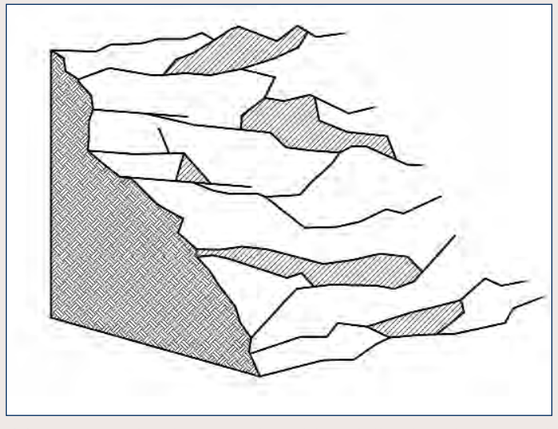
16.0 ROCK CUT AND EXCAVATION

16.1 Analyze rock geology. Work with a multi-disciplinary team of civil engineers, geotechnical engineers, and landscape architects whose job it is to ensure that the inherent character of a rock's natural bedding planes, fractures, joints, and overall stability. Conduct careful geological, site, and cost analysis, and design rock cuts to minimize the need for rock fall protection fencing.

16.2 Design rock cuts to be natural in form. Ensure rock cuts are designed to look natural in form, texture, and color in relationship to the surrounding landforms. Customize fracture rock cuts to match natural rock form and use naturalized bedding planes to avoid creating a sheer, unnatural rock face. Ensure all designed landforms are natural in appearance and blend with the topography and geology of the surrounding landscape. Match new rock and soil excavations with existing rock and soil using rock staining, soil-coloring treatments, and/or accelerated weathering techniques. Such treatments will successfully blend newly cut or filled soil and rock with existing weathered rock. 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.

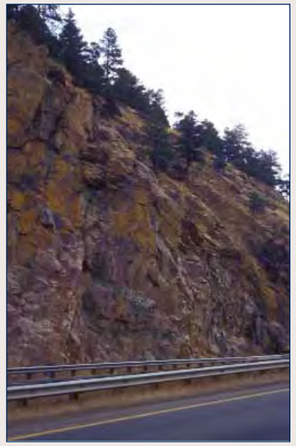


(3) Replace artificially appearing straight cuts and benches with custom naturalized cuts.

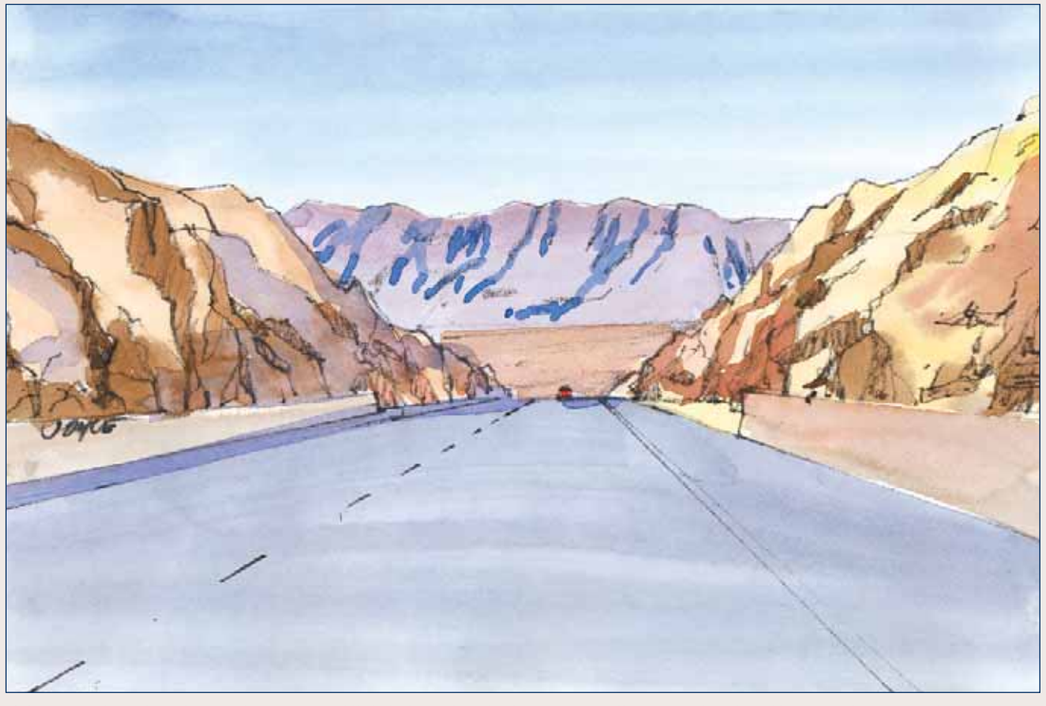


(4) An example of custom benching, following the natural formation of the rock and accomplishing the same elevation change as shown in illustration 1.

(1) Rock cuts and excavation should be natural in form, shape, and texture. Rock formations, such as this rhyolite outcrop, have an inherent visual form that can be duplicated in custom rock excavations.



(2) Example of a rock cut in which natural bedding planes were used to excavate naturalized landform. Weathering techniques blend this rock cut.



(5) 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. Where possible avoid paving drainage ditches or check dams with asphalt or concrete. Secure check dams with rock and use naturalized channel design and infiltration methods to functionally and visually enhance highway drainage systems. On a case by case situation, utilize geotextiles, impervious mats, or stone lining to maintain a natural channel appearance. When excessive flow velocities or soil conditions must be accommodated, paved drainage surfaces may be used.

17.2 Revegetate drainage infrastructure. Drainage detention and infiltration areas should be shaped with natural, undulating edges and bottoms rather than angular embankment slopes. Upper slopes of drainage detention basins should be revegetated or covered with appropriate ground treatment (refer to Ground Treatment Softscape Type guideline, page 5.26, and Native Plant Revegetation Softscape Type guideline, page 5.27).

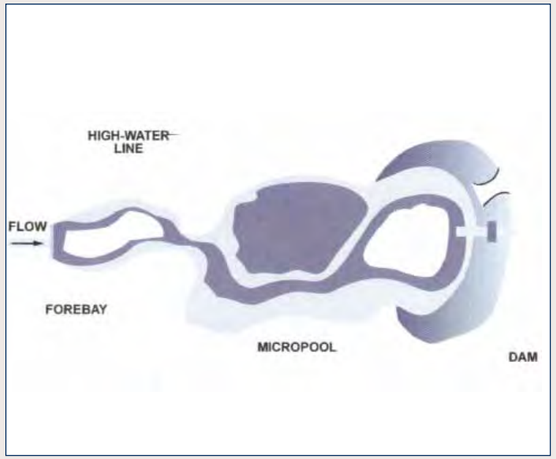


Image courtesy NDOT Stormwater Quality Manuals

(1) Design of detention basin avoids engineered flow patterns.

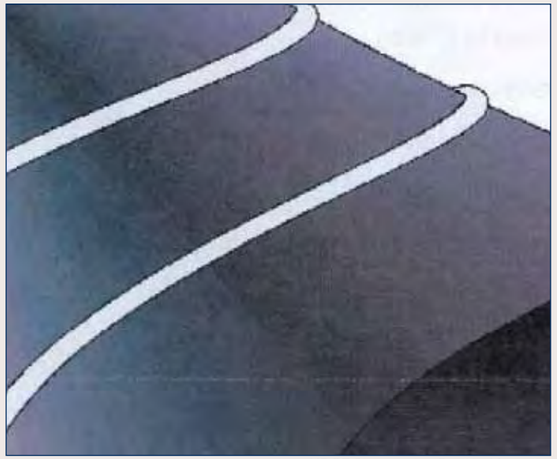


Image courtesy NDOT Stormwater Quality Manuals

(2) Fiber rolls reduce sediment migration.

(3) Rock bed drainage allows water to infiltrate and provide water for adjacent plant materials.

18.0 EROSION CONTROL

18.1 Stabilize soils and ensure successful revegetation to control erosion. Stabilize soils and control erosion using 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. The success of permanent revegetation efforts can be improved by providing in situ topsoil, native vegetation fragments, and rocks and improving soil salvage techniques and seed mixes.

18.2 Refer to temporary and permanent erosion control best management practices as prepared and documented by NDOT.

(4) Water basins blend into their natural surroundings.

(5) 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 top soil, site surfacing, track walking, and applying mulches and tackifiers. 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 be done to increase both the quantity of organic matter and water holding capacity of the soil.
- Site Surfacing: Rock surface composition should simulate the original or adjacent surface cover. Placing rocks and shaping landforms to create depressions will increase water retention, providing needed moisture to the plants. 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, and allowing water to collect.
- Track Walking: Where possible, track walk all slope surfaces to stabilize material and minimize potential erosion.
- Mulches and Tackifiers: Use mulch and tackifiers to keep seeds and topsoil cover in place and to assist with moisture retention during germination.

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 drip irrigation systems that have a central controller and that can be easily maintained. Consider the use of reclaimed water, including fully treated effluent and water harvesting techniques, as a supplement to irrigation.

20.2 Provide appropriate supplemental irrigation for each softscape type. Temporary irrigation may be provided for establishment of Native Plant Revegetation softscape plantings. This may include using drip irrigation and/or water applied by truck. The early stage of revegetation growth demands the most water use and is the critical period when young plants are starting to establish themselves in the arid climate. As revegetation becomes more established and mature, the demand for water will lessen to the point of being removed. Temporary watering may be required for containerized native plants. Permanent irrigation to individual plants is usually required for all Regionally Adapted and Regional Ornamental softscape types.

20.3 Manage the high concentration of salts. In Nevada's desert soils, in drip irrigation situations, salts often concentrate at the outer edge of the wetted soil volume, including near the soil surface. Salt management techniques include flushing the soil periodically with heavy watering and/or planting salt tolerant materials.

20.4 Use natural and/or artificial products to collect, store, and release water for plant use. Use products such as:

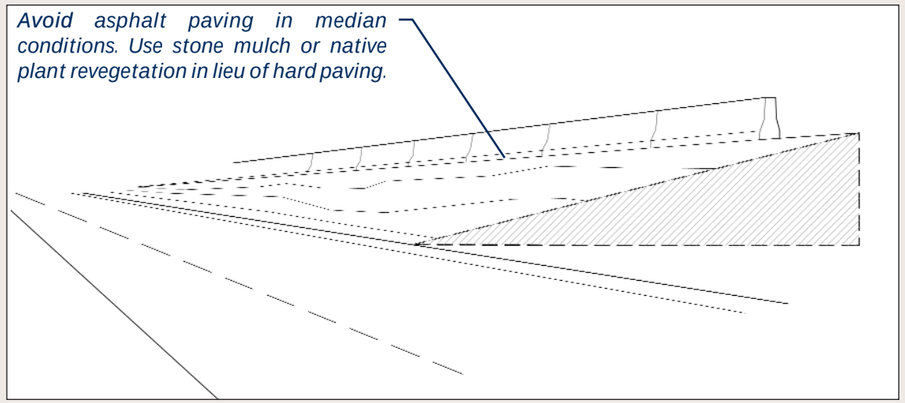
- Pumice wicks
- Polymer products
- Diatomaceous earth
- Wattles

21.0 GROUND TREATMENT SOFTSCAPE TYPE

21.1 Implement appropriate "Ground Treatment" softscape type. Use revegetation softscape type and an appropriate ground treatment to assist with erosion and dust control (refer to Native Plant Revegetation Softscape Type guideline, page 5.27, for more information about revegetation practices). Where used, rock mulch should complement and/or match the surrounding natural environment. For rural areas, ground treatment plant palettes should be derived from natural patterns found in playas, foothills, or ephemeral drainages. For areas within urban settings, use rock mulches to create patterned and textured ground treatments that are aesthetically rich. Implement a ground treatment retrofit program to treat areas which are bare soil.

21.2 Consider aesthetics and maintenance. Select ground treatment in all non-paved areas that meets both aesthetics and maintenance requirements.

21.3 Coordinate ground treatment with the 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. Where ornamental plantings are used, the ground should be treated with combinations of rock mulches, colored soil, and/or boulders to break up expansive ground planes and provide visual interest.



(1) Match texture and variety of size of stone found in the surrounding landscape.

(2) Large-scale ground cover stone placement of various sizes may be utilized for slope stabilization..

(3), (4) A mix of aggregate size and color re-establishes the graded slope to a naturalized condition.

22.0 NATIVE PLANT REVEGETATION SOFTSCAPE TYPE

22.1 Reestablish the native desert condition using the native plant revegetation softscape type. The native plant revegetation softscape type is the background planting for the majority of the corridor and should be implemented as shown in the landscape design segments. Ensure all roadway construction in these areas re-establishes native desert conditions. Roadsides should also be revegetated after a fire to reduce erosion and snow drifts.

The Great Basin is comprised of a variety of plant communities dependent upon elevation, precipitation, temperatures, and specific soil characteristics. All revegetative projects should follow native plant spatial and frequency patterns and incorporate scattered rock mulch to reduce erosion and improve success of revegetation efforts. In addition, native plant revegetation projects should be evaluated in terms of elevation, site, soil conditions, and ecosystem type (for example, riparian, playa, or salt barren) when selecting an appropriate native plant revegetation palette.

22.2 Select perennial grasses, herbs, and shrubs that can be established with little or no maintenance over the long term. 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. For excerpts regarding plant communities appropriate to the I-80 corridor, refer to Appendix A of this plan.

22.3 Salvage native plants and topsoil prior to construction. Salvage existing native plant material prior to construction. The species to be salvaged depends on location, soils, and analysis of plant value, including the potential survival rate. Salvaged plants can readily improve the roadside aesthetic by providing mature plants that would normally take many years to establish. 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 top soil 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.

Plant Palette

Upper Elevations (Range Sub-segments)	*Height x Width*	*Exposure to Sun*	*Water Requirement*	*Seasonal Interest*
Big Sagebrush Sites				
Shrubs:				
Artemisia tridentata - Big Sagebrush	*1.5' to 6' x 10'*	*Full sun*	*minimal*	*Aromatic*
Chrysothamnus viscidiflorus - Douglas Rabbitbrush	*2' x 3'*	*Full sun*	*minimal*	*Yellow flowers*
Ephedra viridis - Green Ephedra	*3' x 3'*	*Full sun*	*minimal*	*Evergreen*
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 - Pubescen 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 sp. - 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 sp. - Lupine	*12" x 12"*	*Full sun*	*minimal*	*Brilliant flowering color*
Penstemon palmerii - 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 monophylla - Single-leaf Pinyon Pine	*20' x 15'*	*Full sun*	*minimal*	*Evergreen*
Pinus ponderosa - Ponderosa Pine	*100' x 30'*	*Full sun*	*minimal*	*Evergreen*
Populus tremuloides - Aspen	*50' x 25'*	*Full sun*	*moderate*	*Golden yellow in fall*
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 sp. - Rabbitbrush	*5' x 5'*	*Full sun*	*minimal*	*Golden flowers*
Ephedra sp. - Mormon Tea	*3' x 3'*	*Full sun*	*minimal*	*Evergreen*
Kochia prostrata - Summercypress	*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 sp. - 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 - Prarie Flax	*12" x 12"*	*Full sun*	*minimal*	*Delicate blue flowers*
Lupinus sp. - Lupine	*12" x 12"*	*Full sun*	*minimal*	*Brilliant flowering color*
Penstemon palmerii - 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*

22.0 NATIVE PLANT REVEGETATION SOFTSCAPE TYPE cont.

22.4 Apply a prescribed soil treatment and conduct effective site preparation. Every revegetation project requires a prescribed soil treatment. Soil treatments include plowing, disking, harrowing, furrowing, hydroseeding, applying mulches (such as straw), and using tackifiers (such as dark colored netting) to firmly anchor the mulches to the site. 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 should be applied to reduce potential dust problems. Some sites require deep ripping in order to loosen hardpan and improve seeding success. In conditions of steep cut and slopes greater than 40%, slope disking is required to create seed pockets.

In most cases, organic materials will need to be added to the site to improve soil quality. Each site should be carefully analyzed to determine the type of fertilizer application. On sites with hardpan and salts near the surface, an amendment to control or ameliorate pH should be applied. Scattered rock mulch is to be used with this softscape type as groundcover. This mulch will provide seed pockets and protection that will assist in the establishment of seed.

22.5 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.

22.6 Monitor revegetation construction. Carefully monitor revegetation to ensure the specified materials and installation methods have been used in applying treatments. 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 to NDOT staff who oversee revegetation administration. Failures in revegetation can often be attributed to poor installation and maintenance.

22.7 Consider the use of living snow fences to control drifting snow. Living snow fences can be up to 90% less expensive than slatted snow fences, capture up to 12 times more snow, reduce maintenance costs, and have the additional benefits of being aesthetically appealing and providing wildlife habitat. Identify locations where the placement of living snow fences will help reduce the effects of blowing snow along the right-of-way. Coordinate with local landowners, natural resource agencies, and soil and water conservation agencies to plan, fund, and maintain snow fences.

22.8 General plant section. 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*, refer to the list of native plant species provided for revegetation efforts. Ensure the plant palette selected for the site complements existing 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. Consider sunlight, water and wind exposure when placing plant material.

Plant Palette

	Height x Width	Exposure to Sun	Water Requirement	Seasonal Interest
Lower Elevations (Basin Sub-segments)				
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 sp. - 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 - Firemaker 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-Leafed	*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 sp. - 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 hymnenoids - 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 - Galeta Grass	*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 sp. - 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*

22.0 NATIVE PLANT REVEGETATION SOFTSCAPE TYPE cont.

22.9 Preserve healthy, mature trees and/or vegetation within the right-of-way. Mature vegetation is an integral part of community life and an important public resource that enhances the quality of life. All previously landscaped areas with ornamental plant materials measuring 4' above the ground and trees with greater than 3" caliper in good condition, form, and health shall be preserved. All softscape treatment projects should be initiated by a tree inventory plan listing all protected trees and other landscape materials within the right-of-way which includes: a listing of species, size and condition of each tree, index of trees to be removed and trees to preserve, and an outline of specifications for tree maintenance during construction.

(1) Native plant materials of northern Nevada including: Sagebrush, Bitterbrush, and Rabbitbrush.

Plant Palette

	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 (Riparian Sub-segments) (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*
Clematis ligusticifolia - Virgin's Bower	*25' x 1'*	*Sun to light shade*	*high*	*White flowers*
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*
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 Falsehellebore	*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*

23.0 ENHANCED NATIVE SOFTSCAPE TYPE

23.1 Enrich the native softscape palette with the enhanced native softscape type. The enhanced native softscape type is the second most commonly used plant palette along the I-80 corridor and should be utilized as shown in the landscape design segments (pages 4.10-4.46). The enhanced native softscape type enriches the Great Basin and Sierra Nevada plant palettes with a mix of vertical heights and densities. A variety of native species are planted in moderately dense patterns to create this landscape. The enhanced native softscape type uses the plant material of the native revegetation palette as a base and adds regionally adapted trees, shrubs, and other materials for diversity in form. Plants are placed in closer proximity to one another so that planting is seen as a mass.

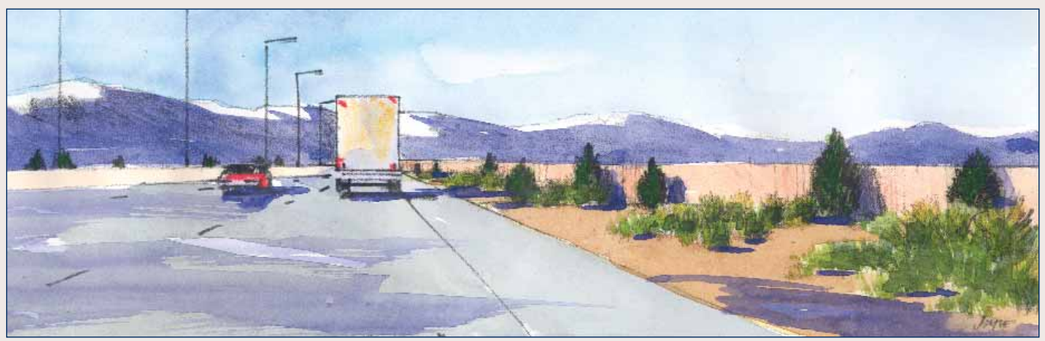
23.2 General plant selection. Use regionally adapted and native plant species. In addition to the plants listed in the Native Plant Revegetation softscape type, the following list of plants should be consulted to comprise the Enhanced Native softscape type. Use these species to create plant communities with variations in plant height and width. Ensure the plant palette selected for the site complements existing vegetation in the surrounding landscape. Additional plants not listed in the adjacent list can be included upon review and approval. Consider sunlight, water, and wind exposure when placing plant material.

23.3 Preserve healthy, mature trees and/or vegetation within the right-of-way. Mature vegetation is an integral part of community life and an important public resource that enhances the quality of life. All previously landscaped areas with ornamental plant materials measuring 4' above the ground and trees with greater than 3" caliper in good condition, form, and health shall be preserved. All softscape treatment projects should be initiated by a tree inventory plan listing all protected trees and other landscape materials within the right-of-way which includes: a listing of species, size and condition of each tree, index of trees to be removed and trees to preserve, and a outline of specifications for tree maintenance during construction.

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*
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' ft*	*Full sun*	*minimal*	*Yellowish green foliage*
Pinus edulis - Pinyon Pine	*20' x 15'*	*Full sun*	*minimal*	*Evergreen*
Pinus monophylla - Single-leaf Pinyon	*50' x 25'*	*Full sun*	*minimal*	*Evergreen*
Populus fremontii - Fremont Cottonwood	*60' x 30'*	*Full sun*	*moderate*	*Bright yellow in fall*
Populus tremuloides - Aspen	*50' x 25'*	*Full sun*	*moderate*	*Golden yellow in fall*
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*
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*
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*
Miscanthus sacchariflorus- Silver Banner Grass	*6' x 4'*	*Full sun*	*moderate*	*Grass*
Miscanthus sinensis - Japanese Silver Grass	*3' x 4'*	*Full sun*	*moderate*	*Grass*

For additional plants appropriate to the different plant communities, refer to the Technical Appendix



(1) This is an example of enhanced native landscape type planting in front of a highway sound wall .

24.0 REGIONALLY ADAPTED SOFTSCAPE TYPE

24.1 Enhance welcome centers, gateways, rest areas, and urban areas using the regionally adapted softscape type. Use the regionally adapted softscape type where identified in each landscape design segment (see Sections 1-7, pages 4.11-4.45). This softscape type is utilized in urban areas and locations of high visibility. For this softscape type, the Great Basin and Sierra Nevada plant palettes and other low-water use plants are planted in greater densities, forming over-story and under-story layers. Plant palettes create a richness of color, seasonal change, texture, and form to enhance the desert garden. This softscape type integrates Great Basin and Sierra Nevada plants with a variety of plants from other arid environments that have similar climatic conditions.

24.2 General plant selection. Use regionally adapted plant species. In addition to the plants listed in the Native Plant Revegetation softscape type and the Enhanced Native softscape type, refer to the following list of plants 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 may be included upon review and approval. Consider sunlight, water, and wind exposure when placing plant material.

24.3 Preserve healthy, mature trees and/or vegetation within the right-of-way. Mature vegetation is an integral part of community life and an important public resource that enhances the quality of life. All previously landscaped areas with ornamental plant materials measuring 4' above the ground and trees with greater than 3" caliper in good condition, form, and health shall be preserved. All softscape treatment projects should be initiated by a tree inventory plan listing all protected trees and other landscape materials within the right-of-way which includes: a listing of species, size and condition of each tree, index of trees to be removed and trees to preserve, and a outline of specifications for tree maintenance during construction.

(1) This is an example of regionally adapted softscape type planting at the embankment of a highway bridge using the plant list above.

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*
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*
Fallugia paradoxa - Apache Plume	*5' x 4'*	*Full sun*	*minimal*	*Feathery plumes*
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*
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*

25.0 REGIONAL ORNAMENTAL SOFTSCAPE TYPE

25.1 Use the regional ornamental softscape type to create cultural meaning, enhance a landmark feature, or both. The regional ornamental softscape type is the rarest treatment and should be used where identified in the landscape design segments (see Sections 1-7, pages 4.11-4.45). This softscape type is meant to emphasize the unique cultural elements of these particular urban environments. 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.

25.2 General plant selection. Use 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 should be used to 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. Use one-gallon containers for groundcovers and perennials, a minimum container size of five-gallons for all shrubs, and a minimum box size of 24-inches for trees. Additional plants not listed in the plant palette may be included upon review and approval by NDOT. Consider sunlight, water, and wind exposure when placing plant material.

25.3 Preserve healthy, mature trees and/or vegetation within the right-of-way. Mature vegetation is an integral part of community life and an important public resource that enhances the quality of life. All previously landscaped areas with ornamental plant materials measuring 4' above the ground and trees with greater than 3" caliper in good condition, form, and health shall be preserved. All softscape treatment projects shall be initiated by a tree inventory plan listing all protected trees and other landscape materials within the right-of-way. This inventory plan includes a listing of species, size and condition of each tree, index of trees to remove and preserve, and an outline of specifications for tree maintenance during construction.

Plant Palette

	Height x Width	*Exposure to Sun*	*Water Requirement*	*Seasonal Interest*
Trees:				
Alnus glutinusosa 'Fastigiata' - European Alder	*60' x 15'*	*Full sun*	*high*	*Bright green*
Alnus spp. - Alder	*25' x 12'*	*Full sun*	*moderate*	*Bright green*
Crataegus spp. - 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*
Populus alba - White Popular	*70' x 30'*	*Full sun*	*high*	*Fast growing*
Populus fremontii - Fremont Cottonwood	*60' x 30'*	*Full sun*	*moderate*	*Bright yellow*
Populus tremuloides - Aspen	*50' x 25'*	*Full sun*	*moderate*	*Golden yellow*
Rhus spp. - Sumac	*15' x 15'*	*Full sun*	*minimal*	*Bright red foliage*
Robinia spp. - Locust	*50' x 25'*	*Full sun*	*moderate*	*Yellowish-green*
Sequoia gigantea - Giant Redwood	*80'x 35'*	*Full sun*	*moderate*	*Evergreen*
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*
Rhus spp. - Sumac	*15' x 15'*	*Full sun*	*minimal*	*Bright red foliage*
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) This is an example of regional ornamental softscape type planting highway intersection using the same plants listed in the plant palette above.

26.0 WILDLIFE CROSSINGS AND PROTECTION

26.1 Engage appropriate agencies in planning and designing wildlife crossings. Engage Federal, State and local agencies, and wildlife professionals in the initial stages of planning and design through implementation of wildlife crossings. Incorporate wildlife professionals as members of the design team in all non-urban areas. Locate crossing structures to correspond with landscape patterns and to provide landscape connectivity.

26.2 Observation points and watchable wildlife opportunities to observe animal movement may be possible in the design of crossings. Provide appropriate viewing areas, where possible, that do not negatively affect wildlife movement and/or behavior.

Image courtesy of Tony Clevenger

(1) Wildlife undercrossing provides visibility to bisected habitat.

27.0 CONSTRUCTION PRACTICES

27.1 Clear the site only within the limits of construction. Ensure the project site is cleared only within the limits of construction to avoid excessive site disturbance.

27.2 Protect important environmental, landscape and cultural features. Ensure trees, shrubs, landscape and cultural features, and environmentally sensitive areas to be preserved are identified and protected during construction. In areas where vegetation is to remain, 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.

27.3 Coordinate with construction personnel when planning and designing projects. Implementation of project design requires close cooperation with the personnel directly responsible for its construction. Involve construction personnel early on in the design stage through to the development of final specifications. Maintain effective communication with construction personnel through the construction process.

27.4 Ensure erosion and sedimentation is controlled during construction. Ensure sediments are controlled through the timely control of soil erosion. Consider site specificity, timing of execution, and application of man-made devices and/or vegetative cover to stabilize banks during construction. Consider alternatives to hard surface paving. Give preference to other sediment control devices including sediment basins, diversion berms, vegetative buffer areas, channel linings, energy dissipators, seeding, and mulching. Build permanent erosion controls into structural earthwork design through terracing, flattening slopes, stone and durable synthetic blankets, retaining walls, rip-rap, and/or native revegetation. Maintain compliance with necessary permits throughout construction.

27.5 Carefully manage and dispose of waste material. Avoid disposing of milled asphalt by placing it as a cover on highway shoulders. This can inhibit revegetation on slopes and create a cluttered, unfinished appearance to the corridor.

27.6 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 laid out on the site. Salvaged plant materials shall be stored and maintained during the period prior to planting. Stripped topsoil in excess of the quantity required for the project should be stored at specified locations. Topsoil of lesser quality can be blended with soil amendments to improve condition for final bedding.

27.7 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 as good or better than original, and consistent with the *Corridor Plan* design guidelines.

28.0 MAINTENANCE PRACTICES

28.1 Consult Best Management Practices and provide for efficient and effective maintenance. Design new projects that are low maintenance. 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

28.2 Create a visual design unity among all existing and new structures. 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, complete repairs, joints, or logical edge point. Use anti-graffitti treatment on all accessible structures. District level maintenance teams should use the same color palette for all maintenance and repairs (refer to Color Palette guideline, page 5.9, for more information).

28.3 Locate and screen maintenance staging areas appropriately. Maintenance staging areas need to be adequately set back from the highway, situated at or near an interchange, located to be visually unobtrusive from the highway, and safe for ingress and egress by maintenance workers. Drainage is an important aspect in the design and location of a maintenance area in order to prevent any environmental damage that results from leachates in salt and gravel stockpiles. Salt and sand piles should be covered to avoid watercourse and groundwater degradation according to the NDOT Best Management Practices Manual. Provide space for equipment storage, vehicles, and supplies as well as employee or visitor parking. Consider, future expansion needs. Architectural or landscape architectural screening of maintenance areas, particularly stockpiles and equipment, should be provided if a maintenance area is visible from the highway or from adjacent developed property. Security fencing may be appropriate in some locations.

28.4 Coordinate with personnel when planning and designing maintenance areas. Planning and design of maintenance area requires close cooperation between designers and the personnel directly responsible for its use.

20.0 RECOMMENDATIONS FOR SUSTAINABLE HIGHWAY ENVIRONMENTS

29.1 Sustainable development is defined as achieving stability of both physical and social systems by meeting the needs of current generations without compromising the ability of future generations to meet their needs. 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. In this document, the focus is on sustainability for design and construction of the elements that comprise the physical highway system. Restoration of disturbed man-made and natural habitat is an important component in achieving a sustainable highway related landscape.

29.2 Three key principles in highway construction and natural resource management include Avoid, Minimize, and Mitigate. Concepts central to these principles include:

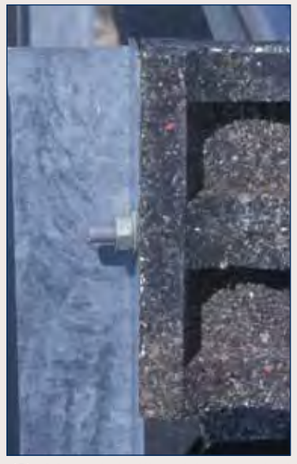
- Water conservation: efficiency, protection and reuse.
- Construction materials selection: reduce, reuse and recycle.
- Air quality protection.
- Energy efficiency: use renewable energy.
- Design innovation.

29.3 Techniques for creating sustainable highway environments.

- Develop systems that 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, reuse of organic materials, water conservation, and selection of long-lived materials.

(1) Solar power provides a sustainable, renewable energy 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.

(4) Existing condition of asphalt millings being placed along shoulder should be reused in repaving projects.

OVERVIEW

To understand the cost implications of the improvements proposed by this *Corridor Plan*, estimates on a cost per square foot (SF) and per acre basis have been prepared. At the planning budget level, these values can be applied over the Landscape Design Segments to produce a planning level cost for the right-of-way sections 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.

PROCESS

Costs for individual hardscape and softscape treatments, such as 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, plant care, and irrigation.

Prototypical designs for each of the five softscape types and four hardscape treatments were developed for two Nevada interchanges. Overall cost estimates for each level of treatment were developed from these and compared to the costs from actual projects for verification. The project area was then incorporated into the estimate to create a per square foot and per acre cost.

Prototypes were also created for the sections of highway right-of-way that exhibit the various types of treatment. A similar process was applied to these areas to create a per square foot and per acre cost for each hardscape and softscape type.

APPLICATION OF DESIGN GUIDELINES

The Design Guidelines included in this report describe the elements that compose a typical highway interchange and right-of-way section. 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. The next step following adoption of the *Corridor Plan* is for NDOT to initiate internal review to determine implementation strategies. This review will include cost evaluation, priorities and scheduling, and visual preference evaluations to test each standard proposed by this section.

Funding for the landscape and aesthetics portion of a project will generally 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 is a summary description of the components contained within an NDOT standard project that are not generally considered landscape and aesthetic elements:

Roadway Service Areas

- Service area program as defined inclusive of designated services

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

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 signs
- Application of a long-term, non-sacrificial anti-graffiti treatment coating to all appropriate structures
- Pedestrian access across bridges

Retaining Walls

- Cast-in-place or pre-cast concrete with variable vertical ribbed design
- Acrylic stain base color application
- Application of a long-term, non-sacrificial anti-graffiti treatment coating to all appropriate structures

Sound Walls
- Cast-in-place or pre-cast concrete with variable vertical ribbed design
- Acrylic stain base color application
- Application of a long-term, non-sacrificial anti-graffiti treatment coating to all appropriate structures
- 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
- Application of a long-term, non-sacrificial anti-graffiti treatment coating to all appropriate structures

Guard Rail
- Galvanized steel triple-corrugated guard rail

Fencing
- Chain link fencing with color application—vinyl clad or painted finish with steel post supports where required (select urban areas)
- 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” horizon minimum) with native plant fragments
- Respreading of stockpiled topsoil and native plant fragments to minimum 6” 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
- Use of dust control practices
- Construction fencing to preserve sensitive areas
- Traffic control and project site security
- 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

COST ANALYSIS

Softscape Treatments

Using the process described on page 6.1, planning level construction cost estimates for the different softscape treatments were determined in 2004 dollars. They are as follows:

Softscape Type	Cost Estimate (sf & acre)
Ground Treatment / Native Revegetation:	
	$1.15 - $1.35 sf
	$50,000 - $59,000 acre
L & A Cost	*$0.00 sf*
	$0.00 acre
Enhanced Native:	$1.40 - $1.60 sf
	$61,000 - $70,000 acre
L & A Cost	*$0.25 - $0.45 sf*
	$11,000 - $20,000 acre
Regionally Adapted:	$2.25 - $2.75 sf
	$98,000 - $120,000 acre
L & A Cost	*$1.10 - $1.60 sf*
	$48,000 - $70,000 acre
Regional Ornamental:	$3.50 - $6.00 sf
	$152,000 - $262,000 acre
L & A Cost	*$2.35 - $4.85 sf*
	$102,000 - $212,000 acre

The cost for Ground Treatment/Native Revegetation is covered under the general construction costs as part of the project. The data shown for the different treatment levels represents a total cost. The *L & A Cost* is the portion of the total cost that is above the ordinary construction costs and would be paid for through the Landscape and Aesthetics budget.

For example, a Regionally Adapted softscape costs about $1.10 sf more than the standard Ground Treatment / Native Revegetation level of treatment, for a total cost of $2.25 sf ($1.15 + $1.10 = $2.25). The additional $1.10 sf would be funded through the L & A budget because it is above and beyond the ordinary construction costs. The Regional Ornamental treatment exhibits the widest range of costs due to the highly customized nature of this type.

To place the estimates in the context of a highway corridor, an estimate was calculated for a one-mile section of road. A typical section of highway right-of-way that is 240' wide with two 40' wide paved areas for travel lanes was used to determine this value (Figures 1-4, page 6.4). The approximate softscape costs to develop one mile of corridor right-of-way at each treatment level were calculated to be:

Softscape Type	Cost Estimate (1 mile)
Ground Treatment / Native Revegetation:	
	~ $800,000
L & A Cost	*$0.00*
Enhanced Native:	~ $950,000
L & A Cost	*~ $150,000*
Regionally Adapted:	~ $1,600,000
L & A Cost	*~ $800,000*
Regional Ornamental:	~ $2,250,000 - $3,800,000
L & A Cost	*~ $1,450,000 - $3,000,000*

Structures and Hardscape Treatments

The construction of the bridge at an interchange composes the majority of hardscape costs. For the purposes of cost estimation, a 12,000 square foot (60' x 200') bridge was assumed. The estimate for the various hardscape levels is:

Hardscape Type	Cost Estimate (sf & total)
Standard:	$110 - $115 sf
	$1,320,000 - $1,380,000
L & A Cost	*$0.00 sf*
	$0.00 total
Accentuated:	$125 - $135 sf
	$1,500,000 - $1,620,000
L & A Cost	*$15 - $25 sf*
	$180,000 - $300,000
Focal:	$170 - $185 sf
	$2,040,000 - $2,220,000
L & A Cost	*$60 - $75 sf*
	$720,000 - $900,000
Landmark:	$210 - $250 sf
	$2,520,000 - $3,000,000
L & A Cost	*$100 - $140 sf*
	$1,200,000 - $1,680,000

Again, the overall construction cost is listed as well as the cost specific to landscape and aesthetics enhancements. Similar to the Regional Ornamental softscape, the Landmark level contains many custom elements and the widest range of potential cost.

A typical interchange encompasses an area of about 6.5 acres including on/off ramps and infield landscape areas (Figures 5-8, page 6.5). To develop an estimate for an interchange, the softscape data was applied to the infield areas and added to the cost of the bridge deck. Likely softscape and hardscape treatment combinations were used to create the following interchange estimates:

Type	Cost Estimate (total)
Ground Treatment / Native Revegetation & Standard:	~ $1,700,000
L & A Cost	*~ $0.00*
Enhanced Native & Accentuated:	~ $2,000,000
L & A Cost	*~ $300,000*
Regionally Adapted & Focal:	~ $2,750,000
L & A Cost	*~ $1,050,000*
Regional Ornamental & Landmark:	~ $4,000,000
L & A Cost	*~ $2,300,000*

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.

Figure 1

Structures and hardscape Type - **Standard**
Softscape Type - **Ground Treatment / Native Revegetation**

Total Cost: $50,000 - $59,000 acre of ROW area

L & A Cost: $0.00 acre

Figure 2

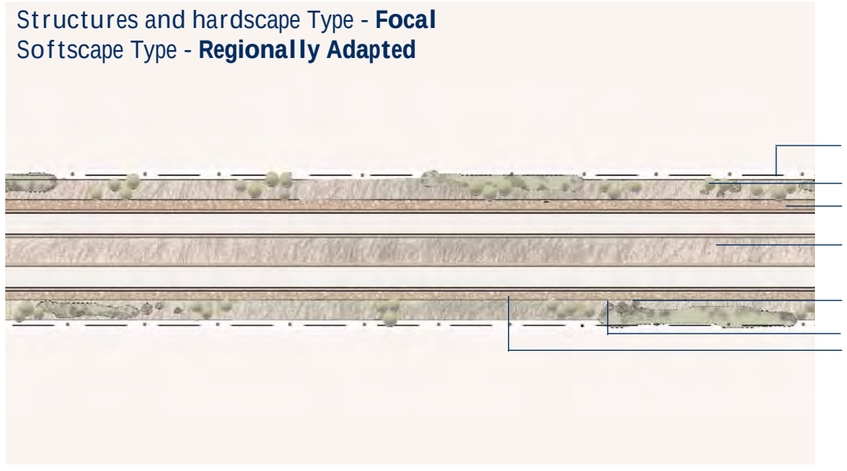
Structures and hardscape Type - **Accentuated**
Softscape Type - **Enhanced Native**

Total Cost: $61,000 - $70,000 acre of ROW area

L & A Cost: $11,000 - $20,000 acre

Figure 3

Structures and hardscape Type - **Focal**
Softscape Type - **Regionally Adapted**

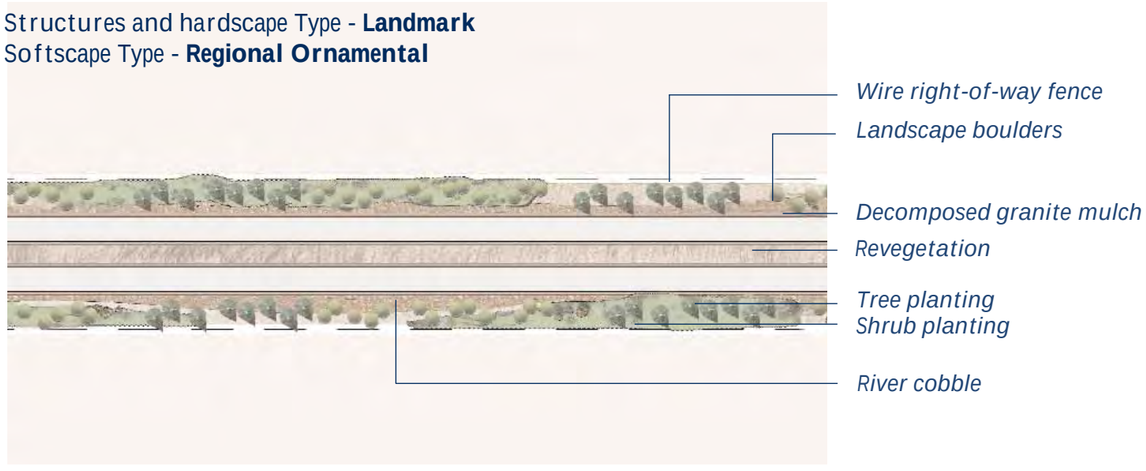


Total Cost: $98,000 - $120,000 acre of ROW area

L & A Cost: $48,000 - $70,000 acre

Figure 4

Structures and hardscape Type - **Landmark**
Softscape Type - **Regional Ornamental**

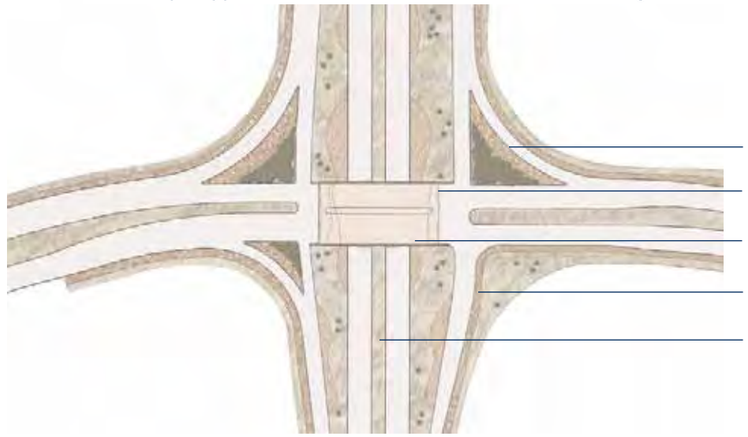


Total Cost: $152,000 - $262,000 acre of ROW area

L & A Cost: $102,000 - $212,000 acre

Figure 5

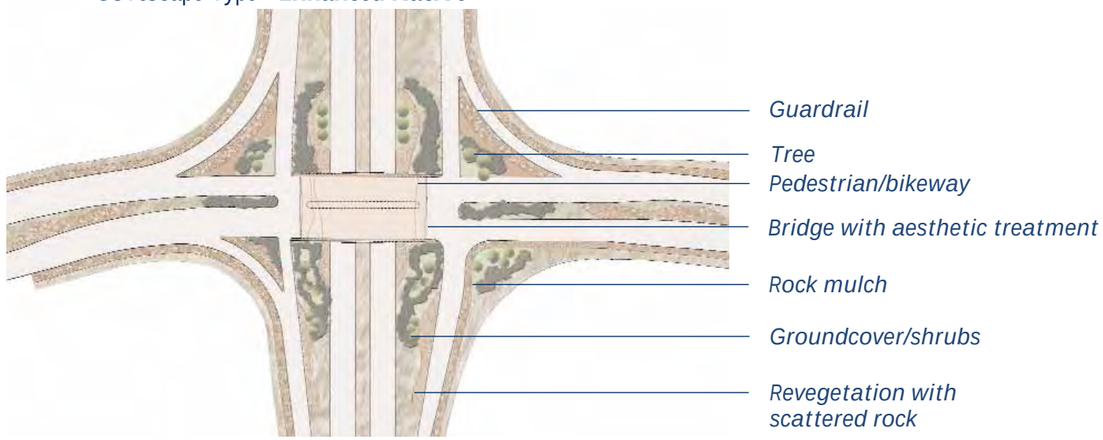
Structures and hardscape Types - **Standard**
Softscape Type - **Ground Treatment / Native Revegetation**



Total Cost: $1,700,000 (infield landscape and bridge deck) L & A Cost: $0.00

Figure 6

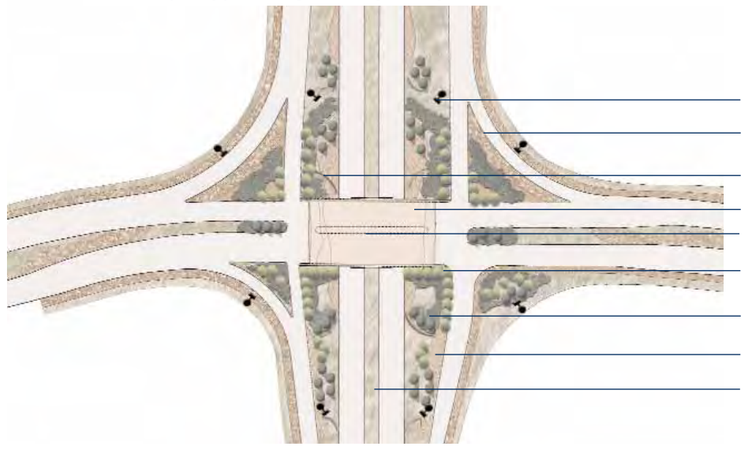
Structures and hardscape Types - **Accentuated**
Softscape Type - **Enhanced Native**



Total Cost: $2,000,000 (infield landscape and bridge deck) L & A Cost: $300,000

Figure 7

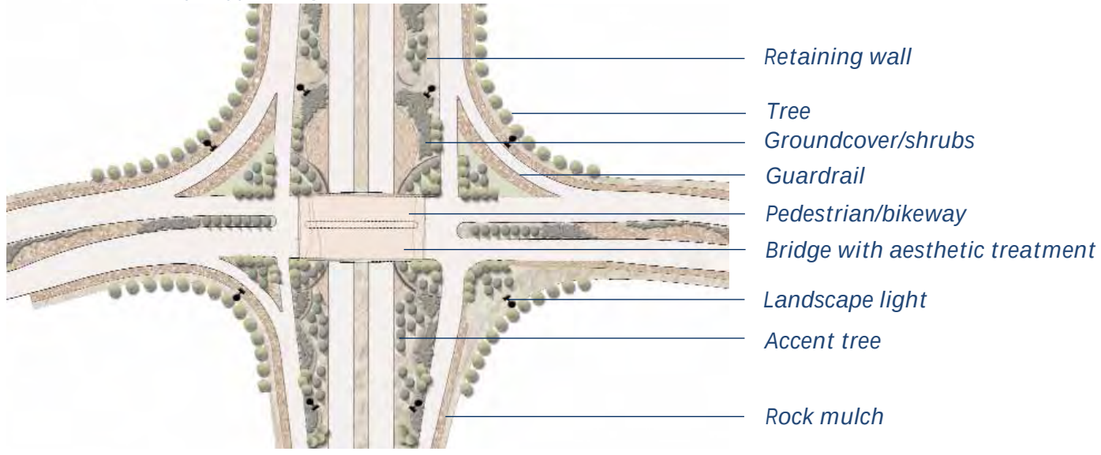
Structures and hardscape Types - **Focal**
Softscape Type - **Regionally Adapted**



Total Cost: $2,750,000 (infield landscape and bridge deck) L & A Cost: $1,050,000

Figure 8

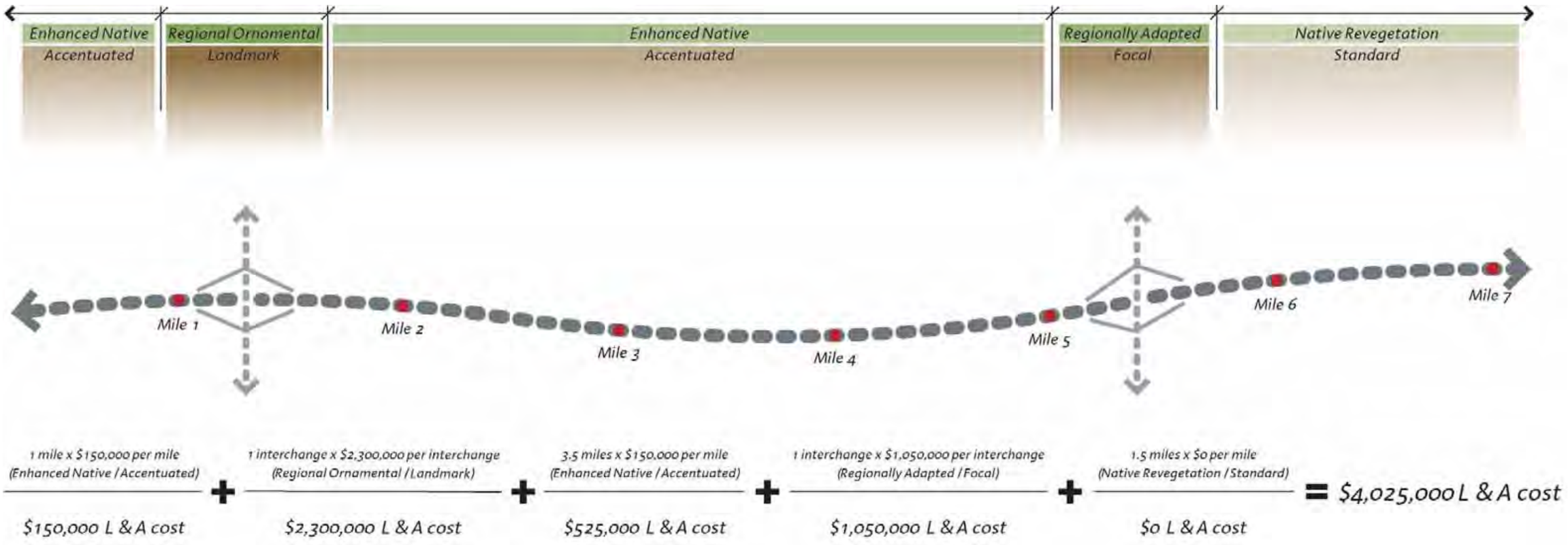
Structures and hardscape Types - **Landmark**
Softscape Type - **Regional Ornamental**



Total Cost: $4,000,000 (infield landscape and bridge deck) L & A Cost: $2,300,000

The diagram below (figure 9) 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 ordinary construction costs.

Figure 9



MAINTENANCE COSTS

The *Corridor Plan* identifies the level of landscape and aesthetic treatment, and consequently, 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 them fully understand the long-term maintenance implications of retrofit projects.

In collaboration with the *Corridor Plan*, long-term maintenance costs have been researched by the University of Nevada, Las Vegas (UNLV) and compiled as the *Maintenance Cost Study for Corridor Planning*. Figure 10 diagrams how total life cycle maintenance costs were developed for the different landscape and aesthetic treatments. Figure 11 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 10

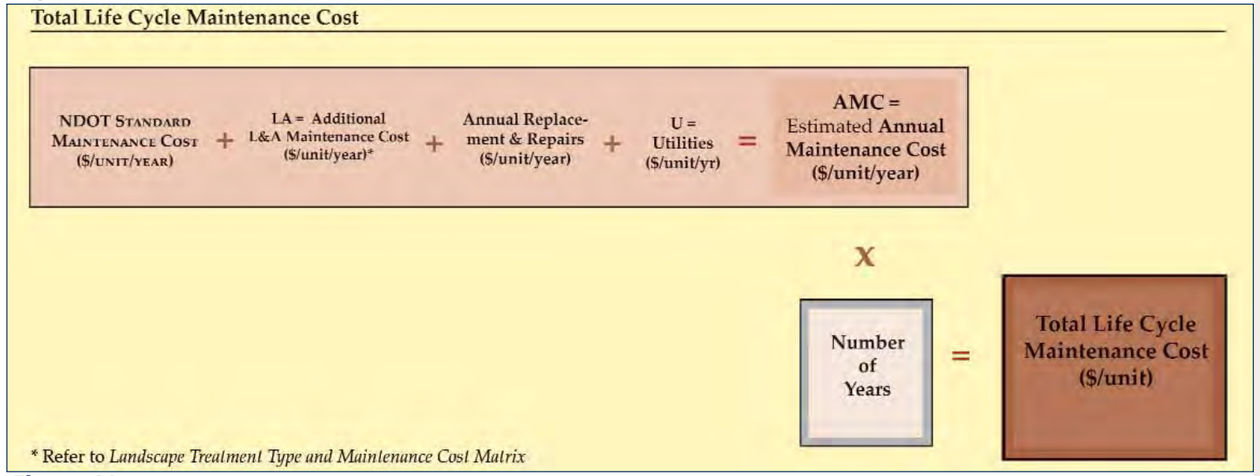


Figure 11

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 numbers

PROJECT FUNDING

Funding for the implementation of the projects that are included in the corridor may occur through several programs. Funding for new landscape and aesthetic projects associated with the state's highway program could come from both State and Federal sources. Up to three percent (3%) of the total project construction cost may be allocated for landscape and aesthetic 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 in a matching funds program. This program assists with the funding of projects initiated independent of the statewide capital plan and annually funds specific projects based on applications received from local public agencies. Additionally, communities and developers can determine enhanced levels of landscape and aesthetics through long-term capital and maintenance cost sharing agreements with NDOT.

The landscape and aesthetic project funds may be banked to allow for better project distribution of capital funds. This would provide the mechanism for NDOT to shift landscape and aesthetics money to areas that have been identified to receive enhanced levels of treatment. The capacity to allocate funds will allow NDOT to broadly manage the landscape and aesthetics budget on a corridor-wide basis.

OVERVIEW

This section describes priority levels for projects within the landscape design segments. First priority was given to sections of road with a high degree of visibility or identity, areas that can contribute significant quality immediately, 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 was given to areas that currently display a reasonable level of aesthetic quality and, upon enhancement, will complete the landscape and aesthetics program for that particular Landscape Design Segment.

It is important to note that corridor-wide roadside trash clean-up has been identified as the top priority for all four Landscape Design Segments. A color retrofit for all existing structures and hardscape elements is recommended as the first priority after the trash clean-up. Establishment of community gateways is also noted as a first priority within the rural study area. These three activities have been selected because of the immediate and significant impact they will have on the overall aesthetics of the entire I-80 corridor.

Wildlife movement corridors are an important component of the I-80 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, specific crossing areas are designated as first priority due to current crossing use and their importance for connectivity of wildlife habitat.

The priority levels are based on current capital improvements and landscape and aesthetics planning. They are intended to act as a guide and represent those projects the *Corridor Plan* recommends as having the greatest potential impact on the aesthetics of the entire corridor.

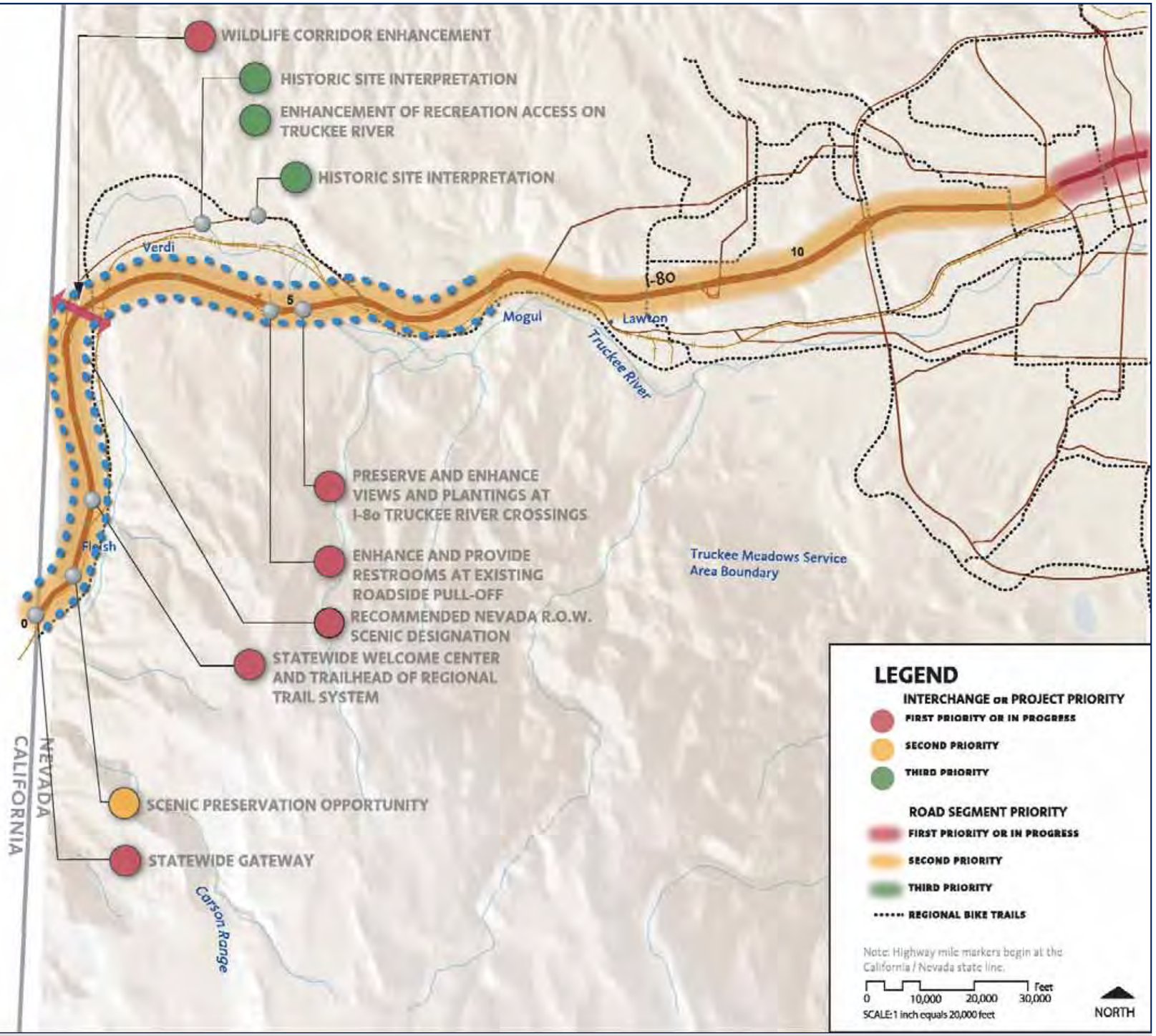
The priorities identified in this chapter are subject to change according to the availability of funds for individual project improvements. Capital projects are significantly influenced by the availability of funding.

FEATURES ALONG ENTIRE CORRIDOR

- ROAD CORRIDOR TRASH CLEAN-UP
- PAINT/STAIN RETROFIT OF BRIDGES AND STRUCTURES
- ANALYZE WILDLIFE MOVEMENTS AND PROVIDE APPROPRIATE CROSSING STRUCTURES
- STATEWIDE PLACE NAME SIGNAGE

FEATURES ALONG THE SIERRA NEVADA LANDSCAPE DESIGN SEGMENT

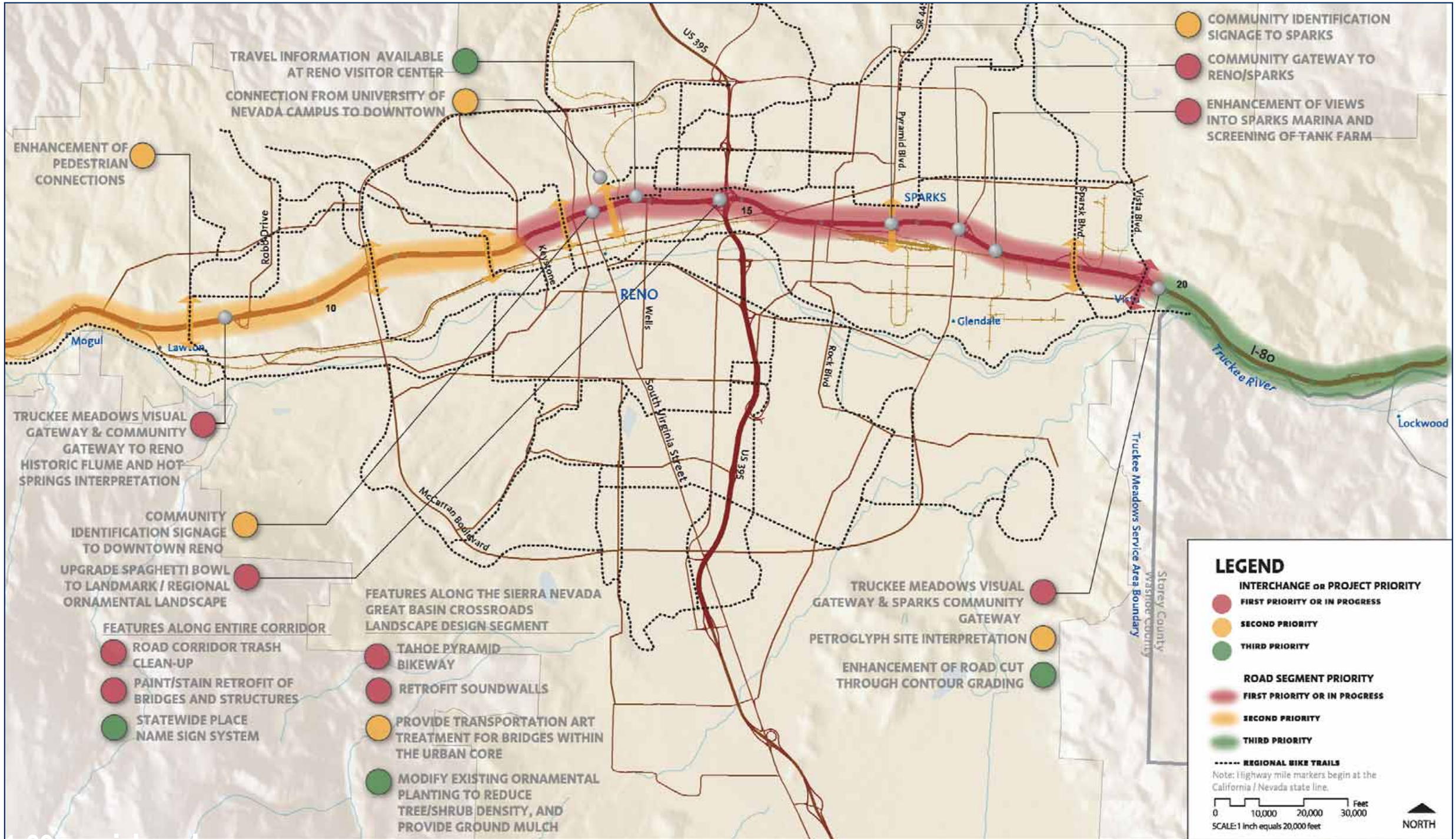
- TAHOE PYRAMID BIKEWAY
- PRESERVE SCENIC QUALITY THROUGH COORDINATION WITH APPROPRIATE AGENCIES AND ORGANIZATIONS
- SCREEN INDUSTRIAL USES WHERE FEASIBLE



MAP 1C
7.2

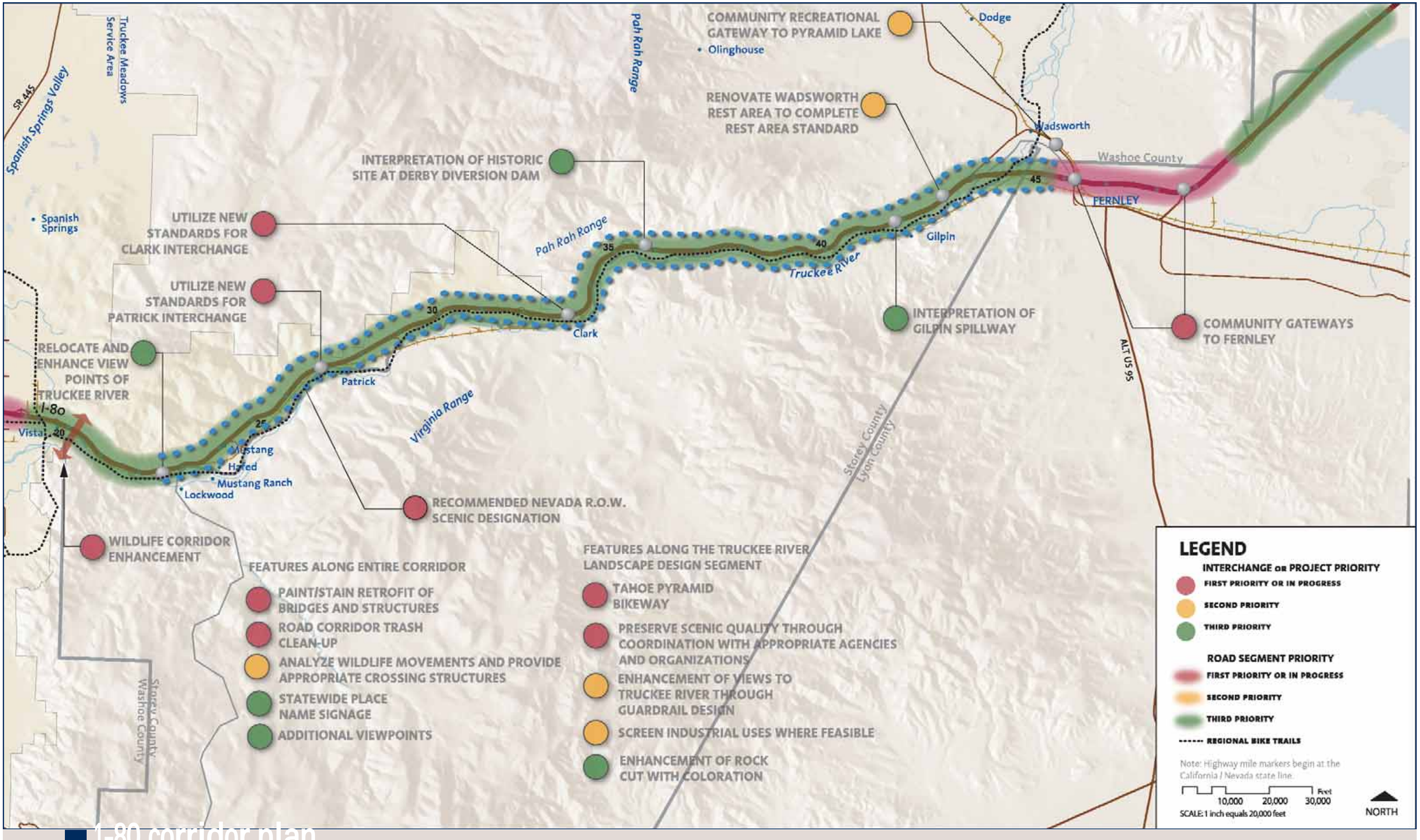
SIERRA NEVADA PASSAGE LANDSCAPE DESIGN SEGMENT

I-80: VERDI TO MOGUL - PRIORITY PROJECTS



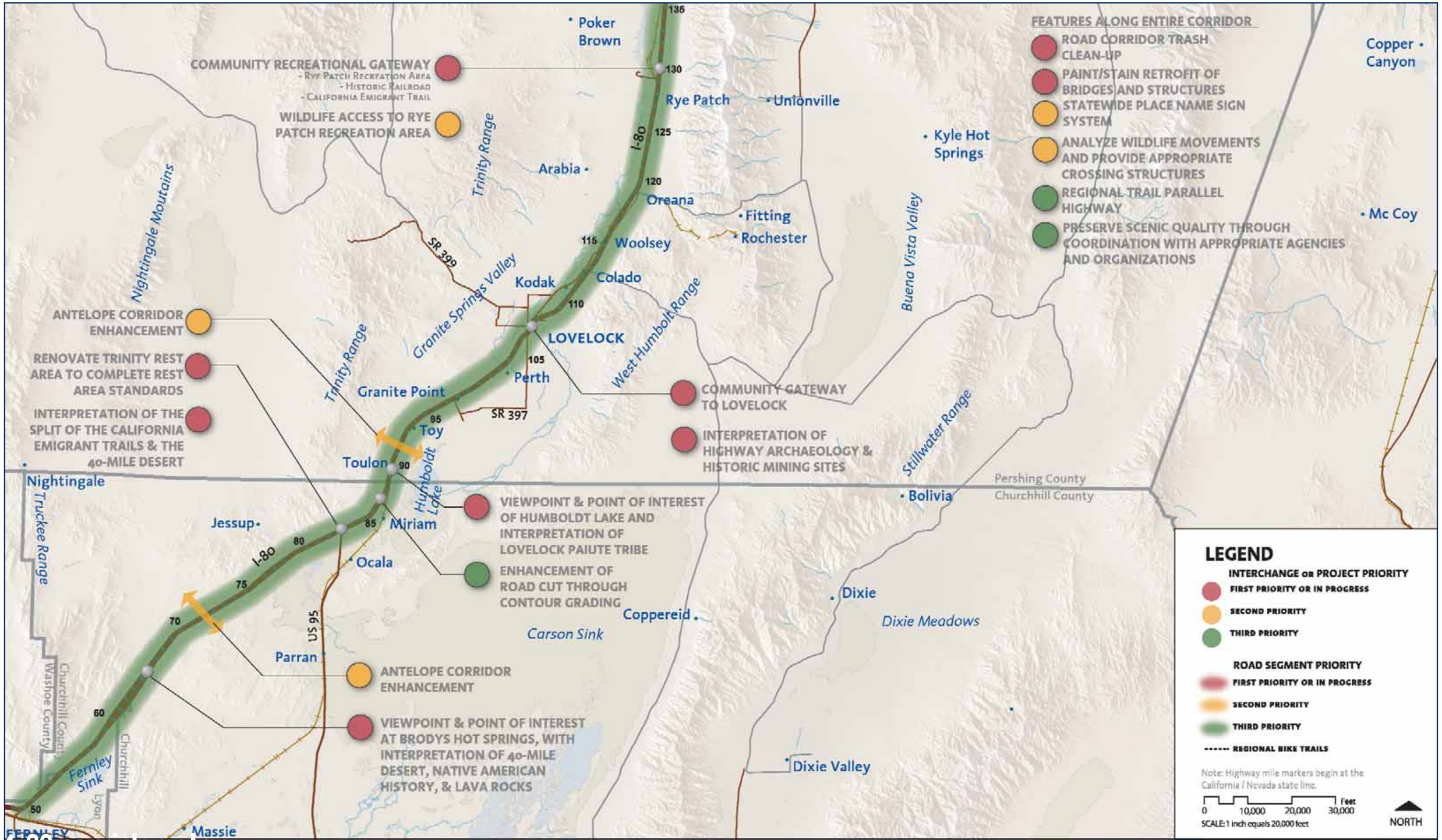
SIERRA NEVADA GREAT BASIN CROSSROADS LANDSCAPE DESIGN SEGMENT

I-80: MOGUL TO VISTA - PRIORITY PROJECTS



TRUCKEE RIVER PASSAGE LANDSCAPE DESIGN SEGMENT

I-80: Vista to Fernley - Priority Projects



HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Fernley to Rye Patch - Priority Projects

MAP 4C

7.5

COMMUNITY GATEWAYS TO WINNEMUCCA AND RECREATIONAL GATEWAY TO BLACK ROCK DESERT

ENHANCEMENT OF FOREGROUND VIEW THROUGH SCREENING OF INDUSTRIAL USES

DEER & ANTELOPE WILDLIFE CORRIDOR ENHANCEMENT

RENOVATE COSGRAVE REST AREA TO COMPLETE REST AREA STANDARDS

VIEWPOINT & POINT OF INTREST AT APPLEGATE-LASSEN CUTOFF TRAIL

RENOVATE BUTTON POINT REST AREA TO BASIC REST AREA STANDARDS & PROVIDE VIEWS OF SONORA RANGE

RENOVATE VALMY REST AREA TO COMPLETE REST AREA STANDARDS

INTERPRETATION OF MINING ACTIVITIES

COMMUNITY GATEWAY TO BATTLE MOUNTAIN

VIEWPOINT & POINT OF INTEREST AT EMIGRANT PASS WITH TRAVEL INFORMATION

HISTORIC INTERPRETATION OF EMIGRANT TRAIL SPRING CAMP & WATER SUPPLY AS WELL AS THE HUMBOLDT RIVER & RAILROAD

WILDLIFE CORRIDOR ENHANCEMENT

RENOVATE BEOWAWE REST AREA TO COMPLETE REST AREA STANDARDS

FEATURES ALONG ENTIRE CORRIDOR

- PAINT/STAIN RETROFIT OF BRIDGES AND STRUCTURES
- ROAD CORRIDOR TRASH CLEAN-UP
- STATEWIDE PLACE NAME SIGN SYSTEM
- ANALYZE WILDLIFE MOVEMENTS AND PROVIDE APPROPRIATE CROSSING STRUCTURES
- REGIONAL TRAIL PARALLEL HIGHWAY
- PRESERVE SCENIC QUALITY THROUGH COORDINATION WITH APPROPRIATE AGENCIES AND ORGANIZATIONS
- PEDESTRIAN CONNECTIONS TO LINK COMMUNITY DISTRICTS
- CONNECTION TO REGIONAL BIKE TRAILS
- INTERPRETATION OF COPPER, BORITE, & GOLD MINING AT OLD BATTLE MOUNTAIN
- SOUND PROTECTION FOR RESIDENTIAL AREAS
- PRESERVATION OF VIEWS TO BATTLE MOUNTAIN

LEGEND

INTERCHANGE OR PROJECT PRIORITY
- FIRST PRIORITY OR IN PROGRESS
- SECOND PRIORITY
- THIRD PRIORITY

ROAD SEGMENT PRIORITY
- FIRST PRIORITY OR IN PROGRESS
- SECOND PRIORITY
- THIRD PRIORITY
- REGIONAL BIKE TRAILS

Note: Highway mile markers begin at the California / Nevada state line.

0 10,000 20,000 30,000 Feet

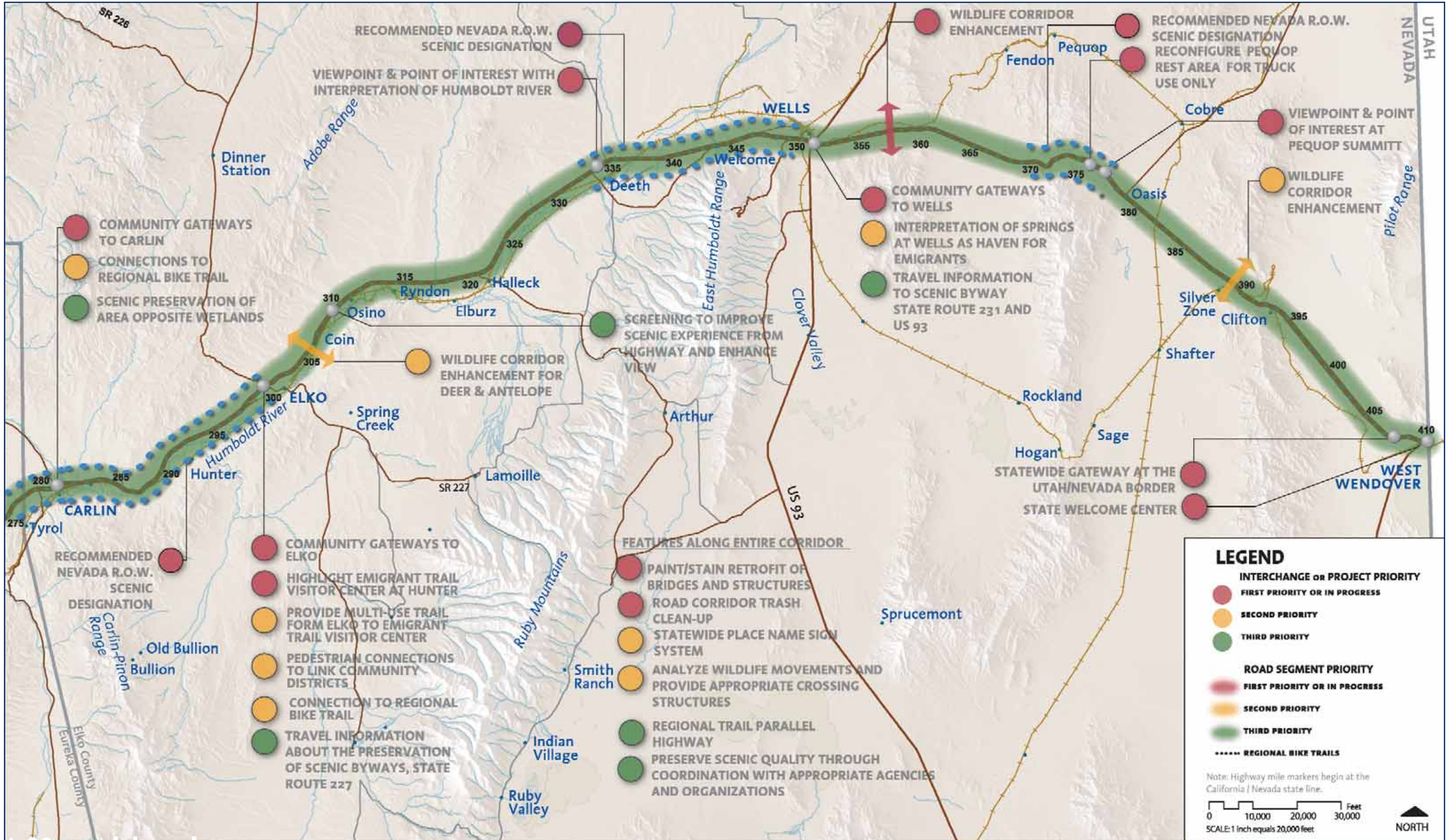
SCALE: 1 inch equals 20,000 feet

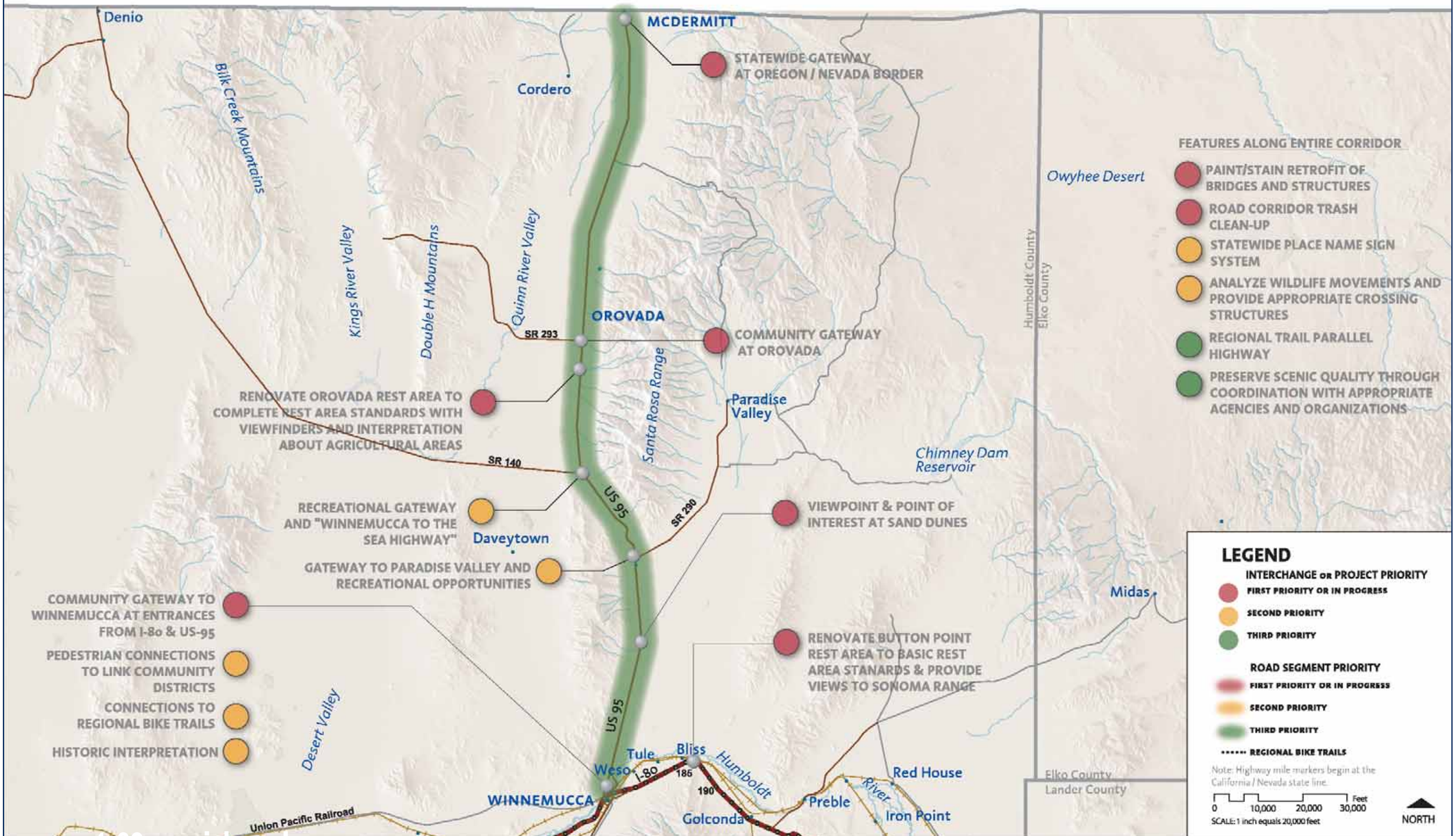
NORTH

MAP 5C 7.6

HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

I-80: Rye Patch to Tyrol - Priority Projects


SR 226
RECOMMENDED NEVADA R.O.W. SCENIC DESIGNATION
VIEWPOINT & POINT OF INTEREST WITH INTERPRETATION OF HUMBOLDT RIVER
WILDLIFE CORRIDOR ENHANCEMENT
RECOMMENDED NEVADA R.O.W. SCENIC DESIGNATION
RECONFIGURE PEQUOP REST AREA FOR TRUCK USE ONLY
VIEWPOINT & POINT OF INTEREST AT PEQUOP SUMMITT
WILDLIFE CORRIDOR ENHANCEMENT
NEVADA
UTAH
Fendon
Pequop
Cobre
Oasis
Pilot Range
Adobe Range
Dinner Station
WELLS
Welcome
Deeth
East Humboldt Range
Clover Valley
COMMUNITY GATEWAYS TO WELLS
INTERPRETATION OF SPRINGS AT WELLS AS HAVEN FOR EMIGRANTS
TRAVEL INFORMATION TO SCENIC BYWAY STATE ROUTE 231 AND US 93
COMMUNITY GATEWAYS TO CARLIN
CONNECTIONS TO REGIONAL BIKE TRAIL
SCENIC PRESERVATION OF AREA OPPOSITE WETLANDS
Ryndon
Halleck
Elburz
Osino
Coin
SCREENING TO IMPROVE SCENIC EXPERIENCE FROM HIGHWAY AND ENHANCE VIEW
WILDLIFE CORRIDOR ENHANCEMENT FOR DEER & ANTELOPE
ELKO
Humboldt River
Spring Creek
Arthur
Silver Zone
Clifton
Shafter
Rockland
Sage
Hogan
STATEWIDE GATEWAY AT THE UTAH/NEVADA BORDER
STATE WELCOME CENTER
WEST WENDOVER
Hunter
Lamoille
SR 227
US 93
CARLIN
Tyrol
RECOMMENDED NEVADA R.O.W. SCENIC DESIGNATION
COMMUNITY GATEWAYS TO ELKO
HIGHLIGHT EMIGRANT TRAIL VISITOR CENTER AT HUNTER
PROVIDE MULTI-USE TRAIL FORM ELKO TO EMIGRANT TRAIL VISITOR CENTER
PEDESTRIAN CONNECTIONS TO LINK COMMUNITY DISTRICTS
CONNECTION TO REGIONAL BIKE TRAIL
TRAVEL INFORMATION ABOUT THE PRESERVATION OF SCENIC BYWAYS, STATE ROUTE 227
Carlin-Pinon Range
Old Bullion
Bullion
Elko County
Eureka County
Ruby Mountains
Smith Ranch
Indian Village
Ruby Valley
Sprucemont
FEATURES ALONG ENTIRE CORRIDOR
PAINT/STAIN RETROFIT OF BRIDGES AND STRUCTURES
ROAD CORRIDOR TRASH CLEAN-UP
STATEWIDE PLACE NAME SIGN SYSTEM
ANALYZE WILDLIFE MOVEMENTS AND PROVIDE APPROPRIATE CROSSING STRUCTURES
REGIONAL TRAIL PARALLEL HIGHWAY
PRESERVE SCENIC QUALITY THROUGH COORDINATION WITH APPROPRIATE AGENCIES AND ORGANIZATIONS
LEGEND
INTERCHANGE OR PROJECT PRIORITY
FIRST PRIORITY OR IN PROGRESS
SECOND PRIORITY
THIRD PRIORITY
ROAD SEGMENT PRIORITY
FIRST PRIORITY OR IN PROGRESS
SECOND PRIORITY
THIRD PRIORITY
REGIONAL BIKE TRAILS
Note: Highway mile markers begin at the California / Nevada state line.
0 10,000 20,000 30,000 Feet
SCALE: 1 Inch equals 20,000 feet
NORTH



MAP 7C

7.8

HIGHWAY OF THE WEST LANDSCAPE DESIGN SEGMENT

US 95: Winnemucca to McDermitt - Priority Projects

CONCLUSION

The *I-80 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 highways. This document is designed to guide decisions and policies that will 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 discussion of:

- 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 will raise the basic level of aesthetics on all future projects significantly.

The *I-80 Landscape and Aesthetics Corridor Plan* is a public/private partnership initiative. The *Plan* provides a foundation for this unique initiative to build a comprehensive vision for the landscape and aesthetics of the I-80 corridor. The partnership policy, outlined in the *NDOT Landscape and Aesthetics Master Plan*, clearly states the unique and exciting result of this process.

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.

O9/20/02

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 tricoides*	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 naseousus*	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 tanecetifolia*	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 – *Achnathermum 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 -*Linium 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* ***varvaseyana***	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 – *Castilleya* spp.	1.0
4.	Lupine – *Lupinus* spp.	1.0
5.	Wild geranium -*Geranium viscosissimum*	1.0
		Total 21.5bs.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.

SAMPLE SPECIFICATIONS

In this section we have taken one specific site and described specifications that might be followed in order to improve the aesthetics, dust control, and other problems on this site.

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
Determine and apply appropriate additives

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 tanecetifolia*
- 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	*Cardaria 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. squarrose	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
Solanum 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	Puncturevine

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)-768-3967, 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	1.9	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 Graig 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.

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PERSONAL COMMUNICATION

Anna Bartlome, City of West Wendover City Clerk, April 8, 2004.

Arlo Stockholm, City of Reno Senior Long Range Planner, April 7, 2004.

Catherine Lorbeer Washoe County Planner, April 7, 2004.

Dora Wren Planning & Building Technician with Pershing County, April 7, 2004.

Doug Smith, Citizens for Scenic Nevada, April 1, 2004.

John Kingwell Planning Coordinator with Elko County, April 8, 2004.

Joyce Lacaillade Administrative Clerk for Humboldt County, April 7, 2004.

Margaret Powell, City of Sparks Senior Planner, April 6, 2004.

Patty Menke, City of Fernley Community Development Assistant, April 8, 2004.

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