

Rising to over 10,000 feet in elevation, the Crest of the Rockies design segment provides access to numerous ski resorts and recreational opportunities through Silverthorne, Frisco, Copper Mountain, Vail, Avon and Edwards. The Crest of the Rockies offers dramatic views of peaks and valleys, steep topography, lush alpine vegetation, rocky hillsides, waterways and views of numerous ski resorts.

The Crest of the Rockies design segment contains five Areas of Special Attention (ASA) including the Town of Vail, Top of Vail Pass, Dowds Junction, Herman Gulch and Silverthorne. Information on Areas of Special Attention can be found in corresponding ASA reports located under the Design tab on the I-70 CSS Website. The locations of each ASA in the Mountain Mineral Belt design Segment can be found on the Features of Special Significance Map in this document.

Additional resources for the I-70 Mountain Corridor can be found at <http://i70mtncorridorcss.com/>. These resources include, but are not limited to, I-70 Mountain Corridor Design Criteria, Area of Special Attention Reports, Stream and Wetland Ecological Enhancement Program (SWEEP), Sediment Control Action Plans (SCAP), I-70 Visual Context Maps, A Landscape Level Inventory of Valued Ecosystems (ALIVE), Linkage Interference Zones (LIZ), Colorado Department of Transportation Drainage Manual, Context Statements, Core Values and the decision making process.

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- Guardrails, Barriers, and Edge Delineation

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- Recreational and Cultural Resource Access

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- Advanced Guideway System

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- Signage

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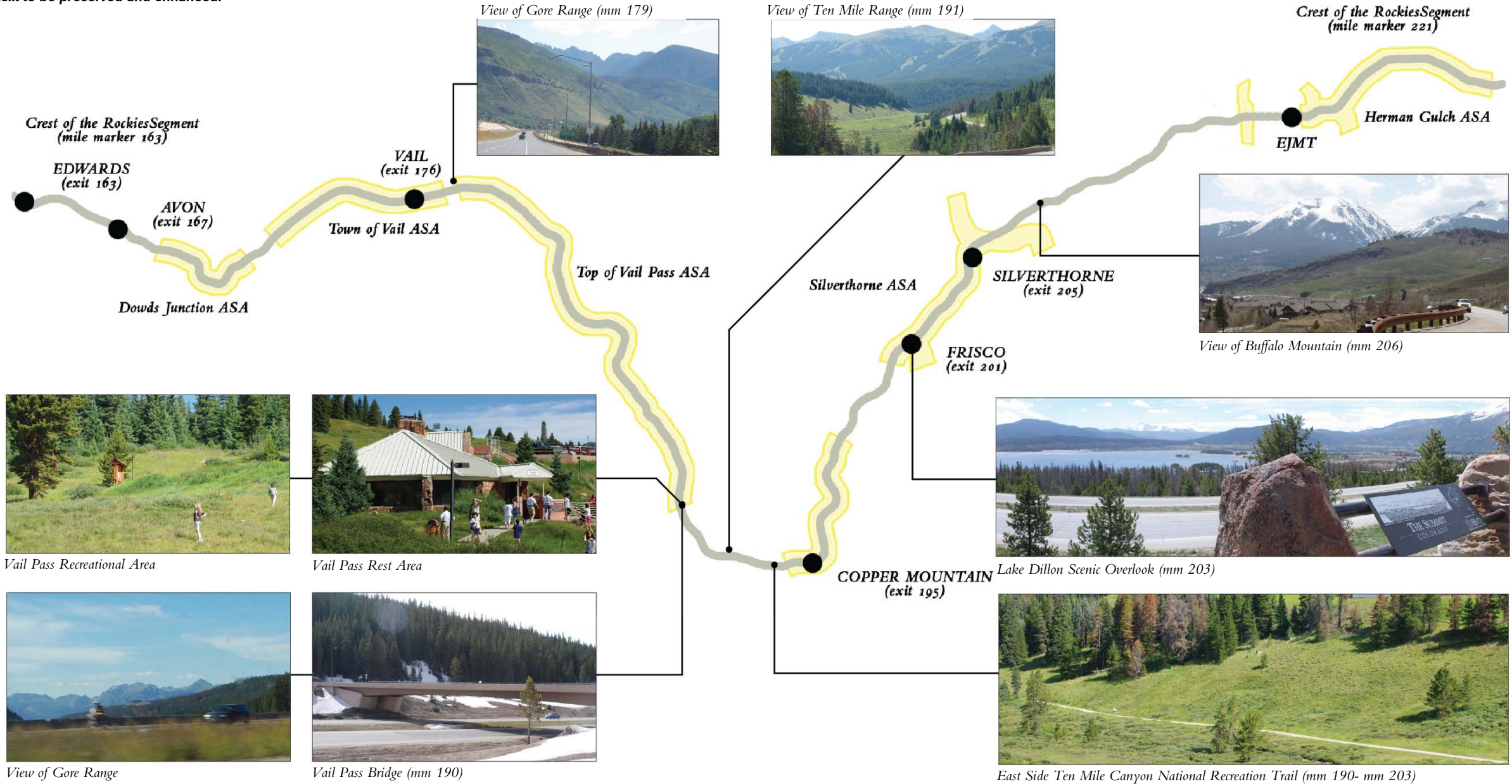
19 | Construction Material Management

- Management of Construction Materials

CREST OF THE ROCKIES design segment

FEATURES OF SPECIAL SIGNIFICANCE MAP

This diagram describes unique and important views, landscape features, recreational points, cultural/historic elements, and roadway facilities that contribute to the special character found in the Crest of the Rockies design segment. These elements should be considered as having special significance in the corridor and provide the best examples of the context to be preserved and enhanced.



CREST OF THE ROCKIES design segment

01 | TRANSPORTATION AND LAND RELATIONSHIPS

Elevating structures, retaining embankments, adapting design to topographic conditions, and respecting the historic limits of disturbance are techniques available for both retro-fitted and new construction. The desired result is a transportation facility that minimizes the alteration of land and avoids slopes that appear artificially constructed.

ADAPTING THE HIGHWAY TO EXISTING TOPOGRAPHY

Design Strategies to Be Employed

- Design eastbound and westbound travel lanes as independent alignments as described in the [Design Criteria](#).
- Utilize split elevations for eastbound and westbound travel lanes in areas of steep topography. Structured and elevated roadway design solutions will minimize the level of disturbance on steep slopes (A, B, C).
- The roadway should respect the sinuosity of the valley floor and natural hydrology (D).
- Use structural retaining devices to minimize earthwork and stay within existing limits of disturbance (E).
- Locate the centerlines of eastbound and westbound travel lanes as close as possible to the existing topography to minimize the use of cut and fill embankment. Alternatively, utilize structured or elevated road alignments to provide greater design flexibility.



A | Using a split elevation for the travel lanes will adapt the corridor to the steep slopes found in this segment.



D | The roadway should respect the sinuosity of the valley floor and creek.



B | Elevated solutions can fit into the landscape and respond to sudden changes in topographic, hydrologic, or environmental conditions.



C | Elevated roadways will minimize disturbance on steep slopes.



E | Structural retaining devices should be utilized to stay within the existing limits of disturbance.

In newly constructed sections, when horizontal lane separation can be developed beyond the minimum median standard, it is advisable to separate the eastbound and westbound lanes by a desired distance of 80 to 1,500 feet. A median of this width can provide a method for managing water quality, storing snow, preserving vegetation, restoring the disturbed landscape, adapting to topographical conditions, and providing a tangible buffer to the opposing lane.

The minimum horizontal separation between lanes will be maintained. As an alternative condition, a vertical elevation separation between lanes of at least 6' may be established to adapt the corridor to the mountainous and topographic conditions. Where vertical elevation separation exists in the current alignment, it should be preserved in any new design. The vertical separation will also eliminate the need for high barriers and devices that shield oncoming headlights.

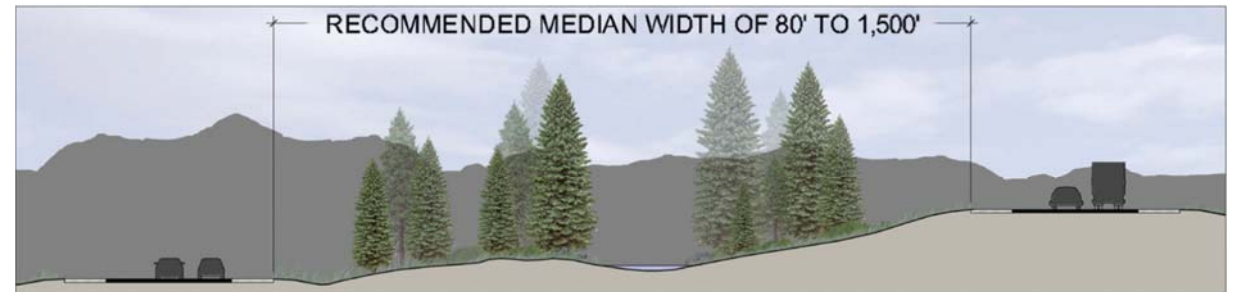
MEDIANS AND LANE SEPARATIONS

Design Strategies to Be Employed

- Incorporate variable widths of medians and include plants and landscape materials characteristic of the various landscape types found along this segment (A).
- Preserve existing median width as described in the [Design Criteria](#) or separate eastbound or westbound lanes by a preferred distance of 80' to 1,500' (B). A minimum median width that allows a clear zone without guardrail or barriers is described in the [Design Criteria](#).
- Preserve the existing vertical separation as described in the [Design Criteria](#) or separate eastbound and westbound lanes by at least 6' in elevation in locations where it is difficult to achieve the desired horizontal separation (C, D).
- Look to Vail Pass as a design precedent for substantial and variable median widths, successful landscape revegetation, and the integration of recreation and habitat within the median and right-of-way (A).



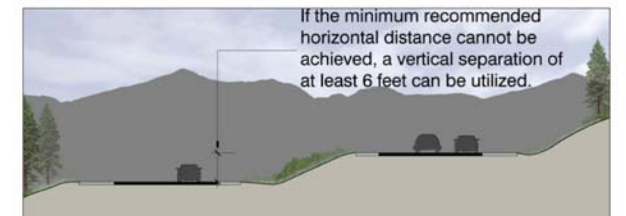
A | Medians of variable width blend the transportation corridor with natural landscape and drainage patterns.



B | A median of 80' to 1,500' provides an appropriate separation of the travel lanes and allows space for landscape and hydrologic features.



C | Where steep topography restricts median width, a vertical separation of at least 6' should be implemented.



D | Vertical separation can be accomplished through structured or embankment solutions or a combination of both.

CREST OF THE ROCKIES design segment

03 | STRUCTURES THAT SUPPORT TRANSPORTATION FACILITIES

Visual design continuity should exist throughout the corridor, linking existing and new transportation facility structures. Bridges should be of similar proportion and structural components should be designed using like materials and finishes.

Each retaining wall should be constructed of a single material with a visually simple texture that renders a shadow pattern on the surface. Retaining walls that include decorative pictorial patterns and multiple materials, shapes, and styles create visual confusion and should not be used in the I-70 Mountain Corridor.

EXISTING HIGHWAY FEATURES

Design Strategies to Be Employed

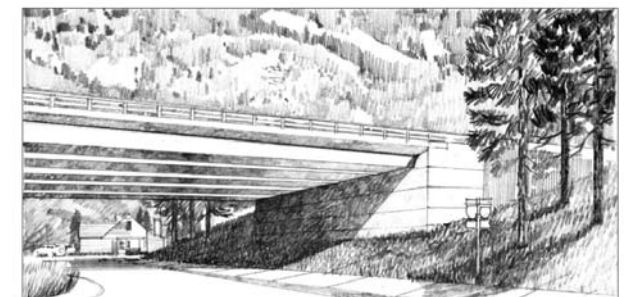
- In areas of retrofit construction, utilize the Aesthetic Guidance and refer to the existing character of structures and facilities across the segment to achieve a consistent design aesthetic, rather than a series of disconnected and random structures (A, B, C).
- New construction should incorporate the Aesthetic Guidance and be of the same design family as existing facilities (A).
- Consider individual projects as part of the larger context of facilities.



A | *The strong sculptural design of existing structures along Vail Pass should serve as a precedent for retrofit construction.*



B | *The bridge at Copper Mountain presents an aesthetic character with color, shadow, and box girder construction.*



C | *A retrofit design for the facility shown above would remove slope paving and incorporate guidance for the design of bridge structures, planting, and pedestrian connections.*

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BRIDGE STRUCTURES

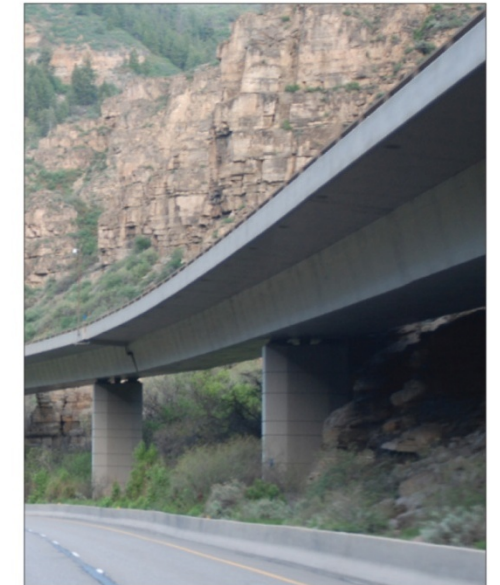
Design Strategies to Be Employed

- Utilize closed end abutment designs which have a minimum vertical height of 8' as described in the [Design Criteria](#).
- Simple and elegant bridge design is more appropriate than complex shapes and geometries. The elegant design provides an aesthetic contrast to the complexity of the surrounding mountain landscape (A, D).
- Create a clean, uncluttered appearance below the bridge and eliminate the exposed support pier face condition. Aesthetic guidelines recommend a box girder design.
- Incorporate thoughtful and deliberate shadow patterns on super structures and abutments. The overhang of the bridge deck should be equal to 2/3 the height of the girder to produce the desired shadow on the superstructure (B, D).
- Treat the color of bridges and other structures in a manner consistent with this segment's color palette. Fussy and jarring color schemes are inappropriate for this segment. See Section 06 | Color Selection and Consistency for additional details and color palette.
- Consider attached metal rails or a 24" high concrete wall with attached metal rail rather than solid concrete barrier for bridge rails (C, D, E).

- Slope paving is not allowed in this segment as described in the [Design Criteria](#). The intent is to extend the existing landscape underneath bridges (D). See Section 07 | Earthwork, Embankment, and Restoration of Existing Disturbance and Section 09 | Landscape Planting, Revegetation, and Topsoil Management for strategies to accomplish this.
- Use a consistent material for approach rail and bridge rails. Ensure the point of attachment between the two does not sacrifice the appearance of continuity (E).
- Utilize a concrete wall face with a simple vertical or horizontal texture pattern on bridge abutments.
- Plant trees on the bridge embankment slope to anchor the ends of the bridge and connect the span to the embankment (D).
- Avoid disturbing the natural landscape below bridges except in places where a pier is constructed.
- Avoid locating piers in a stream or river where scour could occur.



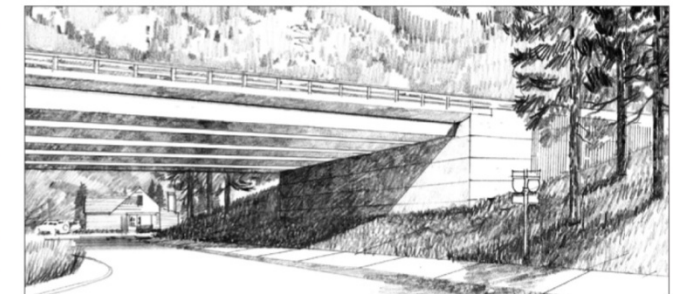
A | Bridges with simple forms, color, and shadow patterns exhibit an aesthetic contrast to the complexity of the natural landscape.



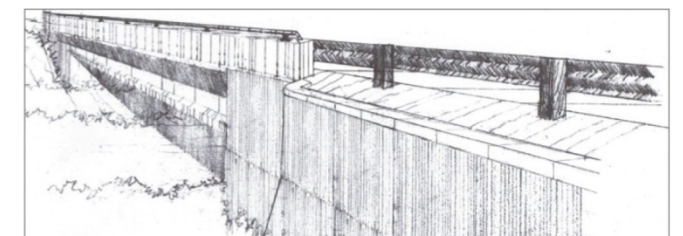
B | Deep overhangs and shadow lines add visual depth and give the bridge superstructure a thin appearance.



C | Utilizing attached metal rails on bridges rather than concrete barriers adds to the transparency and thin appearance of the span.



D | Open pedestrian connection, transparent bridge rail, vertical abutment, deep shadow line, and landscape planting strategies.



E | Ensure the point of attachment between approach rail and bridge rail does not sacrifice the appearance of continuity.

03 | STRUCTURES THAT SUPPORT TRANSPORTATION FACILITIES

Visual design continuity should exist throughout the corridor, linking existing and new transportation facility structures. Bridges should be of similar proportion and structural components should be designed using like materials and finishes.

Each retaining wall should be constructed of a single material with a visually simple texture that renders a shadow pattern on the surface. Retaining walls that include decorative pictorial patterns and multiple materials, shapes, and styles create visual confusion and should not be used in the I-70 Mountain Corridor.

RETAINING WALLS SUPPORTING THE HIGHWAY

Design Strategies to Be Employed

- Install roadway retaining walls greater than 12' in height below the elevation of the roadway as described in the [Design Criteria](#).
- Provide space for landscape screening treatments in front of all retaining walls that are visible from the roadway or adjacent communities (A).
- Incorporate wall materials that have a consistent texture and pattern (B).
- Employ simple vertical textures and patterns on walls to create shadows and interest (B).
- Use grading strategies to minimize the height of retaining walls along the corridor (C).
- Utilize landscape platforms and turn the ends of walls to meet with the grades of hills and slopes to ensure that retaining walls are integrated with adjoining slopes (D).
- Design walls with a single material, style, and method rather than a mix of materials-even if wall height varies.
- Design walls to include an appropriate cap with an overhang to create shadows and interest.

TUNNELS

Design Strategies to be Employed

- Provide lighting and light colored reflective surfaces in the tunnel to eliminate the black hole effect.
- Flare tunnel portals and extend them out from the rock cut face. The use of Headwalls perpendicular to the travel lanes is strongly discouraged.



A | Where possible, allow for landscape screening to buffer the view of retaining walls.



B | Simple vertical textures provide depth and shadow to large wall faces.



C | Incorporate earthwork solutions in conjunction with structured retaining to limit the height of retaining walls.



D | Turning the ends of walls helps integrate them into the adjoining slope.

CREST OF THE ROCKIES design segment

04 | INTERCHANGES

Newly constructed interchanges shall consider the context in which they are planned. The goal for interchanges is to efficiently use land, reduce visual prominence, and integrate with the landscape context and existing land uses. In narrow canyons, for example, compact designs should be used. In locations adjacent to existing communities – where limitations on space and reduction in visual prominence will be key in planning for contextual solutions – interchange alternatives that use little land area may be preferred. In all designs, understand the visual prominence and scenic influences of the facility. Provisions for landscape planting should be incorporated into the available interchange open space and be reflective of the surrounding native landscape.

INTERCHANGE DESIGN

Design Strategies to Be Employed

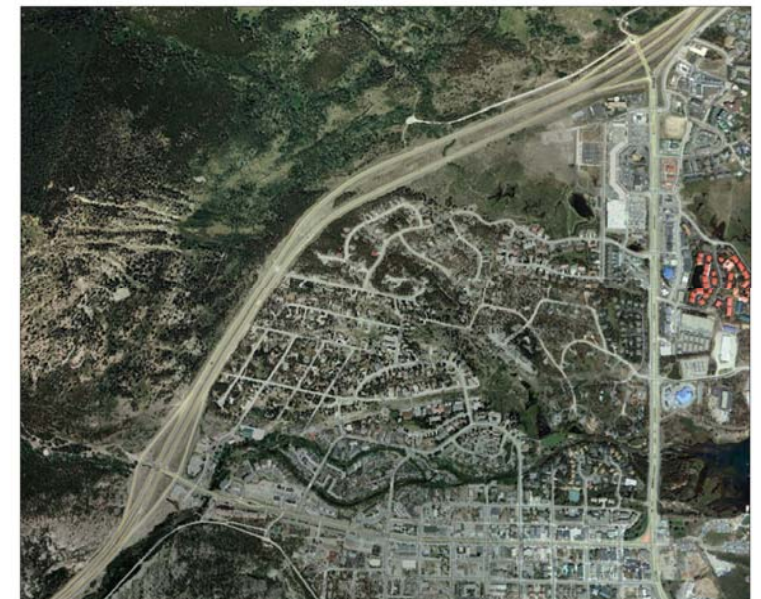
- Consider the urban design implications associated with interchanges – including connections to the local road network, pedestrian circulation, and adjacent land uses (B, C).
- Ensure smooth and seamless access into the community (C).
- Utilize a compact interchange design to avoid consuming more land than necessary. Utilize vertical walls to facilitate this style of design (A).
- Provide substantial landscaping in open areas to create a transition from the transportation corridor to the community environment (A).



A | Interchanges should exhibit a compact design and include dense landscaping in open areas to create a transition from the transportation corridor to the community environment.



B | Community circulation must be considered at the onset of interchange design to ensure the creation of comfortable pedestrian spaces.



C | Frisco has two interchanges, one that contains traveler-oriented land uses and another that feeds directly into the historic downtown Main Street.

CREST OF THE ROCKIES design segment

05 | GUARDRAILS, BARRIERS, AND EDGE DELINEATION

Guardrails will be constructed using Type 3 Guardrail W Beam with a rusted rail finish and wooden posts. Any concrete barrier rail will be colored to match the segment color selection. An identical design will be used throughout the corridor. A recovery zone is preferable to guardrail or barriers for protection from edge obstacles.

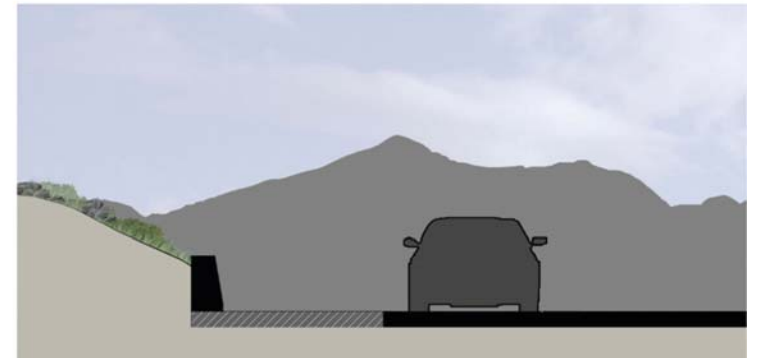
GUARDRAILS, BARRIERS, AND EDGE DELINEATION

Design Strategies to Be Employed

- Use self-weathering Type 3 Guardrail W Beam with wooden posts for guardrails. Eliminate the use of galvanized W beam (A).
- Color concrete barriers using the selected colors from the design segment color palette in order to blend the roadway into the surrounding environment. See Section 06 | Color Selection and Consistency for additional details and color palette.
- Incorporate landform and planting directly with concrete barrier walls (B).
- The use of cable rail is strongly discouraged in this segment because of the long term maintenance cost and aesthetics.
- Utilize continuous concrete barriers rather than segmented movable barriers (C).
- Provide edge delineation through applied markings and reflectors rather than painting bright contrasting colors on concrete barriers.



A | Self-weathering Type 3 Guardrail W Beam should be used for guardrails throughout this segment.



B | Planting and landform should be incorporated with barrier rail walls.



C | Continuous concrete barriers with a consistent color application should be utilized rather than segmented barriers.

A color palette has been selected for use and is described in the guidance for each individual design segment. Color selected for transportation features – including light standards, sign supports, and other vertical construction – will blend into the background of the natural and built environment.

COLOR SELECTION AND APPLICATION

Design Strategies to Be Employed

- Apply this segment's color palette to transportation structures and associated facilities within this segment-including sound walls, retaining walls, lighting, signage, bridges, etc. The colors selected for this segment complement the unique features found here and provide consistency across the entire design segment (A).
- The base color for this design segment is a beige tone consistent with the dominant color of bridge and overpass structures found in Glenwood Canyon (C). The Vail Pass section of the corridor is historic; therefore, colors chosen for structures shall match those color choices previously used.
- Accent colors for this design segment are tones currently found in this segment and should not represent more than 15% of the painted structure (D).
- Apply the base color to the dominant sections of the structure. Utilize accent colors to highlight smaller details that are attached to the overall roadway structure.
- Vertical metal features such as light poles, sign poles, and highway edge facilities should be colored with US Forest Service Brown color.

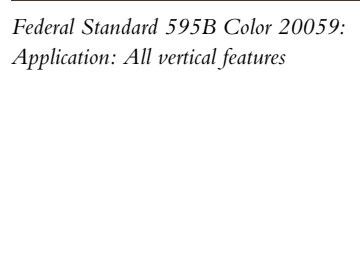
Color Palette



*Federal Standard 595B
Color 30233
Application: Accents*



*Federal Standard 595B Color 30372:
Application: All road structures*



*Federal Standard 595B Color 20059:
Application: All vertical features*



A | A consistent color palette provides the traveler a clear experience free from confusing or inappropriate visual cues.



B | The application of color on these utility structures matches the surrounding landscape context.



C | Vail Pass structure



D | Use of accent color on bridge substructure.



E | Example of vertical elements color.

CREST OF THE ROCKIES design segment

07 | EARTHWORK, EMBANKMENT, AND RESTORATION OF EXISTING DISTURBANCE

All site grading and existing disturbance restoration in the corridor should utilize landforms that reflect the patterns and diversity naturally occurring throughout the segment. Earthen embankments are natural reflections of the landscape and should mimic the patterns found in pre-existing conditions. Grading should avoid scarring on steep slopes, as well as the negative visual effects that result. New rock cuts will be naturalized with custom shaping and coloration will be applied to reduce the contrast between new cuts and existing rock faces.

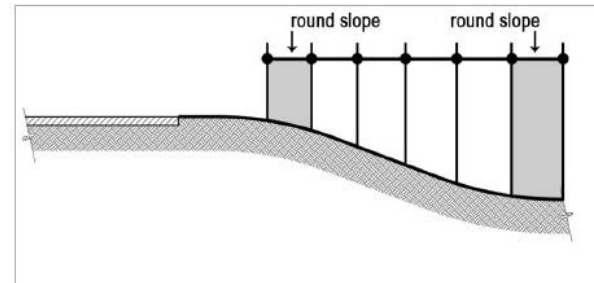
EARTHWORK AND GRADING

Design Strategies to Be Employed

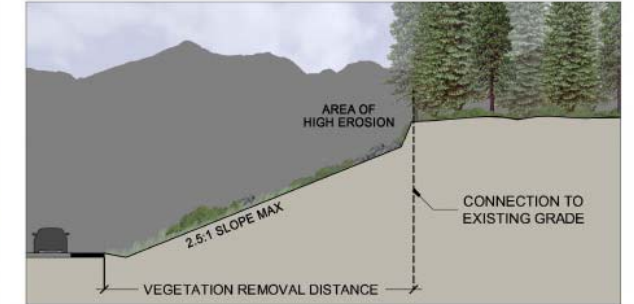
- Limit slopes to 2.5:1 (H:V) maximum and physical disturbance to less than 40 vertical feet from the edge of pavement or rail platform to the farthest edge of cut or fill as described in the [Design Criteria](#).
 - Round the top and bottom of the slope to provide a stable area for revegetation and transition the embankment back into natural grade. When viewed in elevation, this rounded transition should occur over the last 1/6th of the slope top and toe (A, B).
 - When clearing vegetation is necessary for earthwork, the roadway design may remove more vegetation than required in order to create a natural and irregular edge, allow a naturalized rounding of the slope, frame scenic views, and create islands of significant existing trees and shrubs (C, D).
 - Use a warped or variable slope technique in areas where the terrain is rolling and road work requires frequent shifts between cuts and fills.
 - Soften transitions by laying back the slopes more at the ends of the cuts and fills than in the middle.
 - Vary the slope of the embankment through the length of a large cut or fill area. A consistent slope should not be used for a longitudinal length greater than 300' (D).
- Replicate the diversity of natural slope conditions in new earthwork design and construction (D).



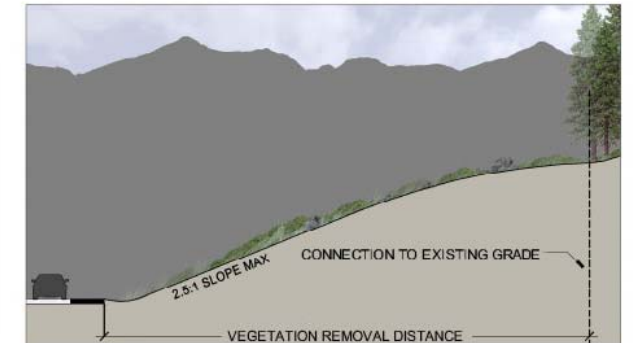
A | Rounding the top and toe of the slope blends embankments into the existing landscape and facilitates revegetation of constructed slopes.



B | To transition into existing grade, round the slope over the last one sixth of the top and toe of the embankment.



Typical methods deliver an engineered slope poorly integrated into existing grade.



C | The preferred method requires additional clearing to round grading properly, yet creates a more natural slope and vegetation condition.



D | Utilizing variable slopes through the length of an embankment mimics the natural patterns found in the alpine landscape.

All site grading and existing disturbance restoration in the corridor should utilize landforms that reflect the patterns and diversity naturally occurring throughout the segment. Earthen embankments are natural reflections of the landscape and should mimic the patterns found in pre-existing conditions. Grading should avoid scarring on steep slopes, as well as the negative visual effects that result. New rock cuts will be naturalized with custom shaping and coloration will be applied to reduce the contrast between new cuts and existing rock faces.

ROCK CUTS AND MODIFICATION

Design Strategies to Be Employed

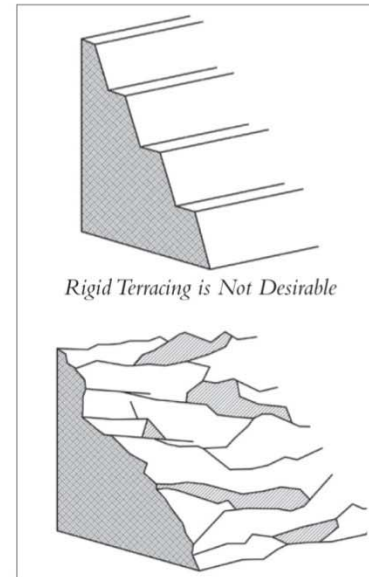
- Use scatter blasting techniques and random rock drilling at varying depths to cause rock to break in natural patterns and expose natural rock fractures as described in the [Design Criteria](#) (C).
- The geologic properties of rock within this segment serve as the basis for strategies to contain rock fall in order to maintain these natural forms. The design team should include a multidisciplinary group of geotechnical engineers, civil engineers, and landscape architects whose role is to maintain the inherent character of the natural bedding planes, fractures, joints, and overall stability of rock along the segment. Refer to the [Design Criteria](#).
- Based on careful geological, site, and cost analyses, rock cuts should strive to minimize the need for rock fall protection.
- Employ custom naturalized cuts and staggered benches and avoid the use of straight vertical cuts and benches that have a sheer, unnatural appearance (A, C).
- Allow natural rock outcrops along the segment to be left in earthwork rather than covered up or removed. When a rock cut is necessary, place bench-boulders within the slope to be visually compatible with existing rock outcrops (B).
- Design new rock cut slopes along this segment to blend with existing rock formations. Use rock staining, soil-coloring treatments, and/or accelerated weathering treatments to match new rock and soil excavations with existing rock and soil (D).
- Evaluate moving the road away from the rock face to avoid rock fall protection.
- For rock fall protection, use naturally sculpted benches and ledges across the face of rock instead of human-made features. When required, the use of natural contours supplemented with retention devices (such as protection fencing or mesh screens) can be used to minimize the extent of benching (A).
- Utilize tieback and other anchoring strategies to preserve and stabilize rock formations rather than the installation of rock fall protection devices.
- Consider low reflectivity and color matching materials for rock safety structures. Rock safety structures that include earth-tone colors will match the patterns of surrounding rocks (E).
- When mesh rock fall draping is required, it should follow the existing natural contours of the rock face. The end of the mesh material should terminate in a hidden condition to reduce visual clutter on the rock face.
- Where feasible, sculpture new rock cuts to include soil pockets within rock ledges. The soil pockets will present opportunities for revegetation that reflect the natural patterns found along this segment (A).
- Implementation of these strategies will be especially important in areas of steep, rocky terrain including:
 - *Dowds Junction*
 - *Vail Pass (EB and WB approaches)*
 - *Officers Gulch*
 - *Eisenhower Johnson Memorial Tunnel (EB and WB approaches)*



A | Rock cuts should include naturalized benches with planting pockets to mimic the surrounding landscape.



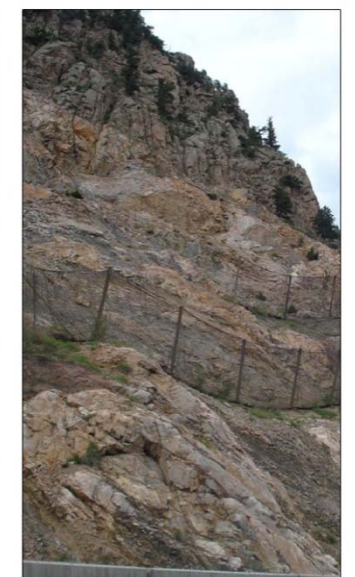
B | Allow rock outcrops and boulders to be left in earthwork to create a more natural appearance.



C | Scatter blasting and random drilling techniques result in a more natural appearance by breaking rock along existing fracture lines and bedding planes.



D | Color staining techniques will blend new rock cut with existing rock features.



E | Rock fall protection devices, when required, should utilize self-weathering and/or earth-toned materials.

07 | EARTHWORK, EMBANKMENT, AND RESTORATION OF EXISTING DISTURBANCE

All site grading and existing disturbance restoration in the corridor should utilize landforms that reflect the patterns and diversity naturally occurring throughout the segment. Earthen embankments are natural reflections of the landscape and should mimic the patterns found in pre-existing conditions. Grading should avoid scarring on steep slopes, as well as the negative visual effects that result. New rock cuts will be naturalized with custom shaping and coloration will be applied to reduce the contrast between new cuts and existing rock faces.

RESTORATION AND NATURALIZED APPEARANCE OF DISTURBED AREAS

Design Strategies to Be Employed

- Restore graded areas with a landscape pattern that resembles the existing natural plant community (A). See Section 09 | Landscape Planting, Revegetation, and Topsoil Management for strategies to accomplish this.
 - Use large-scale rip-rap and talus (including boulders) in conjunction with native grass, wildflower, shrub, and tree species for restoration on steep slopes (B).
 - Utilize a variety of plant material – including trees, shrubs, and herbaceous plants – in revegetation efforts to ensure long-term establishment and success (C).
 - Analyze the location and amount of native topsoil prior to construction. Strip, store, and ultimately reuse any topsoil removed during construction within this segment in order to retain the seed bank and bacteria in the soil.
 - Grind and chip existing shrubs and other plants grubbed in the area of disturbance and mix with topsoil prior to reuse to increase organic matter and regenerative capacity.
 - Ensure more successful plant establishment by using temporary and permanent drip irrigation techniques.
 - Increase the success of revegetation by track walking with earthwork equipment to create small depressions and pockets for water capture.
- Implement control measures and ongoing maintenance to prevent the spread of invasive weed species.



A | Areas of disturbance should be restored using a mixture of native landscape plants, rocks, stumps, and other natural materials to mimic and blend with the existing surroundings.



B | Boulders and talus rock used in conjunction with native planting will stabilize and restore steep slopes to a more natural condition.



C | Replanting disturbed areas with a variety of plant material including grasses, shrubs, and trees promotes the long-term success of the restoration.

07 | EARTHWORK, EMBANKMENT, AND RESTORATION OF EXISTING DISTURBANCE

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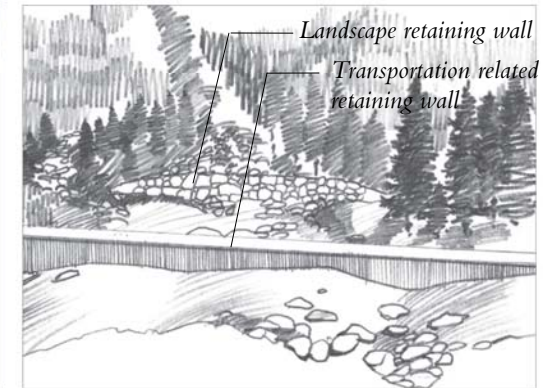
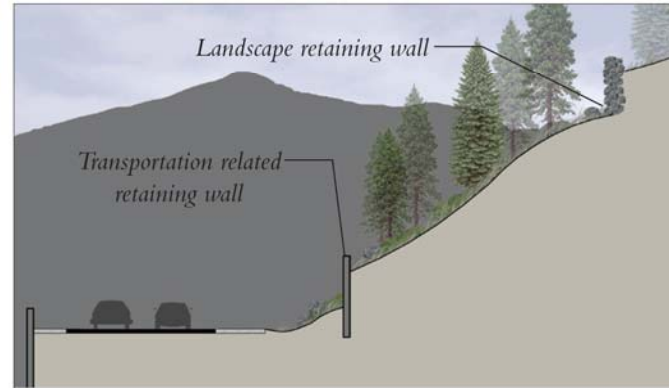
LANDSCAPE RETAINING WALLS

Design Strategies to Be Employed

- Landscape retaining walls are defined as being completely set within the existing landscape – not associated with the roadway structure or surface and are generally small in size. Walls that retain earth specifically for the purpose of creating the road platform are *not* landscape walls. Walls of this sort should be treated as part of the transportation facility.
- Small retaining walls, separated from the transportation facility and set entirely in the landscape, should utilize materials found in the natural surroundings – including boulders, rock, or talus (A, B).
- The design of these landscape associated walls is in contrast to the aesthetic of walls directly related to transportation facilities (B).



A | Landscape retaining walls are completely set within the existing landscape and should complement the surrounding natural materials, textures, and colors.



B | Landscape retaining walls should be distinct from retaining walls associated with the transportation infrastructure by being more organic in nature.

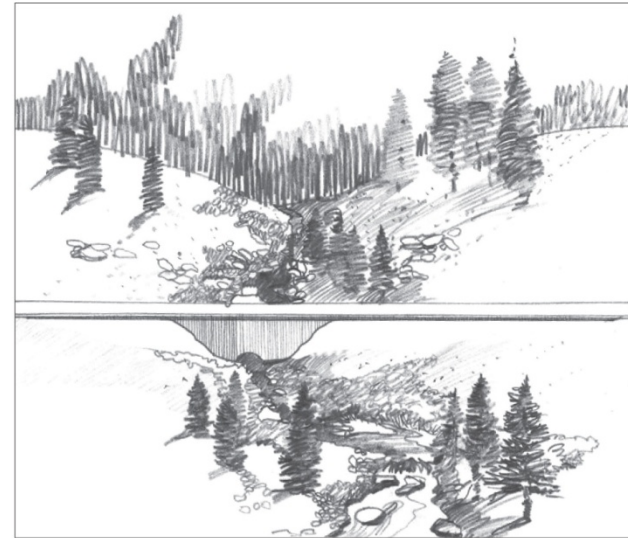
08 | HYDROLOGIC FEATURES

Hydrologic features such as streams, intermittent drainages, ponds, and wetlands that may be affected by any transportation facility construction should be designed to reflect the surrounding environment. Channels, ponds, drainages on slopes, and riparian environments hold high ecological and scenic value. Therefore, they require aesthetic design consideration as part of their implementation.

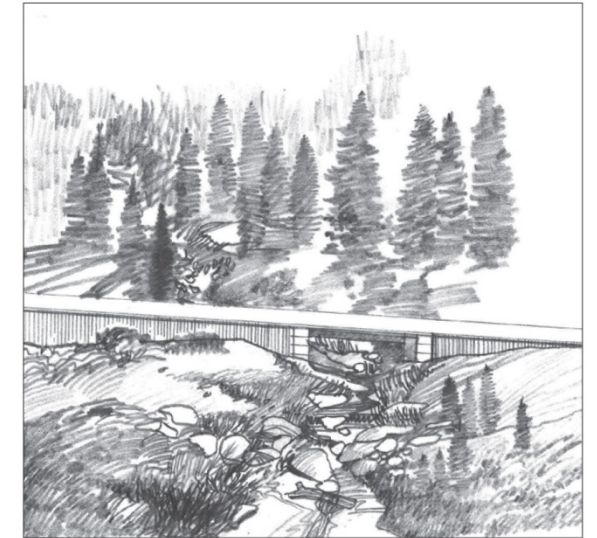
STREAMS AND HYDROLOGIC FEATURES

Design Strategies to Be Employed

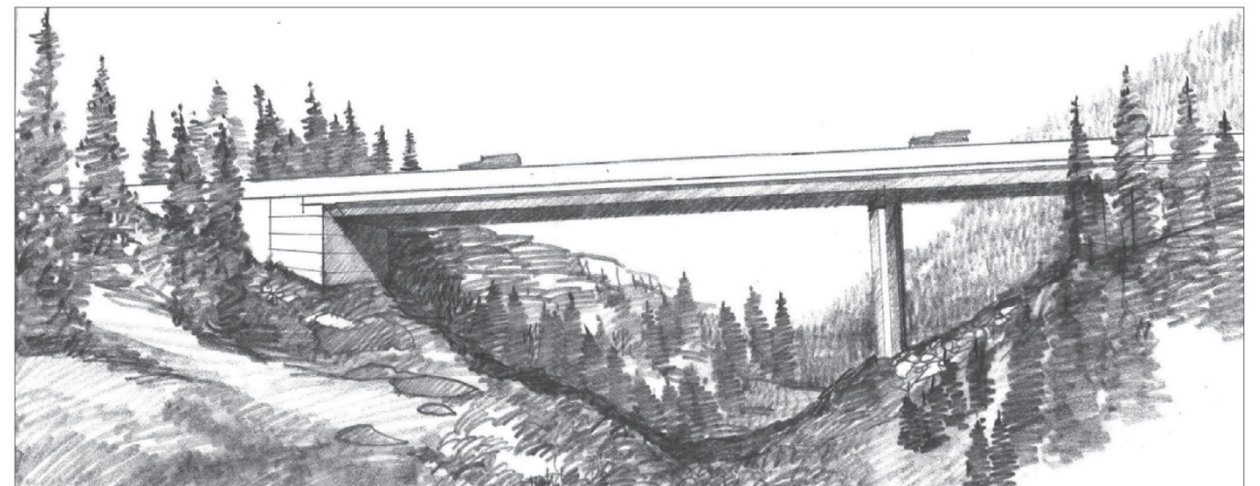
- Employ the recommendations of the [Stream and Wetland Ecological Enhancement Program \(SWEET\) MOU](#) as they pertain to hydrologic function, enhancement, and preservation. Use the SWEET Implementation Matrix to guide design at each phase of the project.
 - Incorporate the recommendations of the Black Gore Creek and Straight Creek Sediment Control Action Plans (SCAPs) and other appropriate documents to address sediment management.
 - Analyze the entire stream course to understand the overall hydraulic and geomorphologic conditions as a foundation for the design of stream enhancements, including landform, planting, edge conditions, and drop structures.
 - Treat stream edges with a variety of rock, plant materials, and landform appropriate to the functional aspects of individual drainages and stream courses.
 - Design stream and hydrologic enhancements with a sinuous and meandering aesthetic to blend with existing drainage and landscape patterns (A, B).
 - Pursue aesthetic and functional restoration of natural channels, including Black Gore Creek, Gore Creek, Tenmile Creek, and Straight Creek, where they have been previously damaged or modified by roadway improvements.
- Allow sedimentation ponds and features to perform water quality functions and then drain into natural hydrologic patterns.
 - Utilize natural rock, riparian planting, and stream channel improvements to preserve and/or enhance the visual quality of features including streams, ponds, and waterfalls.
 - Use naturalized channel design for stream crossings on the uphill and downhill sections (A, B).
 - Vary the size of rock treatments. Meander naturalized treatments so that they feather into the landscape as a naturally appearing stream.
 - Treat varying sizes of drainages in a manner appropriate to their hydrologic function and importance. Bridge perennial streams and significant drainages to minimize disturbance and preserve the hydrologic and visual quality of the landscape. If the top of bank exceeds 30' in length, then a bridge is recommended. It is expected that stream channels will not be impacted by construction (A, B, C).



A | Seasonal and ephemeral stream courses can be placed in a culvert for short sections as they cross the corridor. Naturalized channels should be maintained and enhanced on both the uphill and downhill sections as a landscape and visual feature.



B | Intermittent and perennial streams should be bridged to preserve their hydrologic function and visual quality.



C | Open bridge solutions span significant landforms and stream corridors and leave undisturbed drainages below, minimizing environmental disturbance and impacts to the hydrologic and visual characteristics of the watershed.

08 | HYDROLOGIC FEATURES

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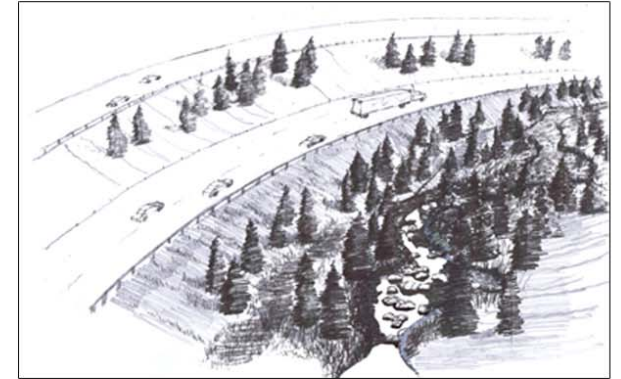
STREAMS AND HYDROLOGIC FEATURES

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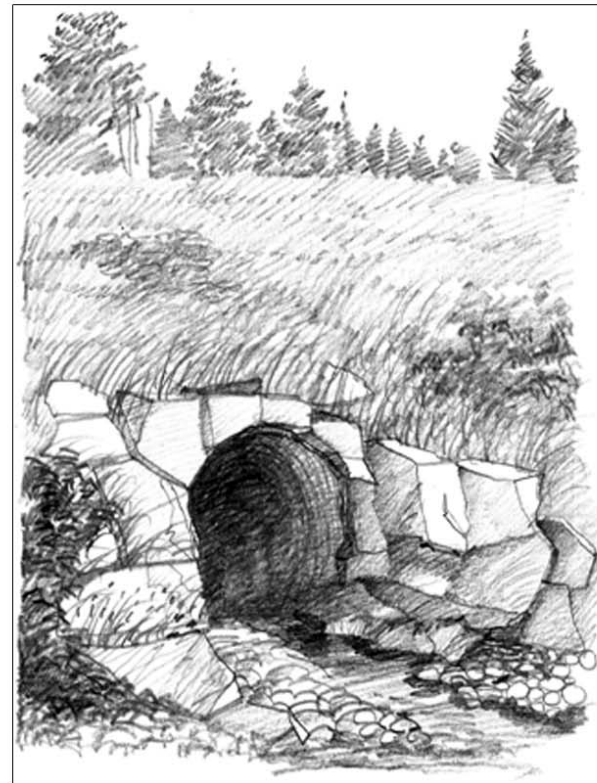
- Creeks should not be straightened or channelized in order to accommodate roadway improvements. Roadways should accommodate creek or stream sinuosity and natural appearance (B).
- Shape wetlands, pond edges, and shorelines with naturalized forms to appear as if they were existing features (A).
- Utilize naturally placed rock and aggregate at culvert outlets to provide a natural appearance (E).
- Detention basins should be revegetated or covered with appropriate ground treatment in order to reduce the look of an engineered landscape.
- Design drop structures and other stream improvements with natural materials rather than concrete structures (C, D).



A | Naturally designed wetlands contribute to water quality.



B | Allow enough room for natural creek alignment. Do not channelize the creek.



E | Culvert with natural material at outfall.



C | Drop structure using indigenous log construction.



D | Drop structure using indigenous rock construction.

09 | LANDSCAPE PLANTING, REVEGETATION, AND TOPSOIL MANAGEMENT

A landscape planting program will be included in every project in the corridor. The program – which will be completed in partnership with agencies and communities – will include a plan for landscape type, maintenance, and funding. Trees, shrubs, herbaceous plants, and native grasses will be incorporated into every new project. The incorporation of new landscape is essential to restoring the natural appearance of land after construction and to restoring the visual conditions of the corridor.

Salvaging, storing, and redistributing topsoil in all disturbed areas is a required practice throughout the corridor. The native topsoil contains a natural seed bank, moisture-retaining capacity, and nutrients to support plant growth. When these resources are managed properly, successful revegetation and long-term restoration can be achieved. Restoring disturbed areas eliminates the appearance of artificial construction, thereby creating an authentic representation of the site's natural conditions.

REPLICATION OF EXISTING LANDSCAPE PATTERNS

Design Strategies to Be Employed

- Evaluate sites for elevation, solar orientation, soil conditions, and Crest of the Rockies ecosystem type (sub-alpine, montane, foothills, or riparian). Refer to the [CSS I-70 Visual Context Maps](#) for general information.
 - Plant selections should be reviewed for drought tolerance, salt and alkali tolerance, seedling vigor, fire retardant characteristics, growth habit, suitable soil groups, and seeding rates. Use native plants already found in this segment. Natural patterns and distribution of plants is the predominate landscape design principle. Ensure that the selected plant palette complements the site-specific existing vegetation (See Section 09 | Landscape Planting). Restored plant communities should have variations in plant height, size and width (A, B).
 - Minimize the linear effect of vegetation clearing (D, E).
 - Create a continuous habitat pattern by extending planting across the full extent of medians and roadway edges (A).
- Mimic surrounding conditions of plant density and spacing, species composition, and plant community structure (A, B).
 - Blend existing rock and natural materials from the site with the landscape. Save and reuse native rock, stumps, and other natural materials in conditions such as boulder fields, talus slopes, or ground cover that emulates the existing landscape. Reuse of existing materials should be considered part of the site design (C).

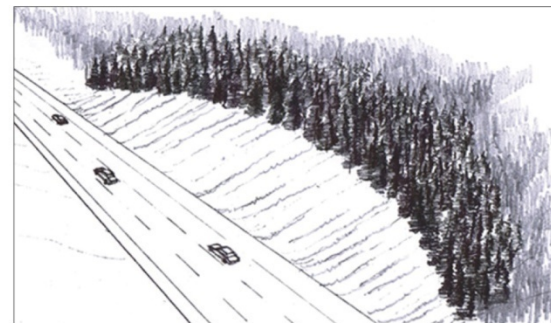


A | The existing landscape should appear to extend across the transportation corridor. Clusters of trees and other plant material representative of the life zone should be planted in the median space to accomplish this.



B | Areas of disturbance should be restored using native landscape plants that range in species, height, density, and distribution to mimic and blend with the existing surroundings.

C | Rocks, stumps, and other natural materials should be salvaged, stored, and reused in the restoration of disturbed areas.



D | Uniform clearing lines create an unnatural edge.



E | Staggered clearing lines provide a natural appearance.

09 | LANDSCAPE PLANTING, REVEGETATION, AND TOPSOIL MANAGEMENT

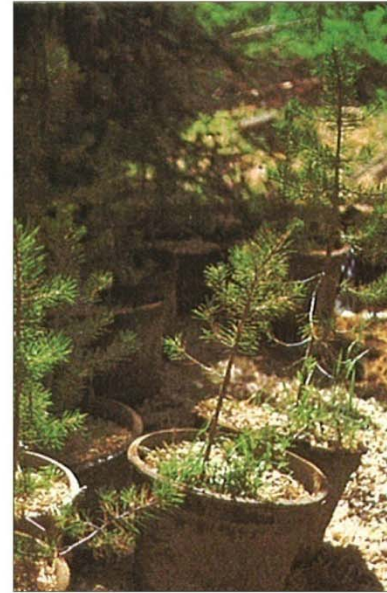
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LANDSCAPE PLANTING

Design Strategies to Be Employed

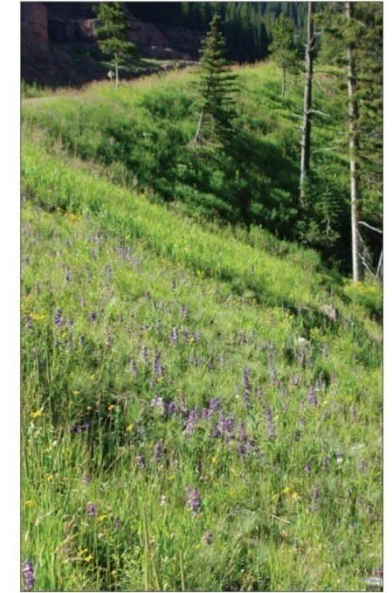
- Approximately 1/3 of existing native plants should be salvaged prior to construction. Select plants based on size, location, soils, plant value, and potential survival rate. Salvaged plants can provide mature specimens that would otherwise take years to establish. Where existing native plants cannot be reused, chip salvaged plants and incorporate them into the topsoil (A).
 - Initiate a process for native seed collection prior to construction. Collect native seed from sites in close proximity to the revegetation area. Plan in advance for seed collection as several factors can affect seed availability. If native seed is not available, acquire alternatives through seed companies or Bureau of Land Management (BLM) nurseries.
 - Nursery stock shall be sourced from an elevation within 1,000 feet of the project.
 - Monitor revegetation during construction to ensure the specified materials and installation methods have been used. Monitor and maintain areas of revegetation and weed control for up to 5 years to ensure successful native plant establishment.
- Develop a program to control noxious weeds and invasive plant species. In areas requiring revegetation, quickly establishing native species is the most effective method of controlling invasive weeds. Use biotic or organic forms of control, such as temporary mulches, to prevent invasive species from establishing.
 - Incorporate the Federal Highway Administration (FHWA) Operation Wildflower Program in revegetation efforts.
 - Utilize a central control for irrigation systems and consider the use of reclaimed water, including fully treated effluent and water harvesting techniques, as a supplement to irrigation.
 - Provide temporary watering for containerized native plants for a period of approximately 2 to 3 years.
 - Utilize the ecosystem type (sub-alpine, montane, foothills, or riparian) plant palettes appropriate to this design segment as a starting point to develop a full revegetation plant list tailored to the specific location of the project. Elevation and ecosystem information can be found on the [CSS I-70 Visual Context Maps](#).



A | Existing native plants should be salvaged prior to construction and then replanted in conjunction with additional landscape material.



B | The plant palette should be utilized as an initial list when developing a full revegetation list.



C | The plant palette should be used in conjunction with wildflower and grass seed mixes.

FOOTHILL ECOSYSTEM (4,000 to 8,000 FEET) NATIVE SPECIES

Trees	Shrubs	Perennials/Grasses
<ul style="list-style-type: none"> White Fir, <i>Abies concolor</i> Box Elder, <i>Acer negundo</i> Colorado Spruce, <i>Picea pungens</i> Ponderosa Pine, <i>Pinus ponderosa</i> Southwestern White Pine, <i>Pinus strobiformis</i> Lanceleaf Cottonwood, <i>Populus x acuminata</i> Douglas Fir, <i>Pseudotsuga menziesii</i> Bigtooth Maple, <i>Acer grandidentatum</i> Thinleaf Alder, <i>Alnus tenuifolia</i> Rocky Mountain Birch, <i>Betula fontinalis</i> Rocky Mountain Juniper, <i>Juniperus scopulorum</i> Pinyon Pine, <i>Pinus edulis</i> Quaking Aspen, <i>Populus tremuloides</i> Gambel Oak, <i>Quercus gambelii</i> 	<ul style="list-style-type: none"> Saskatoon Serviceberry, <i>Amelanchier alnifolia</i> Mountain Mahogany, <i>Cercocarpus montanus</i> Red Twig Dogwood, <i>Conus sericea</i> American Plum, <i>Prunus Americana</i> Western Chokecherry, <i>Prunus virginiana</i> Buckthorn, <i>Rhamnus smithii</i> Smooth Sumac, <i>Rhus glabra</i> Sandbar Willow, <i>Salix exigua</i> Silver Buffaloberry, <i>Shepherdia argentea</i> Rock Spirea, <i>Holodiscus dumosus</i> Three-Leaf Sumac, <i>Rhus trilobata</i> Golden Currant, <i>Ribes aureum</i> Bluestem Willow, <i>Salix irrorata</i> Slivery Leadplant, <i>Amorpha caescens</i> 	<ul style="list-style-type: none"> Nodding Onion, <i>Allium cernuum</i> Windflower, <i>Anemone multifida</i> Chocolate Flower, <i>Berlandiera lyrata</i> Purple Poppy Mallow, <i>Callirhoe involucrate</i> Sundrops, <i>Calylophus lavandulifolius</i> Plains Yellow Primrose; <i>Calylophus serrulatus</i> Purple Prairie Clover, <i>Dalea purpurea</i> Maximilian Sunflower, <i>Helianthus maximiliana</i> Bush Morning Glory, <i>Ipomea leptophylla</i> Gayfeather, <i>Liatris punctata</i> Desert Four O'Clock, <i>Mirabilis multiflora</i>

SUB-ALPINE ECOSYSTEM (9,500 TO 11,500 FEET) NATIVE SPECIES

Trees	Shrubs	Perennials/Grasses
<ul style="list-style-type: none"> Sub-Alpine Fir, <i>Abies lasiocarpa</i> Engelmann Spruce, <i>Picea engelmannii</i> Lodgepole Pine, <i>Pinus contorta latifolia</i> Limber Pine, <i>Pinus flexilis</i> Douglas Fir, <i>Pseudotsuga menziesii</i> Thinleaf Alder, <i>Alnus tenuifolia</i> Bristlecone Pine, <i>Pinus aristata</i> Quaking Aspen, <i>Populus tremuloides</i> 	<ul style="list-style-type: none"> Mountain Mahogany, <i>Cercocarpus montanus</i> Native Mountain Ash, <i>Sorbus scopulina</i> Bog Birch, <i>Betula glandulosa</i> Bristly Currant, <i>Ribes lacustre</i> Red-Berried Elder, <i>Sambucus racemosa</i> Kinnikinnik, <i>Arctostaphylos uva-ursi</i> Common Juniper, <i>Juniperus communis Montana</i> Shrubby Cinquefoil, <i>Potentilla fruticosa</i> Woods Rose, <i>Rosa woodsii</i> Russet Buffaloberry, <i>Shepherdia Canadensis</i> 	<ul style="list-style-type: none"> Pearly Everlasting, <i>Anaphalis margaritacea</i>, Pussytoes, <i>Antennaria parvifolia</i> Colorado Columbine, <i>Aquilegia caerulea</i> Golden Columbine, <i>Aquilegia chrysantha</i> Fringed Sage, <i>Artemisia frigida</i> Silver Sage, <i>Artemisia ludoviciana</i> Prairie Smoke, <i>Geum triflorum</i> Silver Lupine, <i>Lupinus argenteus</i> Sulphur Flower, <i>Eriogonum umbellatum</i> Rocky Mountain Penstemon, <i>Penstemon strictus</i> Bluemist Penstemon, <i>Penstemon virens</i> Wand Bloom Penstemon, <i>Penstemon virgatus</i> Showy Goldeneye, <i>Viguera multiflora</i> Needle Grass, <i>Stipa neesiana</i>

MONTANE ECOSYSTEM (8,000 to 9,500 FEET) NATIVE SPECIES

Trees	Shrubs	Perennials/Grasses
<ul style="list-style-type: none"> White Fir, <i>Abies concolor</i> Engelmann Spruce, <i>Picea engelmannii</i> Colorado Spruce, <i>Picea pungens</i> Lodgepole Pine, <i>Pinus contorta latifolia</i> Limber Pine, <i>Pinus flexilis</i> Ponderosa Pine, <i>Pinus ponderosa</i> Southwestern White Pine, <i>Pinus strobiformis</i> Narrowleaf Cottonwood, <i>Populus angustifolia</i> Douglas Fir, <i>Pseudotsuga menziesii</i> Rocky Mountain Juniper, <i>Juniperus scopulorum</i> Bristlecone Pine, <i>Pinus aristata</i> Pinon Pine, <i>Pinus edulis</i> Quaking Aspen, <i>Populus tremuloides</i> Gambel Oak, <i>Quercus gambelii</i> 	<ul style="list-style-type: none"> Mountain Mahogany, <i>Cercocarpus montanus</i> Red Twig Dogwood, <i>Conus sericea</i> Western Chokecherry, <i>Prunus virginiana</i> Rocky Mountain Willow, <i>Salix monticola</i> Native Mountain Ash, <i>Sorbus scopulina</i> Rock Spirea, <i>Holodiscus dumosus</i> Whitestem Currant, <i>Ribes inerme</i> Bristly Currant, <i>Ribes lacustre</i> Western Thimbleberry, <i>Rubus parviflorus</i> Red-Berried Elder, <i>Sambucus racemosa</i> Bearberry, <i>Arctostaphylos patula</i> Kinnikinnik, <i>Arctostaphylos uva-ursi</i> Silver Sagebrush, <i>Artemisia cana</i> 	<ul style="list-style-type: none"> Aspen Daisy, <i>Erigeron speciosus</i> Blanket Flower, <i>Gaillardia aristata</i> Sticky Geranium, <i>Geranium viscosissimum</i> Fairy Trumpets, <i>Ipomopsis aggregate</i> Blue Flax, <i>Linum lewisii</i> Bee Balm, <i>Mondarda fistulosa</i> White-Tufted Evening Primrose, <i>Oenothera caespitosa</i> Pasque Flower, <i>Pulsatilla patens</i> Scarlet Bugler Penstemon, <i>Penstemon barbatus</i> Mat Penstemon, <i>Penstemon caespitosus</i> Smooth Penstemon, <i>Penstemon glaber</i> Shell Leaf Penstemon, <i>Penstemon grandiflorus</i>

RIPARIAN ECOSYSTEM NATIVE SPECIES

Trees	Shrubs	
<ul style="list-style-type: none"> Box Elder, <i>Acer negundo</i>, Narrowleaf Cottonwood, <i>Populus angustifolia</i> Balsam Poplar, <i>Populus balsamifera</i> Plains Cottonwood, <i>Populus sargentii</i> Douglas Fir, <i>Pseudotsuga menziesii</i> Blue Spruce, <i>Picea pungens</i> Engelmann Spruce, <i>Picea engelmannii</i> Peachleaf Willow, <i>Salix amygdaloides</i> Rocky Mountain Juniper, <i>Juniperus scopulorum</i> 	<ul style="list-style-type: none"> Mountain Willow, <i>Salix norticola</i> Drummond's Willow, <i>Salix drummondiana</i> Narrowleaf Willow, <i>Salix exigua</i> Dewystem Willow, <i>Salix irrorata</i> Pacific Willow, <i>Salix lucida</i> Buffaloberry, <i>Shepherdia argentea</i> Snowberry, <i>Symphoricarpos alba</i> 	<ul style="list-style-type: none"> Rocky Mountain Maple, <i>Acer glabrum</i> Thinleaf Alder, <i>Alnus incana tenuifolia</i> River Birch, <i>Betula fontinalis</i> Red-Osier Dogwood, <i>Cornus sericea</i> River Hawthorn, <i>Crataegus rivularis</i> Strechberry, <i>Forestiera pubescens</i> Chokecherry, <i>Prunus virginiana</i> Skunkbrush, <i>Rhus trilobata</i>

Sources: Colorado State University Extension Gardening Series No. 7.421, No. 7.422, and No. 7.242. National Park Service Website, <http://www.nps.gov/romo/naturescience/naturalfeaturesandecosystems>.

09 | LANDSCAPE PLANTING, REVEGETATION, AND TOPSOIL MANAGEMENT

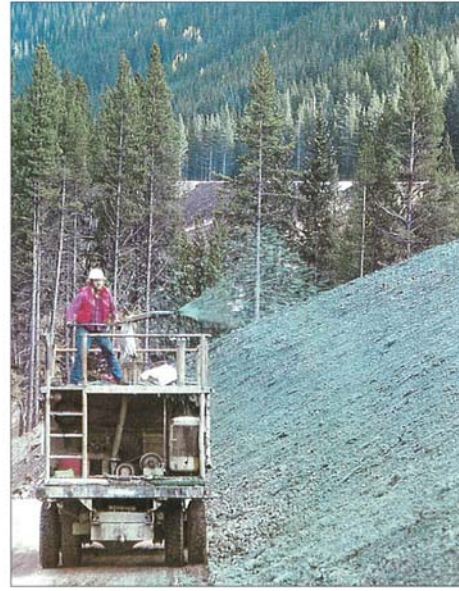
A landscape planting program will be included in every project in the corridor. The program - which will be completed in partnership with agencies and communities - will include a plan for landscape type, maintenance, and funding. Trees, shrubs, herbaceous plants, and native grasses will be incorporated into every new project. The incorporation of new landscape is essential to restoring the natural appearance of land after construction and to restoring the visual conditions of the corridor.

Salvaging, storing, and redistributing topsoil in all disturbed areas is a required practice throughout the corridor. The native topsoil contains a natural seed bank, moisture-retaining capacity, and nutrients to support plant growth. When these resources are managed properly, successful revegetation and long-term restoration can be achieved. Restoring disturbed areas eliminates the appearance of artificial construction, thereby creating an authentic representation of the site's natural conditions.

TOPSOIL MANAGEMENT

Design Strategies to Be Employed

- Ensure native topsoil is collected and stored for reuse to maintain the seed source and soil bacteria. Carefully remove, stockpile, and store the native topsoil of new construction projects to be used as final bedding material. Ensure native soil stockpiles are protected from the wind to avoid erosion and the creation of a dust hazard.
- Analyze the soil on the site to determine the need for fertilizers and pH amendments. This is particularly important if there is insufficient native topsoil on the site.
- Apply a prescribed soil treatment. Treatments such as plowing, disking, harrowing, furrowing, and hydroseeding ensure successful re-establishment, as does applying mulches (such as certified straw) and tackifiers. Soils should be roughened before planting to create favorable seed sites, particularly for grass and forb seeds (A, B).



A | Mulching should be used to reduce dust and erosion impacts and promote successful revegetation.



B | Utilize soil retention netting, mulches, and other revegetation techniques that improve the chances of successful re-establishment.

Wildlife corridors and crossings planned for inclusion in the corridor will allow animals to move naturally without physical barriers. Wildlife crossings will provide for species-appropriate clearances, clear sight lines, and buffering that will create usability for animals. Wildlife protection fences will blend into the environment and utilize the same design throughout the corridor.

WILDLIFE FENCING AND CROSSINGS

Design Strategies to Be Employed

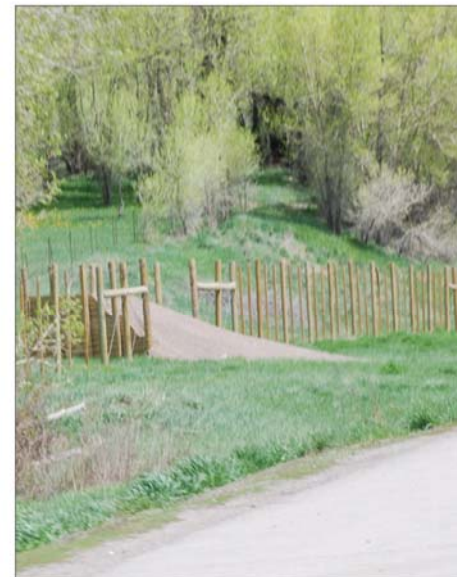
- Use open-span bridges to improve visibility for wildlife (A, B, C).
- Underpasses should incorporate naturally occurring materials that exist in adjacent areas on the ground surface. Reconstruct the ground plane in a natural configuration using rocks, soil, plants, etc. to create a natural-appearing corridor (A).
- Apply [Design Criteria](#) and strategies for transportation structures to wildlife crossing structures.
- Coordinate roadway and bridge design with naturally occurring landform and associated wildlife movement patterns (A).
- Wildlife fencing and crossings should be designed in accordance with the [A Landscape Level Inventory of Valued Ecosystems \(ALIVE\) Memorandum of Understanding](#) (C).
- Use wooden pressure-treated posts with non-galvanized rectangular wire in the construction of wildlife fencing (C).
- 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.



A | Roadway and bridge design should consider naturally occurring landforms and wildlife movement patterns.



B | Underpasses that utilize open-span bridges offer greater visibility for wildlife.



C | Fencing constructed with pressure-treated posts will weather and blend into the landscape.



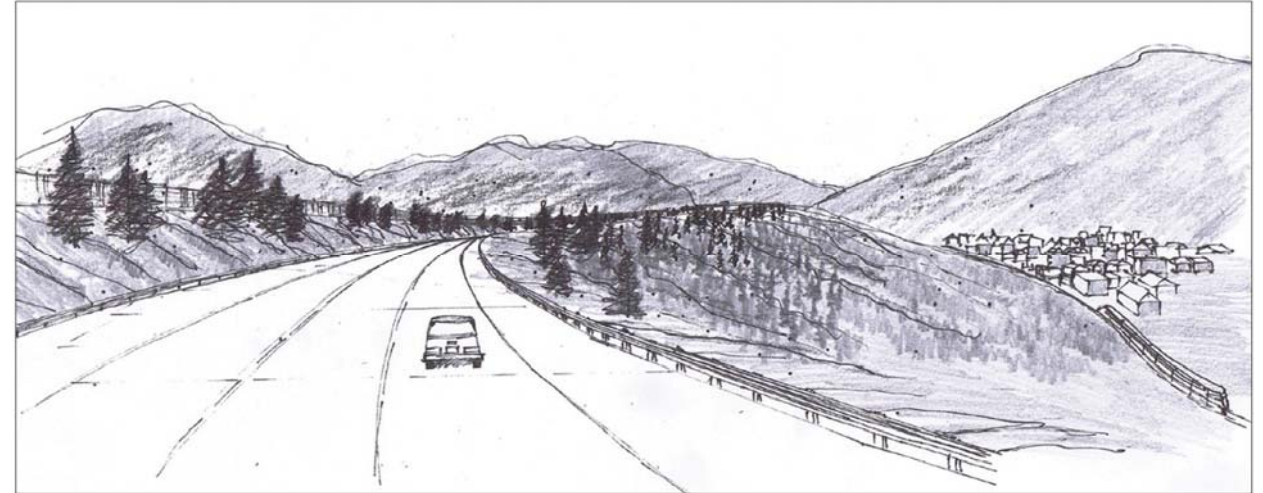
D | Underpasses that utilize open-span bridges offer greater visibility for wildlife than box culverts or enclosed crossings.

A thoughtful transition between transportation alignments and adjacent community-oriented land uses will buffer noise and visual impacts and help preserve the quality of life for residents living and working next to the corridor. Alignment, landscape, earthwork, and structural solutions should include an evaluation of their potential interface with adjacent communities. Corridor designs that facilitate pedestrian and multi-modal connections across the transportation corridor strengthen mobility within the community and encourage successful land use patterns and circulation. The design of the corridor can further enhance the functionality of adjacent communities by appropriately identifying gateways, regional highway connections, and recreational or cultural activities. These primary interchanges and locations should be highlighted to visually communicate their importance to the traveler.

PROTECTING ADJACENT COMMUNITIES

Design Strategies to Be Employed

- Consider alignment alternatives that improve community interface.
- Engage the adjacent community in a discussion about appropriate interface and where sightlines should be enhanced (A).
- Design the corridor in partnership with communities, agencies, and future project planners to create a buffer and transition from the transportation corridor to community-oriented land uses. Landscape, earthwork, and structural solutions may be used to create the appropriate transition based on the adjacent land uses and character (B, C).
- Minimize impacts and consider the potential negative effects of roadway design on residential and commercial areas (B, C).



A | Provide appropriate visual buffers between transportation improvements and communities.



B | This community interface successfully uses a combination of landforms, walls, and planting solutions for noise reduction.



C | Where possible, earthwork and landscaping should be utilized to buffer community-based land uses from the corridor rather than stand-alone sound walls.

A thoughtful transition between transportation alignments and adjacent community-oriented land uses will buffer noise and visual impacts and help preserve the quality of life for residents living and working next to the corridor. Alignment, landscape, earthwork, and structural solutions should include an evaluation of their potential interface with adjacent communities. Corridor designs that facilitate pedestrian and multi-modal connections across the transportation corridor strengthen mobility within the community and encourage successful land use patterns and circulation. The design of the corridor can further enhance the functionality of adjacent communities by appropriately identifying gateways, regional highway connections, and recreational or cultural activities. These primary interchanges and locations should be highlighted to visually communicate their importance to the traveler.

LINKAGES AND CONNECTIONS

Design Strategies to Be Employed

- Open pedestrian underpasses to allow for maximum natural lighting to enhance a feeling of safety and comfort. The use of landscape and appropriate materials will contribute to the comfortable pedestrian environment (A).
- Plan and integrate transit connections and access into the corridor design to enhance the community interface with future transit systems.
- Consider the relationship of communities to the location of rest areas, recreation portals, chain-up stations, etc. The location and design of these facilities will follow standard federal requirements and will also consider potential community impacts and benefits such as resident access to recreation, traveler use of community services and amenities, tourist accommodations, etc.
- Locate safe pedestrian crossings in conjunction with existing or planned pedestrian circulation networks. Pedestrian networks should provide access to community parks, recreation trails, attractions, and businesses as well as between city districts (B, C).



A | Safety and accessibility is improved by open, day-lit connections and a clear separation of vehicular and pedestrian circulation.



B | Connections and linkages should facilitate access to nearby recreational trails and activities.



C | Pedestrian bridge crossings reconnect the community when bisected.

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HIERARCHY OF ACCESS

Design Strategies to Be Employed

- **Regional Access** – Establish a hierarchy of importance for regional access points and apply the appropriate level of identification and design treatments. Criteria used to determine the hierarchy include access to other areas of the state, important recreational or cultural features, and the population served by the interchange. Primary interchanges should receive greater resources and landmark design quality as opposed to secondary and community interchanges. Regional interchanges include:

- US 24 (mm 171)
- CO 91 (mm 195)
- CO 9 South (mm 203)
- CO 9 North (mm 205)
- US 6 (mm 216)

- **Community Access** – Establish a hierarchy of importance for different interchanges serving the same community based on the functionality of particular interchanges (B). Important criteria used to determine the hierarchy of interchanges include the presence of road corridors connecting with interchanges, access to major amenities, and connections to major attractions and civic destinations. This strategy will visually identify the *main* access serving particular communities along this segment, including:

- Edwards (mm 163)
- Avon/Beaver Creek (mm 167)
- Minturn (mm 171)
- Vail (mm 176)
- Frisco (mm 203)
- Dillon/Silverthorne (mm 205)

- **Traveler Services** – Establish an appropriate level of identification and design treatments for interchanges pertaining to traveler services (C, D). Criteria used to determine the hierarchy include easily accessible interchange configuration, visible services, and minimal interruption to the community. Interchanges servicing travelers include:

- Avon/Beaver Creek (mm 167)
- Copper Mountain (mm 195)
- Frisco (mm 203)
- Dillon/Silverthorne (mm 205)

- **Local Access** – Establish an appropriate level of identification and design treatments for local access (A). Criteria used to determine the hierarchy include limited access to the community, services, recreation, or major amenities. This access provides connection to primarily residential land use. Interchanges with local access include:

- Post Boulevard (mm 168)
- Eagle/Vail (mm 169)
- Frisco (mm 201)



A | US 24 at Douds Junction (mm 171).



B | CO 91 at Copper Mountain (mm 195).



C | Avon/Beaver Creek (mm 167).



D | CO 9 at Dillon/Silverthorne (mm 205).

12 | SOUND ATTENUATION

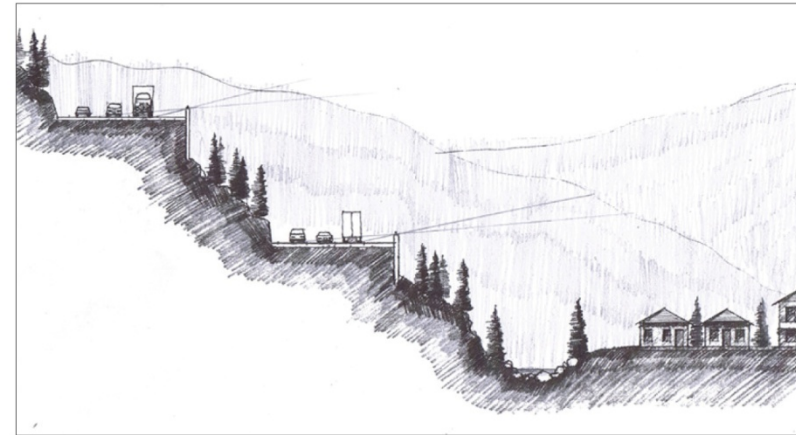
A goal for the corridor is to eliminate the need for sound attenuation through facility design. Alternatives to sound walls will be considered in the search for sound attenuation solutions. No free-standing sound attenuation should be included in the corridor design. Sound walls should be avoided where possible. Cases in which sound walls are obligatory, such as those where right-of-way space is lacking, walls should incorporate landscape features and earth forms.

SOUND ATTENUATION

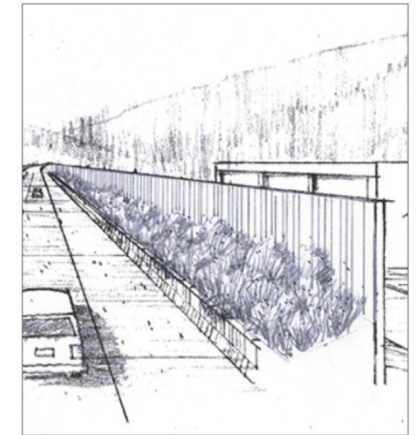
Design Strategies to Be Employed

- Initially address sound attenuation by considering vertical and horizontal alignment as described in the [Design Criteria](#). The intent is to eliminate the need for sound attenuation through the appropriate design of the transportation facility (A).
- Utilize landform and berming strategies or integrated landform and wall systems for noise protection rather than stand-alone sound walls (C, D, E).
- Incorporate a 90 degree stepped or sinuous horizon line at the top of walls. Elevation changes should be 6" to 24" in height. Angular and irregular designs are not appropriate for this segment (F).
- Avoid placing sound walls on top of concrete barriers. Sound walls should be consistent structures using a consistent material. As an alternative design, install sound walls separate and parallel to barriers, leaving at least 8' in between (B).
- Include simple, attractive textures and patterns on both sides of sound walls (i.e., sides facing local communities and lanes of traffic along I-70). Motifs or pictorial representations are not to be used on sound walls.
- Integrate sound walls into the right-of-way of the segment with landscape planting as a transition between sound walls and the roadway. The use of grading and earthwork in

- the landscape area will allow for reductions in the height of the exposed sound walls (E).
- Incorporate landscape screening on both sides of the sound wall.
- Utilize variable grade options on both sides of sound walls to limit the height of the exposed wall to 12' (C, D, E).
- The geometric alignment of sound walls should include variations created by earthwork, landscape or offset faces when viewed from the transportation facility.
- Aesthetic treatments can be considered on soundwalls facing communities with coordination and a signed agreement regarding costs and maintenance.



A | Initially address sound attenuation by considering vertical and horizontal alignment alternatives as described in the Design Criteria.



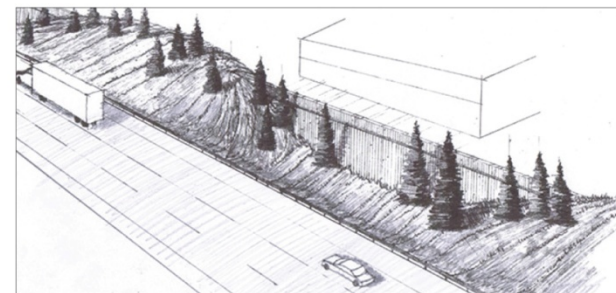
B | Separate but parallel sound walls with minimum of 8 feet to allow for landscape.



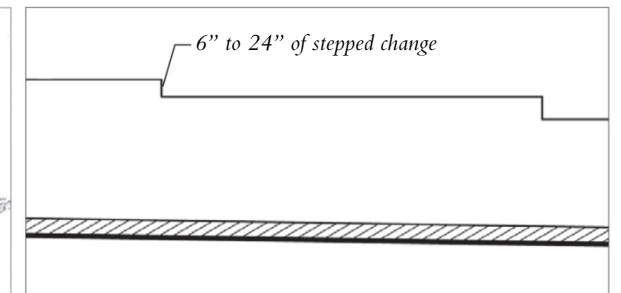
C | Use of landform and berming strategies.



D | When sound walls are required, utilize berming, landscape, texture, and limited wall height.



E | Utilize berms and landforms as much as possible to reduce the need for exposed sound wall structures.



F | Elevation changes on the top of sound walls should occur in 6 to 24 inch increments.

The design of corridor facilities should facilitate access to the wealth of recreational and cultural resources that exist throughout the corridor. Clear and intuitive signage, parking areas, trailheads, and interpretive elements will draw attention to these resources and accommodate both travelers and local residents alike. Opportunities to combine functions into multi-use facilities that encourage efficient use of space and expose visitors to a variety of activities should be explored.

RECREATIONAL AND CULTURAL RESOURCE ACCESS

Design Strategies to Be Employed

- Designate rest area facilities, scenic areas, and viewpoints as *shared use* to accommodate both recreational users and travelers. Design these facilities in a deliberate manner to minimize potential conflicts between recreational users and travelers, and to provide interpretive signage, restrooms, and parking for cars and trailers (A).
- Utilize signage to indicate points of historical or cultural importance, recreation, natural history, or landmarks for travelers to note along the corridor (B).
 - *Specific recreational points of interest may include:*
 - *The Continental Divide*
 - *Access to the Continental Divide Trail at Copper Mountain (exit 195), Frisco (exit 203), Herman Gulch (exit 218), and Bakerville (exit 221)*
 - *Access to Vail Pass Winter Recreation Area/White River National Forest*
 - *Historic and cultural points of interest may include:*
 - *1844: Congress commissioned the first US expedition to map routes through the mountains. John Charles Fremont followed the route of today's CO 9.*
 - *1936: Loveland was the first ski area to open.*
 - *1939-1949: The Public Works Administration established the first route over Vail Pass from Wheeler Junction to Minturn.*
- Incorporate a landscaped buffer of at least 30' between the roadway shoulder and any adjacent trails or bike paths to minimize conflicts in locations where recreational trails parallel the roadway (C).
 - *1943: The US Army established the 10th Mountain Division specializing in skiing and mountaineering located at Camp Hale, a training facility outside of Leadville along US 24.*
 - *1962: Vail ski area opened.*
 - *1973: The 1.7-mile-long Eisenhower Johnson Memorial Tunnel was opened to two-way traffic.*



A | Design rest areas and other roadside facilities such as scenic areas and viewpoints to accommodate both travelers and recreational users.



B | Cultural, scenic, and recreational points of interest should be clearly identified and described by interpretive signage.



C | Utilize landform and planting within a buffer of at least 30 feet to protect recreational trails from the roadway.

Road service areas and adjunct facilities along the corridor will be designed in conjunction with the roadway as a complete design effort. The utilization of colors, materials, architectural elements, and plant communities that are reflected in the adjacent landscape can integrate facilities into their surrounding context. Rest areas and viewpoints offer opportunities for multi-functional spaces that can provide traveler services and serve as launch points for recreational and/or cultural activities. However, roadside facilities that are directly related to safety and maintenance – such as chain stations – should remain dedicated to those specific functions. Visually screening maintenance and equipment areas will limit visual clutter and ensure a consistent relationship among the roadway, the traveler, and the surrounding environment.

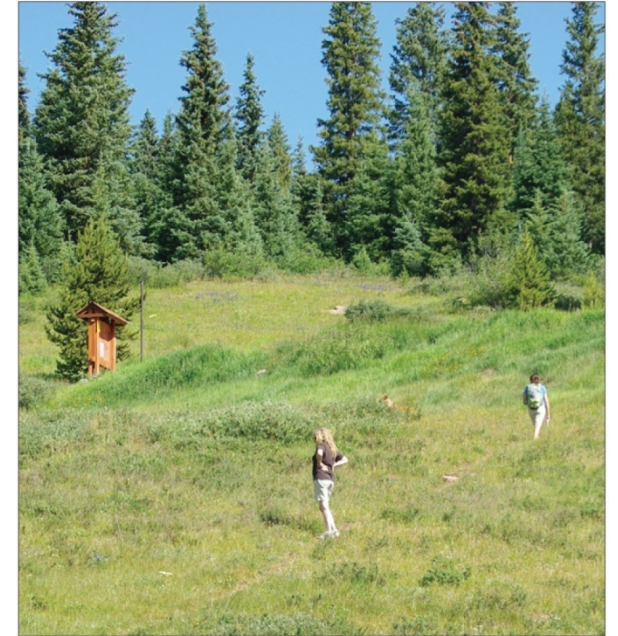
ROAD SERVICES

Design Strategies to Be Employed

- Research and review all appropriate documents and plans associated with rest areas, truck parking, chain stations, and other road service facilities that have been previously prepared.
- Design road service areas to consider and preserve major site resources and features such as topography, views and vistas, unique vegetation, geological features, wetlands, and other qualities native to the site and its surroundings (A, C).
- Utilize local materials, plantings, and landscape features to blend seamlessly with the surrounding landscape (A).
- Scale light levels and the height of light poles appropriately to create a pedestrian environment and to avoid light pollution.
- Locate truck parking in a manner so as not to disrupt views and other features.
- Site road service areas in relation to activities located adjacent to the highway (B).
- Coordinate with appropriate agencies to provide informational signage for shared-use activities.
- Incorporate park-and-ride lots, activity access, and transit stops to encourage public transportation – particularly in areas of heavy tourist traffic.



A | Road service areas should utilize local materials and plantings, as well as pedestrian-scale lighting.



B | The location of road service areas should be coordinated and integrated with recreational trails and access.



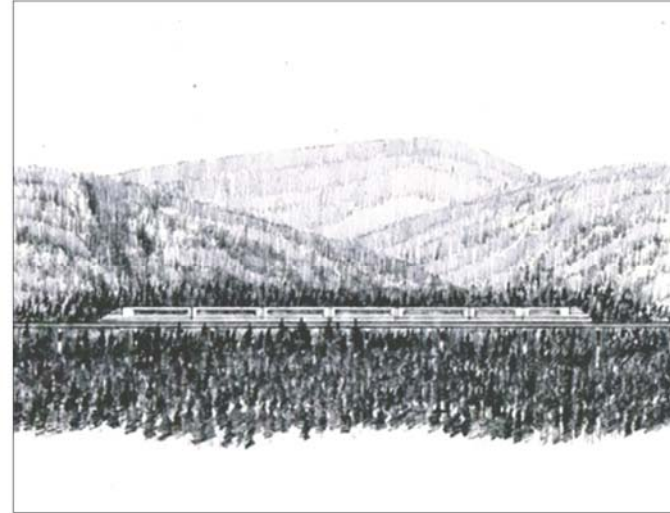
C | Road service areas should be designed to highlight and preserve site resources and scenic views.

Transit infrastructure and facilities will be designed according to the same Aesthetic Guidance that applies to the roadway in order to develop a uniform, comprehensive design solution for the corridor. Structures that support transit infrastructure should share a design language that is common in form, color, and material to that utilized for the highway. This consistency will apply across all transit-associated facilities, including stations, yet allow several opportunities for location specific elements.

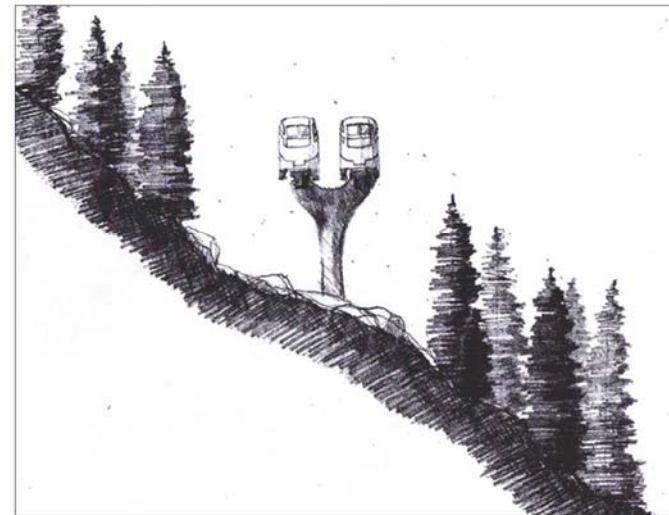
ADVANCED GUIDEWAY SYSTEM

Design Strategies to Be Employed

- Coordinate the location of transit support facilities throughout the I-70 Mountain Corridor with the Rocky Mountain Rail Authority High-Speed Rail Feasibility Study and the I-70 Coalition Transit Land Use Study or the most recent transit implementation study.
- Transit facilities should be designed comprehensively to include urban design, architecture, engineering, and landscape architecture.
- Transportation facilities should connect communities with multi-modal facilities, transfers, and pedestrian circulation. Information systems can facilitate these connections and links. A uniform identity and design should be used for these elements.
- Advanced Guideway System (AGS) must have a separate alignment as described in [Design Criteria](#).
- Apply roadway Aesthetic Guidance to transit facilities.
- Design transit structures and facilities as described in the [Design Criteria](#).
- Avoid locating the Advanced Guideway System (AGS) where it can be viewed silhouetted against the sky (A, B).



A | Locate the AGS with natural landscape foreground and background.



B | Reduce the visual prominence of the AGS by locating it below ridgelines with sensitivity to natural landform and avoid straight linear vegetation removal.

Corridor lighting will satisfy safety and functional needs while avoiding excessive light levels and high mast lighting applications. Light spillage and encroachment will be avoided in consideration of adjoining neighborhoods and the protection of the dark night sky.

LIGHTING

Design Strategies to Be Employed

- Select an elegant and simple pole configuration (B).
- Use a durable, powder-coated color finish for light poles and fixtures to match this design segment color palette.
- Focus attention on luminance versus illumination (i.e., brightness of pavement versus brightness of light) when establishing light levels to be provided.
- Use lighting fixtures that minimize light pollution and glare, provide even light dispersion, and fully conceal the light source. Use fixtures with full-cutoff luminaires.
- Avoid high mast lighting as it is not appropriate for this segment.
- Avoid metal halide light sources as they are not appropriate for this segment.
- Design lighting in accordance with the policies and programs of the International Dark Sky Association to minimize light pollution along the corridor.
- Prepare a lighting study as part of the design process that addresses lighting from multiple perspectives – including, but not limited to, minimum transportation lighting requirements, impacts on wildlife and recreation, and pedestrian perspectives.
- Use intelligent lighting systems for roadside facilities that are only functional during specific situations. For example, recent lighting

- upgrades at chain stations only activate when the chain law is in effect (C).
- Consider reflective lane stripping.
- Focus lighting at major transportation and community interchanges consistent with their level of importance (A). These include:
 - Edwards (mm 163)
 - Avon/Beaver Creek (mm 167)
 - Minturn/US 24 (mm 171)
 - Vail (mm 176)
 - Frisco/CO 9 (mm 203)
 - Dillon / Silverthorne/CO 9 (mm 205)
 - Loveland Pass/US 6 (mm 216)
 - Copper Mountain/CO 91 (mm 195)
- Focus lighting at major roadway service areas and recreation portals consistent with their level of importance (C). These include:
 - Vail Chain-Up Station (EB & WB mm 177)
 - Vail Pass Rest Area (mm 190)
 - Officers Gulch (mm 198)
 - Dillon Chain-Up Station (EB mm 205)
 - EJMT Chain-Up Station (WB mm 215)
 - Watrous Gulch (EB & WB mm 219)



A | Lighting should be concentrated at transportation and community access points appropriate with their level of importance including, Vail (mm 176) and Dillon/Silverthorne/CO 9 (mm 205).



B | Light poles should be of an elegant and simple design with full-cutoff luminaire fixtures.



C | Concentrate lighting and utilize intelligent systems at major road service areas like the chain-up station at Watrous Gulch (EB & WB mm 219). The image above is an ideal example of forest service brown.

The traveler should enjoy the beauty of the surrounding landscape, and the traveler's dominant experience should be a clear and intuitive visual scene that is free of the clutter caused by signs of various types, sizes, materials, and purposes. Signage should be kept to a minimum. Where it is used, it should be simple and elegant – constructed with a palette of consistent, high-quality materials and colors. Commercial billboard advertisements and signage affect the visual integrity of the landscape and are not appropriate for the corridor.

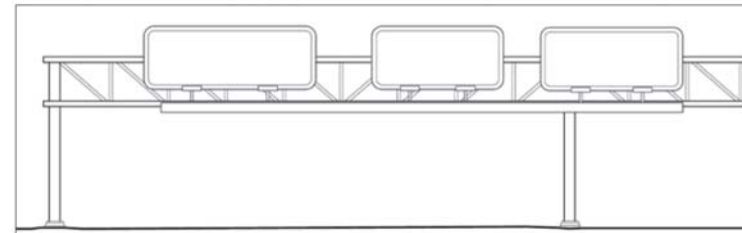
SIGNAGE

Design Strategies to Be Employed

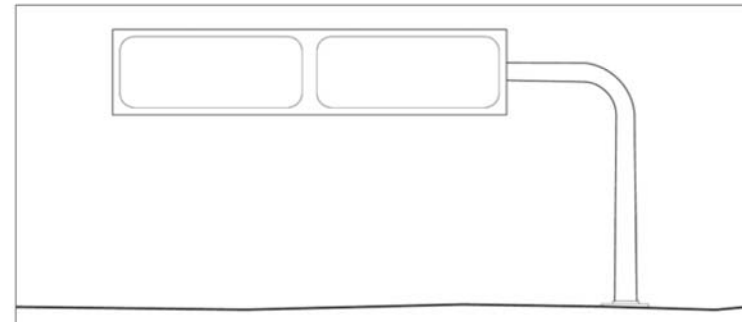
- Design signage to meet all applicable Colorado Department of Transportation (CDOT) and Manual on Uniform Traffic Control Devices (MUTCD) standards.
 - Prepare a conceptual signing plan to ensure signage can be located and implemented correctly within the context of the improvement at approximately the 15% design stage.
 - Apply a consistent color and material to signage support structures that matches this segment's color palette. See Section 06 | Color Selection and Consistency for additional details and color palette.
 - Construct signs of a high quality and durable material.
 - Use single-arm monotube systems for signage support rather than complex steel trusses to reduce visual clutter (A, B).
 - Limit signage on the roadway to identify road services, communities, and cultural, recreational, or historical points of interest.
 - 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 FIR 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 after-thought and protect sight lines to focal points along the corridor.



A | Single-arm monotube systems should be used.



Truss systems are not preferred.



B | Monotube supports for signage present a more elegant solution than the cluttered truss systems shown above.

Utility infrastructure, such as power and gas distribution lines, can create poor visual quality in the corridor. Burying overhead lines, relocating them, and reducing the crossing of utility lines over the highway will avoid visual degradation. These scenic improvement opportunities must be considered in corridor projects.

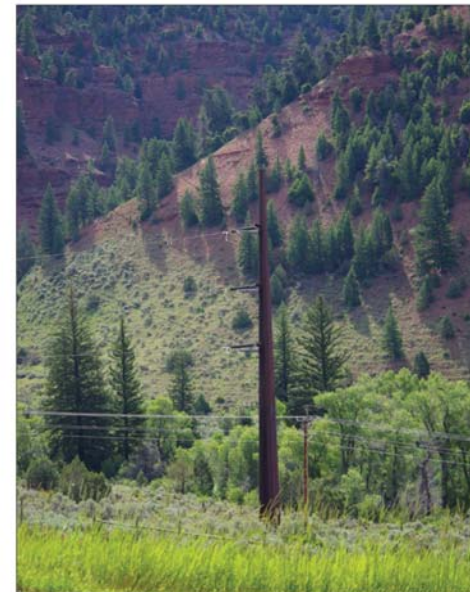
UTILITIES

Design Strategies to Be Employed

- Consider placing utility lines underground to minimize conflict with high-value views to improve scenic and visual appearance.
- Realign utility corridors to avoid a direct or unobscured view from the corridor.
- Add landscape plantings and landforms to screen and block views from the transportation corridor toward existing utility corridors.
- Avoid straight-line cut patterns in forests or dense vegetation. Varying cuts will create a feathered or irregular pattern, providing a more natural appearance (A).
- Apply the appropriate color from this design segment color palette (B).



A | Straight, linear utility cuts appear highly unnatural and impact the scenic quality of the high alpine environment found in this segment.



B | Proper color application based on the surrounding natural context blends utility structures into the landscape.

Materials used for construction will be managed to minimize the negative aesthetic implications of construction logistics. Materials acquisition, storage and clearance of excess cut and fill, and the disposal of waste materials will be predetermined and controlled with a pre-approved, corridor-wide Construction Management Plan. The plan will assist in anticipating where materials may be stored, sourced, and may include partnerships used in future corridor projects.

MANAGEMENT OF CONSTRUCTION MATERIALS

Design Strategies to Be Employed

- Develop a construction management plan which describes the approach for cut and fill sources and storage and logistics for materials prior to construction.
- Do not stockpile construction materials in medians or other areas of high visual or recreational value – even on a short-term or temporary basis (A, B).
- Manage dust on stockpiles and/or construction zones by using revegetation with annual grasses or mechanical methods.
- Place batch plants, stone crushing, or material storage according to the construction management plan.



A | The approach to the Eisenhower Johnson Memorial Tunnel presents a cluttered and confusing mix of construction and maintenance uses to the traveler.



B | Construction and maintenance materials should not be stockpiled along medians or shoulders. This is especially important for areas with high visual or recreational value.