

Appendix to BCCP Open Space Element Maps: Mapping Overview, View Protection Corridor Mapping Methodology and Guidance for Use

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Introduction

There are two maps associated with the Boulder County Comprehensive Plan's Open Space Element following the 2017 update of the element: 1) the "Open Space and Protected Lands Map,"¹ and 2) the View Protection Corridor (VPC) Map. The purpose of the Open Space and Public Lands map is to provide context so the reader can gain a general understanding of the magnitude, scope and location of land protected from development in the county. The VPC map is intended to serve as a more detailed tool for planners as they gather information to inform an assessment of a site's aesthetic resources.

In contrast to the previous version of the element, updated mapping no longer identifies "streamside corridors," as riparian resources are now addressed comprehensively in the BCCP Environmental Resources Element policy language and maps.² In addition, the new map no longer identifies "proposed open space," as the county's open space acquisition efforts are at a phase where identification of those lands is no longer a priority feature for the OSE map.

Interpretation and Use of View Protection Corridor (VPC) Scoring

The county's electronic mapping system provides a precise score for each section of roadway. Scores range from 0 to 5. For simplicity, the map color codes the roadways to indicate whether they fall into the following broad scoring categories: below 1; between 1 and 2, and above 2. It is important to click on the road section in question to check on the actual score rather than relying entirely on the color coding by category.

The intent is for planners to consider the score of a given section of roadway relative to other areas of the county, and to use the VPC score as an indicator of whether a property deserves a heightened level of attention with regard to aesthetic characteristics. The VPC score assesses the view from the roadway, so it does not factor in all aspects of aesthetics that warrant consideration during development review. Some properties not adjacent to a high scoring section of road may still warrant attention with regard to VPC scoring because there are visible from a high scoring road segment.

VPC Mapping - Background

View Protection Corridors are referenced in Policy OS 1.02.01, which reads:³

Policy 1.02.01: To the extent possible, the county shall avoid, minimize or mitigate impacts on views from view protection corridors including, but not limited to, those shown in mapping that accompanies this element. The county may preserve these scenic corridor areas by means of appropriate dedication during the development process, reasonable conditions imposed through

¹ This map follows the same format as a map the Parks and Open Space Department updates quarterly for posting on its own department's website. The only difference is that the map used for the BCCP includes specific notation for its use as a reference map for the BCCP. The map used for reference in the BCCP will undergo an annual update.

²Riparian resources are mapped as part of the BCCP Environmental Resources Element's (ERE) "BCCP Wetlands and Riparian Areas Map," available at: <https://assets.bouldercounty.org/wp-content/uploads/2017/03/bccp-map-wetlands-riparian-areas.pdf>. In addition, the scenic and resource values of riparian areas are addressed through a variety of goals and policies in the ERE. For example, Goal B2, ER 1.04 (addresses protection of scenic vistas generally), and ER 3.01 (addresses mapping of Environmental Conservation Areas including riparian areas).

³As part of the 2016 update to the BCCP Open Space Element, staff updated previous policy OS 3.03 with policy OS 1.02.01. Previous policy 3.03 read, "To the extent possible, the county shall protect scenic corridors *along highways and mountain road systems*. The county may preserve these scenic corridor areas by means of appropriate dedication during the development process, reasonable conditions imposed through the development process, or by acquisition."

the development process, or by acquisition. This, however, does not preclude the county from providing essential and appropriately planned road improvements.

The primary intended purpose of the VPC map is to serve as a reference tool for planners as they evaluate aesthetic resources during land use reviews. The map will inform staff's analysis, but it is just one component in staff's overall assessment; staff conducts a comprehensive assessment of property-specific characteristics which may include considerations beyond those captured in the VPC mapping. Parks and Open Space Department staff will also reference the VPC map for use in valuing conservation easements. This is similar to the way in which staff used the "open corridor, roadside" designation prior to the 2017 update to the OSE.⁴

Staff developed the VPC map in an effort to supplement/supersede the previous "Open Corridor-Roadside" mapping with a mapping resource that would: 1) have greater transparency in its development, 2) leverage a range of GIS data, and 3) be comprehensive in its identification of roadways warranting view protection (i.e., recognizing the importance of a range of views, not just those of the mountains).

The county's VPC mapping framework draws on the National Scenic Byways Program's "intrinsic qualities" of scenic roadways (scenic, archaeological, cultural, historic, natural, and recreational). Staff identified a variety of "mappable" criteria that align with those intrinsic qualities. For simplicity, the county's system organizes the criteria into three categories: scenic, cultural and natural. The criteria reflect the range of data sources and other possible means by which to identify roads that possess exceptional scenic characteristics. The criteria (Table A1) consist primarily of elements trackable in GIS using existing data sources, but also include some components identifiable through field observation.

Staff developed a scoring system to reflect the degree to which a given road segment meets the county's View Protection Corridor criteria. The scoring system uses weighted averages that factor in both length of roadway meeting a criterion and the number of criteria met. It gives higher scores to road segments that either: 1) meet some criteria for a long stretch of roadway; or 2) meet a significant number of criteria for a shorter stretch of roadway.

Key Definitions, Parameters and Procedures

Staff applies the following definitions, parameters and procedures for purposes of View Protection Corridor mapping and analysis:

- **Eligible roads** include roads in unincorporated Boulder County and shown on the Boulder County Road Map, excluding subdivision roads. Roads in historic townsites are considered eligible for scenic mapping, despite the fact that some roads within townsites are classified as subdivision roads. This exception to the standard eligibility criteria reflects the historic significance of townsites.
- **Road segment** is defined as the roadway that spans the distance between two intersections.

⁴ Staff uses view protection-related mapping (referred to as "open corridor, roadside" in the previous Open Space Element) for multiple purposes. Parks and Open Space staff uses it to help measure the value of conservation easements. When Parks and Open Space staff negotiates conservation easements (CEs) with landowners or receives CEs from or grants CEs to municipalities, the CEs need to describe the property's open space values. For CEs that involve donation value, where the landowner wants to obtain state or federal tax benefits, the CEs have to meet one of four defined public purposes, one of which includes a scenic component. LU staff uses it to identify properties that warrant a heightened level of attention to scenic and aesthetic issues when conducting land use reviews (e.g., extra attention to locating and/or screening a structure to avoid, minimize or mitigate visual impacts). Aesthetic factors do not serve as a basis for denial of a development opportunity. Rather, LU staff may cite use the scenic designation as rationale to avoid, minimize and mitigate potential visual impacts by placing conditions on the location of the structure, and by requesting use of screening methods.

- Staff will **update mapping on an annual basis**. The Open Space and Public Lands Map will be updated annually to reflect the latest data available from the Parks and Open Space Department. Staff will review circumstances annually to determine whether an update to the VPC Map is warranted. Updates to the VPC Map will serve the purpose of: 1) adapting the criteria or map in response to newly available information (e.g., availability of new map layers referenced in the criteria, identification of new cultural resource locations not previously incorporated in to analysis, or other information provided by members of the public or advisory committee members), 2) changing the map to reflect changing conditions (e.g., remove roads that no longer meet criteria or add new roads that previously did not meet criteria). **Any updates to the criteria or map would be made available for public comment, and would require PC approval.**
- If new information is presented that identifies **cultural resources not previously factored into the mapping**, county staff with expertise in historic resource assessment will be responsible for determining the historic significance of the identified resources. Staff will keep a log of data updates to be incorporated in the annual update to the VPC Map.
- **An applicant may challenge staff’s assessment** of the aesthetic significance of a parcel. This would adhere to the same process that would apply for challenges to staff findings related to any development review process.
- **Roadways already designated as Scenic Byways (either state or federal)** will automatically be assigned the highest scoring available so that they stand out in the VPC as warranting the greatest level of attention to aesthetic characteristics.

Mapping Criteria

The VPC mapping criteria are shown in Table A-1. When reviewing the map, note that criteria shown in plain font can be mapped using existing GIS and other readily available data. Those serve as base criteria for initial mapping. Criteria marked with an asterisk (*) and shown in italics are used to refine the initial base map, and need to be mapped based on field observation and other efforts. New data gathered related to these criteria will be added to the map when the map undergoes updates.

Table A-1. Scenic Roadway Corridor Mapping Criteria

Category	Criteria	Significance / Relevance to Intrinsic Qualities
Scenic Views ⁵	<ol style="list-style-type: none"> 1. Roadways that have views of the Natural Landmarks as identified in the BCCP [Implemented in coordination with Criteria #8; Roadways can meet either Criteria #1 or #8] 2. Roadways having a Scenic Byway designation of any type (i.e., state or federal) [automatically mapped with max score] 3. Roadways that have considerable views of the plains 4. Roadways that have views of perennial lakes, ponds, or reservoirs 5. Roadways that are along the bottom or sides of a canyon 	Heightened visual experience derived from the view of natural and manmade elements of the visual environment.

⁵See Viewshed Mapping Method summary included in this document.

Category	Criteria	Significance / Relevance to Intrinsic Qualities
	6. Roadways that run alongside slopes steeper than 10 degrees or more ⁶	
Cultural Resources (including historical, cultural and archaeological)	7. Structures or corridors with historic landmark designation of any type (i.e., municipal, county, state, national) and are visible from the road 8. Roadways that have views within one mile of Significant Agricultural Lands as identified in the BCCP [Implemented in coordination with Criteria #1; Roadways can meet either Criteria #1 or #8] 9. <i>*Historic, cultural or archaeological interpretive signage or displays are present along the roadway *The roadway corridor itself, or adjacent parcels are identified</i> 10. by staff as possessing historic, cultural or archeological significance	Historical: Legacies of the past that are distinctly associated with physical elements of the landscape, whether natural or manmade. Cultural: Evidence and expressions of established customs or traditions of a distinct group of people. Archaeological: Physical evidence of historic or prehistoric human life or activity.
Natural	11. Roadways are within Critical Wildlife Habitat; Rare Plant Areas; Significant Natural Communities; Wetlands and Riparian Areas; Natural Areas; or High Biodiversity Areas as identified in the BCCP	Features in the visual environment that are in a relatively undisturbed state. These features may include geological formations, fossils, landform, water bodies, vegetation, and wildlife.

Scoring Method

The scoring method uses a weighted average approach. To calculate the score for a specific segment of road, the number of criteria that a particular part of the road segment meets is multiplied by the length of that part. This is done for all of the parts of the road that have a different number of criteria. The results are then summed together, and the total is divided by the total length of the segment.⁷ This process can be described by the following equation.

$$\frac{(number\ of\ criteria_{part1} \times length\ of\ part_{part1}) + (number\ of\ criteria_{part2} \times length\ of\ part_{part2}) + \dots + (number\ of\ criteria_{partN} \times length\ of\ part_{partN})}{total\ length\ of\ segment}$$

- For example, there is a 1200' road segment. 500' of the road meets 3 criteria, 200' of the road meets 2 criteria, 400' of the road meets 1 criterion, and 100' of the road meets 0 criteria.
- The score for this segment of road would be 1.91:

$$\frac{(500' \times 3) + (200' \times 2) + (400' \times 1) + (100' \times 0)}{1200'} = 1.91$$

Viewshed Mapping Method

⁶Development of this criterion was informed by the I-70 Mountain Corridor PEIS Visual Resources Technical Report (See Section 2.1 Visual Resources Inventory Methodology pg. 2 – 6). In particular, the description of foreground, middle ground, and background views (pg. 6) informed which criteria should have view distance limits (Ag Land and Historical Landmarks) since they would be more 'foreground' type scenic views, and those criteria not having distance limits since they would be more middle ground and background views (Natural Landmarks, Plains, and Lakes). Descriptions of the areas found in Appendix B of the report (PDF page 104-173) help show what is considered scenic. The report can be found at: https://www.codot.gov/projects/i-70mountaincorridor/final-peis/final-peis-documents/technical-reports/Vol5_I-70_Mntn_Corridor_Final_PEIS_VisualResources_TR.pdf

⁷When calculating weighted averages for scoring the denominator is always ½ mile, or smaller.

The view analysis determines the geographic area that is visible from a location. This analysis uses a Digital Surface Model (DSM); it shows the approximate surface elevation including ground, vegetation and buildings. The DSM used a 100x100' cell size (about 0.23 acres) for this analysis. Points based on a 500x500' grid (about 5.7 acres) within the criteria area were then used as observer points. The ArcGIS Viewshed tool was then run using the DSM and the observer points. The output of the tool is a grid of cells that counts how many observer points can be seen from each cell. The effect is the higher the number, the more area of the criteria that can be seen. A minimum number of observer points was then used for each criteria to determine whether that location should be considered as having a view of the criteria. The following is the how the minimum number was determined for each of the view criteria:

Natural Landmark Views: A distance factor was also applied, so that the number of observer points was adjusted, so that farther landmarks would have less weight than closer landmarks. The number of observer points visible was kept the same (100%) for locations adjacent to landmarks. At a distance of 1 mile, the number of observer points was reduced 25%. At a distance of 2 miles, the number of observer points was reduced 50%. At a distance of 4 miles the number of observer points was reduced 75%. At a distance of over 8 miles, the number of observer points was set to zero (100% reduction). Locations that had more than the mean number of observer points visible were considered to have views of the Natural Landmarks. Locations where at least 1,003 acres (176 observer points) of Natural Landmarks are visible were considered to meet this criterion.

Views of Plains or Agricultural Lands: For agricultural lands, only views within one mile of the agricultural lands were considered. Locations that had more than the mean number of observer points visible were considered to have views of the Agricultural Lands. This includes areas were at least 28 acres (5 observer points) of Agricultural Lands are visible. For the plains, areas that had more than the mean number minus $\frac{1}{4}$ of the standard deviation were considered to have views of the plains. This includes areas were at least 1,294 acres (227 observer points) of plains visible. Locations that met the criteria of either the plains or agricultural lands were considered to meet this criterion.

Lake Views: For perennial lakes, ponds or reservoirs, only views within one mile were considered. Locations that had more than 11 acres (2 observer points) visible were considered to meet this criterion.

Historic Landmark Views: Only views within a half-mile were considered. Locations that had more than had any visibility were considered to meet this criterion.