
Appendix P
I-25 South Aesthetic Guidelines



COLORADO

Department of
Transportation

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Environmental Existing Conditions

I-25 South Aesthetic Guidelines

I-25 PEL: Colorado Springs Denver South Connection

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SECTION 1

Acronyms and Abbreviations

I-25	Interstate 25
CDOT	Colorado Department of Transportation
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
LED	light-emitting diode
MP	mile post
PEL	Planning and Environmental Linkages
RTD	Regional Transportation District
SH	State Highway
US 85	United States Highway 85

1 Introduction

These aesthetic guidelines were developed as part of the Colorado Springs Denver South Connection Planning and Environmental Linkages (PEL) Study. The PEL Study evaluated a variety of transportation improvements for a 34-mile portion of the Interstate 25 (I-25) corridor (PEL Corridor) between Denver and Colorado Springs, Colorado – specifically from State Highway 105 (SH 105) in Monument to C-470/E-470 in Lone Tree (see Figure 1-1). The I-25 South Gap project — a separate project within the PEL Corridor between Monument and Castle Rock (Milepost [MP] 160 to MP 179) — resulted from the early stages of the PEL. Construction for the I-25 South Gap began in late summer 2018. As such, the I-25 South Gap Project impelled development of these aesthetic guidelines to mitigate resulting visual impacts. However, these guidelines apply to the entire 34-mile PEL Corridor and any subsequent projects therein.

These guidelines apply to aesthetic qualities of project design elements, including form, finish, color, and textures, as applicable, per project within the PEL Corridor, and are intended for use by state and local agencies, including, but not limited to, the Colorado Department of Transportation (CDOT), and private developers of projects along the corridor. Applying the aesthetic instructions in this document will contribute to creating a cohesive aesthetic character as projects are developed along this transportation corridor.

These guidelines build upon and add to existing aesthetic guidelines previously established within and adjacent to the PEL Corridor limits. In 2002, the *Interstate-25 Lincoln Avenue to Castle Rock Aesthetic Study and Design Guidelines* (Lincoln to Castle Rock Guidelines) (CDOT, 2002) was published to apply to approximately the northern half of the PEL Corridor. No aesthetic guidelines have been previously established to apply to the southern half of the corridor between Monument and Castle Rock.

These guidelines provide an overview of the physical setting along the PEL Corridor, an inventory of transportation elements and aesthetic treatments currently in place, and aesthetic guidelines for future projects.

These guidelines were established with the intent to create a consistent design throughout the PEL Corridor that does not detract from the surrounding landscape through the use of low contrast and complimentary colors.

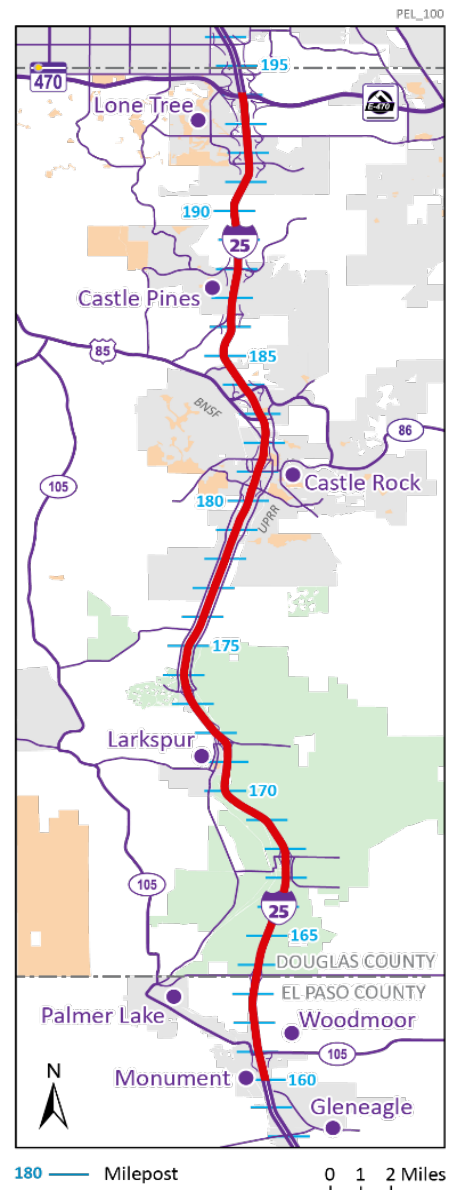


Figure 1-1. Vicinity Map

2 PEL Corridor Setting

The PEL Corridor traverses both rapidly developing suburban areas and pristine rural landscapes between Denver and Colorado Springs, as briefly described in the following sections.

2.1 Monument to Castle Rock

The southern half of the PEL Corridor stretches from the northern Colorado Springs suburb of Monument at SH 105 to Crystal Valley Parkway on the south side of Castle Rock at approximately mile post (MP) 180. It is divided into four landscape units with distinct characteristics. As defined by the Federal Highway Administration (FHWA), a landscape unit is “a spatially defined landscape with a particular visual identity—a distinctive ‘outdoor room’” (FHWA, 2015).

2.1.1 Monument/Woodmoor (MP 161 – 164.5)

This landscape unit encompasses terrain that slopes gradually upward from SH 105 toward the Palmer Divide at the El Paso County/Douglas County line. It includes a portion of the Town of Monument and the unincorporated community of Woodmoor. Because much of the land near the I-25 corridor has been developed, this landscape unit has a suburban character. Traveling in the southbound direction, the Rocky Mountain foothills are clearly visible to the west over the valley. A representative photo of this landscape unit is provided in Figure 2-1.



Figure 2-1. Monument/Woodmoor Landscape Unit

2.1.2 Greenland (MP 164.5 – 168)

The highway in the Greenland landscape unit travels through a broad, open valley that has maintained a highly rural appearance because most of the land is protected as open space through conservation easement. A part of Greenland Ranch, owned by Douglas County for use as public open space, is located on the west side of I-25. The historic Greenland townsite is visible on the west side, with a small scattering of old commercial and ranch buildings. A large red barn, which is a frequently photographed landmark, is visible from I-25. On the east side, private ranch land is under conservation easement to preserve views and open space. Views of



Figure 2-2. Greenland Landscape Unit

these lands consist of rolling grassland in the foreground and geologic landmarks in the mid-to-background, including Rattlesnake Butte, Larkspur Butte, Dawson Butte, and Monkey Face. A representative photo of this landscape unit is provided in Figure 2-2.

2.1.3 Larkspur (MP 168 – 174.6)

The interstate travels through the Larkspur landscape unit along a narrow valley that follows East Plum Creek and Carpenter Creek, forming a series of curves as it travels around the toes of forested buttes. Most of the land along the west side of the interstate from the landscape unit's southern boundary at MP 168 to the southern end of the Town of Larkspur near MP 170.8 is either publicly owned open space or protected under a conservation easement. Similarly, most of the land visible on the east side of the highway is ranch land that is protected from development by a conservation



Figure 2-3. Larkspur Landscape Unit

easement. Nodes of development along the highway corridor in this landscape unit exist in the Town of Larkspur and at the Jellystone Campground Park at the Sky View Lane exit near MP 173.8. With the exception of two billboards and a new truck stop at Upper Lake Gulch Road, development in the Town of Larkspur is not visible from I-25 because it is screened by intervening topography and vegetation. A representative photo of this landscape unit is provided in Figure 2-3.

2.1.4 Plum Creek Valley (MP 174.6 – 179)

The interstate travels through the broad, open valley along East Plum Creek within the Plum Creek Valley Landscape Unit. The interstate is generally flat and straight as it travels through the wide valley, which is defined by low ridges to the east and a series of ridges that include Dawson Butte to the west. The valley is defined by Hunt Mountain to the south. Land that borders the interstate between MP 174.6 and MP 175.5 on the east is publicly owned open space that includes the Columbine Open Space. Lands to the east of the railroad tracks that define the eastern edge of these publicly owned lands are protected from development by conservation easements.



Figure 2-4. Plum Creek Valley Landscape Unit

Relatively little development exists on the flat lands along the interstate corridor. Nearby lands along much of the highway maintain the appearance of open ranch land. To the extent that there is development close to the interstate, it is concentrated in the area between MP 179 and MP 180.9 within Castle Rock's town limits. Along much of the corridor in this landscape unit, large, single-family homes

on large lots can be seen on the surrounding hillsides, 0.4 to 1.0 mile and more from the highway. I-25 is a rural, four-lane highway throughout most of this landscape unit; however, near MP 179 it transitions to three lanes in each direction. A representative photo of this landscape unit is provided in Figure 2-4.

2.2 Castle Rock to C-470/E-470

Similar to the southern half of the PEL Corridor, the Castle Rock to C-470/E-470 northern half travels through varying degrees of developed and undeveloped lands. However, the northern half of the PEL Corridor contains a higher intensity of development in both the Castle Rock and Lone Tree areas. This half of the PEL Corridor is divided into three landscape units, as follows.

2.2.1 Castle Rock (MP 179 – MP 187)

This landscape unit begins at Crystal Valley Parkway, which provides access to a newer residential area that has developed rapidly over the past decade and is slated to continue developing. Moving north into the Town of Castle Rock, the Castle Rock Butte rock formation becomes the focal point of views from the interstate and the surrounding community. As I-25 travels through Castle Rock, areas of commercial, institutional, and light industrial development are visible on both sides of the interstate. On the north side of the Town of Castle Rock, pine forest screens large, single-family residential lots abutting the highway on both sides between MPs 185 and 187. In the southbound direction through this wooded area, the interstate curves eastward as it descends into the community, offering views of the Town of Castle Rock, including its namesake butte formation. A representative photo of this landscape unit is provided in Figure 2-5.



Figure 2-5. Castle Rock Landscape Unit

2.2.2 Castle Pines (MP 187 – MP 192)

The landscape becomes more rural beyond the development of Castle Rock moving northward from Happy Canyon Road. Some commercial development is centered on the Castle Pines Parkway interchange. All development is currently on the west side of I-25, but Castle Pines has plans for development on the east side. A representative photo of this landscape unit is provided in Figure 2-6.



Figure 2-6. Castle Pines Landscape Unit

2.2.3 RidgeGate South (MP 189– 192)

Through this landscape unit, the view consists primarily of low rolling hills in the foreground with grassy vegetation. The historic Schweiger Ranch can be seen directly east of the interstate at MP 192. At approximately MP 191.5, the Happy Canyon creek bed with its heavier vegetation and trees meanders next to the interstate and crosses under the roadway to the west side. Past Castle Pines Parkway traveling southbound, Pikes Peak can be seen in the distance. A representative photo of this landscape unit is provided in Figure 2-7.



Figure 2-7. RidgeGate South Landscape Unit

2.2.4 Lone Tree (MP 192 – 194)

From RidgeGate Parkway to the C-470/E-470 interchange in the Town of Lone Tree, the landscape transitions from open undeveloped grasslands to dense development with multifamily residential, institutional, and office buildings. The Regional Transportation District (RTD) Southeast Rail Extension line is currently under construction to extend the southern light rail line south to the new RidgeGate station Park and Ride. Views beyond adjacent parcels are limited. A representative photo of this landscape unit is provided in Figure 2-8.



Figure 2-8. Lone Tree Landscape Unit

3 Existing Conditions and Aesthetic Features Inventory

3.1 Overview

Existing highway design elements in the 34-mile PEL Corridor were inventoried to provide a baseline for making decisions about the design of I-25 Gap project elements as well as elements of future projects undertaken in the PEL Corridor. This inventory was prepared based on field observations, photography, and a systematic review of Google Earth Street View photography for the corridor. The results of this research are documented on Figure 3-1 through Figure 3-7. These figures consist of a set of photographs with locations depicted on a corridor map to provide an understanding of the appearance of existing PEL Corridor features. The photos include views of all bridge structures and walls in the corridor, along with representative light poles and fixtures, signs, medians, median barriers, roadway edge barriers, fencing, and landscaping.

The photos on Figure 3-1 through Figure 3-7 depict a range of highway design features within the PEL Corridor. Much of the PEL Corridor has experienced only small-scale, piecemeal improvements since the corridor's initial development in the 1960s. In contrast, an incremental series of modifications to the highway from Castle Rock to C-470 since the 1960s resulted in replacement of some of the highway's original features with designs that reflect this segment's more developed context and more recent ideas about highway aesthetics. The adoption of the *Lincoln to Castle Rock Guidelines* in 2002 (CDOT, 2002) also shaped the design of some of the recently developed highway features within the Castle Rock to C-470 segment.

3.1.1 Bridge Structures

The bridge structures in the PEL Corridor reflect a variety of design approaches. Many of the bridges, particularly in the I-25 Gap project segment (Monument to Castle Rock), are utilitarian concrete structures with simple, functional designs; they have no architectural enhancements, and make no use of color. Bridge structures fitting this description are located at County Line Road (MP 163.5), Greenland Road (MP 167.5), Upper Lake Gulch Road (MP 171.8), the railroad crossing near Larkspur (MP 171.2), the crossing of Plum Creek (MP 127.3), Spruce Mountain Road (MP 172.4), Liggett Road (MP 182.3), Happy Canyon Road (MP 186.9), and Oak Hill Lane (189.8). Two of the bridges in the PEL Corridor are generally utilitarian in design but include measures to increase their attractiveness. The bridge at Sky View Lane (MP 173.9) is a concrete structure that has a modest level of architectural treatment. It is supported by square pillars, between which the spans of the deck support structure have a slightly arched form. The railroad bridge that crosses over the highway at MP 182.2 in Castle Rock is an older utilitarian steel structure, the sides of which have been painted in white and brown to create the appearance of an arch.

The remaining bridge structures in the PEL Corridor, all located in the area from Castle Rock north through Lone Tree, are newer structures designed to include some measure of visual enhancement. Bridge crossings are described in the following sections.

3.1.1.1 Castle Rock Landscape Unit

The I-25 bridge over Plum Creek Parkway (MP 180.9) uses an accent color for the deck support girder and textured and colored retaining walls in front of the bridge's abutments.

The Park Street/Fifth Street overcrossing of the highway (MP 181.4) has an aesthetically enhanced design that includes a wide, open-appearing span, color treatment for the concrete bridge piers and the bridge's concrete walls, and color treatment for the steel bridge deck support girder. In addition, the retaining wall in front of the bridge's abutment on the east side of the highway is made of blocks with a textured surface appearance in several shades of brown that are laid to create a series of horizontal stripes.

The bulky concrete central pier and the concrete deck support beam of the Wilcox Street/Wolfensberger Road overcrossing of the highway (MP 181.7) have been left in their natural concrete color, but the appearance of the bridge's concrete wall has been enhanced through color treatment that creates a brown stripe. The paving on the slopes in front of the bridge's abutments has a natural concrete color.

The Santa Fe Drive overcrossing of the highway (MP 183.4) has a wide span that creates a sense of space flowing under it and uses tinted concrete for the bridge's central piers and the bridge deck support beam. The bridge's abutments and other elements have a smooth finish, giving the bridge a refined appearance. The paving on the slopes in front of the bridge's abutments has a natural concrete color.

The Meadows Parkway overcrossing of the highway (MP 184.2) incorporates use of tinted concrete for the central bridge piers and the bridge deck support beams. In addition, the retaining walls in front of the bridge's abutments have rounded corners and are constructed of concrete tinted in several tones of brown to create a striping pattern.

The highway's bridge over Castle Rock Parkway (MP 185.0) has smooth concrete walls that retain their natural concrete color. The bridge deck support beam is painted brown. The retaining wall and wing walls located in front of the bridge's abutments are constructed of brown textured block.

3.1.1.2 Castle Pines Landscape Unit

The design of the Castle Pines Parkway overcrossing of the highway (MP 188.5) is very similar to the design of the overcrossing at Santa Fe Drive in Castle Rock (MP 183.4). Like the Santa Fe Drive overcrossing, the Castle Pines Parkway overcrossing has a wide span that creates a sense of space flowing under it and makes use of tinted concrete for the bridge's central piers and for the bridge deck support beam. The bridge's abutments and other elements have a smooth finish, giving the bridge a refined appearance. The paving on the slopes in front of the bridge's abutments has a natural concrete color.

3.1.1.3 RidgeGate South Landscape Unit

The highway's overcrossing of Oak Hill Lane (MP 189.8) is a simple design with a single span that provides an open view down the roadway. The bridge's abutments and other elements have a smooth finish, giving the bridge a refined appearance. The paving on the slopes in front of the bridge's abutments has a natural concrete color.

3.1.1.4 Lone Tree Landscape Unit

The highway's overcrossing of RidgeGate Parkway (MP 192.0) incorporates a number of substantial aesthetic design features. The overcrossing spans RidgeGate Parkway without the use of center piers, creating an open view under the structure and down the roadway. The concrete rail running across the top of the overcrossing is white and has a textured surface, smooth bands at its base and top, and a series of smooth vertical elements spaced across its face that divide it into a linear series of rectangles. The bridge deck support beam is light brown. The walls under the overcrossing consist of a series of large white concrete panels separated by vertical inset areas with brown surfaces. Concrete retaining walls slope up toward the bridge's deck on both sides of the parkway as it approaches the overcrossing. These walls have a textured surface on which a series of bands in different shades of brown have been created, suggesting thin bands of exposed rock strata.

The Lincoln Avenue overcrossing of the highway (MP 193.0) uses a set of round center piers. It has small concrete abutments and concrete abutment slope paving, all of which have been left with their natural concrete color. The wide bridge deck girder has a smooth brown surface. The thin rail of uncolored concrete that runs across the top of the structure has a smooth surface. The paving on the slopes in front of the bridge's abutments has a natural concrete color.

The C-470 interchange (MP 194.4) consists of a set of high curving ramps supported by tall piers. The interchange has a light, minimalist design that makes it visually interesting and appealing. The concrete of the piers and bridge deck has a light brown tint.

In addition to the three highway bridges, there are two pedestrian overpasses related to the Denver Regional Transportation District's light rail system. The pedestrian overpass at the Lincoln rail station (MP 193.8) consists of a glassed-in walkway suspended from a steel arch structure. The overpass has a simple, uncluttered design. Because the walkway consists of a single span that is located relatively high above the roadway, it does not obstruct views up the highway. The pedestrian overpass at the County Line rail station (MP 194.7) incorporates a generally similar design. However, because the bridge's span is considerably longer than the one at the Lincoln station, it is supported by two arches and a pier located in the center of the highway. Like the pedestrian bridge at the Lincoln station it, has clean lines, a light appearance, and does not obstruct views along the roadway.

3.1.2 Retaining Walls

Currently, there are no retaining walls or sound walls in the gap segment of the PEL Corridor from Monument to Lone Tree. A small number of retaining walls are located in the Castle Rock to Lone Tree segment. Some walls are located along the edge of the highway and others are located along local roads at highway overcrossings, as described below.

3.1.2.1 Castle Rock Landscape Unit

At the Park Street/Fifth Street highway overcrossing (MP 181.4) retaining wall is located in front of the bridge's abutment on the east side of the highway that is made of blocks with a textured surface appearance. The blocks are tinted in several shades of brown and have been laid to create a series of horizontal stripes.

At the highway's undercrossing of the railroad (MP 182.2), a retaining wall is located on the east side of the highway just south of the crossing structure that has a smooth concrete surface and a top that curves to follow the slope of the hill that it retains. This wall appears to have been tinted a light brown color.

At the Meadows Parkway overcrossing of the highway (MP 184.2), retaining walls are located in front of the bridge's abutments. These walls have rounded corners and are constructed of concrete tinted in several tones of brown to create a striping pattern.

At the highway's overcrossing of Castle Rock Parkway (MP 185.0), retaining walls and wing walls are located in front of the bridge's abutments that are treated with a vertical Fractured Fin pattern painted to blend in with the natural environment. In addition, on the west side of the highway, there is a poured concrete retaining wall along the southbound on-ramp that has a smooth surface and retains its natural concrete color.

At MP 185.5, a concrete retaining wall is located along the east side of the highway that was constructed using the Colorado Random Reveal pattern. This wall has no color treatment and retains its natural concrete color.

At the Happy Canyon Road overcrossing of the highway (MP 186.9), the spaces between the bridge abutments and the roadway are occupied by short sections of paved slope that terminate at retaining

walls adjacent to the roadway. The walls are constructed of poured concrete with a smooth, uncolored surface.

3.1.2.2 RidgeGate South Landscape Unit

At MP 191.9, a section of poured concrete retaining wall borders the outside edge of the southbound lanes. This wall has a Colorado Random Reveal surface texture bounded by a Type-7 concrete barrier at its base and smooth band at its top. This wall segment has no color treatment and retains its natural concrete color.

3.1.2.3 Lone Tree Landscape Unit

At the overcrossing of RidgeGate Parkway (MP 192.0), the walls under the overcrossing consist of a series of large light-beige concrete panels separated by vertical inset areas with brown surfaces. On both sides of the parkway as it approaches the overcrossing, concrete retaining walls slope up toward the bridge's deck. These walls have a textured surface on which a series of bands in different shades of brown have been created, suggesting thin bands of exposed rock strata.

At MP 193.8, a retaining wall is located along the west side of the southbound lane, adjacent to the Lincoln light rail station and parking garage. This retaining wall is constructed of untinted concrete panels with an offset placement, creating a pattern of discontinuous horizontal seam lines.

3.1.3 Sound Walls

Currently, the only sound wall in the 34-mile PEL Corridor is located in the Castle Pines landscape unit at MP 188.7 on the west side of the highway, just north of the Castle Pines Parkway exit. This wall is constructed of concrete panels faced with a "mountain" pattern that consists of lower fractured, brown fin textures representing hills or mountains, and a smooth upper area that is cream colored, representing the sky. In addition to this sound wall, a sound attenuation berm is located at MP 188.8, just north of the sound wall. The slope of the berm that fronts the highway has been planted with grasses and a thick planting of shrubs.

3.1.4 Lighting

Four types of lighting fixtures are now used in the Monument to Lone Tree portion of the PEL Corridor, as follows.

The most common fixture type is a tapered steel pole with a cobra-style luminaire. This style is found along the illuminated segments of the roadway in the Monument landscape unit, and in the roadway segments at off-ramps and on-ramps in other landscape units. Typical examples of the cobra-style lighting fixtures can be seen in the photos of the roadway segments at MPs 161.0, 163.6, and 170.3, in Figure 3-1 through Figure 3-7. In some locations, the cobra-style lighting fixtures use a trussed support arm like those seen in photos taken at MPs 161.8. and 188.2.

Some of the lighting fixtures at certain locations in the Castle Pines and Lone Tree landscape units use round luminaires like those seen in the photo taken at MP 181.1. Very tall poles topped with high-mast luminaire assemblies are located in several areas of the Lone Tree landscape unit, such as those seen in the photos taken at MPs 192.8, 194.0, and 194.4. In most cases, the poles are untreated galvanized steel. However, in a few locations, particularly in the Monument landscape unit, the poles have a dark brown color, like the pole seen in the photo taken at MP 160.1.

3.1.5 Highway Signage

Only a limited number of signs have been installed adjacent to the highway or in the median in the PEL Corridor. These signs are supported by vertical steel poles, like those seen in photos taken at MPs 177.1 and 190.3. Most of the signs in the PEL Corridor are overhead signs supported by monotubes. In many

cases, the signs are mounted on a cantilever, as seen in photos taken at MPs 162.9, 167.7, and 188.2. In other locations, the signs are mounted on sign bridge structures that span across the highway's lanes, as seen in photos taken at MPs 181.2, 182.85, and 188.5. In the Lone Tree landscape unit, two monotube sign bridge structures create a rectilinear design, as seen in the photo taken at MP 194.7. Although the sign supports have an untreated galvanized steel finish in most cases, there are a few locations where the supports have been painted brown, particularly in the Monument area, as seen in photos taken at MPs 161.0 and 162.2.

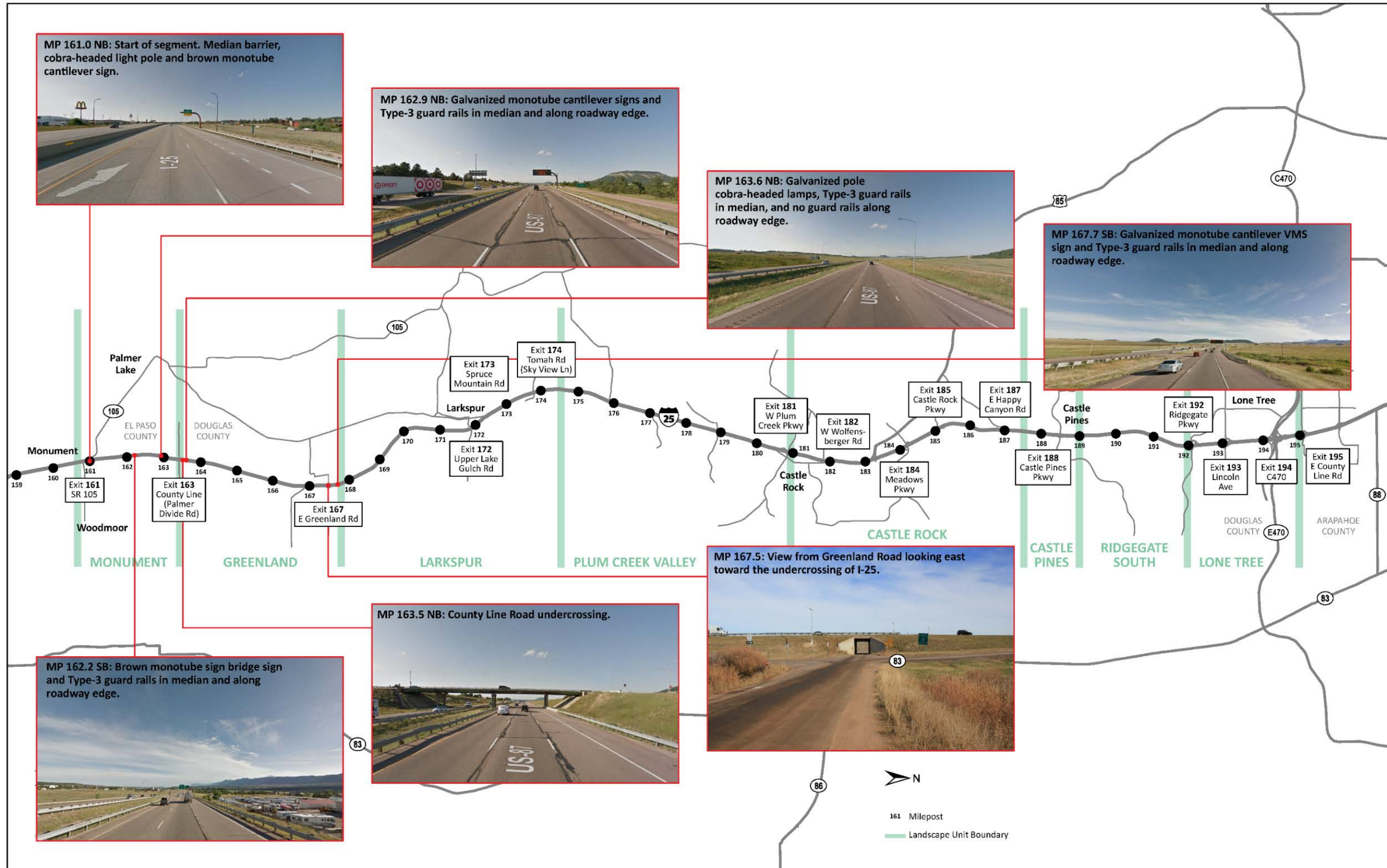


Figure 3-1. Photo Inventory of Existing Aesthetic Elements MP 161.0 - 167.7

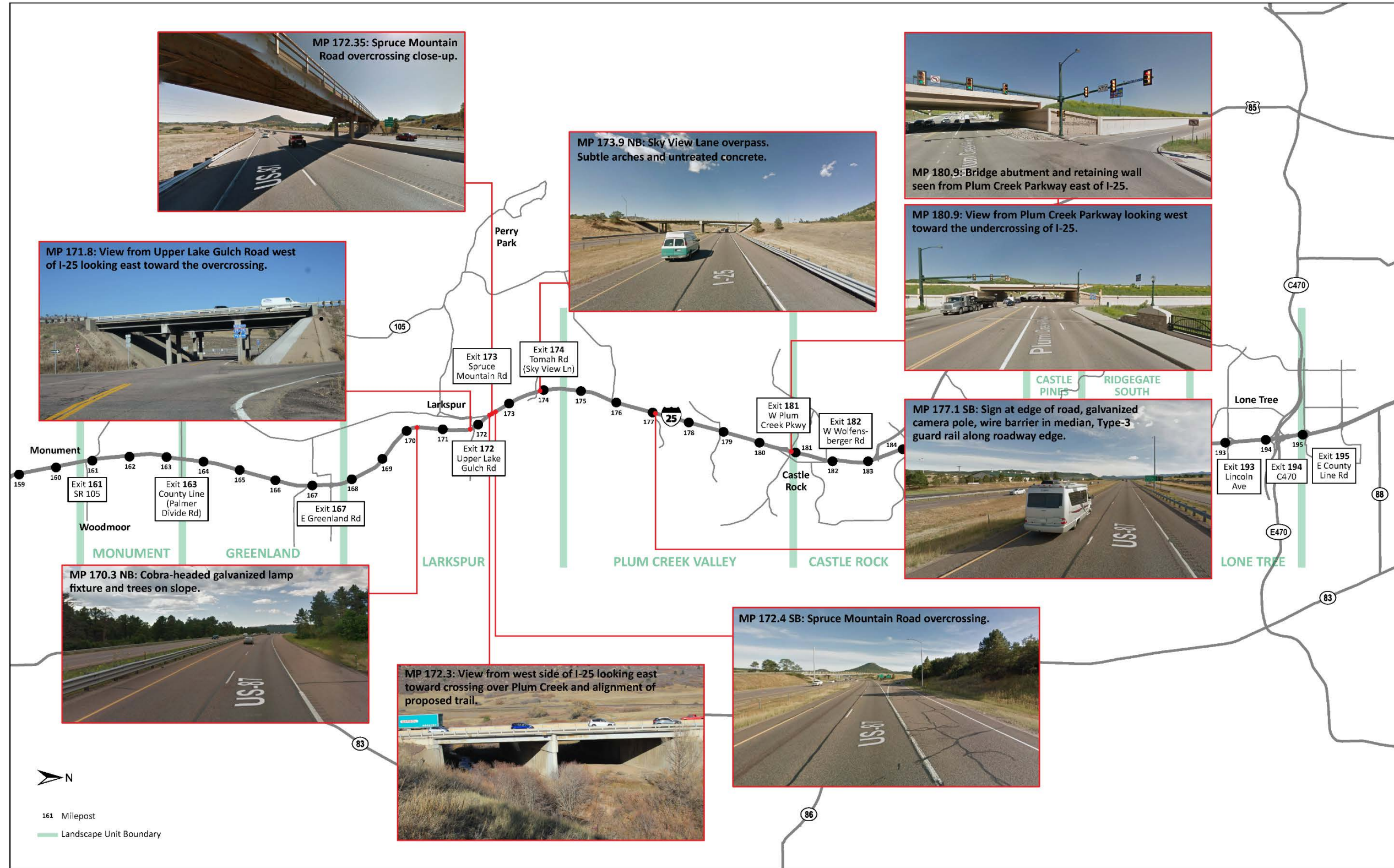


Figure 3-2. Photo Inventory of Existing Aesthetic Elements MP 170.3 - 180.9

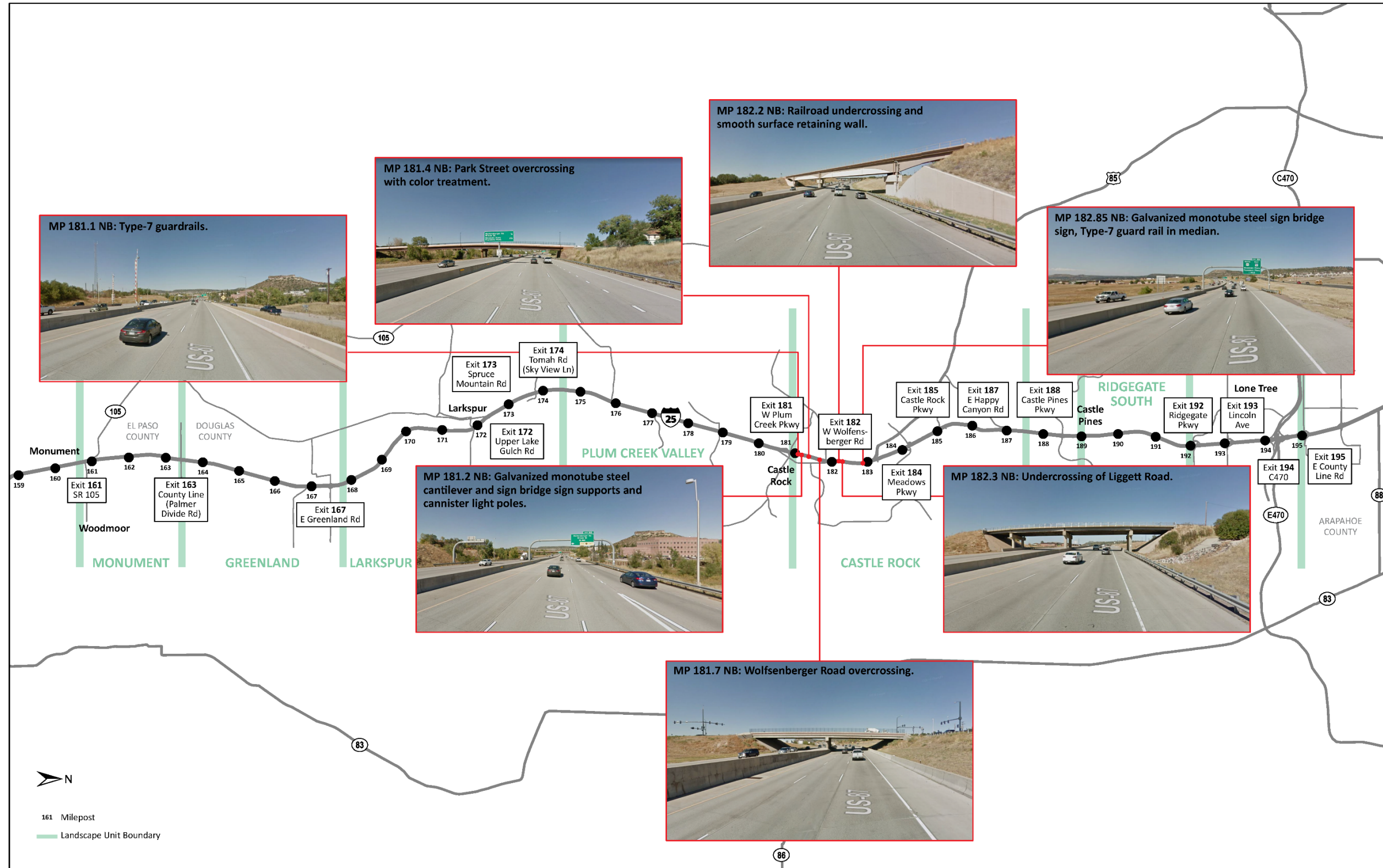


Figure 3-3. Photo Inventory of Existing Aesthetic Elements MP 181.1 - 182.85

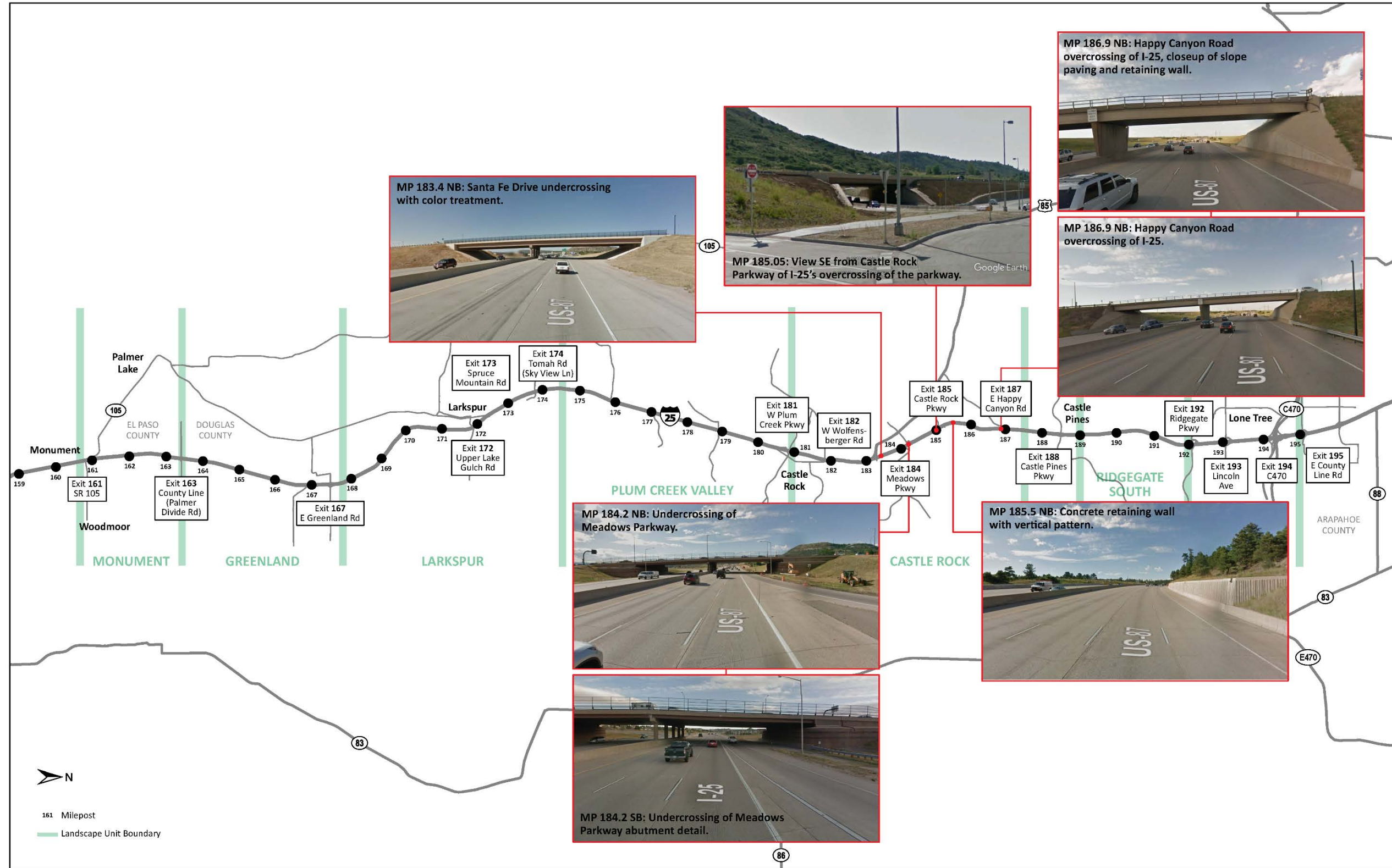


Figure 3-4. Photo Inventory of Existing Aesthetic Elements MP 183.4 - 186.9

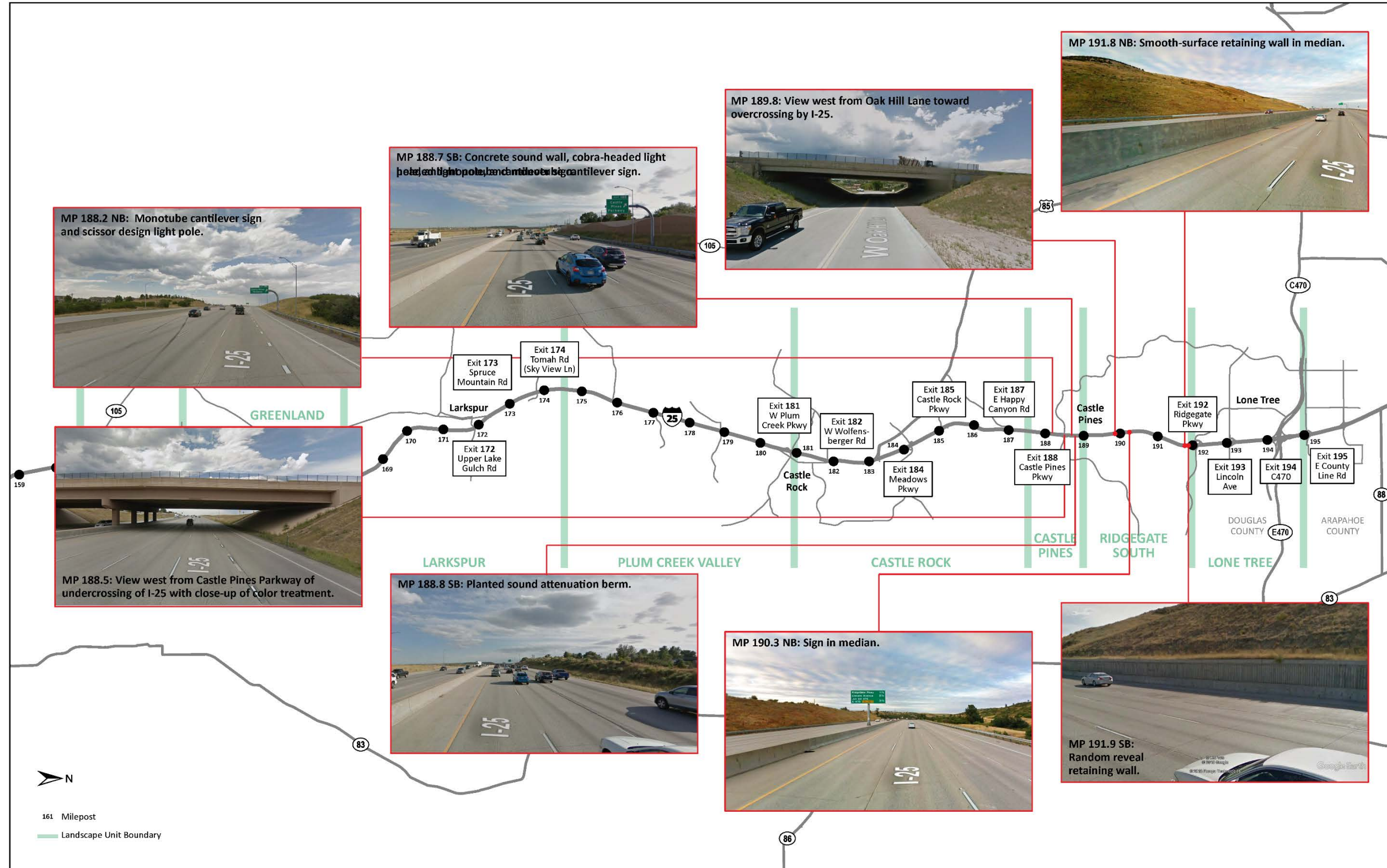


Figure 3-5. Photo Inventory of Existing Aesthetic Elements MP 188.2 - 191.9

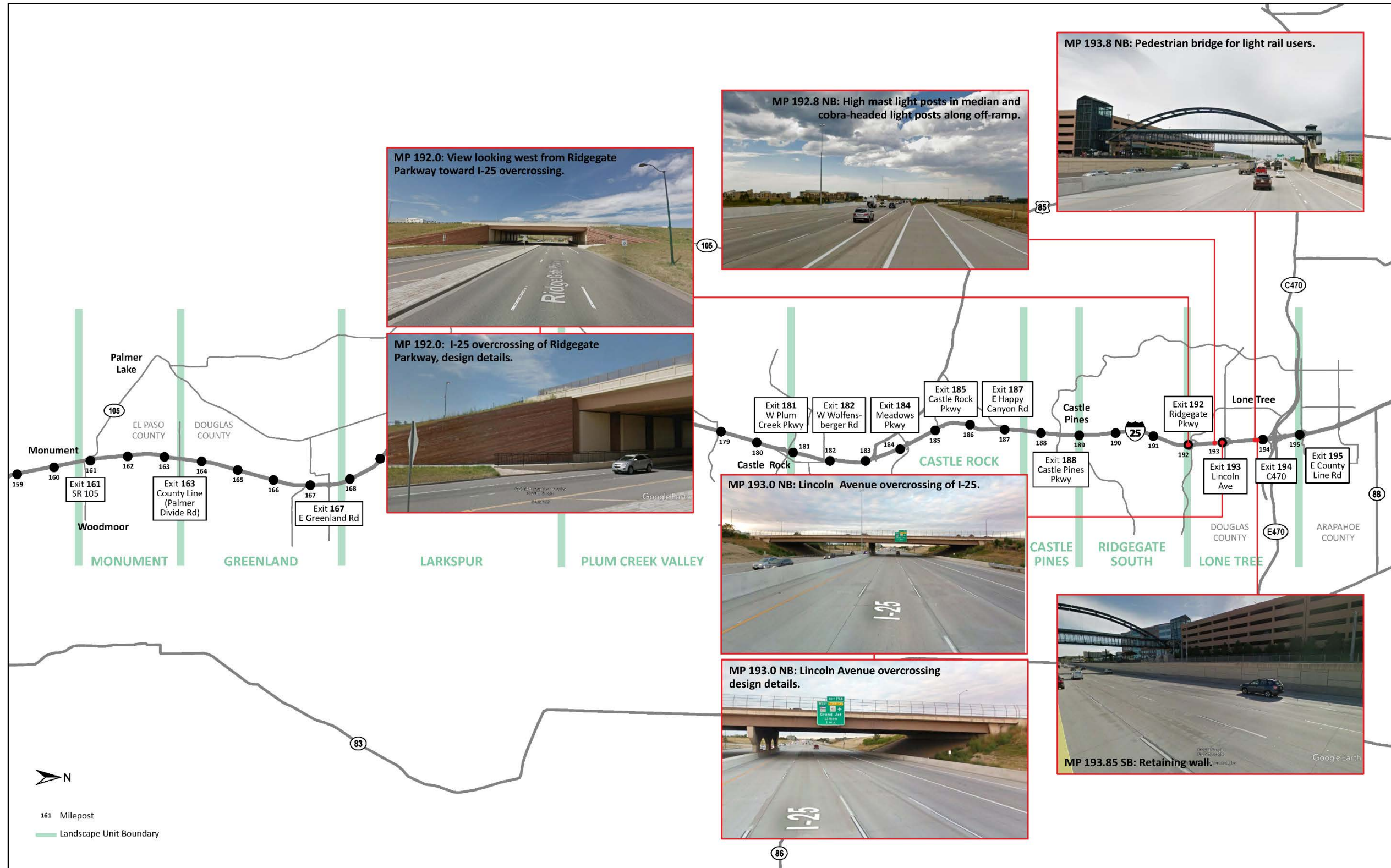


Figure 3-6. Photo Inventory of Existing Aesthetic Elements MP 192.0 - 193.85

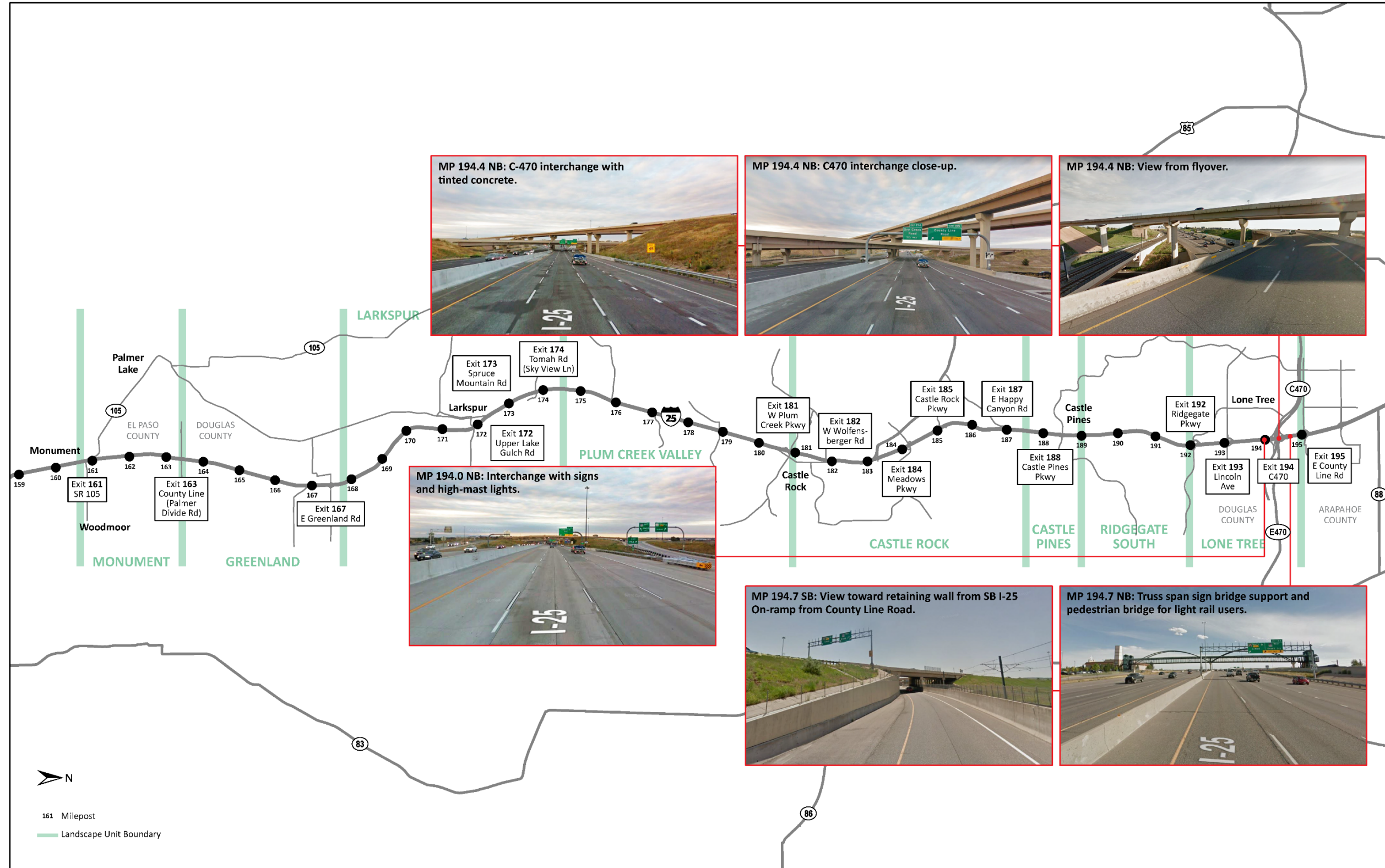


Figure 3-7. Photo Inventory of Existing Aesthetic Elements MP 194.0 - 194.7

4 Design Principles

These aesthetic guidelines are intended to provide guidance on aesthetic treatments for projects in the PEL Corridor in order to contribute to and maintain a cohesive aesthetic character throughout the corridor. Design principles established for the PEL Corridor were heavily informed by design principles from local governments and agencies, existing aesthetic guidelines, and public input, as discussed below.

4.1 Local Design Principles

Design principles for the PEL Corridor were informed in large part by the goals, principles, and objectives found in local planning documents. Relevant content from these plans is presented below. The major themes among all these planning documents are to protect the natural environment; preserve views of surrounding open spaces, mountains, and geologic features; and to balance development with the preservation of local character.

4.1.1 Monument Comprehensive Plan

The *Monument Comprehensive Plan* (Town of Monument, 2017) (https://www.townofmonument.org/DocumentCenter/View/681/CompPlan_2017) specifically calls for the need to protect views from the PEL Corridor. Toward this end, Monument will create a visual overlay district to direct development in a way that preserves views through methods such as providing adequate setbacks and stepped-back building heights.

The plan describes input received from the public, stating, “[c]itizens remain concerned about the views one sees from the I-25 corridor and views from the east side of I-25 toward the mountains... Specifically, the citizens of Monument want to ensure that the views from the I-25 corridor provide a strong small town community identity by providing adequate open lands, trees, and buffers to deter noise and protect views” (Town of Monument, 2017).

4.1.2 2000 Tri-Lakes Comprehensive Plan

The Tri-Lakes Comprehensive Planning area includes communities in unincorporated northern El Paso County at the southern end of the Study Area. The vision set forth in the 2000 *Tri-Lakes Comprehensive Plan* (El Paso County, 1999) (<https://planningdevelopment.elpasoco.com/wp-content/uploads/ResourcesReference/MasterPlan/Tri-Lakes-Comprehensive-Plan-2000.pdf>) emphasizes the natural beauty of the Tri-Lakes area, with unparalleled views of Pikes Peak, unique rock formations, and sightings of the abundant wildlife. Goal 2.3 of the plan is “[t]o preserve and protect significant visual resources.” The objectives listed for this goal are to:

- Encourage site design and development standards that protect and preserve the character of the natural landscape.
- Preserve and reinforce panoramic views of the mountains and plains.
- Protect the environmental and visual quality of surface waters.
- Consider the individual character unique to each sub area.
- Preserve, protect, and maintain area lakes for all to enjoy, including visual leases, with property owners.
- Support protection of environmentally sensitive lands.

Specific to the PEL Corridor, this plan addresses development near the interstate with a focus on preserving the “views of the dramatic mountain backdrop from the top of Monument Hill down through Monument Valley extending south to the Air Force Academy,” which serves as a point of entry into El Paso County. Maintaining the visual integrity of the views of the dramatic mountainous landscape in contrast to the rolling grasslands of the Greenland Ranch is a goal of the plan in reference to I-25.

4.1.3 El Paso County Parks Master Plan

The *El Paso County Parks Master Plan* (El Paso County, 2013)

(https://communityservices.elpasoco.com/wp-content/uploads/Parks_Planning/FINAL-EPC-Doc-06-12-13.pdf) specifically details the character of the landscape and significant landforms in the county. The landscape types found in El Paso County and described by the plan are Southern Rocky Mountains, Foothills and Transitional, and High Plains. Important landforms/landmarks listed in the plan are Table Rock, Elephant Rock, Cathedral Rock, Pulpit Rock, Monument Rock, Fremont Fort, and Ben Lomond Mountain. The plan refers to the I-25 corridor as an important viewshed and stipulates that development should respect the community’s character and sense of place.

4.1.4 Douglas County Comprehensive Master Plan

The *Douglas County Comprehensive Master Plan* (Douglas County, 2014)

(<https://www.douglas.co.us/documents/full-cmp.pdf>) contains several objectives and policies that pertain to visual resources, as listed below:

- Objective 2-2A: Balance development with preservation of environmental and visual resources.
- Policy 2-5A.1: Locate development away from environmentally and visually sensitive lands, including, but not limited to, primary ridges, bluffs, and horizon lines.
- Policy 2-5A.2: Protect the integrity of urban areas by protecting, where appropriate, views to and from significant natural features.

4.1.5 Castle Rock 2030 Comprehensive Master Plan

Visual resources are an integral part of the *Castle Rock 2030 Comprehensive Master Plan* (Castle Rock, 2017 [current updated draft]) (<http://www.crgov.com/DocumentCenter/View/17658/Comprehensive-Master-Plan?bidId=>). The plan incorporates the 2013 Draft 2030 Vision, which lists “Town Identity” as one of the “Town Cornerstones,” stating the need to “[p]reserve open space areas in and surrounding Castle Rock to protect the Town’s natural environment, ridgelines and scenic views, and to maintain a physical separation from surrounding communities.”

Goal 2-2 of the Plan is to “[s]upport environmental systems comprised of water, wildlife, wildlife habitat, recreation, and sense of place,” under which is listed Objective 2-2A: “Balance development with preservation of environmental and visual resources.”

4.1.6 Conservation Easements and Open Space

A large portion of the southern half of the PEL Corridor, between County Line Road and Sky View Lane, is situated among a collection of protected open spaces as a result of concerted efforts on the part of Douglas County and agencies such as the Douglas Land Conservancy. From County Line Road north to Castle Rock, much of the land abutting the I-25 corridor is either publicly-owned open space or private land under conservation easements. The conservation easements prevent the encroachment of development pressures from the north and south by limiting uses on these properties with the intent of preserving specific values. While these values vary from property to property, commonly protected values along the I-25 Gap Project corridor include rural character, scenic vistas, recreation, and wildlife habitat. The publicly-owned open space and private lands under conservation easements form a large,

contiguous network of habitat and rural open space that provides connectivity for wildlife movement and creates uniquely beautiful and undisturbed views from I-25.

4.2 Existing Aesthetic Guidelines

4.2.1 Interstate-25 Lincoln Avenue to Castle Rock Aesthetic Study and Design Guidelines

The 2002 *Interstate-25 Lincoln Avenue to Castle Rock Aesthetic Study and Design Guidelines* (available through CDOT) apply to the northern 14 miles of the PEL Corridor between Lincoln Avenue in Lone Tree and what was originally Douglas Lane in south Castle Rock (now Crystal Valley Parkway). The guidelines were produced as part of the South I-25 Corridor and US Highway 85 (US 85) Corridor Final Environmental Impact Study (FEIS) (<https://www.codot.gov/library/studies/southi25us85-feis-rod/final-environmental-impact-statement-feis>). They provide an overview of the corridor setting, and inventory of aesthetic treatments and elements existing at the time of the guidelines' publication, and design standard options for use in the project corridor. The standards identify wall textures, colors, slopes, guardrail types, sound wall design, lighting standards, sign types, and landscaping. The color palette identified by these guidelines was chosen to create an identifiable highway aesthetic that also coordinates with existing elements and general landscape colors.

4.2.2 US 85 C-470 to Castle Rock

Also prepared as part of the South I-25 Corridor and US 85 Corridor FEIS, the 2002 *US 85 C-470 to Castle Rock* guidelines (available through CDOT) apply to the stretch of US 85 between C-470 at the north end and the I-25 interchange at Founders Parkway at the south end. The guidelines provide an inventory of the setting and existing aesthetic elements at the time, and provide a set of recommendations for the colors, styles, and finishes for bridge and roadway elements for developing projects.

4.2.3 I-25 Colorado Springs

The *I-25 in Colorado Springs Corridor Improvements Design Build Architectural Design Requirements* (available through CDOT) were developed in 2004 for the I-25 design-build project, which implemented a variety of projects to improve capacity, including interchange reconstructions and lane additions. These guidelines provide details on requirements for bridges and walls through the project area, ending at Monument. Three different categories of bridges are described in these plans, ranging from highly prescriptive and stylized urban gateway bridges to more simple bridge standards for less populated areas or less visually significant structures.

4.3 Common Themes

The three aesthetic guidelines described above have common characteristics, which can be carried through the PEL Corridor. These common elements include:

- Incorporate roadway elements into the natural environment. Where color is used, federal standard colors are chosen in variations on browns and beiges that mimic earth tones and vegetation found in the area.
- Adjust standards appropriate to the urban or rural context. In each guidance, simpler, less colorful design is called for in more rural areas, while more urbanized areas are treated with higher levels of aesthetic detail and richer colors.
- Use a type of vertically striated pattern, such as Colorado Random Reveal or Fractured Fin, when texture is used on sloped or wall surfaces.

4.4 Incorporation of Previous and Existing Guidelines

These guidelines are meant to coordinate with and incorporate as appropriate the existing aesthetic guidelines described above, while providing recommendations specific to and appropriate for the 34-mile PEL Corridor between Monument and C-470.

4.5 Stakeholder Input

Involving local stakeholders in discussions and decision-making about aesthetic principles and guidance for the PEL Corridor was an important part of developing these guidelines. Some of the opportunities for stakeholder discussion and input regarding aesthetics for the PEL Corridor are summarized below:

Aesthetics Discussion with Conservation Easement Representatives: May 31, 2018

- Meeting attendees included:
 - CDOT: Chuck Attardo, Jack Thorpe, Jody Allen, Basil Ryer, Sean Brewer, Belinda Arbogast, Andrew Wahr, David Weld, Mike DelCupp
 - Kraemer: Mike McNish, Grif Searles
 - Jacobs: Elise Bielen, Andrew Wahr
- Discussion summary:
 - This meeting was held as development of the aesthetic guidelines for the PEL Corridor began. The group identified initial issues and concerns to be considered, including long-term maintenance, consistent appearance throughout corridor, etc. It was noted that safety, budget, and schedule are important to consider in developing the guidelines.
 - The group discussed both general and specific aesthetic treatments and design standards for various project elements, including noise walls, retaining walls, bridge elements, fencing, concrete finishes, landscaping and revegetation (including seed mixes, soil, slopes, and vegetation surveys), express lane signage, guardrails, desire for low-contrasting treatments and color limitations (e.g., use of non-fading and non-reflective paint), and lighting. The group identified elements related to visual conditions such as water features and snow storage.
 - No mowing in Preble’s Meadow Jumping Mouse (PMJM) habitat.
 - PMJM habitat shrubs/trees – landscape establishment spec will be required.
 - Six inches of topsoil is required throughout the corridor on finished surfaces.
 - Median barriers – concrete, Class 1 finish, no color.
 - Median walls – concrete, “Fin” finish, no color.
 - Signs – No painting of the back of signs.
 - ITS/light poles – galvanized, matte finish.
 - Type 7 with snow fence – Gray matte finish, galvanized.
 - Wildlife crossing – shotcrete.
 - Noise wall – Double-sided texture.

Technical Working Group and Resource Agency Group Combined Meeting: May 4 and June 1, 2018

- Meeting attendees:

- CDOT: Chuck Attardo, Jack Thorpe, Jody Allen, Basil Ryer, David Weld, Alex Nelson, Francesca Tordonato, Belinda Arbogast
- Kraemer: Grif Searles, Mike McNish
- Jacobs: Elise Bielen, Troy Slocum, Will Voss, George Woolley, Matt Nork
- Discussion summary:
 - The group discussed treatment options for noise walls, retaining walls, bridge structures, wildlife crossings, and railing. Field visits indicated that PEL Corridor landforms and structures create a mix of colors. Staff evaluated colors currently used in Denver and Castle Rock.
 - CDOT’s intent for finishes is to minimize contrast. A natural gray color has low contrast and works well for maintenance and weathers well. Use of stain versus paint was discussed. Paint will chip and fade, and is also affected by salt exposure. Issues with stain are that color matching is difficult and stain does not use a Federal color.
 - There were mixed opinions about whether stain should be integral (mixed into concrete) or be applied to the exterior surface. In using integral stain, colors vary between concrete batches, and it is difficult to match color of patching grout to concrete color, which would be an ongoing maintenance issue. Also, CDOT standards require application of a white cure coat on slip-formed center barriers, which is difficult to remove and would affect appearance of color. Options are clear coating or wet curing
 - It was found that landscape architects and stakeholders have some contrasting goals. Is finish selection based on decoration or for blending purposes? Field color tests and renderings for proposed colors will be done.
 - Douglas County priorities for bridge abutments and outside retaining walls south of Larkspur to County Line are to focus on painting just those walls. Policies and needs for color need to be confirmed.
 - Colorado Random Reveal is recommended for inner and outer surfaces for noise wall at RV Park in Monument.
 - Top soil testing results indicated that soil is sandy loam with a 7 pH level, and lacks nitrogen. Nitrogen presence contributes to higher weed growth that adversely impacts native grass growth. Discussed seed mix and soil conditioning designs based on soil test results.
 - Need temporary seeding (this is intermediate for wetland areas). Soil conditioning designs should be adjusted to contain more compost in the mix.
 - Light poles with matte galvanized steel finish would work well and have low contrast.

Meeting with Douglas County Open Space and Planning Representatives: July 12, 2018

- Meeting attendees:
 - CDOT: Jack Thorpe, Basil Ryer, Chuck Attardo, Susie Hagie, Francesca Tordonato
 - Jacobs: Elise Bielen, Troy Slocum, Michelle Pinketon, Chris Bisio, George Woolley
 - Kraemer: Grif Searls, John Barkowski
- Discussion summary:
 - Paint/Stain: The group further discussed paint/stain colors and treatments for bridge rails, landscaping, water quality facilities. The group will look into other area guidelines, pull colors, and evaluate them. CDOT has list of approved paints. The team has reached out to stakeholders

(Kraemer) to determine if they have a preferred stain product. It was discussed that paint and stain samples should be field tested by painting/staining an existing bridge that is scheduled to be demolished. It was noted that all hues of stained concrete will vary whether the stain is sprayed onto the surface or mixed into the concrete. Further, reapplication of stain in the future will not match existing worn application. A preference for paint was expressed because of its easy maintenance.

- Bridge rails: The group discussed different rail types and heights, transitions between different types/heights of railings/barriers, and that transitions should taper and not be abrupt.
- Depth of reveal: It was decided to have Colorado Random Reveal (CRR) on both sides of noise walls. Stakeholders selected CRR. CDOT wants to make sure that the lines are vertical and not diagonal. It was discussed that a Fractured Fin has a better cost, but not enough to override stakeholder input. The group will discuss the reveal depth with the roadway designers. Note: this decision was reversed based on additional discussion in the October 2018 meeting (see below).
- Landscaping: The group discussed coordination with the Bio Team, CPW, and Douglas County representatives. Incorporating seed mixes into the aesthetic guidelines was discussed. Wildlife elements, such as wildlife crossings and jump-outs were discussed, as well as landscaping at those locations. It was discussed that natural materials, such as rocks, etc. could be repurposes/used on the project. It was noted that topsoil is a salvageable item that can be recycled/reinstalled, and would require a storage area. It was discussed that Flex Mat is an alternative to soil riprap near the roadway. Willows and big plants can be inserted into Flex Mat.

Team discussions/emails regarding noise wall aesthetic treatments – October 2018

- Participants:
 - CDOT: Basil Ryer, Chuck Attardo, Susie Hagie, Belinda Arbogast, Jody Allen, John Gregory
 - Jacobs: George Woolley, Pat Hickey, Jeff Berna
 - AECOM: Jim Bemelen
 - Kraemer: Mike McNish
- Discussion summary:
 - It was discovered that including CRR on both sides of the noise wall presented constructability issues. The issue was due to the 1.5-inch depth of the CRR. The CRR (front side of the noise wall) can be placed on the bottom of the casting bed, but the top portion (back side of noise wall) is stamped in place while the concrete is in the form. The contractor is unable to stamp the 1.5-inch depth of the CRR on the top side of the bed and is limited to a 1.0-inch depth. To resolve this issue, it was decided that the front side of the noise wall would remain CRR with a 1.5-inch depth, and the back side would be 109 Standard Fractured Fin with a 0.75-inch depth. Note: this decision is a reversal of the decision made in the July 2018 meeting (see above).

4.6 CDOT Design Principles

As a state agency, CDOT’s motivations and values for aesthetic features in the PEL Corridor differ somewhat from those of local agencies and stakeholders, but they can nonetheless be complementary. CDOT must consider the wider transportation system, and how the traveling public experiences not only short distance travel within the corridor, but travel through the corridor as part of longer distance trips. CDOT’s 2014 *Landscape Architecture Manual* was referenced to identify overall goals for transportation project aesthetics, which states:

It is CDOT’s responsibility to its customers and stakeholders that CDOT projects and operations:

- Reflect an expertise in landscape architecture, site design and aesthetics
- Mitigate the impacts of CDOT actions
- Enhance the user’s experience and perception
- Encourage community involvement to help with representing stakeholders’ interests and objectives

One major driver of CDOT’s project decisions is maintenance. CDOT’s goal is to create resilient project features in accordance with guidelines that last as long as possible and comply with maintenance needs to repair and replace items as efficiently as possible to ensure safe driving conditions.

4.7 PEL Corridor Design Principles

Considering the established local planning literature, stakeholder input, and CDOT design principles, the following design principles were developed for the PEL Corridor:

1. Harmony with the character of the landscape
2. Minimal contrast with the natural landscape
3. Preservation of important views
4. Consistency and continuity throughout the PEL Corridor
5. Compatibility within the regional context
6. Robust maintainability of aesthetic features

To follow these principles, the following aesthetic guidelines have been developed for elements of projects in the PEL Corridor.

4.8 Aesthetic Guidelines

4.8.1 Colors and Finishes

The color palette for the PEL Corridor has been selected to meet the design principles discussed in this document. Finishes and colors for project elements are described in Table 4-1 and Table 4-2.

Table 4-1. I-25 South Corridor Textures and Finishes



Textures and Finishes	Texture Photo	Elements
Colorado Random Reveal 1.5-inch maximum and 1.25-inch minimum reveal depth		<p>Bridge Elements:</p> <ul style="list-style-type: none"> • Parallel retaining walls • Perpendicular retaining walls <p>Highway Elements:</p> <ul style="list-style-type: none"> • Median walls with face >6-inch • Retaining wall primary face • Noise walls (front side only)
109 Standard Fractured Fin 0.75-inch relief		<p>Highway Elements:</p> <ul style="list-style-type: none"> • Noise walls (back side only)

Table 4-1. I-25 South Corridor Textures and Finishes





Textures and Finishes	Texture Photo	Elements
Galvanized Steel		<ul style="list-style-type: none"> Type 10 barrier Type 3 barrier Light poles, masts, luminaire heads Sign poles Sign backs Snow fence
Smooth Concrete		<p>Bridge Elements:</p> <ul style="list-style-type: none"> Abutments (painted) Slope paving (painted) Pier cap (painted) Pier column (painted) <p>Highway Elements:</p> <ul style="list-style-type: none"> Retaining wall caps (painted) Crash barriers (unpainted)
Structural Concrete Coating Colors		
Primary Federal Standard 20219		<p>Bridge Elements:</p> <ul style="list-style-type: none"> Abutments Parallel retaining walls Perpendicular retaining walls (except wildlife crossings) Type 7 bridge rail barrier (top and outside face) Slope paving <p>Highway Elements:</p> <ul style="list-style-type: none"> Retaining wall faces (above crash barrier) Noise walls
Accent Federal Standard 20140		<p>Bridge Elements:</p> <ul style="list-style-type: none"> Girders <p>Highway Elements:</p> <ul style="list-style-type: none"> Retaining wall caps

Table 4-2. I-25 South Corridor Colors and Finishes

Corridor Element	Color/Finish
Bridges	
Abutments	Smooth concrete finish; covered with structural concrete coating tinted to match Federal Standard 20219; anti-graffiti coating
Parallel Retaining Walls	Colorado Random Reveal textured finish; painted structural concrete coating tinted to match Federal Standard 20219; anti-graffiti coating
Perpendicular Retaining Walls (non-wildlife crossing)	Colorado Random Reveal textured finish; painted structural concrete coating tinted to match Federal Standard 20219; anti-graffiti coating
Perpendicular Retaining Walls (wildlife crossing)	Colorado Random Reveal textured finish; unpainted; anti-graffiti coating
Slope Paving	Smooth concrete finish; painted structural concrete coating tinted to match Federal Standard 20219; anti-graffiti coating

Table 4-2. I-25 South Corridor Colors and Finishes

Corridor Element	Color/Finish
Railing/Barrier	Where no snow fence required: Type 10 rail barrier, unpainted galvanized finish Where snow fence required: Type 7 concrete barrier; unpainted on inside, painted only on top surface and outside face structural concrete coating tinted to match Federal Standard 20219 (see Figure 4-1 and Figure 4-2); anti-graffiti coating
Snow Fence	Galvanized finish
Girders	Paint outside face and underside of outside girders accent color (Federal Standard 20140)
Chain Link Snow Fence	Galvanized steel
Pier Cap	Smooth concrete, covered with structural concrete coating tinted to match Federal Standard 20219
Pier Column	Smooth concrete, covered with structural concrete coating tinted to match Federal Standard 20219
Walls	
Noise Walls	Colorado Random Reveal textured finish on front side and 109 Standard Fractured Fin finish on back side of noise walls; covered with structural concrete coating tinted to match Federal Standard 20219; anti-graffiti coating
Median Walls	Colorado Random Reveal where wall revealed between the barrier and the cap is greater than six-inches in height, paint structural concrete coating tinted to match Federal Standard 20219
Retaining Walls – Main Wall Face	Colorado Random Reveal textured finish, covered with structural concrete coating tinted to match Federal Standard 20219; anti-graffiti coating
Retaining Walls - Wall caps	Smooth concrete finish, covered with structural concrete coating tinted to match Federal Standard 20219; anti-graffiti coating
Barrier	
Crash Barrier	Unpainted
Type 3 W-Beam Barrier	Galvanized steel; wood posts where feasible
Lighting	
Light Poles/Masts	Galvanized steel
Luminaire Head	Galvanized steel, matching the pole or mast
Lighting Elements	Dark-sky compliant, down-facing flat-glass LED lighting to minimize glare and light trespass
Signs	
Sign Poles	Galvanized steel

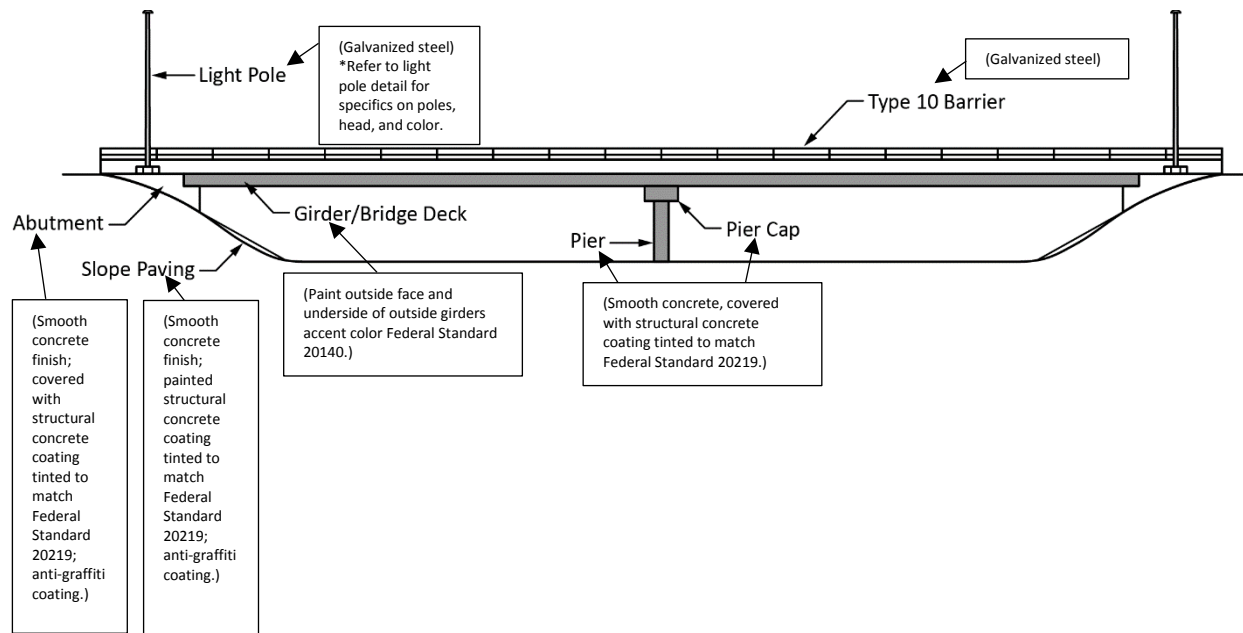


Figure 4-1. Type 10 Rail Barrier

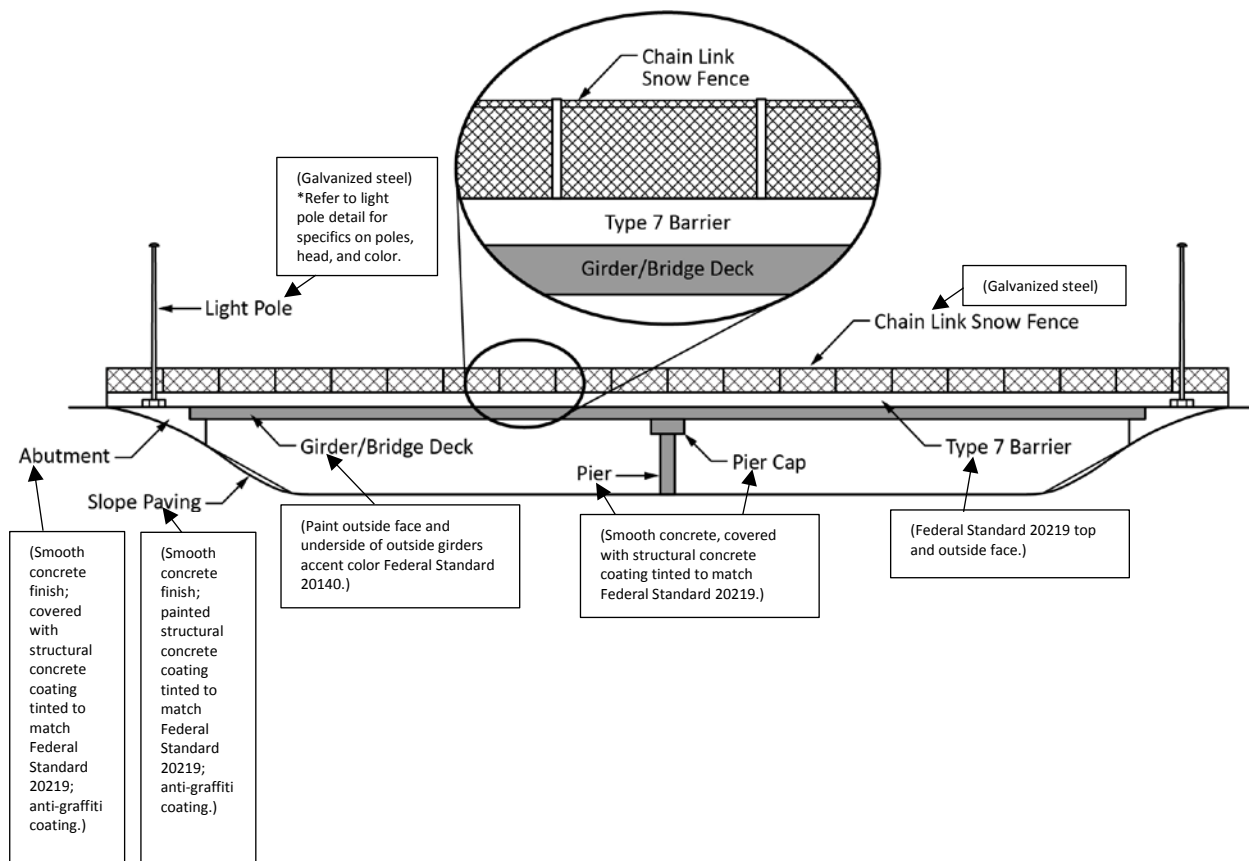


Figure 4-2. Type 7 Concrete Barrier

4.8.2 Bridges

Bridges often stand out as one of the most noticeable elements of a highway corridor. The traveling public encounters a variety of bridges both over and under I-25 throughout the PEL Corridor. The following design strategies apply to new and replaced bridges to maintain a cohesive aesthetic character.

4.8.2.1 Piers/Columns

- Where possible, design single-span bridges with no center support columns.
- Use a smooth concrete finish on bridge pier columns.
- Color piers and pier caps Federal Standard [20219].

4.8.2.2 Girders

- Color the outside faces and underside of the first girder (whether I-beam or box girder) accent color Federal Standard [20140].

4.8.2.3 Bridge Deck

- Use a minimum overhang of four inches to create a shadow effect. This shadow effect adds visual interest, helps break up the visual mass of the bridge, and makes it appear lighter and more slender to the observer.

4.8.2.4 Bridge Wall Faces

- Use a formliner finish in the Colorado Random Reveal pattern on vertical interior embankment retaining walls (perpendicular to the bridge span) and color in structural concrete coating tinted to match Federal Standard 20219. In wildlife crossing underpasses, leave this surface unpainted.
- Use textured formliner finish in the Colorado Random Reveal pattern on outside vertical retaining walls (parallel to the bridge span), and color with structural concrete coating tinted to match Federal Standard 20219.
- Use smooth concrete covered with structural concrete coating tinted to match Federal Standard 20219 where slope paving is used in bridge design.
- Finish bridge abutments in smooth concrete and color with structural concrete coating tinted to match Federal Standard 20219.
- Integrate wing walls into the outside retaining walls and use textured formliner finish in Colorado Random Reveal pattern.
- Treat all bridge wall faces with anti-graffiti coating.

4.8.2.5 Bridge Rails and Fencing

- Use Type 10 barrier wherever possible to maximize visual permeability.
- Where Type 10 barrier is used, use unpainted galvanized steel finish.
- Where snow fence is required along bridge railing, use unpainted Type 7 concrete barrier.
- Color Type 7 concrete bridge barrier with Federal Standard [20219] on the backside and top surface.
- Use galvanized steel finish on snow fence installed on concrete bridge barriers.

Note: CDOT is in the process of transitioning standard design of concrete barriers from Type 7 to Type 9. At the time this document was developed, Type 9 concrete barriers had not been developed for structures. Therefore, this document recommends Type 7 barriers on structures where concrete bridge rail is used. As Type 9 concrete barrier is designed and adopted for structures, it will replace the Type 7 recommendations herein.

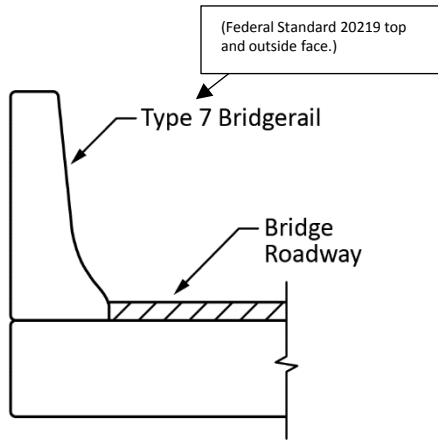


Figure 4-3. Type 10 Bridge Rails

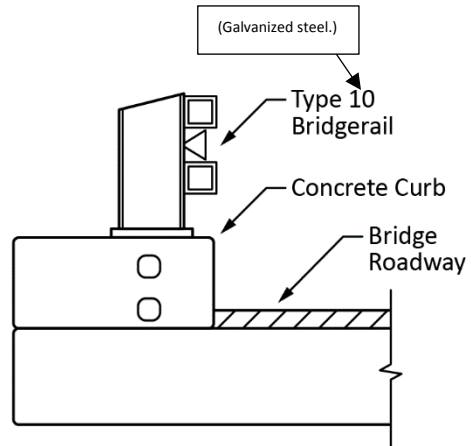


Figure 4-4. Type 7 Bridge Rails

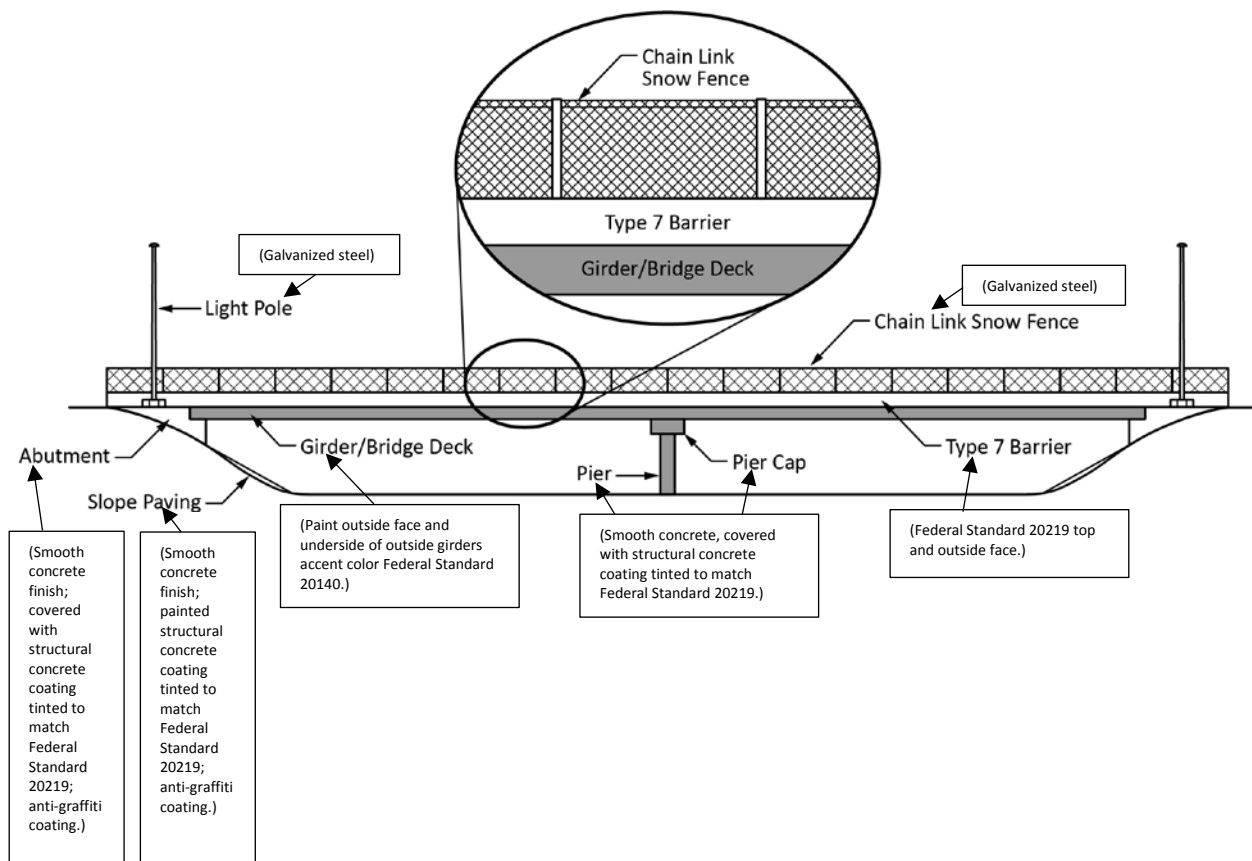


Figure 4-5. Bridge Faces

4.8.3 Retaining and Median Walls

4.8.3.1 Design Strategies

- Where possible, avoid retaining walls by using slopes. A vegetated slope is preferable to a wall.
- Design wall caps with a minimum of a four-inch overhang to create a shadow effect. This shadow effect adds visual interest and helps break up the wall mass.
- Finish wall caps with smooth concrete, colored Federal Standard [20219].
- Use a textured formliner finish in Colorado Random Reveal pattern on the primary wall face. Use Colorado Random Reveal only where the revealed primary wall face is six inches in height or greater.
- Color the primary wall face of retaining walls, both facing away from I-25 and those facing toward I-25, with structural concrete coating tinted to match Federal Standard 20219.
- Color any portion of median walls above the lower crash barrier in structural concrete coating tinted to match Federal Standard 20219 (this includes the back face of the upper crash barrier).
- Use anti-graffiti coating on wall faces to aid in removing graffiti markings where they occur.

4.8.4 Noise Walls

4.8.4.1 Design Strategies

- When possible, avoid the need for sound walls by using berms or designing with landforms to block noise increases to receptors.
- Minimize the “jagged top” effect by maintaining wall heights for the greatest reasonable length before descending or ascending to the next level.
- Use textured formliner finish in Colorado Random Reveal pattern on the front side and 109 Standard Fractured Fin finish on the back side, covered with structural concrete coating tinted to match Federal Standard 20219.
- Use anti-graffiti coating to aid in removing graffiti markings where they occur.

4.8.5 Lighting

4.8.5.1 Design Strategies

Rural Areas

- In rural areas, design lighting to minimize light pollution and light spill as much as possible while still providing necessary illumination for safe travel.
- Use cobra-style light poles with simple self-supported arms.
- Use partial interchange lighting at interchanges, which includes lights only at potential conflict points, such as entrance and exit ramps. Select pole locations to illuminate the roadway as efficiently as possible.
- Finish lighting poles, masts, and luminaire heads in unpainted galvanized steel.

4.8.5.2 Dark Sky Lighting Design

The following design strategies can be employed to minimize light trespass and light pollution (examples in Figure 4-6 and Figure 4-7):

- Use luminaires with “flat glass” that is installed horizontally to produce zero uplight and glare in accordance with Colorado state statutes.
- Use pole arms that are as long as feasible, to reduce the brightness of the top of the pole.
- Use energy-efficient light-emitting diode (LED) lights with spectrum set to 4000 Kelvin, which has been shown in research to be the Correlated Color Temperature that best supports drivers' visual performance.

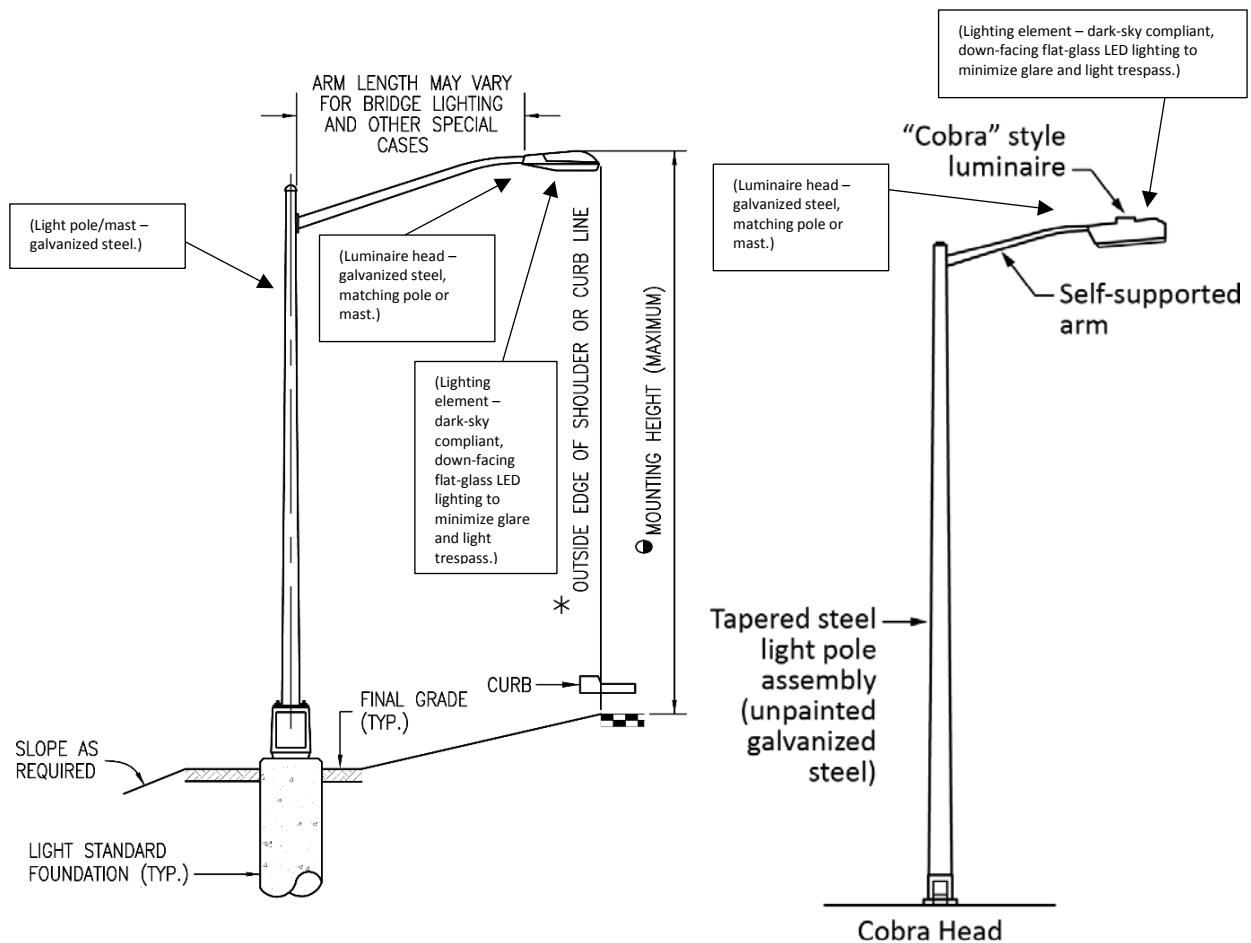


Figure 4-6. Partial Interchange Lighting

Figure 4-7. Cobra-head Luminaire

4.8.5.3 Urban and Suburban Areas

- Brighter, taller, and/or more frequent lighting may be appropriate in more urbanized areas (Figure 4-8).

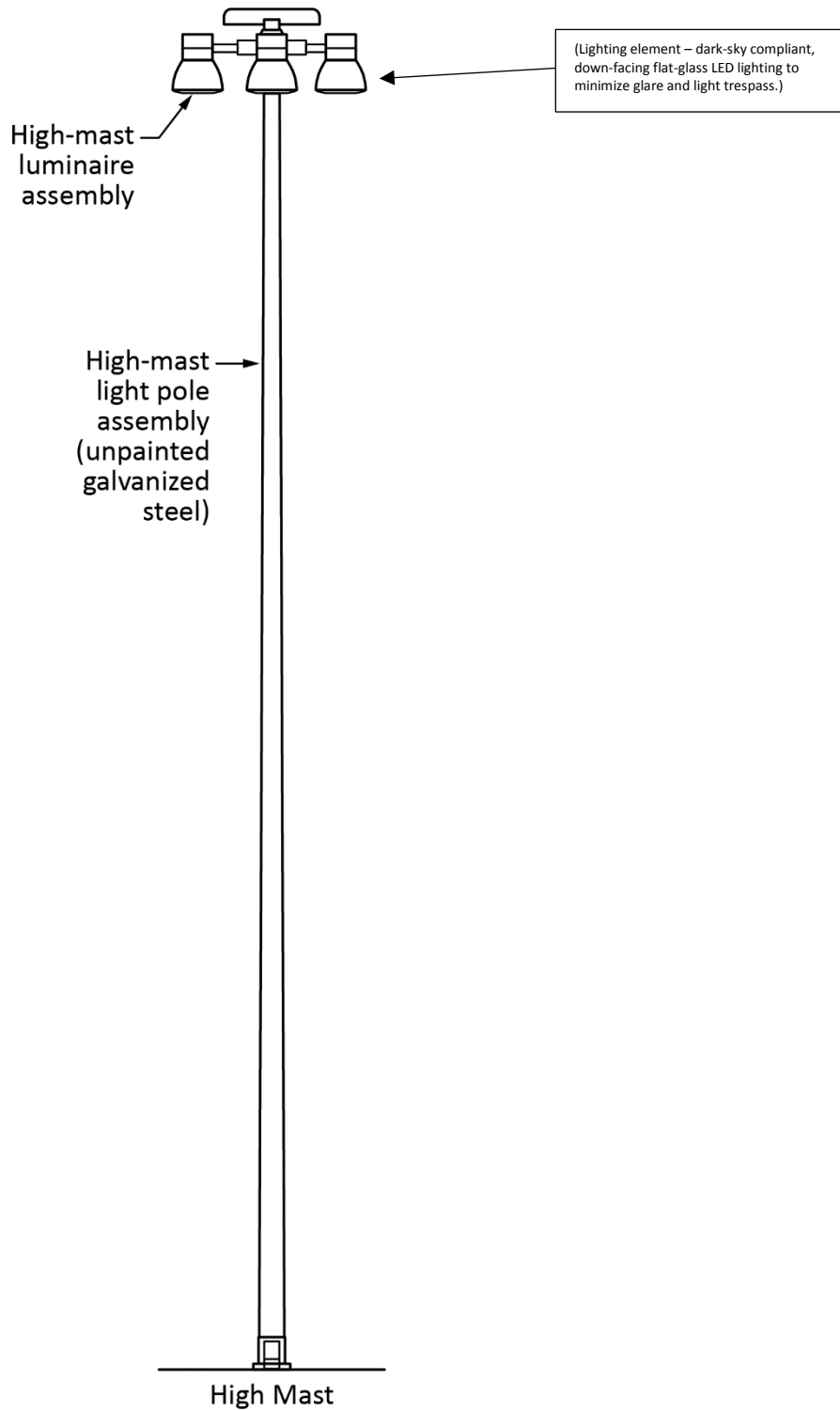


Figure 4-8. High-mast Luminaire

4.8.6 Guard Rails, Barriers, and Edge Delineation

4.8.6.1 Design Strategies

Examples of strategies discussed below are shown in Figure 4-9 and Figure 4-10.

- Wherever possible, use railings that provide higher visual permeability, such as type 10 or type 3 w-beam guardrails instead of concrete barriers.
- Where type 3 w-beam guardrails are included, use unpainted galvanized steel finish.
- When feasible, use wooden posts for type 3 w-beam guardrails.
- Leave any traffic-facing concrete crash barriers unpainted. This treatment is appropriate because of the high susceptibility of crash barriers to damage, both from crash impacts and from snow removal friction, and frequent needs for repair and replacements. In some cases, it is appropriate to paint the back side of crash barriers that are integrated into the top of median barriers. Additionally, use structural concrete coating on the top face of concrete barriers used for bridge railing.
- Where used, use continuous concrete barriers rather than segmented movable barriers.
- Where contiguous concrete barriers must transition between types, such as a Type 7 and Type 9 barrier, integrate a smooth transition over as long a distance as is feasible to avoid abrupt changes in size and shape, thus reducing distracting and unattractive shifts.

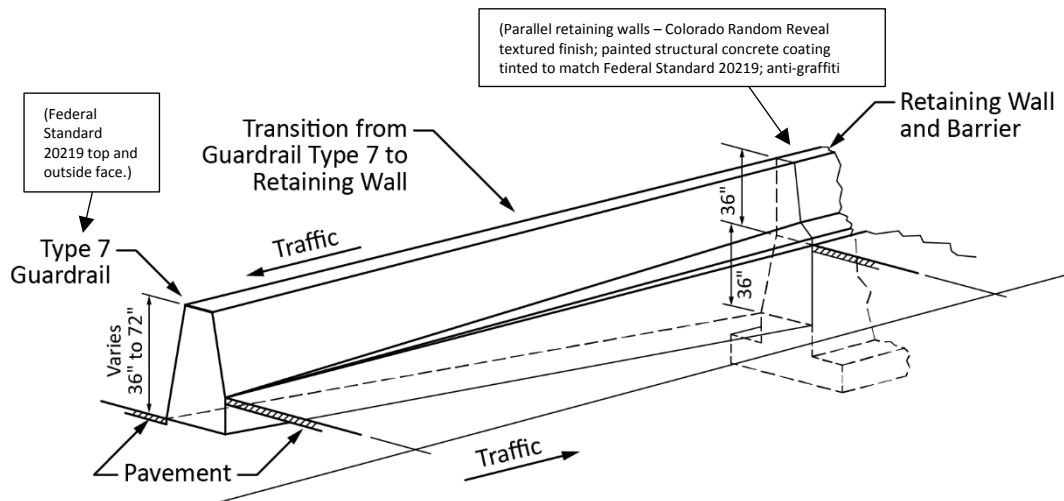


Figure 4-9. Concrete Barrier Type Transition

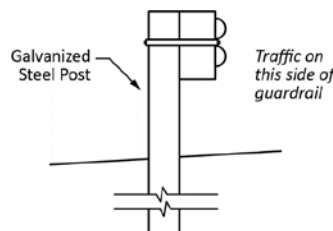


Figure 4-10. Type 3 Guardrail

4.8.7 Median barriers

Examples of strategies discussed below are shown in Figure 4-11.

- Where retaining walls are located in the median, integrate the median barriers into the design of the retaining walls to the extent feasible. If not possible, design the median barriers to relate in a harmonious way with the retaining walls.
- Do not paint concrete barriers in the median. An unpainted concrete finish eliminates the need to repaint median walls when paint peels or cracks, or when barriers require repair. Median concrete barriers are especially subject to conditions that make it difficult to maintain a painted finish.

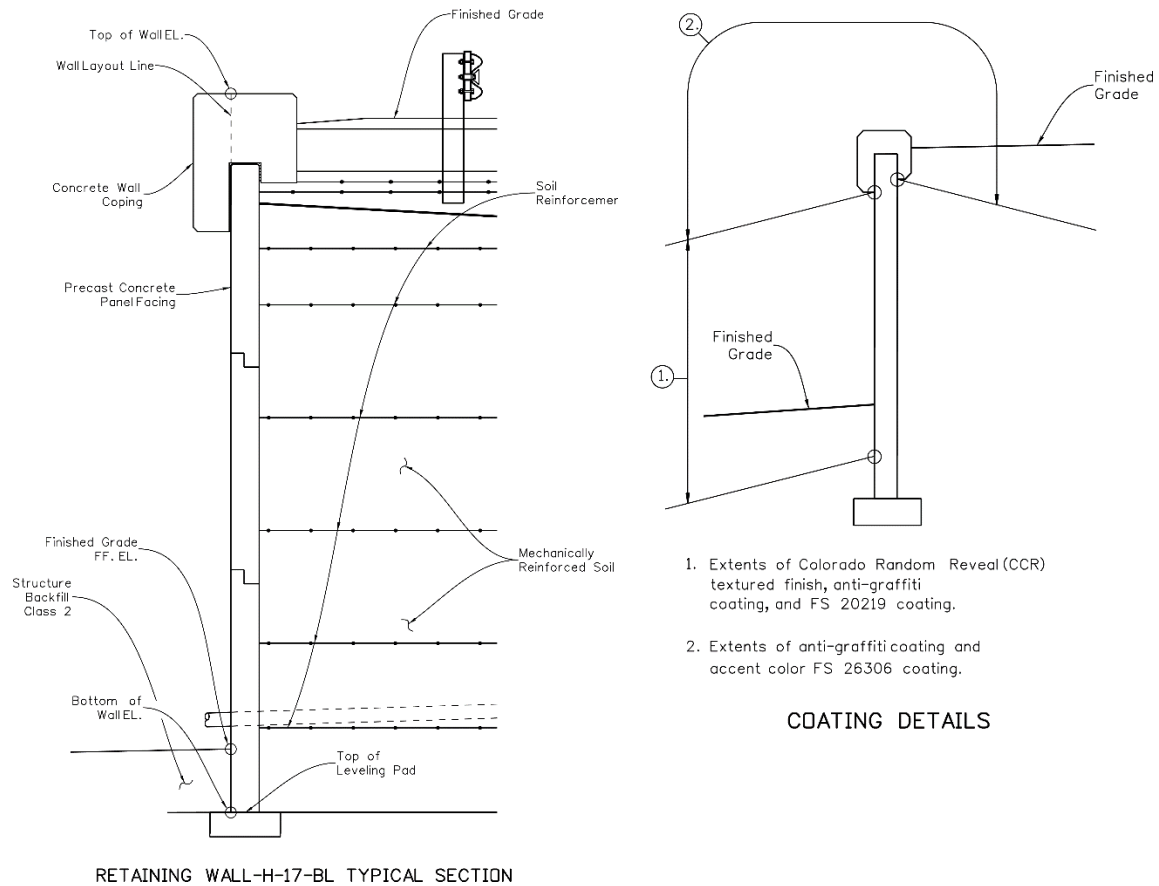


Figure 4-11. Median Barriers

4.8.8 Other Delineation

Provide edge delineation through applied markings and reflectors rather than painting bright contrasting colors on concrete barriers.

4.8.9 Fencing

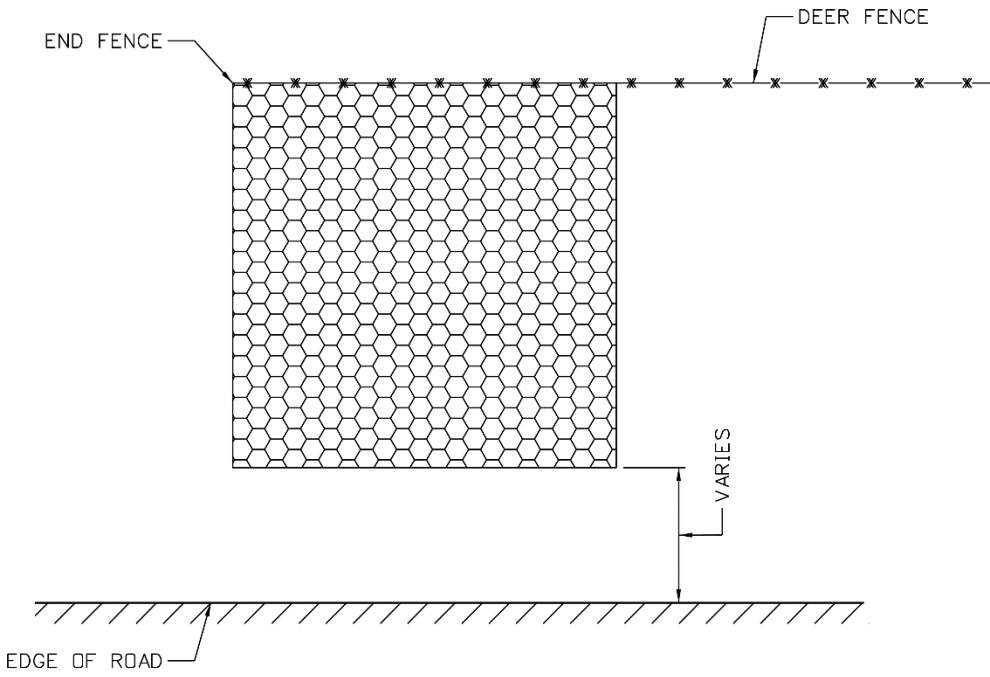
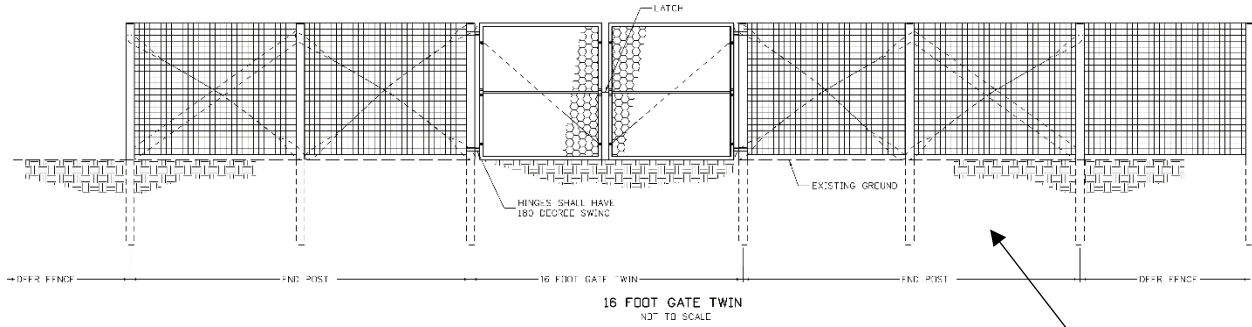
Fencing along highway right-of-way allows CDOT to delineate, protect, and maintain the right-of-way. Wildlife fencing included as part of the Gap project (working in conjunction with wildlife crossings) serves as the right-of-way fence. In areas with no need for wildlife fencing, use standard CDOT specifications for right-of-way fencing. Standard fencing specifications for both right-of-way and wildlife fencing are shown in Figure 4-12 and Figure 4-13.



Figure 4-12. Photos of CDOT Standard Right-of-Way Fencing

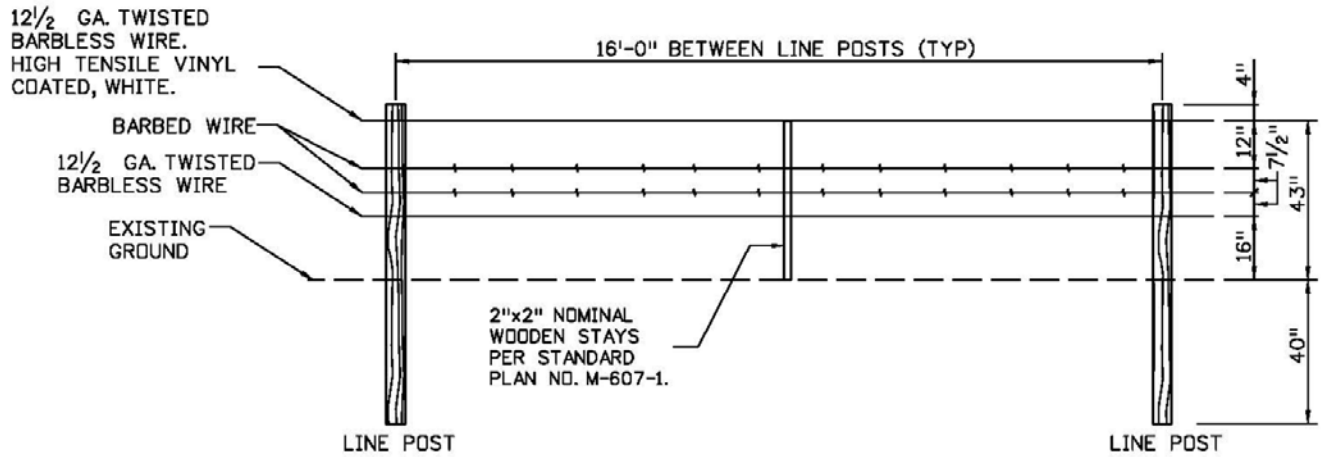
In addition to standard specifications, use the following design strategies:

- Anchor the ends of fencing into landforms, rock faces, or structures rather than simply terminating posts and wire.
- Visually buffer wildlife fencing by integrating fencing into existing landforms and away from the road edge where possible. Provide wildlife access points to allow animals to safely continue through wildlife corridors. Access may include wildlife/game ramps (see Figure 4-14).
- Many of the open spaces on either side of I-25 through the PEL Corridor are used for livestock grazing. When a wildlife underpass is located adjacent to the open spaces used for grazing, wildlife friendly fence will be installed near the underpass opening. Wildlife friendly fence (see Figure 4-13 for fence detail) allows wildlife to pass over, under, and through the fence while prohibiting livestock from crossing the fence, entering the underpass, and leaving the property. A white vinyl coating is applied to the top wire of the wildlife friendly fence to increase its visibility to both livestock and wildlife.



Frames for the gate are 1.625" dia. SS40 galvanized pipe and powder coated green. Chain link fabric shall be 2-inch mesh no. 9 gage wire. The fabric mesh is 2 inch x 9 G galvanized woven wire, coated with a green bonded (fused) vinyl coating.

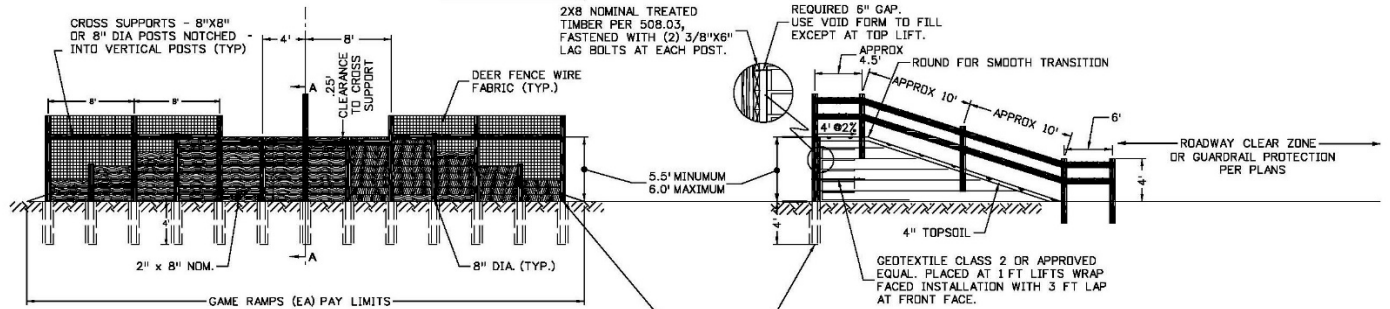
GEOCELL TREATMENT AT FENCE END
NOT TO SCALE



WILDLIFE FRIENDLY FENCE

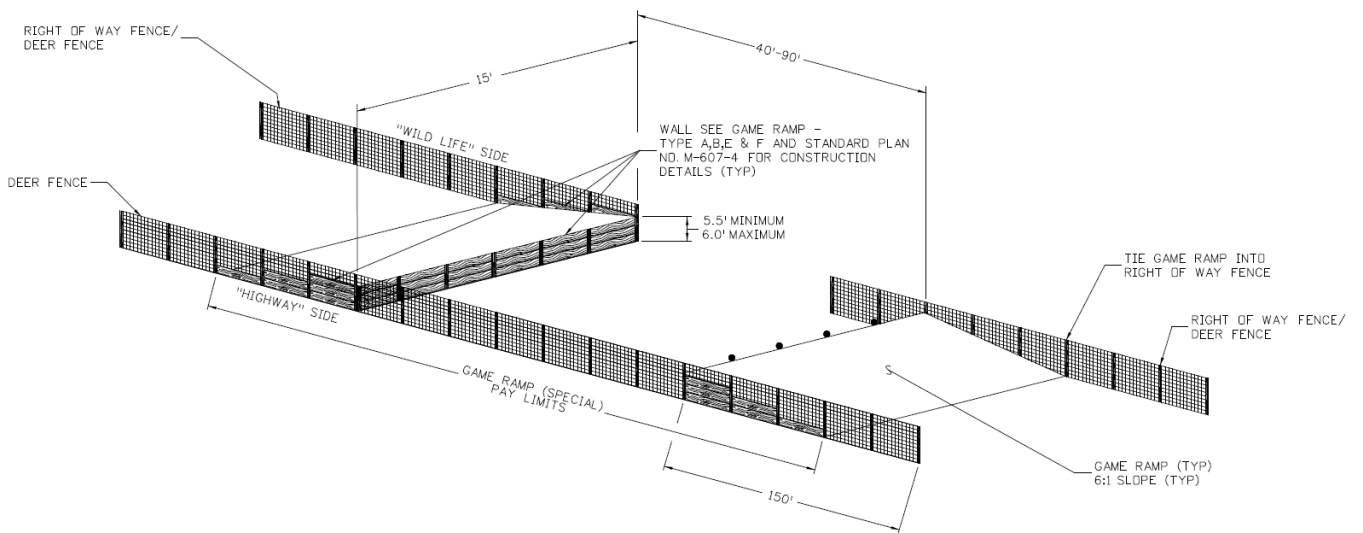
Figure 4-13. CDOT Standard Wildlife Fencing

SECTION 4 – DESIGN PRINCIPLES



8" DIA POSTS @ 4' O.C. - LENGTH VARIES:
 2 @ 8', 4 @ 10', 6 @ 12', 1 @ 14'
 POSTS SHALL BE A MINIMUM OF 4'-0" BELOW GROUND, AND ENCASED IN CONCRETE A MINIMUM OF 12" DIA. AND 6" BELOW END OF POST. BATTER SHALL BE NO GREATER THAN 2" OUT OF PLUMB.

GAME RAMP - TYPE A, B, E, & F



GAME RAMP - TYPE D

Figure 4-14. Game Ramps

4.8.10 Wildlife Corridors and Crossings

The IPEL Corridor is frequently traversed by animals moving between habitats. Wildlife crossings reduce incidents of animal-vehicle collisions and increase the safety of both the traveling public and animals in the corridor. In designing wildlife crossings, the opening must be as wide as possible, not simply to allow physical passage for the animals, but to improve their comfort levels, thereby encouraging and increasing their use. The passageway should feel as natural as possible. Apply the following design strategies when designing and installing wildlife crossings in the PEL Corridor:

- Apply design criteria and strategies for transportation structures to wildlife crossing structures.
- Use vertical, and not sloped, interior embankment walls to allow maximum width throughout the passage for animals using the crossing.
- Use open-span bridges to improve visibility for wildlife.
- Use unpainted Colorado Random Reveal finish on wildlife crossing interior walls (Figure 4-15).
- Incorporate naturally-occurring materials that exist in adjacent areas on the ground surface at wildlife underpasses. Reconstruct the ground plane in a natural configuration using rocks, soil, plants, etc. to create a natural-appearing corridor. Use salvaged landscaping materials and brush in the wildlife crossing.
- Include a brush path to provide shelter and comfort for small mammals using the crossing.
- Coordinate roadway and bridge design with naturally occurring landform and associated wildlife movement patterns.

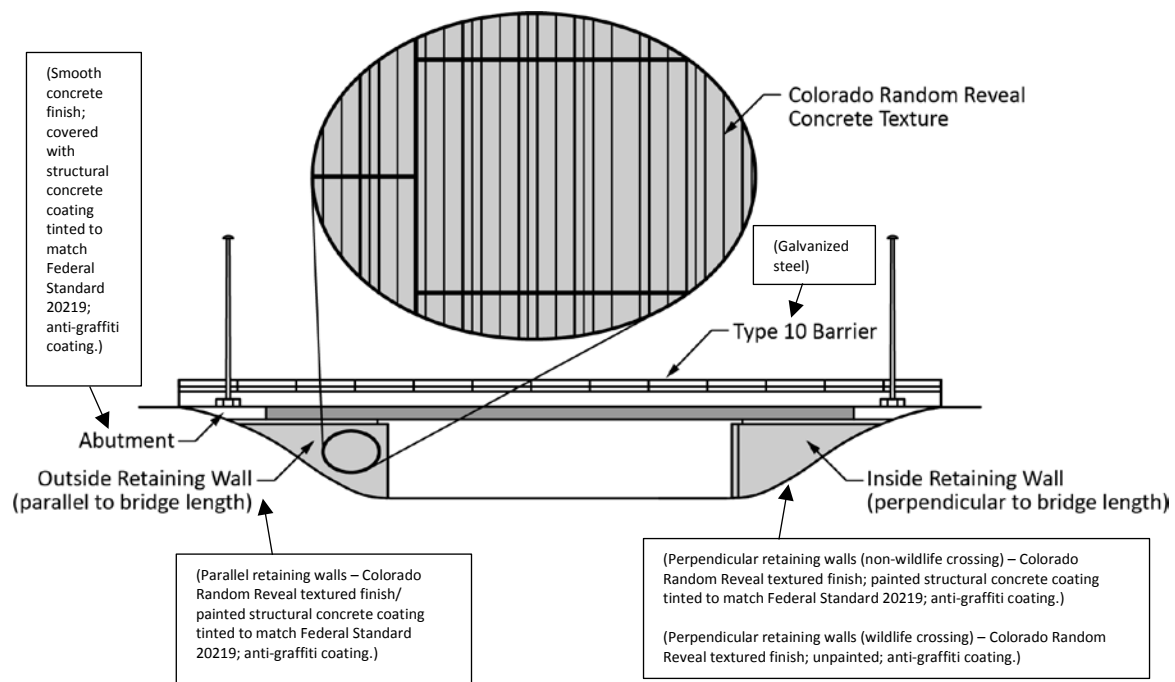


Figure 4-15. Wildlife Crossing

4.8.11 Hydrologic Features

Transportation projects in the PEL Corridor have the potential to cause aesthetic changes to adjacent hydrologic features. Use the following design strategies to maintain as natural a setting as possible once streams and hydrologic features are restored:

- Incorporate the recommendations of the Stormwater Management Plan and other appropriate documents to address sediment management.
- Treat stream edges with a variety of rock, plant materials, and landforms appropriate to the functional aspects of individual drainages and stream courses.
- Design stream and hydrologic enhancements to blend with existing drainage and landscape patterns.
- Restore and revegetate streambed areas using as much of the originally-removed materials as possible.

4.8.12 Highway Signage

Signs along the highway are essential to inform and direct the traveling public (Figure 4-16). When designing and placing signage, consider the visual impacts of those signs. The horizontal nature of the landscape in much of the PEL Corridor means that vertical elements, such as sign poles, have the potential to disrupt that horizon, particularly in rural or open space areas. This disruption should be mitigated by employing the following design strategies:

- Minimize the size and number of signs.
- Use non-reflective, unpainted galvanized steel materials to reduce contrast as much as possible.
- Leave sign backs as unpainted galvanized steel.
- Combine signs and sign posts where possible.
- Limit signage on the roadway to identify road services, communities, and cultural, recreational, or historical points of interest.
- Design signage to meet all applicable CDOT and Manual on Uniform Traffic Control Devices standards.
- Construct signs of a high quality and durable material.
- Where overhead signs are required, use single-arm monotube systems for signage support rather than complex steel trusses to reduce visual clutter.
- Integrate signage into bridge structures. Eliminate a tacked-on appearance by considering placement as an early component of design.
- Complete the roadway signing plan as a part of Field Inspection Review plans so that signs can be considered as an integrated part of the final structures and roadway design. This will avoid placing signs as an afterthought and protect sight lines to focal points along the PEL Corridor.



Figure 4-16. Highway Signage

4.8.13 Landscaping

4.8.13.1 Design Strategies

- Design landscaping and vegetation to be as natural in appearance as possible. In general, do not use decorative landscaping in rural areas. Rather, restore these areas using native species and as much of the originally-removed materials as possible, including topsoil, rocks, etc.
- Use seed mixes for the PEL Corridor that are comprised of all native species (Figure 4-17), including species that support pollinator populations.



Figure 4-17. Examples of Native Seed Mix Plants

- Table 4-3 lists seed mixes to be used for Preble's Meadow Jumping Mouse (PMJM) habitat-upland, upland east-facing areas, upland west-facing areas, wetland-riparian areas, and temporary construction areas. Table 4-4 lists seed mix applications by habitat/aspect.

Table 4-3. I-25 South Corridor Seed Mixes

Seed Name (Common/Scientific)	Lbs. Pls per Acre
<i>PMJM Habitat Upland Seed Mix</i>	
Blue grama/ <i>Bouteloua gracilis</i> v. Hachita	0.5
Western wheatgrass/ <i>Pascopyrum smithii</i> v. Arriba	3.0
Sideoats grama/ <i>Bouteloua curtipendula</i> v. Vaughn	2.25
Little bluestem/ <i>Schizachyrium scoparium</i> 'Pastura'	2.0
Green needlegrass/ <i>Nasella viridula</i> v. Lordum	2.0
Buffalo grass/ <i>Bouteloua dactyloides</i> 'Plains'	5.0
Prairie Junegrass/ <i>Koeleria macrantha</i>	0.2
Prairie coneflower/ <i>Ratibida columnifera</i>	0.4
Purple prairie clover/ <i>Dalea purpurea</i> var. <i>purpurea</i>	1.5
Blanket flower/ <i>Gaillardia aristata</i>	2.0
Oats/ <i>Avena sativa</i>	3.0
<i>Upland East-Facing Seed Mix</i>	
Prairie Coneflower/ <i>Ratibida columnifera</i>	0.3
Scarlet Globemallow/ <i>Sphaeralcea coccinea</i>	0.5
Rocky Mountain Beeplant/ <i>Cleome serrulata</i>	2.0
Purple Prairie Clover/ <i>Dalea purpurea</i>	1.0
Rocky Mountain fescue/ <i>Festuca saximontana</i>	0.1
Mountain brome/ <i>Bromus marginatus</i>	2.0
Idaho fescue/ <i>Festuca idahoensis</i>	0.25
Prairie sandreed/ <i>Calamovilfa longifolia</i>	1.0
Green Needlegrass/ <i>Nassella viridula</i>	1.25
Sideoats Grama/ <i>Bouteloua curtipendula</i> 'Vaughn'	1.5
Blue Grama/ <i>Bouteloua gracilis</i>	0.5
Prairie Junegrass/ <i>Koeleria macrantha</i>	0.1
Western wheatgrass/ <i>Pascopyrum smithii</i>	3.0
Inland saltgrass/ <i>Distichlis spicata</i>	0.3
Indian Ricegrass/ <i>Achnatherum hymenoides</i>	2.0
Slender Wheatgrass/ <i>Elymus trachycaulus</i> 'First Strike'	2.0
Oats/ <i>Avena sativa</i>	3.0
<i>Upland West-Facing Seed Mix</i>	
Prairie Coneflower/ <i>Ratibida columnifera</i>	0.2
Firecracker Penstemon/ <i>Penstemon eatonii</i>	0.5
Sand Verbena/ <i>Abronia villosa</i>	3.0
Western Yarrow/ <i>Achillea millefolium</i> var. <i>occidentalis</i>	0.1
Sand bluestem/ <i>Andropogon hallii</i>	2.0
Buffalograss/ <i>Bouteloua dactyloides</i>	2.0
Idaho fescue/ <i>Festuca idahoensis</i>	0.2
Sand lovegrass/ <i>Eragrostis trichodes</i>	0.2
Prairie sandreed/ <i>Calamovilfa longifolia</i>	1.0
Green Needlegrass/ <i>Nassella viridula</i>	1.0

Table 4-3. I-25 South Corridor Seed Mixes

Seed Name (Common/Scientific)	Lbs. Pls per Acre
Sideoats Grama/Bouteloua curtipendula 'Vaughn'	1.5
Blue Grama/Bouteloua gracilis	0.5
Mountain muhly/Muhlenbergia montana	0.1
Western wheatgrass/Pascopyrum smithii	1.0
Inland saltgrass/Distichlis spicata	0.3
Indian Ricegrass/Achnatherum hymenoides	2.0
Slender Wheatgrass/Elymus trachycaulus 'First Strike'	3.0
Oats/Avena sativa	3.0
Wetland-Riparian Seed Mix	
Common threesquare/Schoenopiecrus pungens	2.0
Big Bluestem/Andropogon gerardii	3.0
Fowl mannagrass/Glyceria striata	1.75
Prairie cordgrass/Spartina pectinata	3.0
Switchgrass/Panicum virgatum	1.0
Indiangrass/Sorghastrum nutans	1.25
Meadow sedge/Carex praegracilis	0.5
Torrey's rush/Juncus torreyi	0.03
Nebraska sedge/Carex nebraskas	0.6
Blue verbena/Verbena hastata	0.2
Swamp milkweed/Asclepias incarnata	1.5
Temporary Construction Seed Mix	
Winter wheat/Triticum aestivum	15.0
Slender wheatgrass/Elymus trachycaulus 'First Strike'	3.0
Oats/Avena sativa	15.0

Table 4-4. I-25 South Corridor Seed Mix Applications by Habitat/Aspect

Habitat Type	PMJM Habitat?	Slope	Seed Mix Used
Mowed/Landscaped	Yes	Less than 3:1 slopes	PMJM
Riparian	Yes	Less than 3:1 slopes	PMJM
Upland Grassland	Yes	Less than 3:1 slopes	PMJM
Disturbed/non-vegetated	No	Less than 3:1 slopes	N/A
Mowed/Landscaped	No	Less than 3:1 slopes	Temporary Construction
Mowed/Landscaped	No	3:1 slopes	Temporary Construction
Riparian	No	Less than 3:1 slopes	Riparian
Riparian	No	3:1 slopes	Riparian
Upland Forest-East Facing	No	Less than 3:1 slopes	Upland East Facing
Upland Forest-East Facing	No	3:1 slopes	Upland East Facing
Upland Forest-West Facing	No	Less than 3:1 slopes	Upland West Facing
Upland Forest-West Facing	No	3:1 slopes	Upland West Facing
Upland Grassland-East Facing	No	Less than 3:1 slopes	Upland East Facing

Table 4-4. I-25 South Corridor Seed Mix Applications by Habitat/Aspect

Habitat Type	PMJM Habitat?	Slope	Seed Mix Used
Upland Grassland-East Facing	No	3:1 slopes	Upland East Facing
Upland Grassland-West Facing	No	Less than 3:1 slopes	Upland West Facing
Upland Grassland-West Facing	No	3:1 slopes	Upland West Facing
Upland Shrubland-East Facing	No	Less than 3:1 slopes	Upland East Facing
Upland Shrubland-East Facing	No	3:1 slopes	Upland East Facing
Upland Shrubland-West Facing	No	Less than 3:1 slopes	Upland West Facing
Upland Shrubland-West Facing	No	3:1 slopes	Upland West Facing

4.8.14 Utilities

The PEL Corridor contains utility lines throughout the serve the highway and surrounding uses. Use the following design strategies when designing utilities in the PEL Corridor.

- When feasible, bury utility lines underground to avoid visual clutter or obstruction.
- If lines cannot be buried, use materials that blend as closely with the natural environment as possible. This may mean using natural wood posts (Figure 4-18) or unpainted galvanized steel posts.



Figure 4-18. Example Electric Pole

5 References

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