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## DEPARTMENT OF PUBLIC WORKS

**TO:** El Paso County Planning Commission  
Thomas Bailey, Chair

**FROM:** Howard A. Schwartz, P.E., Engineer III, DPW  
Joshua Palmer, Department of Public Works, County Engineer

**RE:** MP231, Adoption of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan into the El Paso County Master Plan

First Planning Commission Hearing Date:	10/05/2023
Second Planning Commission Hearing Date:	11/02/2023
Third Planning Commission Hearing Date:	12/07/2023

**Commissioner District:** All

### EXECUTIVE SUMMARY

The El Paso County Department of Public Works (DPW) requests adoption of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan into the El Paso County Master Plan. The Briargate Parkway-Stapleton Road corridor is an integral part of a larger transportation system in the Pikes Peak Region. The corridor will ultimately connect I-25 to US Highway 24 on the north side of the greater Colorado Springs area. The portion of this corridor under consideration as part of this study, between Black Forest Road and Meridian Road, is mostly undeveloped at this time, with some portions containing existing roadways of various types and phases of construction associated with adjacent development.

The study area begins at Black Forest Road, which is the eastern boundary of the Wolf Ranch subdivision and coincides with the eastern boundary of the City of Colorado Springs. The terminus of the study area is along Stapleton Road at Meridian Road. There is a significant amount of development occurring in this rapidly developing area of the City and the County. Most of the study corridor falls under the jurisdiction of El Paso County; however, it will likely be incorporated into the City of Colorado Springs as development progresses.

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The study identifies needed capacity and mobility improvements for the corridor and a phasing plan to implement those improvements. The Corridor Preservation Plan component of the El Paso County 2016 *Major Transportation Corridors Plan* (2016 MTCP) identifies the ultimate need for a four-lane section throughout the project corridor, both to meet forecasted travel demand and to fulfill broader county system and connectivity needs. The 2016 MTCP included specific recommendations regarding functional classification, transportation modes, and other uses for the Briargate-Stapleton corridor. The 2016 MTCP indicates that Briargate-Stapleton is expected to be a four-lane principal arterial from the eastern city limits of Colorado Springs (Black Forest Road) to Judge Orr Road. Additional mobility provisions, such as bike routes, pedestrian accommodations, and public transit, that are necessary also have been identified. This study will ensure the appropriate spacing of proposed development activity access along the corridor to maintain the functionality appropriate for the corridor's functional classification. Also, recommendations for both interim and ultimate improvements that address capacity and safety improvements based upon the findings of the study, along with potential future funding limitations, are identified. Multiple developments have submitted filings along this corridor and are in various approval, construction, and completion stages. The corridor alignment took these planned developments into consideration.

The State of Colorado State Highway Access Code, last updated March 2002, Section 2.12, states that a local authority may develop an ACP for a road segment that defines access locations and type. Creating an ACP allows the local authorities to plan all access points along a roadway segment as a network rather than at individual access locations. Intersection spacing, traffic movements, land use, topography, and other local plans may be considered in developing an ACP.

An ACP provides a framework to ensure that future development and access will not affect the roadway's functionality. This is particularly relevant to arterial roads as it can allow for more continuous traffic movement and reduce delays due to intersection or turning movements. Access management has several benefits:

- Improves Safety - Fewer decision points and conflict points.
- Accommodates Travel Demand - Strategically limits entrance/exit point, reduces congestion, and lessens travel times.
- Preserves Economic Viability - Captures a broader market by providing a consistent development environment, allowing for easy access to businesses and residential areas.
- Enhanced Aesthetics - Defined sidewalks and medians provide opportunities for streetscaping.

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The El Paso County *Engineering Criteria Manual* (ECM) has guidance for the minimum intersection spacing required, based on the roadway classification. Since this is essentially a new corridor, multiple developments have submitted filings along the corridor and are in various approvals, construction, and completion stages. An ACP benefits this corridor by limiting the amount and type of access made to the corridor, per the ECM requirements. All current development filings have been examined, and the access for those developments has been studied. The study results indicate that the currently proposed intersections should be implemented either as full-access or right-in/right out (RIRO) intersections. All future filings should be examined to ensure that they comply with the results of this ACP.

**A. REQUEST/AUTHORIZATION**

**Request:** Adoption of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan (PCD File No: MP-23-001).

**B. EFFECT OF APPROVAL OF AN AMENDMENT TO THE MASTER PLAN**

Colorado Revised Statute C.R.S. § 30-28-106 et. seq. provides that it is the duty of the Planning Commission to make and adopt the County Master Plan. The Statute requires careful studies to be made prior to plan adoption.

If adopted by the Planning Commission, the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan will become the principal Master Plan for further planning and development of the Briargate Parkway/ Stapleton Road corridor within unincorporated El Paso County.

The Briargate Parkway/Stapleton Road Corridor Preservation Plan is legally considered to be advisory only. The review criteria for many of the land use applications processed by the Planning and Community Development Department include a requirement that the application be in conformance, general conformance, or consistent with the Master Plan. The Briargate Parkway/Stapleton Road Corridor Preservation Plan will be utilized to evaluate and inform development proposals and land use and 1041 permit applications; be a foundation for revising or developing regulations; coordinate regional and local initiatives; inform Capital Improvement Programs and Budget initiatives; identify additional studies and future action steps; and be an information source for policy makers and citizens.

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**C. APPLICABLE RESOLUTION**

See attached PC Resolution.

**D. GENERAL LOCATION**

The Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan study area begins at Black Forest Road, which is the eastern boundary of the Wolf Ranch subdivision and coincides with the eastern boundary of the City of Colorado Springs. The terminus of the study area is along Stapleton Road at Meridian Road.

**E. BACKGROUND**

**What is required by Colorado Revised Statute?**

Counties are authorized to prepare comprehensive plans as a long-range guiding document for a community to achieve its vision and goals. The Planning Commission is charged with preparing the master plan. The comprehensive plan (or master plan) provides the policy framework for regulatory tools like zoning, subdivision regulations, annexations, and other policies. A comprehensive plan promotes the community's vision, goals, objectives, and policies, establishes a process for orderly growth and development, addresses both current and long-term needs, and provides for a balance between the natural and built environment. (See C.R.S. § 30-28-106) Elements addressed in a comprehensive plan (master plan) may include: recreation and tourism (required by state statutes), transportation, land use, economic development, affordable housing, environment, parks and open space, natural and cultural resources, hazards, capital improvements, water supply and conservation, efficiency in government, sustainability, energy, and urban design. The statutory basis regarding master plans is included as an attachment.

**Development of this Plan**

The RFQ for development of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan was issued in 2019 and Wilson & Company was selected as the consultant and began work in early 2020. Throughout the process, DPW staff provided support for presentations, recording, advertisements, press releases, web support and publications.

In developing the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan, DPW staff were committed to encouraging a broad spectrum of County residents to participate in an open and transparent public

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input process. This process was designed to provide citizens information about the purpose of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan and the facilities and services provided by the County, and to solicit ideas and priorities related to the study.

The community engagement process was comprehensive to both gather information and engage citizens, staff, partners, and other key stakeholders. Participants were presented with information and encouraged to provide their perspectives and insights. Opportunities included:

- Stakeholder meetings
  - Four virtual meetings were held representing developer organizations, homeowner associations, and governmental agencies.
- Project website at <https://www.briargate-stapleton.com>
- Virtual Public Open House
  - Open for 3 weeks w/additional 30-day comment period
- Public Comment Period on Final Report
  - 41 comments received and responses provided

Development of this Plan occurred during the Covid-19 global pandemic, which challenged the consultant, County staff, review agencies, and public in the completion of the project.

### **What does this Plan include?**

The study identifies needed capacity and mobility improvements for the corridor and a phasing plan to implement those improvements. Also, recommendations for both interim and ultimate improvements that address capacity and safety improvements based upon the findings of the study, along with potential future funding limitations, are identified. The study considered multiple facets as part of the planning process including existing conditions, mobility, roadway geometry, access needs and impacts, drainage requirements and impacts, as well as compatibility with other existing planning documents that include the study area.

### **What will this Plan be used for?**

The Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan is legally considered to be advisory only. The review criteria for many of the land use applications processed by the Planning and Community Development Department include a requirement that the application be in conformance, general

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conformance, or consistent with the Master Plan. The Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan will be utilized to evaluate and inform development proposals, land use, and 1041 permit applications; be a foundation for revising or developing regulations; coordinate regional and local initiatives; inform Capital Improvement Programs and Budget initiatives; identify additional studies and future action steps; and be an information source for policy makers and citizens.

#### F. STATUS OF MAJOR ISSUES

Through stakeholder and public outreach, the strongest sentiments expressed regarding the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan were concerns by the land development community surrounding perceived restrictions in direct access to their properties through the implementation of the Access Control Plan and perceived loss of the rural ambience of the study area was expressed by current area residents. These concerns have been thoroughly considered and addressed in the Study including a process outlined in the Access Control Plan for amending the Plan if certain criteria related to the ECM are met. Additionally, all parties from whom comments were received during the course of the Study on all subjects of concern have had responses to their comments provided to them.

An initial hearing was conducted in front of the Planning Commission on October 5, 2023, and a follow-up hearing conducted on November 2, 2023. Following each of these hearings, several public comments were received by the EPC Departments of Public Works and Planning and Community Development, as well as comments and questions raised by several of the Commissioners at the Nov. 2 hearing regarding this request to adopt the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan into the County's Master Plan. All of these comments have been addressed and appropriate responses returned to all commentors. Revisions have been made to the plan documentation to address the concerns of the public and the Commissioners.

#### G. APPROVAL CRITERIA

##### 1. EL PASO COUNTY MASTER PLAN CONSISTENCY AND POLICY PLAN COMPLIANCE

The Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan will be a component of the Your El Paso Master Plan.

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## **2. COMPLIANCE WITH COUNTY PROCEDURES AND GUIDELINES**

The procedures performed in completion of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan are consistent with documented County policies and guidelines.

Certifications to the municipal planning commissions and to the Board of County Commissioners are required after adoption of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan by the Planning Commission.

## **3. OTHER FACTORS**

C.R.S. § 30-28-106 et. seq. governs adoption of a county master plan. The statute allows the Planning Commission to adopt new or amended County Master Plans "in whole or in parts".

The Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan will become the principal Master Plan for further planning and development of the Briargate Parkway / Stapleton Road corridor within unincorporated El Paso County.

## **H. PUBLIC COMMENT AND NOTICE**

The public was invited to engage at each phase in development of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan. This included development of a project website, media and press releases, social media, and emails to interested organizations and individuals. The El Paso County Public Information Office was instrumental in the public involvement process. Information regarding the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan has been provided continuously on the DPW website, project webpage, and periodically on the County's main website.

Legal Notice for both Planning Commission hearings was published in *The Gazette* on September 22, 2023.

The draft Plan is available for public review online on the project webpage at: <https://www.briargate-stapleton.com/> and is also accessible through the Public Works Department webpage at: <https://publicworks.elpasoco.com/road-bridge/construction-maintenance-projects/>

Additional certifications are required after adoption by the Planning Commission.

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## **I. STAFF RECOMMENDATIONS**

Staff recommends adoption of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan with the following conditions and notations:

### **CONDITIONS**

1. C.R.S. § 30-28-109 requires the Planning Commission to certify a copy of the Master Plan, or any adopted part or amendment thereof or addition thereto, to the Board of County Commissioners and to the Planning Commission of all municipalities in the County. The Planning Commission's action to amend the Master Plan shall not be considered final until a minimum of ten (10) complete sets of the final documents are provided and such documents are certified by the Chairman of the County Planning Commission and distributed as required by law.
2. Upon adoption by the El Paso County Planning Commission, the effect of this document is adoption of the Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan into the Master Plan for El Paso County.

### **NOTATIONS**

1. Certification of the documents to the municipalities within the County pursuant to Condition No. 1 above is determined to be satisfied upon transmittal of summary information and maps along with a clear description of the locations where the complete documents are available for inspection, along with an offer to provide a given municipality a complete copy of the documents if requested. The transmittal may be in the form of a digital copy.
2. In approving this document, it is understood that minor editorial and formatting changes will be made in conjunction with the final publication process. These modifications may include pagination, correction of typographical errors, clarifications, insertion of photographs, insertion of references and/or corrections to factual information, or inclusion of comments and modifications associated with the Planning Commission hearings. In no case will substantive changes be made to the text without reconsideration by the Planning Commission.

## **J. ATTACHMENTS**

Draft Briargate Parkway/Stapleton Road Corridor Preservation Plan and Access Control Plan

Legal Notice

Public Comments

Draft PC Resolution

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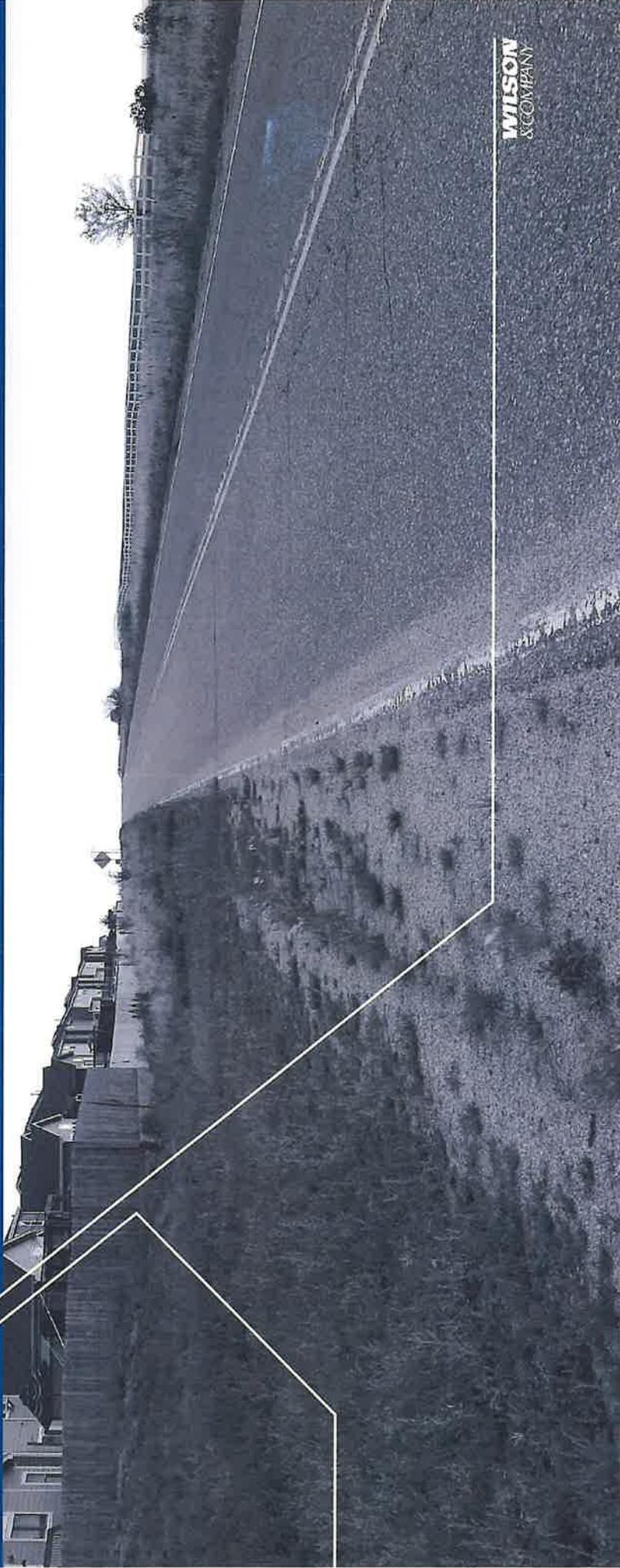
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El Paso County, Colorado  
December 2023

# Corridor Preservation Plan

## Briargate Parkway/Stapleton Road Corridor Study

On-Call CON 17-067Z  
Task Release #17-067-51



**WILSON**  
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# CORRIDOR PRESERVATION PLAN

Briargate Parkway–Stapleton Road Corridor Study for El Paso County

December 2023

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## 1 Introduction and Overview

### 1.3 Existing Conditions

The Briargate Parkway–Stapleton Road (in some locations referred to as Stapleton Drive) corridor is an integral part of a larger transportation system in the Pikes Peak Region. The corridor will ultimately connect I-25 to US Highway 24, on the north side of the greater Colorado Springs area. The portion of this corridor under consideration as part of this study, between Black Forest Road and Meridian Road, is mostly undeveloped at this time, with some portions containing existing roadways of various types and phases of construction associated with adjacent development.

#### 1.1 Project Summary

The study area begins at Black Forest Road, which is the eastern boundary of the Wolf Ranch subdivision and coincides with the eastern boundary of the city of Colorado Springs, as shown in Figure 1.1. The terminus of the study area is along the Stapleton Road right-of-way (ROW) at Meridian Road. There is a significant amount of development occurring in this rapidly developing area of the city and the county.

All the corridor currently falls under the County's jurisdiction; however, some portions will likely be incorporated into the City of Colorado Springs (the City or COS) as development progresses. For this reason, close coordination will be required with the City regarding corridor access control.

#### 1.2 Purpose of the Study

This study identifies needed capacity and mobility improvements for the corridor and a phasing plan to implement those improvements.

The Corridor Preservation Plan component of the El Paso County 2016 Major Transportation Corridors Plan (2016 MTCP) identifies the ultimate need for a four-lane section throughout the project corridor both to meet forecasted travel demand and to fulfill broader county system and connectivity needs. The 2016 MTCP included specific recommendations regarding functional classification, transportation modes, and other uses for the Briargate-Stapleton corridor. The 2016 MTCP indicates that Briargate-Stapleton is expected to be a four-lane principal arterial from the eastern city limits of Colorado Springs (Black Forest Road) to Judge Orr Road. Additional mobility provisions, such as bike routes, pedestrian accommodations, and public transit, which are necessary also have been identified. This study will ensure the appropriate spacing of proposed development activity access along the corridor to maintain the functionality appropriate for the corridor's functional classification.

Also, recommendations for both interim and ultimate improvements that address capacity and safety improvements based upon the findings of the study, along with potential future funding limitations, are identified.

The preferred alternative will reflect corridor improvements that optimize public safety, needs, and preferences while balancing enhanced capacity, access management, and development.

The study corridor extends from Black Forest Road to Meridian Road, about 5.5 miles. Approximately 4.3 miles of the corridor have not been constructed yet. The sections that have been built are not consistent with the proposed roadway classification and use.

From the west, about 0.2 miles of two-lane, 24'-wide asphalt roadway exists to the east of Black Forest Road east. The ROW indicates that 120' has been set aside for this corridor. Through the Wolf Ridge development, Briargate Parkway is a four-lane divided section with curb and gutter and a 30' raised median. In this area, 160' of ROW has been set aside for the roadway.

Similarly, from the east, Stapleton Drive/Road exists for about 1.0 miles as a two-lane, 24'-wide asphalt roadway from Meridian Road to west of Tower Avenue. ROW that has been set aside in this area varies from 120' to 130'. East of the project, Stapleton Drive/Road is a two-lane section with open drainage and an intermittent painted median.

#### 1.4 Corridor Issues

Existing conditions and study scope were presented to corridor residents and identified stakeholders through the project website. Community and stakeholder input helped shape the final recommendations presented in the preferred alternative by identifying corridor improvements that optimize mobility, needs, and preferences while balancing enhanced capacity, access management, and development. This input was used to define solutions and as a basis to refine alternatives. Recurring elements identified include:

- Mobility
- Roadway Geometry
- Access Needs and Impacts
- Drainage Requirements and Impacts

##### 1.4.1 Mobility

This corridor is expected to play an essential role in the mobility and connectivity of the region by providing a northern connection from I-25 to US 24. The proposed corridor typical section will include a 4-lane section with shoulders, turn lanes, pedestrian/bicycle facilities. These facilities will improve the mobility of motorists, transit, bicycles, and pedestrians.

#### 1.4.2 Roadway Geometry

Limited roadway geometry exists in the proposed corridor, with approximately 1.2 miles of the 5.5-mile corridor currently constructed. For the roadway that does exist, geometry upgrades that can improve corridor mobility and provide necessary carrying capacity include:

- Flattening curves and grades
- Providing new and/or wider shoulders
- Adding turn, acceleration, and deceleration lanes
- Increasing lane widths and/or number of lanes
- Adding accommodations for pedestrians and bicyclists
- Providing adequate roadside clear zones
- Upgrading intersections (e.g., adding turn bays, control upgrades)



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#### 1.4.3 Access Needs and Impacts

Multiple developments have submitted filings along this corridor and are in various stages of approvals, construction, and completion. The corridor alignment took these planned developments into consideration. Adjacent planned developments include the list below:

- Sterling Ranch Homestead
- Indian Wells
- The Ranch
- Stapleton Estates
- The Meadows
- Paint Brush Hills
- Sterling Ranch
- Eagle Ridge
- Eagle Wing
- Wolf Ranch
- Highland Park
- Eagle Rising
- Wild Ridge
- Briargate Pkwy
- Meridian Rd
- Raygor Rd
- Stapleton Rd
- Volmer Rd
- Black Forest Rd

Figure 1.2 depicts the locations of these developments relative to the proposed corridor alignment.

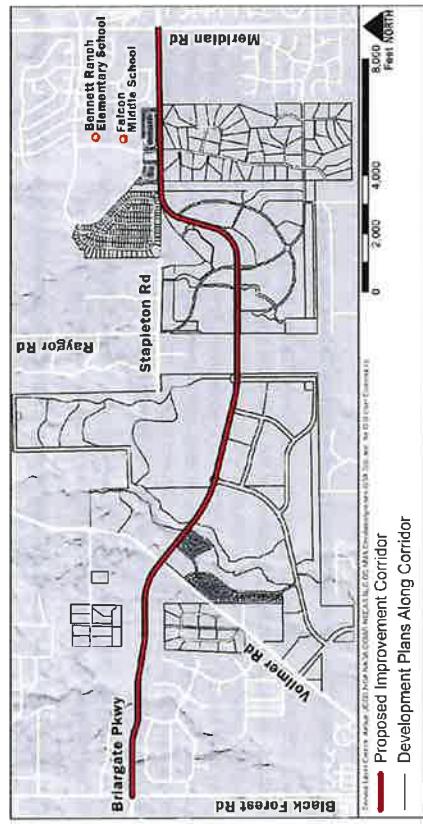


Figure 1.2 Development Plans along the Briargate-Stapleton Corridor

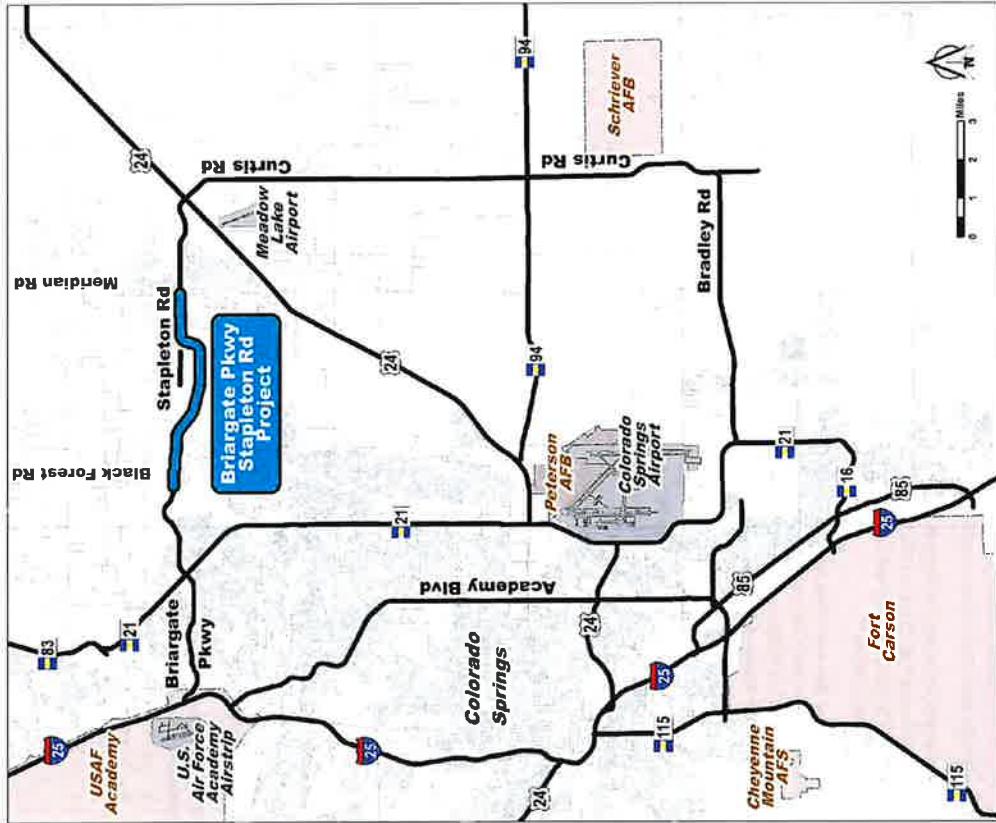


Figure 1.1 Study Area Vicinity Map

#### 1.4.4 Drainage Requirements and Impacts

The Briargate-Stapleton corridor traverses three major drainage basins - Cottonwood Creek, Sand Creek, and Falcon Watershed. The conceptual drainage investigation used data from the available Drainage Basin Planning Studies (DBPS), Major Development Drainage Plans, and Final Drainage Reports. Hydrologic and hydraulic data taken from these reports was used to estimate the off-site drainage needs.

Off-site drainage traverses the Briargate-Stapleton corridor at approximately 30 locations. The most significant crossing locations are Cottonwood Creek, Sand Creek, West Tributary of Falcon Watershed, and East Tributary of Falcon Watershed. Conceptual culvert sizes for all crossings range from 24" pipe to multi-cell concrete box culverts.

On-site drainage was estimated to include 17 outfall locations along the corridor. The off-site runoff will not be allowed to drain onto the roadway section and mix with the on-site runoff. The pavement runoff will be collected in curb box inlets and routed to the outfall locations via storm drains. The on-site runoff will be treated for water quality, and detention will be provided to reduce flows to the required levels.

Key drainage considerations include:

- Managing Off-site and On-site run off appropriately,
- Accounting for any necessary wetland mitigation,
- Sizing culverts to convey peak flows under roadway,
- Including water quality detention and treatment features to mitigate runoff impacts,
- Providing and/or relocating curb and gutter within urban sections.

#### 1.5 Current Regional Transportation Plans

Two regional planning documents related to this Corridor have been published:

- El Paso County Major Transportation Corridors Plan (MTCP, December 2016)
- Pikes Peak Area Council of Governments 2045 Moving Forward RTP (2045 RTP, January 2020)

#### 1.5.1 El Paso County Major Transportation Corridors Plan (MTCP) and Road Impact Fee (2016)

The Major Transportation Corridor Plan is a critical step in creating effective and efficient transportation infrastructure that is ready to meet future needs. Well in advance of a road or bridge design and construction, recommendations from the plan address and prioritize community needs such as road improvements to accommodate new development, connections between rural and urban areas, right-of-way preservation to accommodate long-range needs, and options to serve other means of travel such as walking and biking. The Plan process allows El Paso County to adequately prepare for the future by considering what services and infrastructure are important to its citizens.

This 2016 Major Transportation Corridors Plan (MTCP) is a long-range plan focusing on the multi-modal transportation system in unincorporated El Paso County. The Plan provides:

- an updated vision for future transportation,
- a prioritized list of transportation improvements,
- a funding plan for ensuring adequate resources to build the future transportation system,
- a look at multimodal transportation needs,

- a long-term right-of-way preservation plan for each roadway corridor,
- policies and strategies to implement the plan, and
- a basis for the Road Impact Fee.

The overarching purpose of the plan is "to accommodate mobility needs associated with [county] growth in population and economic activity, the transportation system is carefully planned by the County, led by the Public Works Department. The MTCP is the long-range plan for using on the multimodal transportation system in unincorporated El Paso County." (p.3). The MTCP includes specific recommendations regarding functional classification, transportation modes, and other uses for the Corridor.

The MTCP identifies the Briargate-Stapleton corridor as a secondary truck route and portions of it as a proposed bicycle route. The Corridor Preservation element of the MTCP calls for this Corridor to be constructed to a 4-lane principal arterial along the entire length of the project. Anticipated phasing for the widening of the full corridor to 4-lanes is a long-term need, needed in the year 2040 or beyond. The El Paso County Road Impact Fee was developed in conjunction with the MTCP recognizing the need to develop an equitable and reliable mechanism to provide supplemental funding to implement transportation infrastructure priorities identified by the MTCP.

#### 1.5.2 ConnectCOS - Transportation Plan for a Mobile Community (2023)

ConnectCOS, the City of Colorado Springs first citywide multimodal transportation planning effort in two decades, provides an in-depth assessment of the state of the Colorado Springs transportation system based on technical analysis and input from the public to establish a long-term plan for ensuring the system continues to serve the community well for the next two decades. The process and the resulting plan document the analysis, public input to the process, and outcomes and recommendations necessary to implement this plan. The transportation plan also supports the vision for the community developed through the public process of PlanCOS, the City's Comprehensive Plan.

The Briargate-Stapleton project corridor is included in the ConnectCOS Major Thoroughfare Plan element as a future Principal Arterial Corridor, future Truck Route, and Future Trail alignment.

#### 1.5.3 Pikes Peak Area Council of Governments 2045 Moving Forward Update (2045 RTP Update)

The Pikes Peak Area Council of Governments (PPACG) 2045 Regional Transportation Plan (RTP) was adopted in January 2020. The 2045 RTP identifies the Corridor as a 4-lane principal arterial consistent with the County's 2016 MTCP. Any construction recommended by this study is not currently included on the project lists for the Pikes Peak Regional Transportation Authority (PPRTA).

The 2045 RTP Update lists the Briargate-Stapleton corridor as a gap in the current non-motorized transportation system. Improvements to this corridor are important for the connectivity and safety of non-motorized travel in the corridor. Potential funding sources identified in the document include:

- Municipal/County Capital Improvement Programs
- Pikes Peak Rural Transportation Authority
- Trails and Open Space Funding
- Bike Tax Funds (where applicable)
- LiveWell Colorado



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- State public health funds
- Colorado Health Foundation – Physical activity infrastructure grant (October 2014)
- Kaiser Permanente – Walk and Wheel
- FAST Act
- Safe Routes to School
- Tiger Discretionary Grants
- Community Development Block Grant Programs (CDBGPs)
- Colorado Lottery – Giving Back
- Great Outdoors Colorado (GOCO)
- FTA Funding
- Formula Grants for Rural Access (populations under 50,000)
- Formula Grants for Seniors and Individuals with Disabilities (FTA 5310)
- Crowd Sourcing
- Enhanced Mobility for Seniors and Individuals with Disabilities

## 1.6 Relevant Corridor and Access Control Studies

### 1.6.1 Stapleton Road Corridor Study (2006)

The Stapleton Road Corridor Study (2006) is related to the preferred alignment for Stapleton Road in the area between the drainage structure west of Eastonville Road and the intersection of Judge Orr Road and Curtis Road and is not relevant to this study.

### 1.6.2 Stapleton Road Access Control Plan (2003)

The Stapleton Road Access Control Plan states that the project area extends from the intersection of Stapleton Road and Meridian Road, including the drainage structure east of the intersection, to the intersection of Judge Orr Road and Curtis Road. However, all the exhibits in the document show an alignment beginning west of Eastonville Road and extending southeast to the intersection of Judge Orr Road and Curtis Road. The results of the Stapleton Road Access Control Plan are for an area adjacent to the areas of this planning study, and the roadway in that area has been built.

### 1.6.3 Stapleton Road US Highway 24 to Judge Orr Road Transportation Impact Study

The area of the 2013 Stapleton Road South Extension: U.S. 24 to Judge Orr Road Transportation Impact Study is adjacent to the area of the Briargate-Stapleton planning study. The 2013 report updated the traffic impacts and forecasts of the Stapleton Road Access Control Plan. However, since Stapleton Road has been constructed between Meridian Road and US Highway 24, the results of this study do not have a significant effect on the Briargate-Stapleton planning study.

## 1.7 Master Plan Conformance

### 1.7.1 El Paso County Strategic Plan – Framework + 2022/2023 Objectives

State statutes allow for the adoption of a master plan as a whole, in parts, or by functional subject matter (CRS 30-29-108). El Paso County's approach is to adopt an overall countywide Strategic Plan that is augmented by subject matter plans that provide site-specific land use and supporting infrastructure

framework guidance. The overarching County plan, the El Paso County Strategic Plan serves as a filter for consistent decision making by providing a framework that adapts to community drivers. The Strategic Plan implements County priorities using a process that sets annual objectives, connects annual budgets and performance plans and monitors achievement of objections based on strategic performance indicators and measures.

The Strategic Plan Infrastructure Objective for 2022 provides a framework for addressing infrastructure operating, maintenance and capital investment priorities for five major asset classes, including roadways, stormwater facilities, fleet, and parks assets by implementing the following:

1. Complete a comprehensive inventory and condition assessment of public infrastructure in each of the five major asset classes by December 2023.
2. Implement a Comprehensive Asset Management Program by March 2024.
3. Develop Infrastructure Asset Management Plans for the five major asset classes by March 2024.
4. Define a multi-year financial strategy to determine how multi-year capital plans and operations/maintenance costs drive annual budget appropriation schedules to meet stated service levels by June 2024.
5. Publish a public-facing asset scorecard that baselines and tracks the condition of the infrastructure in each of the five major asset classes by December 2023.

The following, along with the El Paso County MTCP, Roadway Impact Fee, and roadway-specific corridor preservation plans and access control plans, augment the Strategic Plan as supporting subject matter implementation plans. These plans include the following:

### 1.7.2 Your El Paso Master Plan (2021)

In the State of Colorado, counties are provided the opportunity to develop and adopt a master plan per state statute C.R.S. 30-28-106. Your El Paso Master Plan (Plan) establishes the vision for the County's future development pattern based on the needs of the current population and anticipated growth over the next 20 years. The Plan promotes the community's vision, goals, objectives, and policies; establishes a process for orderly growth and development; addresses both current and long-term needs; and provides for a balance between the natural and built environment. The Plan provides the strategies needed to achieve that vision as growth and change occurs. Comprehensive both in scale and scope, the Plan is intended to influence the entire County with recommendations related to a range of topics including land use, housing, infrastructure, transportation, recreation and open space, conservation, tourism, community facilities, and more. The Plan provides the framework for regulatory tools like zoning, subdivision regulations, annexations, 1041 and utility permits, and other County policies.

The Your El Paso Master Plan (Master Plan) was developed to create one comprehensive strategy for the County moving forward, replacing many existing documents including the 1998 El Paso County Policy Plan and the Small Area Plans. However, because the Master Plan is a broadly focused document by design, and it cannot encapsulate every planning component at every necessary level of detail. For this reason, selected subject matter plans will continue to augment the El Paso County Strategic Plan, together with this Master Plan to provide site-specific land use and supporting infrastructure framework guidance.



### 1.7.3 El Paso County Parks Master Plan and Parks Asset Management Plan (2022)

The El Paso County Parks Master Plan (Master Plan) is a guiding document that works with other County plans to strategize and provide outdoor recreation opportunities such as parks and trails, long term protection of open space, and historic and cultural resources interpretation. The Master Plan is an element of the County's comprehensive plan (statutory master plan) used by the Community Services Department, Development Services (Planning) Department, Park Advisory Board, Planning Commission, and the Board of County Commissioners to ensure that new development proposals conform and contribute to a cohesive system of parks, trails, and open space. The Master Plan update process was designed to comprehensively address the needs of parks, trails, open space, and recreation and cultural services throughout El Paso County in a strategic way. The Master Plan endeavors to provide a sustainable approach to allocation of resources for the next five to ten years. The process reaffirms essential goals and objectives of the previous Master Plan, while incorporating needed changes and new ideas based on input by stakeholders and analysis of data. The Master Plan will guide the County's efforts to continue to provide a high quality of parks, recreation, and natural, historical, and cultural interpretation services that are valued by citizens.

Inclusion of a multipurpose trail and detached sidewalk as integral elements of the roadway section will support the use of the project corridor for pedestrian and bicycle travel consistent with the County's standards and guidelines. A grade-separated crossing is included in the design to facilitate protected connectivity between the corridor trail and the existing and planned regional trails system.

### 1.7.4 El Paso County Parks Asset Management Plan (2022)

The El Paso County Parks (County Parks) Asset Management Plan (Plan) serves as a guide and implementation tool for the management of the County Park System. County Parks developed and is implementing a park asset management program to maintain a comprehensive inventory and evaluation of outdoor components in the park system. The park asset management program established baseline information needed to manage the County's assets. The focus of this Plan includes park evaluations to identify condition and life cycles, predict the timing of restoration and replacement schedules, and estimate probable costs for standard components, amenities, and park infrastructure. The Plan is used to prioritize capital improvement expenditures to ensure that funding is directed where it can have the most impact.

## 1.8 Conclusions

Several themes consistently run through the planning documents that were reviewed for the Briargate-Stapleton Corridor Study. They include corridor preservation; accommodating multimodal transportation, especially pedestrian/bicycle mobility, providing adequate carrying capacity, and access management.

2 Purpose and Need

The overall purpose for this Corridor Preservation Plan was discussed in Section 1.2, "Purpose of the Study," but Section 2 discusses the purpose and need for undertaking a proposed action. Articulating the purpose and need to take action to preserve the corridor and to construct the Stapleton Road–Briargate Parkway roadway connection provides the foundation for assessing alternatives. The term "purpose and need" is largely synonymous with the documentation required for federal approvals under the National Environmental Policy Act (NEPA), for which the implementing regulations published by the President's Council on Environmental Quality state: "The [environmental document] statement shall briefly specify the underlying purpose and need for the proposed action." (CFR 1502.13) If any federal funding is ever secured for corridor improvements, a Purpose and Need statement will then be required.

A good explanation of the difference between project purpose and project needs is provided below, from the Colorado Department of Transportation (CDOT) National Environmental / Policy Act Manual (CDOT 2020),

The project purpose statement is a broad statement of the primary intended transportation result and other related objectives to be achieved by a proposed transportation improvement. The purpose must be written clearly and must be supported by the identified needs. It should not include planning decisions or

The need for the project is a more detailed explaining, with supporting data, of the specific transportation problems, deficiencies, or opportunities that exist or are expected to exist in the future that justifies the Proposed Action. The needs should be demonstrated through specific quantitative investigation. Each need for action should enable decision-makers to evaluate alternatives by providing

2.1 Project Purpose

The purpose for constructing an arterial roadway in the Briargate-Stapleton corridor is to provide a continuous roadway connection between I-25 and US Highway 24 in northern El Paso County both for regional system connectivity and to serve the substantial transportation demand that is anticipated from planned development in this area.

a a Project Need

The portion of northern El Paso County in the study area is already experiencing substantial growth, and east-west roadway options are extremely limited. Connections to I-25 are limited for the six miles where it exists on United States Air Force Academy (USAFA) property, between Academy Boulevard (Exit 150) and North Gate Boulevard (Exit 156). See Figure 2.1. USAFA is a designated National Historic Landmark where no additional Interstate access will be granted. Briargate Parkway has access (Exit 151), and sufficient capacity to accommodate the demand from planned urban development.

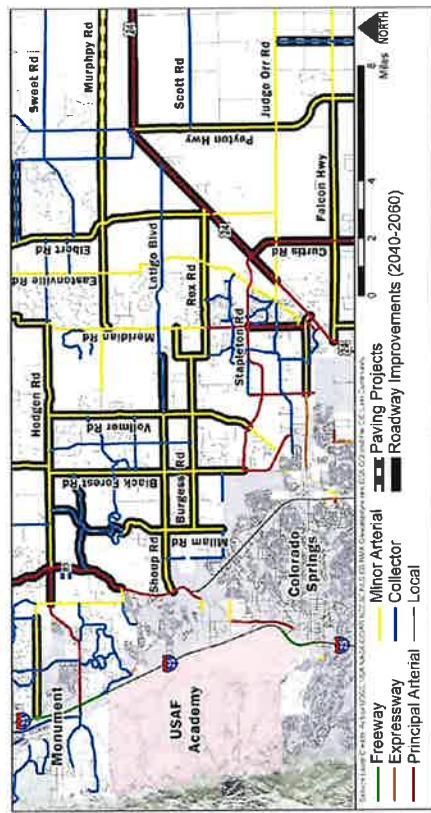
**Figure 2.1 Excerpt from El Paso County Major Transportation Corridors Plan**

In the absence of improved east-west connectivity, increased traffic generation in the study area would place a substantial burden on the modest north-south roadways that access Woodmen Road, an already heavily traveled local roadway.

For this reason, the 2016 MTCP identified the Briargate-Stapleton corridor to improve the east-west continuity of the El Paso County roadway grid. The plan included specific recommendations regarding functional classification, transportation modes, and other uses for the Briargate-Stapleton corridor. The 2016 MTCP indicates that the corridor is expected to be a four-lane principal arterial from the eastern city limits of Colorado Springs to I-25.

It is anticipated that this project will plan for the ultimate improvements but that interim phases of capacity and safety improvements may be warranted based upon study findings and funding limitations. The corridor will also be evaluated to determine if additional mobility provisions such as bike routes, pedestrian accommodations, and public transit are necessary. The area currently has no transit service from the region's transit provider, Mountain Metro Transit, because much of the area is undeveloped.

The preferred alternative will reflect corridor improvements that optimize public safety, needs, and preferences while balancing enhanced capacity, access management, and development. The new developments will need safe, adequate access, but access management will ensure that the roadway can safely accommodate through traffic at desired arterial speeds



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Approximately 1.2 miles of the 5.5-mile corridor, between Black Forest Road and Rising Eagle Place, between Tomahawk Trail and Arroya Lane, and between Tower Avenue and Meridian Road, already have an existing roadway. The proposed improvements would connect these segments and upgrade them to a standardized configuration. For the roadway that does exist, geometry upgrades that can improve corridor mobility and provide necessary carrying capacity include:

- Flattening curves and grades
- Providing new and/or wider shoulders
- Adding turn, acceleration, and deceleration lanes
- Increasing lane widths and/or number of lanes
- Adding accommodations for pedestrians and bicyclists
- Providing adequate roadside clear zones
- Upgrading intersection capacity (e.g., adding turn bays, signalizations, roundabouts)

### 3 Alternatives Analysis

A “no-build” option was not an alternative considered for this corridor. The current lack of roadway and the unconstrained development requires a “build” alternative to be developed to ensure that the roadway will meet the planned classification and function. Based on public and stakeholder input, which was collected via a project website, issues were identified and considered. A full range of improvement alternatives was then developed, evaluated, and iteratively refined to provide:

- Local and Regional Mobility
- Roadway Alignment and Cross Section
- Intersection Layout and Control
- Access Management and Connectivity
- Roadway Drainage

Because the eastern corridor is located at the interface of El Paso County and the City of Colorado Springs, the City was engaged early and through all phases in the planning process. An initial preferred alignment and a hybrid cross section were identified through collaborative engagement. Recommendations were vetted with corridor developers and presented to public stakeholders. Chapter 7 details the public engagement process. Input provided, and resolution of comments are summarized in Appendix F.

Technical components of alternatives evaluation included baseline and future build alternatives analysis. The baseline and future scenarios were evaluated concerning traffic operations, mobility, constructability, cost, and potential project impacts (social, economic, and environmental).

Cost estimates were also prepared by the consultant team for “short-listed” alternatives. Final concept-level cost estimates for the preferred alternatives are detailed in Section 6.4 “Opinion of Probable Costs.”

#### 3.1 Roadway Design

The roadway design element of the Briargate-Stepleton corridor alternatives began with a thorough review of the existing horizontal and vertical alignments, as well as the typical roadway cross sections. Existing conditions were compared to County, City, and American Association of State Highway and Transportation Officials (AASHTO) design criteria and the roadway cross section and functional classification specified by the 2016 MTCP.

The corridor currently falls under El Paso County jurisdiction; however, it is anticipated that with the development occurring, much of the area along the corridor may be annexed into Colorado Springs in the future. As such, the City of Colorado Springs design criteria was also considered.

##### 3.1.1 Design Criteria: Four-Lane Principal Arterial

The 2016 MTCP lists the Briargate-Stepleton corridor as a four-lane principal arterial. The current speed limit west of the project area (in Wolf Ranch Subdivision in Colorado Springs) is 35 mph, which is inconsistent with the City’s classification of the roadway as a principal arterial. The current speed limit east of the project area (at Meridian Road in El Paso County) is 45 mph, which is consistent with the County’s classification of the roadway as an urban principal arterial. The El Paso County Engineering Criteria Manual (ECM) rural and urban standards are shown in Table 3.1. The major difference between the EPC rural and urban standards is

in the handling of the edges of the roadway: in the urban cross section curb and gutter are used, whereas the rural section uses an open system to carry stormwater away from the roadway corridor. Both systems of handling runoff are used through the phasing of this project.

Design criteria from the City were also used to develop ultimate alternatives for the corridor. The COS Traffic Criteria Manual (TCM) standards for a four-lane principal arterial are also shown in Table 3.1.

**Table 3.1. Roadway Design Criteria for 4-Lane Principal Arterials**

Design Criteria	EPC Urban	EPC Rural	COS
Design Speed/Posted Speed	50/45	70/65	50/45
Clear Zone	20'	34'	n/a
Centerline Curve Radius (Min.)	930' <sup>1</sup>	2,050' <sup>1</sup>	1,040'
Trip Length	n/a	=	1-2 miles
Number of Thru Lanes	4	4	4
Lane Width	12'	12'	11'
Right-of-Way	130'	180'	107'
Paved Width	36' (excluding Gutter Pan)	38' <sup>2</sup>	28' <sup>2</sup>
Median Width	19' (including curb & gutter)	24'	17' raised
Outside Shoulder Width	8' (excluding gutter)	12" (10' paved/2" gravel)	4"
Inside Shoulder Width	4" (excluding gutter)	6" (4" paved/2" gravel)	4"
Required Curb/Gutter Type	6" vertical	n/a	n/a
Sidewalk Width (@ FL)	6' detached	n/a	6' detached
Design ADT	40,000	40,000	10,000-25,000
Design Vehicle	WB-67	WB-67	WB-67
Bike Lanes Permitted	Yes	n/a	6' Multi-Use Shoulder
Tree Lawn Width	n/a	n/a	7'
Access	Not Permitted	Not Permitted	Full Control
Intersection Spacing	1/2 mile	n/a	1/2 mile (signalized) 1/4 mile (unsignalized)
Parking Permitted	No	No	No
Min. Flowline Grade of Curb	0.50%	1%	n/a
Centerline Grade (Min.-Max.)	0.5-6%	1-5%	1-4%
Intersection Grades (Min.-Max.)	0.5-3%	1-3%	1% min
Intersection Sight Distance	555'	n/a	500'

<sup>1</sup> Assumes 4% superelevation, 6% for 7% NPHI design speeds.

<sup>2</sup> Pavement width in each direction for divided roadways.

Source: Data from El Paso County Engineering Criteria Manual, Table 2-4: Roadway Design Standards for Rural Expressways and Arterials; Table 2-6: Roadway Design Standards for Urban Expressways and Arterials, October 14, 2020.

City of Colorado Springs, Engineering Criteria Manual, “Section III: Traffic Criteria Manual,” Table 10: Traffic Engineering Design Standards (Freeways, Expressways and Arterials), p. 39, <http://coloradosprings.us/-/media/city-government/departments/transportation-engineering/design-standards/traffic-criteria-manual.ashx>.



### 3.1.2 Design Criteria: Other Design Criteria

Additional El Paso County and City of Colorado Springs design criteria address roadway alignment and its relationship to sight distance adequacy. The County design criteria are specified in 10 mph increments and mirror design criteria that are provided in AASHTO's *A Policy on Geometric Design of Highways and Streets*. The AASHTO design speed values at 5 mph increments on a level terrain are summarized in Table 3.2.

**Table 3.2. Design Controls for Stopping Sight Distance**

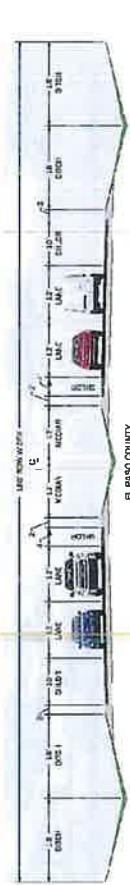
Design Speed (mph)	Stopping Sight Distance (feet)	Calculated	Design	Rate of Vertical Curvature, $K_1$ For Sag Curves	Calculated	Design
30	200	18.5	19	36.4	37	
35	250	29.0	29	49.0	49	
40	305	43.1	44	63.4	64	
45	360	60.1	61	78.1	79	
50	425	83.7	84	95.7	96	
55	495	113.5	114	114.9	115	
60	570	150.6	151	135.7	136	
65	645	192.8	193	156.5	157	
70	730	246.9	247	180.3	181	

*Note:* Rate of vertical curvature,  $K_1$ , is the length of the curve per percent algebraic difference in intersection grades ( $A$ ),  $K=11A$ .

*Source:* AASHTO, *A Policy on Geometric Design of Highways and Streets*, 7th Edition, 2016.

### 3.1.3 Typical Sections

The El Paso County Rural Principal Arterial typical section, as shown in Figure 3.1, includes two 12' through lanes in each direction, with a 6' inside shoulder, a 10' outside shoulder, a depressed 24' median, and graded ditches for drainage. This cross section was used in design primarily for the edge conditions and open drainage system in the early phasing of the design, as discussed in Chapter 6.

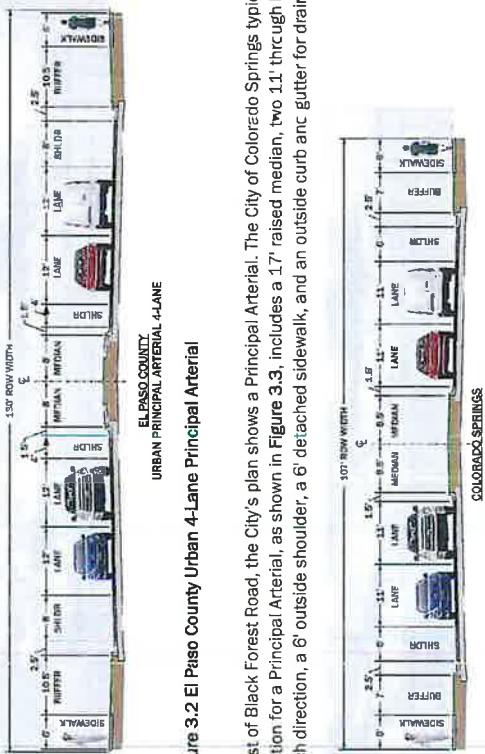


**Figure 3.1 El Paso County Rural 4-Lane Principal Arterial**

Input from the design level survey of the corridor was used to construct CAD modeling of the full roadway alignment within the project corridor. This included the development of a Digital Terrain Model (DTM) to accurately represent the existing and proposed vertical alignment of the roadway. The adherence of the existing condition to a hybrid of the County and the City typical section was then evaluated. The City's design criteria were used for design.

#### 3.1.4 Existing Horizontal and Vertical Alignment

Very little of the proposed corridor has been constructed. The segments that have been constructed are horizontally tangential in nature and meet design criteria for vertical alignments. The typical section used for these constructed sections is undersized for their eventual usage and constructed in locations that will not necessarily align with the proposed pavement sections.



**Figure 3.2 El Paso County Urban 4-Lane Principal Arterial**

**Figure 3.3 City of Colorado Springs 4-Lane Principal Arterial**

West of Black Forest Road, the City's plan shows a Principal Arterial. The City of Colorado Springs typical section for a Principal Arterial, as shown in Figure 3.3, includes a 17' raised median, two 11' through lanes in each direction, a 6' outside shoulder, a 6' detached sidewalk, and an outside curb and gutter for drainage.



**Figure 3.3 City of Colorado Springs 4-Lane Principal Arterial**





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### 3.1.4.2 Proposed Horizontal and Vertical Alignment

Much of the corridor is previously untouched prairie or grazing land. The new roadway will alter the existing landscape. Adjustments will be made to the landscape to conform to design standards. These adjustments will include two bridges or box culverts, retaining walls, and earthwork.

Developers along the corridor have proposed both ROW corridors and locations for access to the corridor. The proposed accesses from the developers do not meet the criteria for minimum spacing of accesses and are discussed in Section 3.1.6. The ROW proposed by the developers is adequate for the construction of the new roadway.

### 3.1.5 Alignment Analysis

To determine the recommended horizontal alignment, research was conducted on plats that had been approved and development plans that had been submitted to either El Paso County or the City of Colorado Springs. Based on this research, two alternative alignments were developed and screened. Both alternatives begin on the west at Black Forest Road and follow the same alignment to Vollmer Road. At Vollmer Road, the northern alternative connects existing roadway segments and follows a direct route between Vollmer Road and Meridian Road. The southern alternative follows the northern alignment and continues to an alignment approximately half a mile south of the existing Stapleton Road before curving north and tying in with the existing road. The southern alignment more closely matched the corridors proposed on the submitted plats.

The southern alternative was selected as the preferred alignment due to ROW constraints and its conformance with the submitted plats. This alternative meets the County's design criteria for horizontal curves based on the design speed, but the curve on the southern alignment is substandard based on the City's design criteria.



Figure 3.4. Corridor Alignment Alternatives

### 3.1.6 Intersections

An analysis of the existing and proposed intersection locations was performed. Based on both EPC and COS design standards, on principal arterials, intersections should be spaced at  $\frac{1}{2}$  mile (2,640'), with COS allowing unsignalized intersections to be spaced at  $\frac{1}{4}$  mile (1,320') increments. Full-movement access is limited to major intersections, and minor intersections are limited to right-in/right-out (RIRO) access.

Table 3.3. Intersection Spacing

Western Road	Rising Eagle Place	Eastern Road	Full Access Spacing
Black Forest Road		Rising Eagle Place	2,775' (0.52 mi.)
Rising Eagle Place		Loch Linne Place	
Loch Linne Place		Lochwinnoch Lane	1,975' (0.37 mi.)
Lochwinnoch Lane		Commercial Collector (proposed)	2,525' (0.48 mi.)
Commercial Collector (proposed)		Vollmer Road	1,000' (0.19 mi.)
Vollmer Road		Wheatland Drive (RIRO access)	
Wheatland Drive (RIRO access)		Potential Access (limited to RIRO)	3,375' (0.64 mi.)
RIRO Access (potential)		Sterling Ranch Collector (proposed RIRO)	
Sterling Ranch Road (proposed)		Banning Lewis Parkway (proposed)	3,550' (0.67 mi.)
Sterling Ranch Collector (proposed RIRO)		Potential Access (limited to RIRO)	
Banning Lewis Parkway (proposed)		The Ranch Collector West (proposed)	2,330' (0.44 mi.)
RIRO Access (potential)		Woodmen Hills Drive/Raygor Road (proposed)	1,550' (0.29 mi.)
The Ranch Collector West (proposed)		The Ranch Collector East (proposed)	3,000' (0.57 mi.)
Woodmen Hills Drive/Raygor Road (proposed)		Towner Avenue	2,525' (0.48 mi.)
The Ranch Collector East (proposed)		Prairie Dove Drive (RIRO)	
Towner Avenue		Liberty Grove Drive (RIRO)	4,250' (0.80 mi.)
Prairie Dove Drive (RIRO)		Meridian Road	

*Note:* Roads in italics are currently unnamed.

#### 3.1.6.1 Intersection Layout and Control

Locations of intersections along the future corridor were identified based on platting and filed master plans for developments that are located adjacent to the study corridor. Locations of potential future intersections were also identified for undeveloped area along the corridor for which development plans are yet unknown.

#### 3.1.6.2 Intersection Left Turn Lane Lengths

The table below shows the storage, deceleration, taper lengths, and rate for each of the intersections in the corridor.

Table 3.4. Left-Turn Lengths

Intersecting Road	Direction	Storage	Decel	Taper	Rate	Total
Black Forest Road	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	200'	530'	180'	15:1	910'
Rising Eagle Place	SB	200'	530'	180'	15:1	910'
	RIRO: No Left Turns					
	EB	200'	435'	165'	15:1	800'
Loch Linneach Place	WB	200'	435'	165'	15:1	800'
	NB					
	SB					
Lochwinnoch Lane	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB					
Commercial Collector (proposed)	SB					
	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
Vollmer Road	NB	100'	235'	180'	15:1	515'
	SB	100'	235'	180'	15:1	515'
	EB	200'	435'	165'	15:1	800'
Wheatland Drive (proposed)	WB	200'	435'	165'	15:1	800'
	NB	100'	435'	180'	15:1	715'
	SB	100'	435'	180'	15:1	715'
Sterling Ranch Collector (proposed)	EB					
	WB	200'	435'	165'	15:1	800'
	NB	100'	435'	180'	15:1	715'
Banning Lewis Parkway (proposed)	SB					
	EB					
	WB	200'	435'	165'	15:1	800'
The Ranch Collector West (proposed)	NB	100'	435'	180'	15:1	715'
	SB					

Table 3.4. Left-Turn Lengths (continued)

Intersecting Road	Direction	Storage	Decel	Taper	Rate	Total
The Ranch Collector West (proposed)	EB					
	WB	200'	435'	165'	15:1	800'
	NB	200'	435'	180'	15:1	600'
Woodmen Hills Drive/Raygor Road (proposed)	SB					
	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
Towner Avenue	NB	100'	435'	180'	15:1	715'
	SB	100'	435'	180'	15:1	715'
	EB	200'	435'	165'	15:1	800'
Liberty Grove Drive	WB	200'	435'	165'	15:1	800'
	NB	100'	235'	180'	15:1	515'
	SB	100'	235'	180'	15:1	515'
Meridian Road	Scenic Brush Drive					
	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
Match Existing	Meridian Road					
	NB					
	SB					

*Note:* Roads in italics are currently unnamed.

### 3.1.7 Bicycles and Pedestrians

The study corridor includes a proposed bicycle route that will be important in pedestrian connectivity within the region. As such, in the ultimate configuration, bike lanes, a detached sidewalk, and a larger detached pedestrian trail will be included in the cross section. See the cross sections included in Section E.3.

#### 3.1.8 Utilities

Overhead utilities exist on the north side of Stapleton Road, west of Meridian Road to just east of Scenic Brush Drive in the Scenic View at Paint Brush Hills subdivision. There are several locations where overhead utilities cross the corridor, including Black Forest Road, Vollmer Road, and Meridian Road. Also, there is a major electric transmission line crossing west of Towner Road. Underground utilities may exist at some locations in the project area where development has occurred adjacent to the corridor. Utility easements likely exist along all platted parcels even if actual utilities are not present.



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### 3.1.9 Drainage

An overall drainage review was completed for the Briargate-Stapleton corridor to identify existing drainage issues. Drainage improvements will be required along with the project. Local, state, and federal criteria will need to be followed when addressing drainage improvements.

#### 3.1.9.1 Drainage Criteria

The City of Colorado Springs Drainage Criteria Manual (COS-DCM) was followed for this report. It requires culverts and ditches carry the 100-year event for arterial streets. This corridor crosses Federal Emergency Management Agency (FEMA)-regulated Zone A and Zone AE floodplains. Floodplains impacted by the improvements shall comply with the National Flood Insurance Program (NFIP).

The western portion of the corridor is adjacent to the urban municipal separate storm sewer system (MS4) permit area and may require water quality treatment by the Colorado Department of Public Health and Environment (CDPHE). Additionally, El Paso County MS4 permit requirements apply as detailed in the County ECM, Appendix I.

Existing roadway drainage, where developed, is an open system.

### 3.2 Access

The Transportation Research Board (TRB) *Access Management Manual Second Edition* (2014, p. 6-10) identifies the following 10 "Principles of Access Management":

1. Provide a specialized roadway system.
2. Limit direct access to major roadways.
3. Promote intersection hierarchy.
4. Locate signals to favor through movements.
5. Preserve the functional area of intersections and interchanges.
6. Limit the number of conflict points.
7. Separate conflict areas.
8. Remove turning vehicles from through-traffic lanes.
9. Use non-traversable medians to manage left-turn movements.
10. Provide a supporting street and circulation system.

Both the EPC Engineering Criteria Manual and the COS *Traffic Criteria Manual* permit intersections along a principal arterial to be spaced at  $\frac{1}{2}$  mile intervals. EPC does not permit access to principal arterials between intersections. COS allows for one access drive per property ownership which may be jointly shared with adjacent properties. COS permits median cuts at a spacing between  $\frac{1}{4}$  mile and  $\frac{1}{2}$  mile at major or significant street intersections.

Access management alternatives, including selected access closures, were considered as means to preserve the functionality of the roadway. Most of the proposed roadway does not exist. Planned/approved future access was identified based on development plans filed with the County. To evaluate the potential to

consolidate access, parcels and subdivisions were grouped by access commonalities to identify direct access locations to the Briargate-Stapleton corridor.

The corridor currently falls under El Paso County jurisdiction; however, it is anticipated that with the development occurring, much of the area along the corridor may be annexed into Colorado Springs. As such, both El Paso County and City of Colorado Springs access spacing criteria were considered.

An analysis of the spacing between existing and proposed access locations was performed to evaluate and support the development of the Access Control Plan. Based on both EPC and COS design standards, principal arterial intersections should be spaced at  $\frac{1}{2}$  mile (2.640'), with COS allowing unsignalized intersection to be spaced at  $\frac{1}{4}$  mile (1.320') increments. Access spacing for existing and proposed access locations are summarized in Table 3.5 and in Figure 3.5.

**Table 3.5. Intersection Spacing**

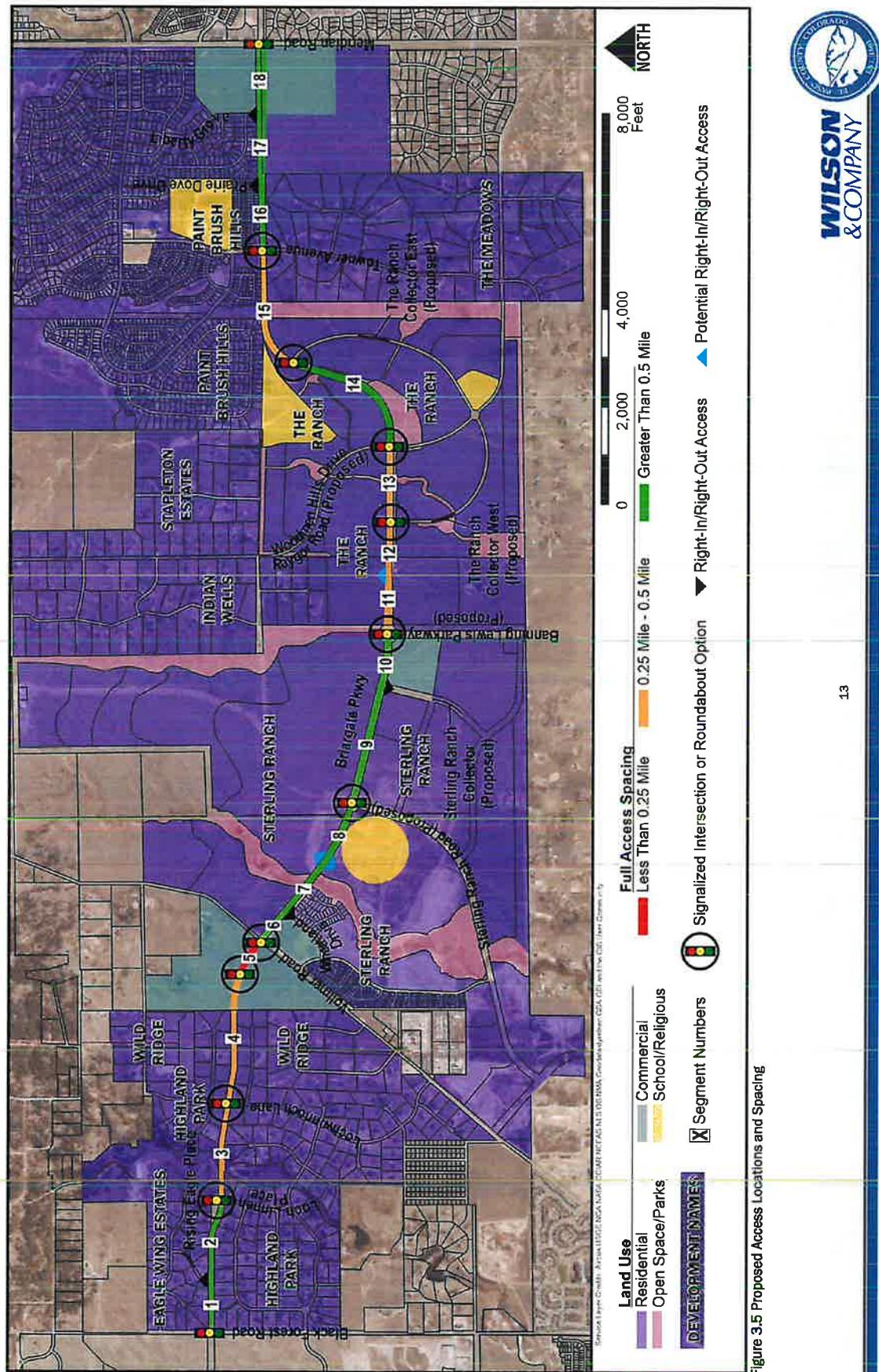
Eastern Road	Western Road	Spacing
Black Forest Road	Rising Eagle Place	1,075' (0.20mi)
Rising Eagle Place	Loch Linneh Place	1,700' (0.32mi)
Loch Linneh Place	Lochwinnoch Lane	1,975' (0.37mi)
Lochwinnoch Lane	Commercial Collector (proposed)	1,925' (0.36mi)
Commercial Collector (proposed)	Vollmer Road	1,600' (0.30mi)
Vollmer Road	Wheatland Drive	750' (0.14mi)
Wheatland Drive (proposed)	Sterling Ranch Road (proposed)	2,625' (0.50mi)
Sterling Ranch Road (proposed)	Sterling Ranch Collector (proposed)	2,475' (0.47mi)
Sterling Ranch Collector (proposed)	Banning Lewis Parkway (Proposed)	1,075' (0.20 mi)
Banning Lewis Parkway (proposed)	The Ranch Collector West (proposed)	2,325' (0.44 mi)
The Ranch Collector West (proposed)	Woodmen Hills Drive/Raynor Road (proposed)	1,550' (0.29 mi)
Woodmen Hills Drive/Raynor Road (proposed)	The Ranch Collector East (proposed)	3,000' (0.57 mi)
The Ranch Collector East (proposed)	Towner Avenue	2,525' (0.48 mi)
Towner Avenue	Prairie Dove Drive	1,350' (0.26 mi)
Prairie Dove Drive	Liberty Grove Drive	1,450' (0.27 mi)
Liberty Grove Drive	Meridian Road	1,450' (0.27 mi)

*Note:* Roads in italics are currently unnamed.

### 3.3 Conceptual Roadway Design

The conceptual design for the preferred alignment (see Chapter 6) incorporates a balance of County and City roadway design criteria and implements the intersection, pedestrian and bicycle facilities, drainage, access management recommendations developed during alternatives analysis. The conceptual plan and profile design for the interim four-lane principal arterial section is included as Appendix A.





**Figure 3.5 Proposed Access Locations and Spacing**

## 4 Traffic Analysis

### 4.1 Methodology

To evaluate traffic operations for future improvement options, existing peak hour traffic volume data was collected, and estimates of future traffic volumes were prepared. Microsimulation (Synchro/SimTraffic) was used to evaluate traffic operations performance for future improvement alternatives. Parallel analysis of roundabout alternatives was also conducted using Synchro and Highway Capacity Software (HCS). *Highway Capacity Manual 6<sup>th</sup> Edition* (TRB, 2016) performance metrics, as detailed below in Section 4.2, were used for both analysis methodologies to evaluate the performance of alternative improvement options. Specific methodologies used for traffic forecasts and traffic operations analysis as well as a more detailed summary of analyses findings are included in Appendix B – Traffic Report.

#### 4.1.1 Traffic Count Data

Available traffic count data was assembled for use in this traffic analysis for the Briargate-Stapleton corridor Study from sources including the Colorado Department of Transportation (CDOT) traffic statistics database, the Pikes Peak Area Council of Governments (PPACG), El Paso County (traffic count data and recent development Traffic Impact studies), and the City of Colorado Springs (traffic count data and recent development Traffic Impact studies). Count data from these sources included: weekday peak period turn movement counts, 48-hour counts, hourly counts, and adjusted Average Daily Traffic (ADT) counts. Additional peak hour intersection turning movement counts were collected at five existing intersections. Directional counts were also conducted hourly at five locations on Stapleton Drive (east of the project corridor), Meridian Road (north and south of the project corridor), Vollmer Road, and Black Forest Road (south of the proposed alignment).

#### 4.1.1 Traffic Forecasts

The unadjusted 2045 forecast volumes, as shown in Figure 4.1, are compatible with a four-lane roadway section, a Principal Arterial functional classification, and applicable Colorado Springs or El Paso County access spacing. The Principal Arterial classification is also consistent with the functional classification and capacity envisioned by both the El Paso County 2016 MTCR and the 2045 PPACG Moving Forward RTP.

The PPACG 2045 fiscally constrained RTP model scenario is coded with four lanes east of Black Forest Road and six lanes west of Black Forest Road. Forecast 2045 daily traffic flows for the project corridor range from 16,000 ADT to 25,000 ADT to the east of Towner Avenue and to the east of Black Forest Road, respectively, consistent the capacity of a four-lane roadway section. The PPACG and City of Colorado Springs plans specify a Principal Arterial with a six-lane cross section west of Black Forest Road. Forecast 2045 daily traffic flows west range from 35,000 ADT to 40,000 ADT, west of Black Forest Road and Union Boulevard, respectively.

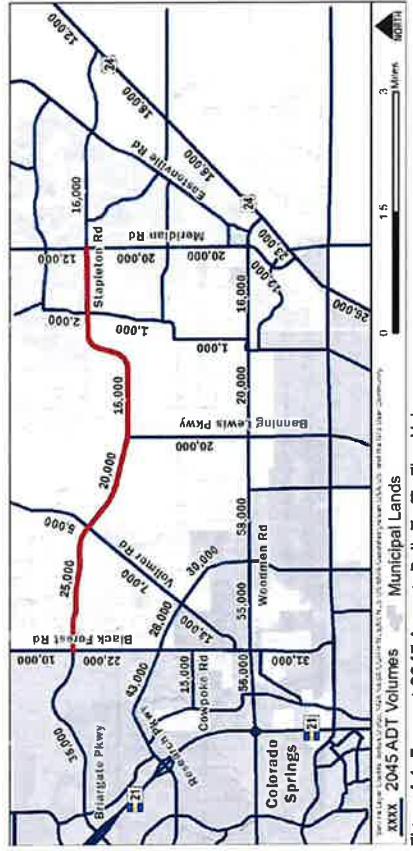


Figure 4.1. Forecast 2045 Average Daily Traffic Flow Volumes

#### 4.1.2 Traffic Operations Analysis

The “operation” of any given intersection or stretch of roadway relates to how well or how poorly it functions given a specific volume of traffic. Analyses of existing traffic operations for the Briargate-Stapleton corridor were completed using the Synchro/SimTraffic software package.

In general, the use of this software involves the development of a Synchro network, adjustment of the model to reflect actual measured conditions to verify the accuracy of the model network and use of the adjusted model to analyze future-year conditions under various scenarios. For the base, the Synchro network was developed by coding the existing geometrics, traffic control conditions, and traffic volumes for each study intersection into the network. Specifically, this coded data included the following:

- | Per Intersection | • Number and type of approach lanes |
|------------------|-------------------------------------|
|                  | • Widths of lanes                   |
|                  | • Lengths of turn lanes             |
|                  | • Existing traffic volumes          |
|                  | • Existing signal timing parameters |
|                  | • Percentage of heavy vehicles      |

- Per Link (Roadway Segment)
- Link distances (intersection to intersection)
  - Speed limits
  - Widths of travel lanes
  - Grade of roadway segment
- Network Settings: (Corridor Signal Timing/Phasing)
- Minimum cycle length, maximum cycle length, reference phase
  - Control type
  - Yellow time, all red time
  - Minimum splits
  - Lead/lag optimization (allowed/not allowed)

#### 4.1.3 Level of Service Measures and Criteria

Once existing data was coded into the software, Synchro was used to perform a level of service (LOS) evaluation, which measures how well an intersection or stretch of roadway functions (or operates) when a specific volume of traffic is present. This methodology is consistent with the procedures outlined in the Highway Capacity Manual 6<sup>th</sup> Edition (HCM6, Transportation Research Board, 2016) and the predecessor HCM2010 (Transportation Research Board 2010).

The HCM2010 utilizes measures, including operating speed and delay (in seconds per vehicle), to characterize roadway and intersection operations or LOS. Level of service evaluation results in a LOS grade that ranges from LOS A to LOS F, where LOS A is representative of little or no delay and free-flow traffic, and LOS F represents excessive delay and breakdown in traffic flow. A typical minimum acceptable LOS for peak hour conditions, and that observed by El Paso County, is LOS D, which represents moderate delay. Signalized intersections are given a LOS grade based on the overall functionality of the intersection. In other words, it is a qualitative evaluation of that intersection's ability to accommodate the travel demand. Unsignalized intersections, however, are graded based on the movement that suffers the greatest delay, otherwise known as the critical movement (e.g., a left-turning movement from a minor street onto a major street). In the case of a single lane approach on a minor street (also referred to as the *minor approach*), the entire approach will be assigned a LOS grade because all movements from that approach would suffer the same delay. Conditions associated with individual levels of service, as defined by the HCM2010, are summarized in Table 4.1 and Table 4.2. Levels of service for roundabouts are defined by HCM2010, as shown in Table 4.3. HCM2010 criteria were used for Synchro/SimTraffic analysis of baseline conditions (existing and future no-build), and for assessment of traffic operations for future intersection improvement options. Roundabouts will be evaluated as alternatives to signalized intersections during preliminary and final design.

**Table 4.1. Level of Service Criteria for Two-Way Stop-Controlled Intersections**

Level of Service	Description - Delay to Minor Street Traffic	Average Control Delay (sec./veh)
<b>A</b>	Little or no delay	0 – 0
<b>B</b>	Short traffic delays	>10 – 15
<b>C</b>	Average traffic delays	>15 – 25
<b>D</b>	Long traffic delays	>25 – 35
<b>E</b>	Very long traffic delays	>35 – 50
<b>F</b>	When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing that may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improving the intersection.	>50

*Note:* For two-way stop-controlled (TWS-C) intersections, level of service is determined by the control delay for each minor movement.  
*Source:* HCM2010, p. 18-6.

**Table 4.2. Level of Service Criteria for Signalized Intersections**

Level of Service	Description - Intersection Signal Delay	Control Delay (sec./veh)
<b>A</b>	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may contribute to low delay.	<=10
<b>B</b>	Good progression, short cycle lengths, or both. More vehicles stop than with LOS A.	>10 and <=20
<b>C</b>	Fair progression, longer cycle lengths, or both. The number of vehicles stopping is significant, though many still pass through without stopping.	>20 and <=35
<b>D</b>	Longer delays result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (v/c) ratios. Many vehicles stop.	>35 and <=55
<b>E</b>	High delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	>55 and <=80
<b>F</b>	This level often occurs with over-saturation when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may be major contributing factors to such delay levels.	>80

*Source:* Transportation Research Board, HCM2010, p. 19-2.



**Table 4.3. Level of Service Criteria for Roundabout Intersections**

(Control Delay (sec/veh)	Level of Service Metrics (Control Delay/volume-to-Capacity Ratio <sup>1</sup> )	
	V/c ≤ 1.0	V/c > 1.0
0–10	A	F
>10–15	B	F
>15–25	C	F
>25–35	D	F
>35–50	E	F
>50	F	F

<sup>1</sup>Note: For approaches and intervention under assumption 1.0 is defined solely by unsignalized control delay. Source: ITCM2010, p. 21-1.

#### 4.1.4 Existing Conditions Intersection Traffic Operations

The LOS and delay measures shown in Table 4.4 are for 2021 existing traffic volumes, roadway geometry and traffic control, as detailed in Appendix B – Traffic Report. The results show that all the analyzed intersections currently operate at LOS C or better. Full Synchro reports are also included in Appendix B.

**Table 4.4. 2021 Intersection Level of Service Summary**

Control	Intersection	LOS/Delay [in seconds/vehicle] (Critical Movement)	
		AM Peak Hour	PM Peak Hour
TWSC	Briargate Parkway & Black Forest Road	b / 12.3 (WB Approach)	b / 13.6 (WB Approach)
AWSC	Stapleton Road & Towner Avenue	a / 9.6	a / 8.4
TWSC	Stapleton Road & Prairie Dove Drive	b / 13.4 (SB Approach)	b / 11.2 (SB Approach)
TWSC	Stapleton Road & Liberty Grove Drive	b / 14.9 (SB LT)	b / 11.5 (SB LT)
Signal	Stapleton Road & Meridian Road	c / 28.6	b / 19.0

#### 4.1.5 Future Intersection Traffic Operations

The LOS and delay measures shown in Table 4.5 are for 2045 forecast traffic volumes and proposed roadway geometry. Proposed full-access intersections were evaluated under signalized traffic control. As shown in Table 4.3, similar or better LOS results would be experienced for roundabout alternatives. The results show that, other than at the western and eastern study limits, the analyzed intersections are projected to operate at LOS C or better during the AM and PM peak hours. The Stapleton Rd/Meridian Rd intersection is projected to operate at LOS D during the AM and PM peak hours. The Briargate Pkwy/Black Forest Rd intersection is projected to operate at LOS E during the AM peak hour and LOS D during the PM peak hour. The projected level of service at Briargate Pkwy/Black Forest Rd indicates a potential need for three through lanes in each direction of Briargate Pkwy across Black Forest Rd at some point in time. Additional detail and full Synchro reports are included in Appendix B.

The queuing analysis results for the left-turn movements at the signalized intersections based on the 2045 AM and PM peak-hour traffic conditions are summarized in Table 4.6. The values in the table are the 95<sup>th</sup> percentile queue lengths as reported by Synchro. As shown in the table, the majority of the left-turn movements are projected to have queues of less than 200 feet in length, with exceptions at Black Forest Rd, Sterling Ranch Rd, Banning Lewis Pkwy, and Meridian Rd. Full Synchro reports are also included in Appendix B.

#### 4.1.6 Future Queuing Analysis

**Table 4.5. 2045 Intersection Level of Service Summary**

Control	Intersection	LOS/Delay [in seconds/vehicle] (Critical Movement)	
		AM Peak Hour	PM Peak Hour
Signal	Briargate Parkway & Black Forest Road	e / 60.6	d / 54.8
TWSC	Briargate Parkway & Rising Eagle Place	c / 16.3 (SB RT)	b / 14.7 (SB RT)
Signal	Briargate Parkway & Loch Linne Place	a / 1.4	a / 1.5
Signal	Briargate Parkway & Lochwinnoch Lane	a / 2.9	a / 2.7
Signal	Briargate Parkway & Commercial Collector	a / 6.7	b / 13.9
TWSC	Briargate Parkway & Wheatland Drive	b / 17.7	c / 24.0
Signal	Briargate Parkway & Vollmer Road	b / 13.5 (NB RT)	c / 16.2 (NB RT)
TWSC	Briargate Parkway & Sterling Ranch Collector	b / 12.7	b / 15.9
Signal	Briargate Pkwy-Stampleton Rd & Banning Lewis Pkwy	c / 27.1	c / 28.7
Signal	Stampleton Road & The Ranch Collector West	a / 1.5	a / 2.0
Signal	Stampleton Road & Woodmen Hills-Rayor	b / 10.8	b / 12.1
Signal	Stampleton Road & The Ranch Collector East	a / 5.5	a / 7.5
Signal	Stampleton Road & Towner Avenue	c / 26.7	b / 17.7
TWSC	Stampleton Road & Prairie Dove Drive	b / 11.4 (SB RT)	b / 10.0 (SB RT)
Signal	Stampleton Road & Liberty Grove Drive	b / 12.1 (SB RT)	b / 10.1 (SB RT)
Signal	Stampleton Road & Meridian Road	d / 37.2	d / 41.4



**Table 4.6. 2045 Left Turn Queueing Summary**

Intersecting Road	Approach Direction	95th Percentile Vehicle Queue Length (in feet)	
		AM Peak Hour	PM Peak Hour
Black Forest Road	EB	131 <sup>*</sup>	117
	WB	108 <sup>*</sup>	251 <sup>*</sup>
	NB	331 <sup>*</sup>	285 <sup>*</sup>
	SB	112	105 <sup>*</sup>
Loch Linnech Place	WB	3†	0†
	EB	2†	6†
	WB	0†	4†
	NB	42	35
Lochwinnoch Lane	SB	56	42
	EB	129	18
	WB	3†	80†
	NB	96	116
Commercial Collector	SB	84	73
	EB	13†	23†
	WB	103	158
	NB	74	114
Vollmer Road	SB	92	85
	WB	12†	49†
	NB	236	280
	WB	189	167
Sterling Ranch Road	NB	287	309
	WB	6	18
	NB	42	42
	WB	3	3
Banning Lewis Pkwy	NB	40	18
	WB	107	138
	NB	26	38
	WB	6†	5†
The Ranch Collector East	NB	96	143
	WB		

<sup>\*</sup>The 95th percentile volume exceeds capacity; queue may be longer.  
<sup>†</sup>The volume for 95th percentile queue is limited by upstream signal.

**Table 4.6. 2045 Left Turn Queueing Summary (continued)**

Intersecting Road	Approach Direction	95th Percentile Vehicle Queue Length (in feet)	
		AM Peak Hour	PM Peak Hour
Towner Avenue	EB	WB	45
	WB	NB	6†
	NB	SB	50
	SB	EB	113
Meridian Road	WB	WB	37
	NB	WB	255
	WB	NB	134
	SB	SB	112

## 5 Environmental Resources, Mitigation, and Permitting

At the Corridor Preservation Plan milestone of overall project development, quantified project impacts cannot be determined, but it is possible to identify the types of resources that would likely be affected and to identify the general types of mitigation and permitting requirements that may apply. Addressed in this section are the following topics:

- 5.1 Floodplain Permitting
- 5.2 Wetlands Mitigation and Permitting
- 5.3 Water Quality Permits
- 5.4 Farmland Protection
- 5.5 Wildlife (Senate Bill 40 Certification)
- 5.6 Hazardous Waste and Materials (Environmental Site Assessment)
- 5.7 Noise Analysis
- 5.8 Air Quality
- 5.9 Wildflowers and Noxious Weeds

### 5.1 Floodplain Permitting

Floodplain hazards are mapped nationally by FEMA. FEMA's floodplain maps are used as the basis for determining whether or not floodplain insurance can be issued and used to compensate affected property owners for flood damage. Construction within a floodplain has the potential to modify that floodplain and thus affect additional properties. Under such circumstances, it is necessary to model the effects of that construction and to update the floodplain hazard maps, if impacted.

A key concept in the FEMA mapping system is identification of areas that are interpreted as having a 1 percent chance of inundation in any given year, and thus are statistically expected to flood once over a period of 100 years. This is commonly known as the 100-year floodplain. A FEMA permit is necessary to undertake construction in the 100-year floodplain.

FEMA maps for the Briargate-Stapleton corridor were reviewed for this Corridor Preservation Plan. Most of the study corridor is classified as areas of Minimal Flood Hazard (Zone X). But there are two locations where the east-west corridor crosses north-south drainages that are classified as Zone AE, meaning 100-year floodplain. These are approximately halfway between Black Forest Road and Vollmer Road (Cottonwood Creek) and east of Vollmer Road (Sand Creek), as shown in **Figure 5.1**.

Accordingly, key drainage considerations for design of the roadway will include:

- accounting for any necessary wetland mitigation.
- sizing culverts to convey peak flows under roadway.
- adding water quality treatment features to mitigate runoff impacts.
- providing and/or relocating curb and gutter within urban sections.

The roadway design will need to be evaluated using an appropriate modeling approach (normally the U.S. Army Corps of Engineers Hydrologic Engineering Centers' River Analysis System, or HEC-RAS).

A FEMA floodplain permit will be needed for the project. This should be coordinated through the Regional Floodplain Coordinator at the Pikes Peak Regional Building Center.



**Figure 5.1** FEMA Floodplain Map Information for the Briargate-Stapleton Corridor.

*Source:* FEMA, 2021.

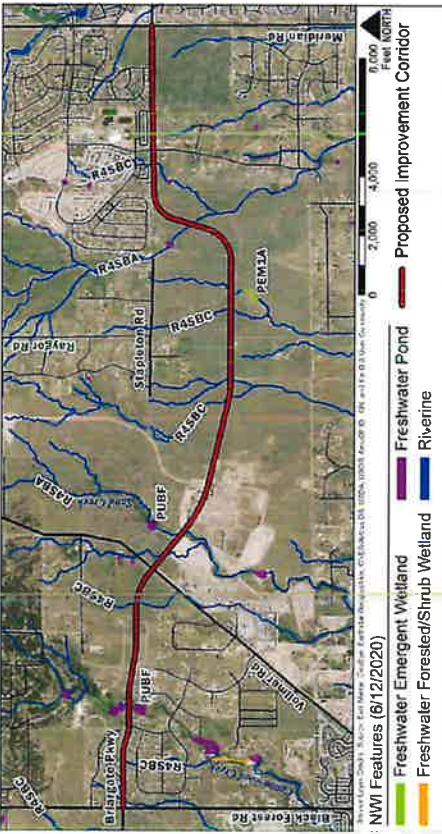
### 5.2 Wetlands Mitigation and Permitting

Wetlands are valuable ecological resources that have numerous benefits for wildlife, flood control, and water quality. Wetlands associated with waters of the United States (WUS) fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Presidential Executive Order 11990, "Protection of Wetlands" (42 FR 26961, 3 CFR, 1977 Comp., p. 121), instructs all federal agencies to "take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities."

An on-site field delineation of wetlands in the Briargate-Stapleton corridor was outside the scope of this Corridor Preservation Plan and, therefore, was not conducted. Wetland size and location can change over time due to development and other factors, so delineation should be done after a specific alignment has been determined so that project impacts can be determined with increased certainty.

To identify the potential for wetland impacts in the corridor, CORVUS Environmental Consulting reviewed available data online from the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI). The NWI data makes informed assumptions about possible wetlands based on the interpretation of satellite imagery. Though useful for screening purposes, it is not adequate for regulatory compliance. See **Figure 5.2**.





**Figure 5.2 Location of Potential Wetlands Identified by USFWS NWI Database**

*Source:* Colorado Springs, El Paso County Map Date June 12, 2020.

Figure 5.2 includes some USFWS codes that indicate the type of wetland that may be present. The first letter "R" stands for riverine (associated with a stream); the first letter "P" stands for palustrine, associated with a pond. Here is a decoding of the four abbreviations shown in the figure:

- R4SBA – Riverine, Intermittent, Streambed, Temporarily Flooded
- R4SBC – Riverine, Intermittent, Streambed, Semipermanently Flooded
- PUBF – Palustrine, Unconsolidated Bottom, Semipermanently Flooded
- PEMIA – Palustrine, Emergent, Persistent, Temporarily Flooded

Given that the Briargate-Stapleton roadway corridor crosses approximately 13 of these drainages, it seems likely that the project would indeed impact wetlands in one or more of them. Cottonwood Creek and Sand Creek appear to be the most likely locations for impacts. These are also the most likely locations for riparian wildlife impacts, discussed later.

Efforts will be needed in the design process to avoid, minimize, and mitigate both temporary and permanent wetland impacts. If wetlands or other WUS would be affected, a permit for construction affecting wetlands and other waters will be needed from USACE, based on a formal wetland delineation and a USACE Jurisdictional Determination (JD).

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill material into WUS, including wetlands. This requirement is administered through the USACE Section 404 Permit Program. USACE has developed a system of streamlined permits for common types of projects with minimal impacts and has updated these Nationwide Permits (NWP) effective March 2021. NWP 14, Linear Transportation Projects, is available for projects with impacts totaling 0.5 acres or less.

For projects with greater impacts, an Individual Permit could be required, which takes significantly more time for processing (USACE 2021).

### 5.3 Water Quality Permits

Protection of water quality is an important national priority addressed by numerous federal laws, including the Clean Water Act (CWA) of 1977 and the Water Quality Act of 1987. These are geared in part to control the release of contaminants into the WUS.

This is relevant to the Briargate-Stapleton roadway corridor; the roadway alignment would cross a number of drainages that flow to Monument Creek, then Fountain Creek, and then the Arkansas River.

Roadway construction projects in urban areas are required to include design features and construction practices that prevent soil erosion and capture stormwater runoff to treat it (e.g., by letting the sediment settle out) before stormwater is discharged to receiving waters. Temporary and permanent Best Management Practices (BMPs) are required under federal and Colorado regulations.

The U.S. Environmental Protection Agency (EPA) has delegated authority for enforcement of the CWA to the CDPIE. Under this authority, the Colorado Water Quality Control Act was passed, and Colorado's Water Quality Control Commission (WQCC) was created to provide regulations to be implemented by CDPIE to keep Colorado in compliance with the CWA.

Based on requirements promulgated under Section 402 of the CWA, the WQCC has implemented regulations identifying the City of Colorado Springs and El Paso County as regulated MS4 areas. By definition, a separate storm sewer system includes not only a storm drainage system but also ditches, gutters, and other similar means of collecting and conveying stormwater runoff that does not connect with a wastewater collection system or wastewater treatment facility.

Figure 5.3 shows a map of El Paso County's MS4 area, shaded in yellow. The Colorado Springs MS4 area is shaded in gray. In between is a planned urban growth area that is unincorporated now but could be annexed into the city in the foreseeable future. This includes much of the Briargate-Stapleton corridor. Logically, it makes sense to assume that the entire study area will soon be subject to MS4 permit requirements and to design and construct the roadway accordingly. The County ECM addresses EPC stormwater quality and permitting that are the same for projects that are located in or outside the MS4 area.

Implemented to comply with the MS4 permit requirements, El Paso County created its stormwater permit, called an Erosion and Sediment Quality Control Permit (ESQCP). In general, it is required for all applicable soil disturbances >1 acre.

## Environmental Resources, Mitigation and Permitting

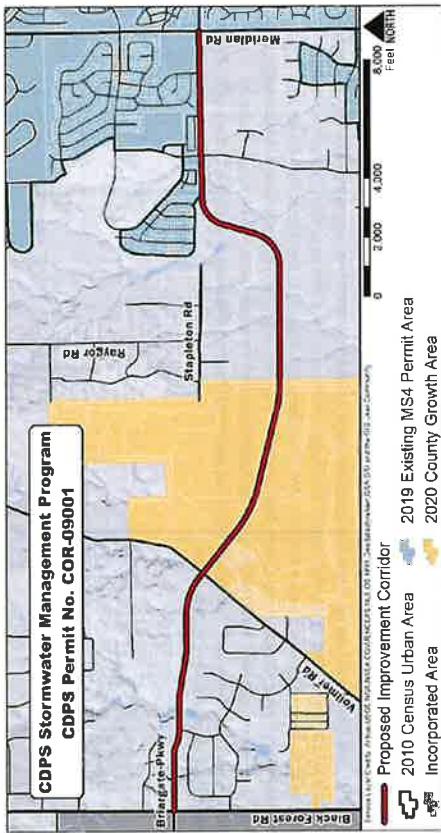


Figure 5.3 2019 El Paso County MS4 Permit Area.

*Source: El Paso County, 2021.*

Construction projects that disturb one acre or more or that are part of a larger common plan of development require a Colorado Discharge Permit System (CDPS) Construction Stormwater Permit from the Water Quality Control Division (WQCD) and a Stormwater Management Plan (SWMP). The SWMP is prepared in the final design phase of the project before the submission of the CDPS construction permit application submitted to the WQCD at least 30 days before construction. Sites that must discharge groundwater from a construction site to surface water body also require a CDPS Dewatering Permit.

In addition to the above requirements, CWA Section 401 mandates that a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into WUS unless either a Section 401 water quality certification is issued that verifies compliance with water quality requirements or certification is waived. States and authorized tribes where the discharge would originate are generally responsible for issuing water quality certifications.

### 5.4 Farmland Protection

Farmland protection is a nonissue in the Briargate-Stapleton corridor due to the lack of farmland in the area. The Farmland Protection Policy Act (FPPA), enacted in 1980, seeks to minimize the impact that federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. FPPA regulations are found in Title 7, Part 658 of the Code of Federal Regulations. These requirements are under the jurisdiction of the U.S. Department of Agriculture (USDA), and within the USDA, farmland statistics are kept by the Natural Resources Conservation Service (NRCS). The FPPA further seeks to ensure that federal actions are compatible with private, local, and state programs and policies to protect farmlands.

The availability of suitable climate, soils, and water supply is critical to agricultural feasibility. Good farming conditions are not prevalent in El Paso County, especially in its northern portion at a higher elevation. Some farming occurs in the southern part of the county, with irrigation from Monument Creek. According to the USDA 2017 Census of Agriculture, El Paso County has 0.2 percent of the state's total number of farms and 0.1 percent of its total agricultural acreage. The market value of agricultural products in El Paso County was estimated at \$32 million in 2017, with half of this attributed to cattle and calves. About a third of the total market value is attributed to the crop category of "nursery, greenhouse, floriculture, and sod." Another 7 percent was attributable to other crops and hay. (USDA 2017)

For farmland protection purposes, USDA specifically defines the terms "prime farmland," "unique farmland," "other than prime or unique farmland of statewide importance," and "other than prime or unique farmland of local importance." Prime farmland is defined as land that has the best combination of physical and chemical characteristics for the production of food, feed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor and without intolerable soil erosion. Prime farmland includes land that possesses the above characteristics but is currently being used to produce livestock and timber.

The NRCS Soil Data Access (SDA) Prime and Other Important Farmlands database identifies 125 different soil types in El Paso County and classifies 104 of them as "not prime farmland." The remaining 21 soil types are considered "prime farmland if irrigated," and six of these also have other conditions.

Due to lack of water for irrigation in the area, no soils in the Briargate-Stapleton corridor are considered prime farmland under the FPPA (USDA 2021). A review of aerial photography confirms there is no evidence of irrigated farming in the study area. The area traditionally has been used for cattle grazing, as seen in Figure 5.4.



Figure 5.4 Cattle Grazing Adjacent to Stapleton Road at Raygor Road.

*Source: Google, Google Maps street view of Stapleton Road and Raygor Road, accessed 2011.  
https://www.google.com/maps/.*





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## 5.5 Wildlife (Senate Bill 40 Certification)

Construction of a new arterial roadway will convert undeveloped grassland to impervious surfaces. In addition to creating a barrier to wildlife movement, a road carries traffic with noise and nighttime light, which creates a disturbance zone that degrades adjacent habitat. Wildlife and wildlife habitats are afforded some protection by the Colorado law commonly referred to as Senate Bill (SB) 40. Per SB 40, roadway impacts to three key classifications of fish and wildlife and their habitat need to be assessed: 1) protected sensitive species, 2) common wildlife (especially roadway crossing by large game animals), and 3) riparian and aquatic species.

### 5.5.1 Threatened and Endangered Species – Possibly Present

In northern El Paso County, the protected sensitive species of primary concern is Preble's Meadow Jumping Mouse (PMJM), or *Zapus hudsonius preblei*. This rodent species was listed as Threatened by the USFWS in 1998. In December 2011, USFWS designated approximately 41.1 miles of rivers and streams and 34,935 acres of streamside habitat in seven Colorado counties as critical habitat that is essential for the survival of this species.

According to USFWS, this largely nocturnal mouse lives primarily in heavily vegetated, shrub-dominated riparian (streamside) habitats and immediately adjacent upland habitats along the Foothills of southeastern Wyoming south to Colorado Springs along the eastern edge of the Front Range of Colorado. Typical habitat for PMJM comprises well-developed plains riparian vegetation with adjacent, relatively undisturbed Grassland communities and a nearby water source. The eastern boundary for the PMJM is likely defined by the dry shortgrass prairie, which may present a barrier to eastward expansion (USFWS 2021).

The closest USFWS-designated Critical Habitat for PMJM is located about four miles northwest of the western terminus (Black Forest Road) of the Briargate-Stapleton corridor study area, as shown in Figure 5.5. Critical Habitat identifies specific areas that are essential to the conservation of PMJM and that may require special management considerations or protections.

The entire Briargate-Stapleton study corridor is located within the potential range of PMJM, but this species is only found in riparian areas ("riparian" is derived from the Latin word *ripa*, which means riverbank). Based on available USFWS mapping, there are approximately 13 places where the proposed east-west Briargate-Stapleton roadway could cross north-south drainages with potential riparian areas. These are shown in Figure 5.6. These riparian areas are drainages that flow southward from the Black Forest into four watersheds: Cotton Creek, Sand Creek, East Fork Sand Creek, and Black Squirrel Creek. Importantly, the southward-flowing Black Squirrel Creek at the eastern end of the study area, which does not have designated critical habitat, is different from the westward-flowing Black Squirrel Creek to the north, which does have designated critical habitat.

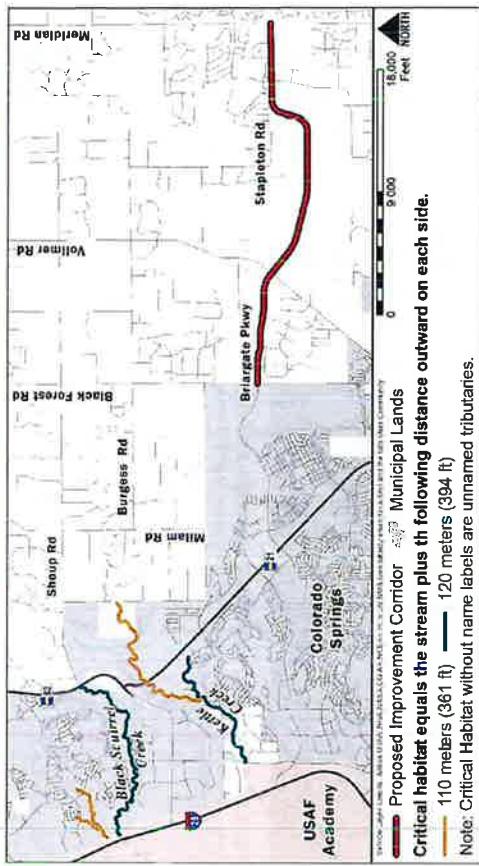


Figure 5.5 Location of Briargate-Stapleton Study Area in Relation to PMJM Critical Habitat.



Figure 5.6 Potential Riparian Areas Along Briargate-Stapleton Corridor

Note: Riparian areas are shown in yellow.  
Source: CORVUS Environmental Consulting

The next step needed in PMJM evaluation is to conduct an on-site habitat evaluation, which is outside the scope of this Corridor Preservation Study. The priority locations for site visits are perennial streams with consistent shrubby vegetation, such as Cotton Creek and possibly Sand Creek. Documentation of no suitable habitat would be sufficient to obtain USFWS concurrence with a determination of No Effect on PMJM.

If suitable PMJM habitat is present, however, trapping efforts may be needed to determine the presence/absence of PMJM in such locations. Note that trapping cannot be performed during the animal's hibernation season (September/October through May/June). If PMJM were determined to be present, preparation of a Biological Assessment and a USFWS Biological Opinion would be needed, and mitigation would be required.

### 5.5.2 Other Threatened and Endangered Species – Not Present

The USFWS online screening tool called Information for Planning and Consultation (IPAC) identifies several other federally listed threatened or endangered species that occur within El Paso County, but these do no impact the Briargate-Stapleton corridor due to lack of suitable habitat (USFWS 2021).

- Mexican Spotted Owl (*Strix occidentalis lucida*) – Threatened. Habitat is in rocky canyons near the mountains, but not on eastern grasslands.
- Greenback Cutthroat Trout (*Oncorhynchus clarkii stormsi*) – Threatened. Found in cold-water streams near Pikes Peak, but not in drainages of the eastern grasslands.
- South Platte River Species downstream in Nebraska: (1) Least tern, (2) Piping Plover, (3) Whooping Crane, (4) Pallid Sturgeon, (5) Western Prairie Fringed Orchid – Threatened. Not applicable, as all drainages in the study area feed into the Arkansas River; they do not flow northward to reach the South Platte River.
- Ute Ladies'-tresses Orchid (*Spiranthes diluvialis*) – Threatened. This orchid occurs along riparian edges, gravel bars, old oxbows, high-flow channels, and moist to wet meadows along perennial streams. It typically occurs in stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers. It also is found in wetland and seepy areas near freshwater lakes or springs. Drainages in the study area may have riparian edges but do not include major rivers or the other riverine features listed above.

### 5.5.3 Common Wildlife – Game Species

The study area almost certainly contains common wildlife species that are prevalent along the Colorado Front Range grasslands, for example, coyotes, foxes, raccoons, rabbits, skunks, squirrels, mice, voles, snakes, and a variety of birds, including raptors such as the red-tailed hawk. These species currently do not have federal or state protection under the Endangered Species Act. Large mammals also are present, including mule deer, white-tailed deer, elk, and occasionally black bears and mountain lions, some visiting from the nearby Black Forest to the north and the U.S. Air Force Academy (a large natural campus against the mountain foothills). Also present is the pronghorn (antelope), a grassland animal that requires large expanses of open space.

Some of these animals will be displaced by the planned urban land uses along Briargate-Stapleton corridor, forcing them to retreat to the Black Forest, the mountain foothills, or the plains (pronghorn). The smaller mammals, including coyotes, will adapt to urban development.

For this Briargate-Stapleton study, CORVUS Environmental Consulting examined available data from Colorado Parks and Wildlife to determine if there are any known migration routes for elk or other large mammals. The CPW data confirmed that the study area is part of the known range for a number of game animals but identified no known migration routes. The game animals identified by CPW were mule deer, white-tailed deer, black bear, pronghorn, and wild turkey. The CPW data did not include elk in the area.

There does not appear to be a need for planned wildlife crossings along the Briargate-Stapleton corridor. Wildlife movement will become confined to major drainages such as Cottonwood Creek and Sand Creek. At both locations, roadway bridges will be needed for hydraulic reasons, and animals will be able to cross under the roadway. The higher the clearance provided under these bridges, the more likely they would be to accommodate wildlife crossing. Small-animal roadkill can be expected in the area due to a relatively high roadway speed, minimal lighting, and traffic volumes of 30,000 vehicles per day. This is a common occurrence throughout Colorado Springs, even on less-traveled streets with less traffic.

As noted above, numerous bird species are present in the study area. Most are protected by the Migratory Bird Treaty Act (MBTA) of 1918, which makes it unlawful to harm these birds, their eggs, or their nests during the breeding season. The Corvus analysis of CPW indicated that 11 species have breeding areas within the Briargate-Stapleton study area. These are:

1. Lewis Woodpecker\*
2. Band-tailed Pigeon
3. Brewer Sparrow
4. Brown-capped Rosy Finch
5. Grasshopper Sparrow
6. Lazuli Bunting
7. Northern Harrier
8. Prairie Falcon
9. Rufous Hummingbird
10. Swainson Hawk
11. Virginia Warbler

\*The Lewis Woodpecker is not threatened or endangered but is the only species on this list identified by USFWS as a Bird of Conservation Concern (BCC).

#### 5.5.4 Riparian Species – Senate Bill 40

Enacted in 1969, Colorado SB 40 requires any state agency (usually CDOT) to obtain wildlife certification when it plans to undertake construction “in any stream or its banks or tributaries (CRS Title 33; Article 5, Protection of Fishing Streams). The purpose of this certification is to identify potential impacts to riparian fish and wildlife and to avoid, minimize, and mitigate impacts as feasible. SB 40 states:

It is declared to be the policy of this state that its fish and wildlife resources, and particularly the fishing waters within the state, are to be protected and preserved from the actions of any state agency to the end that they are available for all time and without change in their existing natural state, except as may be necessary and appropriate after due consideration of all factors involved.

No agency of the state, referred to in this article as an “applicant,” shall obstruct, damage, diminish, destroy, change, modify, or vary the natural existing shape and form of any stream or its banks or tributaries by any type of construction without first notifying the commission of such planned construction. Such notice shall be on forms furnished by the commission and shall be submitted not less than ninety days prior to the date of the commencement of planned construction. The notice shall include detailed plans and specifications of so much of the project as may or will affect, as set forth in this section, any stream. (CO Rev. Stat. § 33.5-101-102, 2018)

Whether or not SB 40 applies to the Briargate-Stapleton roadway project, Cottonwood Creek and Sand Creek are the two key locations where impacts to riparian habitat and wildlife should be explored. These are key locations for PMP assessment, wetland assessment, and floodplain impact evaluation. Any efforts to protect PMJM habitat and minimize wetland impacts will also tend to be beneficial for riparian species in general.

#### 5.6 Hazardous Waste and Materials (Environmental Site Assessment)

The Briargate-Stapleton corridor largely traverses undeveloped ranch land, which does not have past urban or industrial uses and does not have any former landfills.

A hazmat database records search was performed in January 2021 for a one-mile radius around the expected Briargate-Stapleton alignment from Black Forest Road to Meridian Road. This records search, which is a standard component of an Initial Site Assessment (ISA) and included 76 different federal and state hazardous materials databases, found only one record within the search area. This listing comes from the CDPHE database of solid waste disposal facilities, transfer stations, recyclers, waste tire registrants, and waste grease registrants.

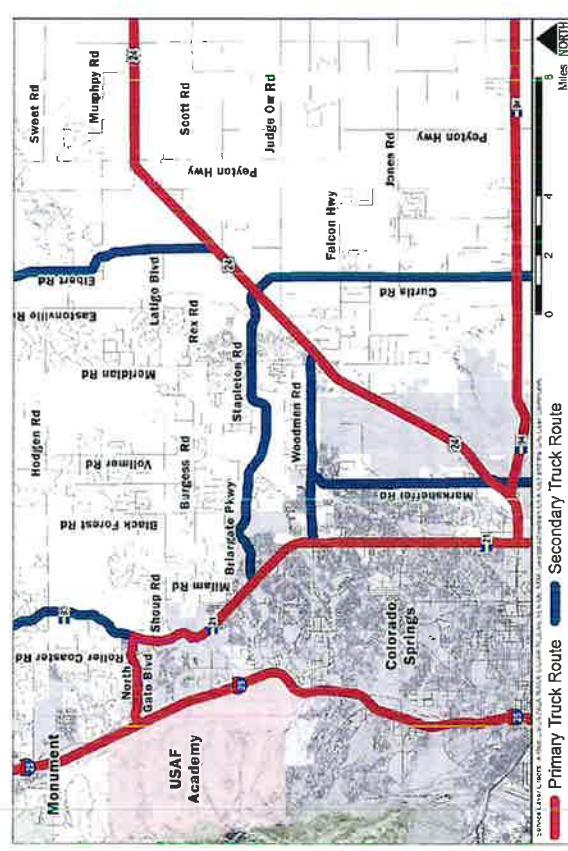
The listing named Hauling by Steve, a business located at 7465 Forestgate Drive. The record indicates that this business involves the transportation of waste tires. This address is south of Briargate-Stapleton and slightly west of Vollmer Road. Google Maps and the El Paso County Assessor's records confirm that this is the proprietor's home residence and not a place of business.

On the basis of this records search, there appear to be no environmental restraints for the Briargate-Stapleton corridor with regard to hazardous materials.

#### 5.7 Noise Analysis

Construction of an arterial roadway in the Briargate-Stapleton corridor will introduce traffic noise in an area that is relatively quiet. This noise likely will be unwelcome to existing residents in the area, who enjoy the relative tranquility of the countryside. However, they do live in a planned growth area within a rapidly growing metropolitan area.

Land developers have the option to include berms in their development designs and to locate non-sensitive land uses near the roadway, rather than build homes lined up right next to it, as often happens. Fortunately, a relatively wide ROW is planned, which will mitigate the noise impact because noise levels decline with increased distance. Factors that can increase noise include high-speed limits, motorcycles, heavy trucks, and steep grades that lead to loud braking. As seen in Figure 5.7, the Briargate-Stapleton corridor is identified as a secondary truck route on El Paso County's 2016 MTCP Update. Briargate-Stapleton is expected to carry roughly 30,000 vehicles per day in 2045.



**Figure 5.7 Excerpt from MTCP - Truck Route Map.**  
Source: El Paso County, 2016, Map 16, p. 62.



The Federal Highway Administration (FHWA) and CDOT have detailed noise analysis and abatement guidelines involving the use of computer noise modeling, but the Briargate-Stapleton corridor is not expected to be funded with state or federal highway funds. Because noise barriers are expensive to build, the federal and state guidelines specify a cost-benefit approach whereby an isolated residence will not qualify for mitigation, but numerous noise "receptors" close together can meet the cost-effectiveness criteria.

Noise barriers in Colorado are common in urban areas along high-speed, heavily traveled Interstate highways, where the criteria are met. Noise barriers are relatively rare along city streets. Barriers typically provide noise reduction benefit for the first row of (closest) receptors and minimal benefit to other receptors behind them. If a person can see the roadway, that means there is not an intervening obstacle to block the noise, and the person can likely hear the noise from vehicles that pass by.

The FHWA guidelines for noise modeling (not applicable to this local project) call for a modeling of receptors within 500 feet of the roadway. Figure 5.8 illustrates this modeling area on an aerial photo of the corridor. It is rare for receptors beyond 500 feet from the traveled lane to experience traffic noise levels exceeding the FHWA/CDOT threshold that triggers analysis of noise barrier feasibility and reasonableness. The threshold level equates to two people being able to hold an outdoor conversation from six feet apart. If this cannot happen due to traffic noise, that property is considered to be an impacted receptor.

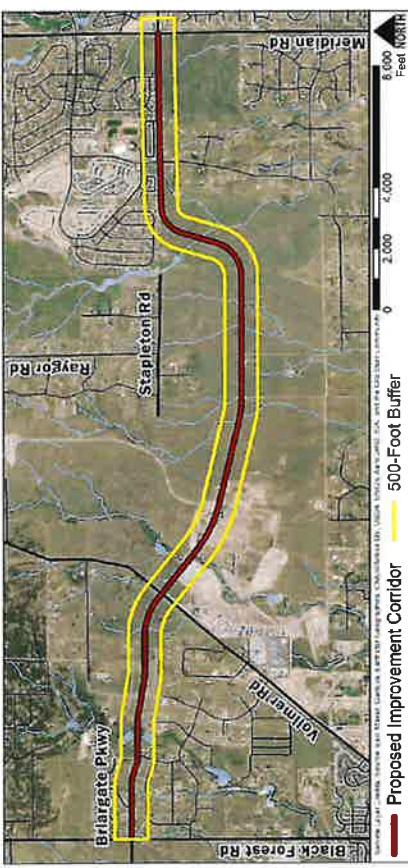


Figure 5.8 Buffer Area 500 Feet from the Proposed Travel Lanes.

#### 5.8 Air Quality

Air quality in the Pikes Peak region is generally good, and it is presumably even better in the Briargate-Stapleton corridor due to lack of dense urban development nearby. Vehicle-related emissions of carbon monoxide resulted in violations of national air quality standards in the 1970s and 1980s, but improved vehicle technology has eliminated this problem. Today, with a much greater regional population and much

more vehicle travel, highest recorded carbon monoxide concentrations are about 70 percent lower than they were three decades ago. The primary air pollution concern today is ground-level ozone.

#### 5.8.1 Ozone Pollution

Ground-level ozone (not the atmospheric ozone layer, which protects the planet from solar radiation) is formed in the atmosphere by various chemical reactions, typically on hot, sunny days, and thus elevated ozone concentrations occur during summer months. The U.S. EPA revised the primary (public health) and secondary (public welfare) eight-hour ozone standards from 75 parts per billion to 70 parts per billion, effective on December 28, 2015. The Pikes Peak region has been teetering at the attainment/nonattainment threshold since that time, so far avoiding a violation.

The region has two ozone monitoring stations; one in Manitou Springs and one at the U.S. Air Force Academy. Because air heats up and rises on warm days, and the pollution created at lower elevations rises during the day, both monitoring stations are located at elevations higher than downtown Colorado Springs. The PPACG is the designated lead air quality management agency for Park, Teller, and El Paso Counties. In January 2020, PPACG committed to the Ozone Advance Program, a voluntary action plan aimed at raising public awareness of ozone pollution and taking steps to reduce the precursor pollutants that cause volatile organic compounds (VOCs) and nitrogen oxides (NOx).

Ozone precursor pollutants are emitted by all aspects of urban life, that is, any activity involving the use of fuels or chemicals. Vehicle use, power plants, paint, and household chemicals are just a few examples. In northern Colorado, gas and oil production are additional contributors.

Ozone concentrations are worse in Denver, which has a much larger population, but the Pikes Peak Region has grown steadily by about 100,000 persons per decade since 1990, and more population creates more ozone pollution. The planned development along the Briargate-Stapleton corridor is part of this ongoing trend. Local air pollution in the Briargate-Stapleton corridor will increase due to the conversion of vacant grassland to urban land use, including the motor vehicle use associated with the new land uses. However, no localized violations of national ambient air quality standards would result.

#### 5.8.2 Fugitive Dust

Although the Pikes Peak Region is in attainment for EPA-regulated particulate matter (including dust) for both coarse (10 microns or smaller) and fine (2.5 microns or smaller) particulates, statewide regulations from the CDPHE and El Paso County regulations apply to construction activities that cause a large amount of ground disturbance.

Section 5.6 of the El Paso County Board of Health Regulations requires a Construction Activity Permit whenever construction may result in a disturbed area of one or more acres. El Paso County Public Health issues permits for periods not to exceed six months when the disturbed area will be at least 1 acre but less than 25 acres. CDPHE's Air Quality Control Division issues permits when the disturbed area is 25 acres or larger. For the Briargate-Stapleton road construction, the disturbed area is expected to be greater than 25 acres and thus requires the CDPHE Construction Air Quality Permit.



To obtain an air quality permit, which is legally enforceable and revocable, the applicant must submit and execute a plan to minimize and control fugitive dust emissions that could result from the construction activity. The dust control plan typically should:

- Indicate what vehicle speed control measures will be in place.
- Indicate what limited disturbed area practices will be in place (explain, phasing, etc.).
- Indicate what re-vegetation methods will be applied.
- Detail mulch application (if applicable),
- Describe compaction methods (specify the location, number, and type of equipment).
- Detail watering times per day or as needed.
- Indicate frequency of use and location of chemical stabilizers (if applicable).
- Describe how steep slopes will be controlled.
- Detail windbreaks (snow, solid fence, berm, furrows, vegetation, etc.).
- Detail stockpile controls.
- Indicate plans for establishment and maintenance of temporary construction haul roads.
- Detail control of haul roads (specify control, frequency of cleanups, etc.).

### 5.8.3 Air Pollution Due to Wildfires

Air pollution can also occur due to wildfires, such as the Black Forest Fire, which burned an estimated 14,280 acres and destroyed over 500 homes in June 2013. This occurred in unincorporated El Paso County, immediately to the north of the Briargate-Stapleton corridor. Other major wildfires in the region (2002 Hayman Fire, 2012 Waldo Canyon Fire), the state (2020 East Troublesome and Cameron Peak Fires), and even fires from out of state have occasionally caused significant degradation to air quality in Colorado Springs. Although these are considered exceptional events, it is foreseeable that similar situations will occur in the future.

### 5.9 Wildflowers and Noxious Weeds

Soil disturbance resulting from roadway construction needs to be mitigated to prevent erosion and also to minimize invasion by noxious weeds. In areas that do not have urban roadside landscaping, revegetation with native plant species is the standard approach. Native plant species include wildflowers, which can be desirable for aesthetic reasons, subject to any maintenance constraints. Native species are adapted to local climatic and soil conditions and do not need ongoing artificial irrigation.

#### 5.9.1 Wildflowers

The Briargate-Stapleton corridor is expected to be developed with local funds and thus would not subject to federal roadway development requirements. Nevertheless, federal initiatives regarding native plant species are instructive. Section 130 of the Surface Transportation and Uniform Relocation Assistance Act of 1987, amended 23 U.S.C. 319 by adding a requirement that native wildflower seeds or seedlings or both be planted as part of any landscaping project undertaken on the federal-aid highway system. At least one-quarter of one percent of funds expended for a landscaping project must be used to plant native wildflowers on that project. This provision requires every landscaping project to include the planting of native wildflowers unless a waiver has been granted. The FHWA Colorado Division Administrator can grant a waiver if the State

certifies that native wildflowers or seedlings cannot be grown satisfactorily or there is a scarcity of available planting areas. (FHWA 2021.)

Related best vegetation practices also found in 23 U.S.C. 319 address the important, emerging focus on the encouragement of pollinator habitat, as follows. In cooperation with willing States, the Secretary of the U.S. Department of Transportation is instructed to (1) encourage integrated vegetation management practices on roadsides and other transportation ROWs, including reduced mowing; and (2) encourage the development of habitat and forage for Monarch butterflies, other native pollinators, and honey bees through plantings of native forbs and grasses, including noninvasive, native milkweed species that can serve as migratory way stations for butterflies and facilitate migrations of other pollinators.

The opposite of desirable wildflowers is an infestation of disturbed soil areas by noxious weeds. Federal law and Colorado law recognize the ecological and economic harm (damage to agriculture) posed by noxious weeds. Under Colorado law, it is ultimately the responsibility of all landowners to employ methods and strategies to manage noxious weeds found on their property. This applies to both the public and private sectors. Roadways are well-known corridors for the spread of noxious weed seeds as the result of vehicles passing through.

#### 5.9.2 Noxious Weeds

Agricultural agencies at the federal, state, and even county levels have developed lists of specific weed species that need to be eradicated. Typically, these lists have three levels, A, B, and C. In El Paso County's Weed Management Plan (2017, p.4):

"List A" identifies rare noxious weed species that are subject to eradication wherever detected statewide in order to protect neighboring lands and the state as a whole.

"List B" identifies noxious weed species with discrete statewide distributions that are subject to eradication, containment, or suppression in portions of the state designated by the commissioner in order to stop the continued spread of these species.

"List C" identifies widespread and well-established noxious weed species for which control is recommended but not required by the state, although local governing bodies may require management.

This noxious weed list, last updated in 2018, is available through El Paso County or the Colorado Department of Agriculture. The County lists 32 noxious weed species, as summarized in Table 5.1.

The Briargate-Stapleton corridor has not been surveyed to identify existing vegetation, including wildflowers and noxious weeds. Both are likely present to a limited degree. Causal observation via Google Maps (driver's view) clearly shows extensive infestation of C-listed common mullein at both ends of the study corridor. During construction, noxious weed management efforts can be undertaken, and the inclusion of wildflower seeds as part of the native species revegetation can be considered.





<b>Table 5.1.</b> <b>Noxious Weed List</b>		
<b>"A" List (3)</b>	<b>"B" List (20)</b>	<b>"C" List (4)</b>
Cypress spurge Dyer's woad Knotweeds: Giant, Japanese & Bohemian Myrtle spurge Orange hawkweed Purple loosestrife	Absinth wormwood Bouncingbet Bull thistle Canada thistle Chinese clematis Common teasel Damian toadflax Diffuse knapweed Hoary cress (white-top) Houndstongue Leafy spurge Musk thistle Perennial pepperweed Russian knapweed Russian olive Scentless chamomile Scotch thistle Spotted knapweed Tamarisk (Salt cedar) Yellow toadflax	Common mullein Downy brome / Cheatgrass Field bindweed Poison hemlock

Source: Data from El Paso County, Community Services Department, Environmental Division, Noxious Weeds and Control Methods, updated 2018, <https://assets.communityservices elpasoco.com/wp-content/uploads/Environmental-Division-Picture/Noxious-Weeds/Noxious-Weed-Control-Book.pdf>.

## 6 Conceptual Roadway Design

### 6.1 Corridor Preservation Basis

As part of the corridor study, concept-level plan and profile design was completed as the basis for the identification of ROW requirements and for the development of conceptual cost estimates. The plan and profile design are based on an ultimate four-lane configuration of Briargate-Stapleton. As part of the process of the plan and profile development, conceptual earthwork cross sections were developed and used as a basis for determining the need for retaining walls and/or slope easements.

### 6.2 Alignment

As discussed in Section 3.1.5, the southern proposed alternative was selected as the recommended horizontal alignment. With no current vertical alignment in place, the proposed profile was designed to meet City of Colorado Springs criteria for grade and matched with existing grades at proposed intersection locations at Black Forest Road, Vollmer Road, and Towner Avenue to Meridian Road. Although the corridor is under El Paso County jurisdiction, the City's design criteria were used as the more conservative design.

### 6.3 Plan and Profile

The conceptual plan and profile design for the ultimate four-lane principal arterial section is depicted in plan and profile sheets included as Appendix A. In areas of the corridor that have been platted, parcel limits show a dedicated ROW width of 120' for the planned extension of Briargate Parkway. Plats on file with the County additionally show utility/drainage easements within platted lots that vary from 20 feet wide to 40 feet wide on each side of the platted ROW.

### 6.4 Phasing

#### 6.4.1 Initial Urban and Rural Sections

Major corridor funding does not often become available in lump sum packages. To help facilitate implementation as funding does become available, the corridor improvements are broken into standalone phases, in which distinct improvement packages may be implemented in two phases. The initial phase for both the urban segment (between Black Forest Road and Vollmer Road) and rural segments (east of Vollmer Road), as shown in Figure 6.1 and Figure 6.2, would construct the westbound lanes only. The initial two-lane roadway would be stripped to allow for travel in both directions.

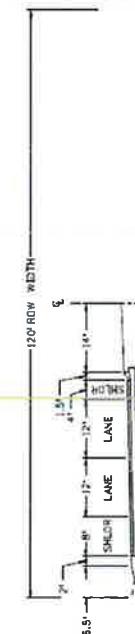


Figure 6.1 Initial Urban Section

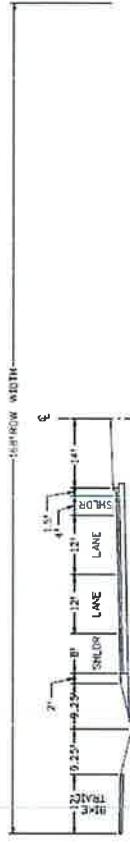


Figure 6.2 Initial Rural Section

### 6.4.2 Ultimate Urban Section

As funding becomes available and travel demand increases, the urban segment of the roadway, between Black Forest Road and Vollmer Road, can be expanded to meet development demands. The ultimate urban section, as shown in Figure 6.3, resembles the City of Colorado Springs typical section with 1:1 thru lanes in each direction, a 6' outside shoulder to provide a shared facility for bicycles, and a 6' detached sidewalk to provide increased pedestrian safety. The ultimate urban section conforms to the dedicated 120' wide ROW and provides a consistent transition from the existing City of Colorado Springs Briargate Parkway section, east of Black Forest Road, to more rural sections of the corridor located to the east of Vollmer Road.

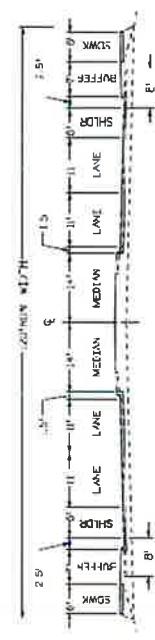


Figure 6.3 Ultimate Urban Section

### 6.4.3 Ultimate Rural Section

The ultimate rural section, as shown in Figure 6.4, includes graded ditches for drainage and accommodates bicycles with an off-street bike trail to be located within the utility corridor on one side of the roadway. Expansion of the rural section to a four-lane principal arterial would include restriping the westbound lanes, construction on the eastbound lanes in the same configuration as the westbound lanes, and addition of an eastbound detached sidewalk with buffer. The ultimate rural section would require a 168' ROW width.

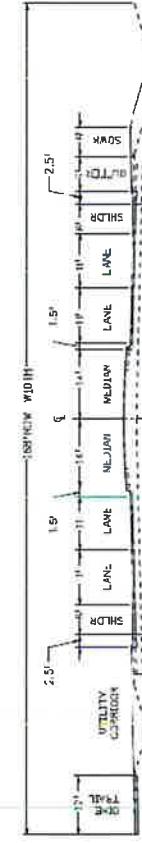


Figure 6.4 Ultimate Rural Section



## 6.5 Opinion of Probable Costs

### 6.5.1 Estimated Costs

The Briargate-Stapleton corridor study identified overall project safety, geometry, and capacity to improve the corridor. The planning level cost estimate for initial improvements is approximately \$32.9M, and approximately an additional \$40.7M to upgrade the roadway to the interim phase section. To upgrade the interim phase section to the ultimate phase section is approximately \$28M. Phased construction is estimated to be approximately \$121.6M.

There is an economy of scale. The planning level estimate for immediately constructing the Interim phase section is \$88.5M, a savings of \$4.7M over the phased approach to achieve the same cross section.

Similarly, constructing the Ultimate phase section without other phases is estimated at approximately \$86M, a savings of \$35.6M over the phased approach. The cost estimate for the Ultimate build-out is included in the table below; the remaining estimates are included in [Appendix E Cost Estimates](#).

**Table 6.1. Phased Opinion of Probable Costs (continued)**

Item No.	Item Description	Unit	Unit Cost	Quantity	Cost
900-	Bridge	SF	\$150.00	7,500	\$1,125,000
900-	Drainage (Estimate by project team)	L SUM	\$13,920,000.00	1	\$13,920,000
900-	Wall	SF	\$80.00	12,000	\$960,000
<b>ITEM COST SUBTOTAL:</b>					
	Contingency*			30%	\$13,317,000.00
	Item Cost with Contingency				<b>\$57,705,000</b>
	Mobilization			10%	\$5,771,000
	Utilities			5%	\$2,886,000
	Right-of-Way			2%	\$1,155,000
	Force Account Provision			1.0%	\$5,771,000
<b>CONSTRUCTION SUBTOTAL:</b>					
<b>Engineering and Environmental Fees</b>					
	Design Fee			10%	\$5,771,000
	Environmental Clearance Fee			2%	\$1,155,000
	Construction Engineering			1.0%	\$5,771,000
	<b>FEE SUBTOTAL:</b>				<b>\$12,657,000</b>
	<b>TOTAL PROGRAM COST</b>				<b>\$86,000,000</b>

\* The design upon which this opinion of the probable cost was based is highly conceptual. As a result, we recommend that a 30% contingency be used to cover additional costs.

Note: Costs highlighted in gray are percentages applied to the Item Cost with Contingency Subtotal. All values are rounded to the nearest \$1000.

### 6.5.2 Basis of Costs

613-10000	Wiring	L SUM	\$75,000.00	2	\$150,000
613-13000	Luminaire (LED) (Special)	EACH	\$1,700.00	8	\$13,600
614-70150	Pedestrian Sig Face (16) (Countdown	EACH	\$670.00	16	\$10,720
614-70236	Traffic Signal Face (12-12-12)	EACH	\$890.00	30	\$26,700
614-70560	Traffic Signal Face (12-12-12-12-12)	EACH	\$1,400.00	10	\$14,000
614-72860	Pedestrian Push Button	EACH	\$840.00	16	\$13,440
614-72886	Intersection Detect System (Camera)	EACH	\$7,500.00	8	\$60,000
614-81150	Signal-Light Pole Steel	EACH	\$21,000.00	8	\$168,000
614-84000	Traffic Signal Pedestrian Pole Steel	EACH	3,300.00	16	\$52,800
614-86240	Controller (Type 170)	EACH	7,100.00	2	\$14,200

Unit costs and contingencies used to estimate Briargate-Stapleton improvement costs were derived from CDOT cost data for recent local highway projects. Quantities were calculated from concept level design drawings (plans and profiles) for Initial, Interim, and Ultimate Phases, as applicable.



## 7 Public Process

### 7.1 Project Website

A full-function website was developed for the project (go to: [Corridor Study | Briargate-Stapleton Project for Mobility](#)). The scrolling Home Page (see Figure 7.1) begins with a Welcome and Project News banner that includes links to frequently visited site Features. The website includes: a Project Overview, a library of Project Resources and a Questions & Answers posting (see Figure 7.2); Public and stakeholder input is facilitated by both an interactive Comment Map (see Figure 7.3) and an online Comment Form (see Figure 7.4).



Figure 7.1 Project Website - Front Page Banner

This screenshot shows the "Frequently Asked Questions" section of the website. It features a question "Q WHAT DO YOU MEAN BY IMPROVEMENTS? IS THERE A LIST OF POSSIBLE IMPROVEMENTS?" followed by a detailed answer. The answer discusses potential improvements like a bridge over I-25, a roundabout at the intersection of Meridian and Stapleton, and a connection to the Stapleton Station. It also mentions a proposed interchange between I-25 and the new Peña Ranch Parkway. The text is presented in a clear, sans-serif font with some bolding for emphasis.

Figure 7.2 Website Frequently Q&A Posting

This screenshot displays two parts of the website's public process. On the left is an "Interactive Comment Map" showing a map of the study area with various locations marked by yellow squares. A callout box provides instructions: "Click on a location on the map and fill out the pop-up form to add your comment." On the right is a "Comment Form" with fields for "Name", "Email", "Subject", and "Message". Below the message field is a "Submit" button. The entire interface is designed with a clean, modern look using light blues and whites.

Figure 7.3 Website Comment Map – Example Comment and Response

This screenshot shows a comment form from Wilson & Company. It includes fields for "Name", "Email", and "Subject", followed by a large text area for the "Message". At the bottom is a "Submit" button. The form is set against a background featuring the company's logo, which includes a circular seal with "WILSON & COMPANY" and "DESIGNERS OF COLORADO'S HIGHWAYS" around a central mountain graphic.

Figure 7.4 Website Comment Form

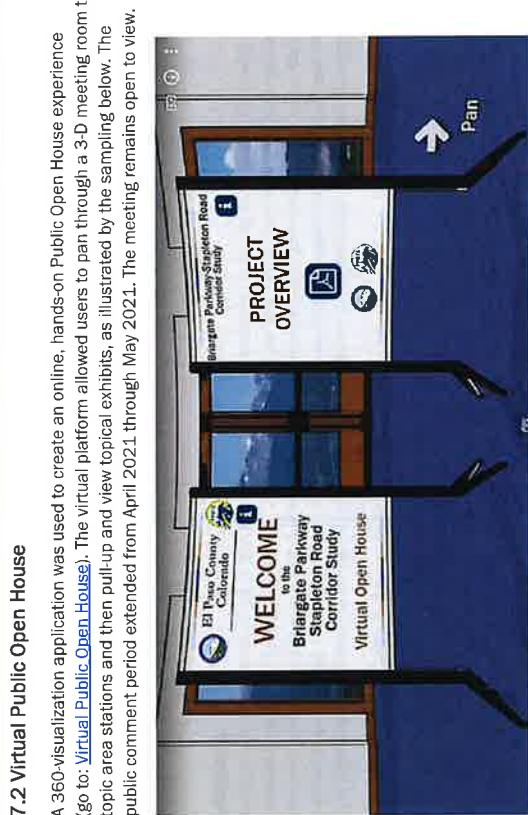


Figure 7.5 Virtual Public Open House – Alignment &amp; Typical Sections



Figure 7.6 Virtual Public Open House – Access &amp; Environmental Considerations



Figure 7.7 Virtual Public Open House – Floodplains Exhibit

## 7.2 Virtual Public Open House

A 360-visualization application was used to create an online, hands-on Public Open House experience (go to: [Virtual Public Open House](#)). The virtual platform allowed users to pan through a 3-D meeting room to topic area stations and then pull up and view topical exhibits, as illustrated by the sampling below. The public comment period extended from April 2021 through May 2021. The meeting remains open to view.

Figure 7.5 Virtual Public Open House – Alignment &amp; Typical Sections





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### 7.3 Stakeholder Coordination

Three agency stakeholder virtual meetings were held (2/19/2020, 3/25/2020 and 4/08/2020) to coordinate integration of El Paso County (County) and City of Colorado Springs (City) engineering design criteria, access, spacing criteria, and development approvals into planning for the corridor. A separate developer stakeholder meeting was held (11/10/2020) to review the proposed alignment, hybrid (County/City) typical section (County/City) as well as planning for pedestrian/bicycle accommodations. Colorado Springs Utilities was also included in this meeting as a "developer" of a proposed gas line extension. Copies of presentation slides or materials for each of the four stakeholder meetings are included in Appendix F.

### 7.4 Corridor Preservation Plan Adoption

The Briargate Parkway-Stapleton Road Corridor Preservation Plan (CPP) will be presented to the Highway Advisory Committee and the Board of County Commissioners for review and approval. The County utilizes a two-step process whereby review and approval by the Highway Advisory Committee (HAC) will precede review and adoption of the CPP by the Board of County Commissioners. Following adoption of the CPP, the El Paso County Master Plan will be amended to include the CPP and the associated Access Control Plan.

### 7.4 Access Control Plan Intergovernmental Agreement Execution

It is the intent of the County to ensure that the Access Control Plan will be enforced equally throughout the corridor. Because there is potential for portions of the corridor to be annexed into the City of Colorado Springs, an Intergovernmental Agreement (IGA) to enforce the Access Control Plan was prepared as part of the CPP and ACP by El Paso County. Although the City will not adopt the CPP, City staff has been engaged in the study throughout the planning process and provided input and concurrence on the final alignment, ACP, and hybrid typical section for the corridor as well as planning for pedestrian/bicycle accommodations. The final Access Control Plan is included as Appendix D.

### 7.5 Summary of Public Comments

The Briargate Parkway-Stapleton Road Corridor Study website included two optional formats for public comment. A standard online comment form as well as location-based comment map comprise two available comment options. Links to each option are provided on the website Welcome Page as well as on each review comment opportunity page, e.g., on the instructions/link page for the Virtual Public Open House. Full detail of the public comments received that were and the responses that were provided are included in Appendix F.

## 8 References

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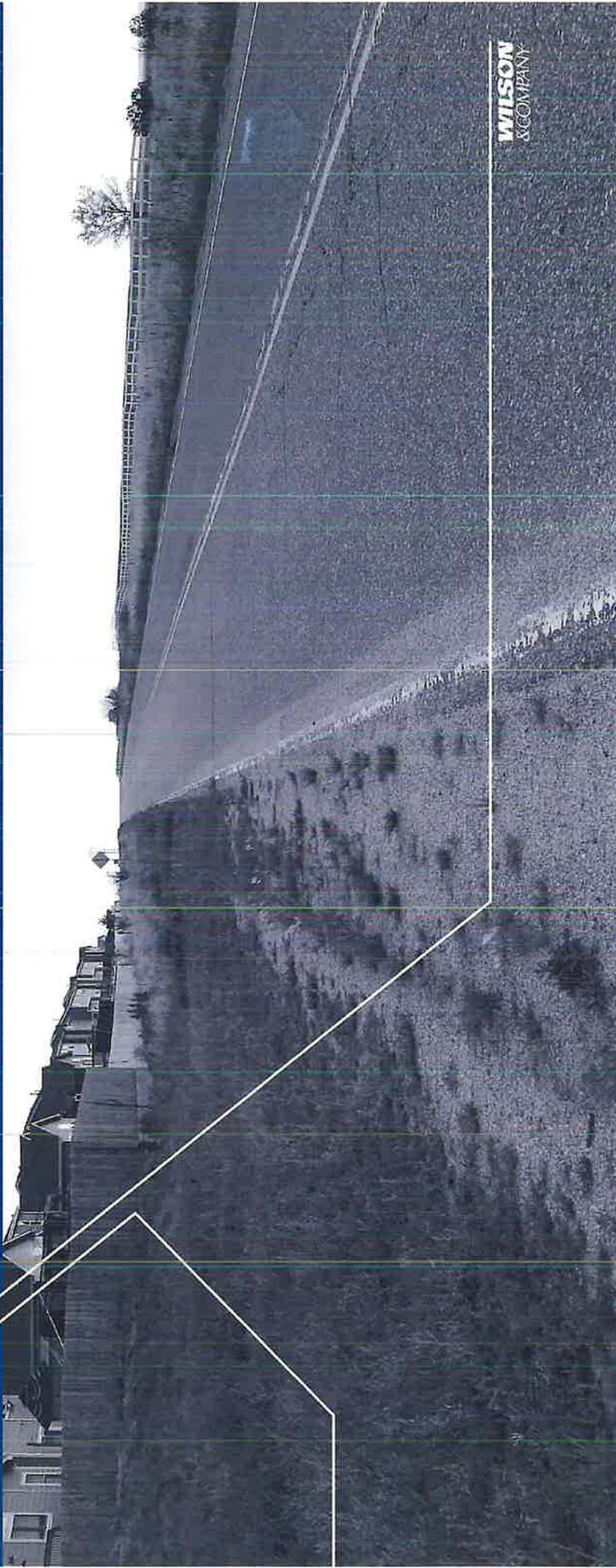
El Paso County, Colorado  
December 2023

## Appendix A

### Conceptual Plan and Profile

#### Briargate Parkway/Stapleton Road Corridor Study

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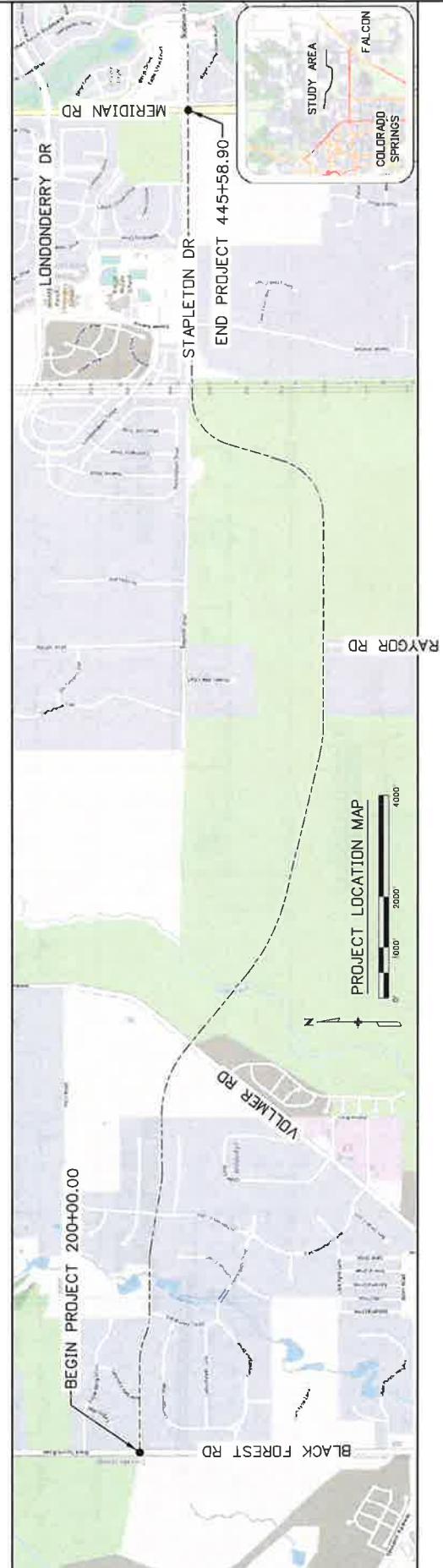


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**BRIARGATE PARKWAY-STAPLETON ROAD STUDY**  
**PRELIMINARY DESIGN**

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STA. 200+00.00	
<b>END =</b>	
STA. 445+58.90	24558.9
<b>TOTAL</b>	<b>24558.9</b>
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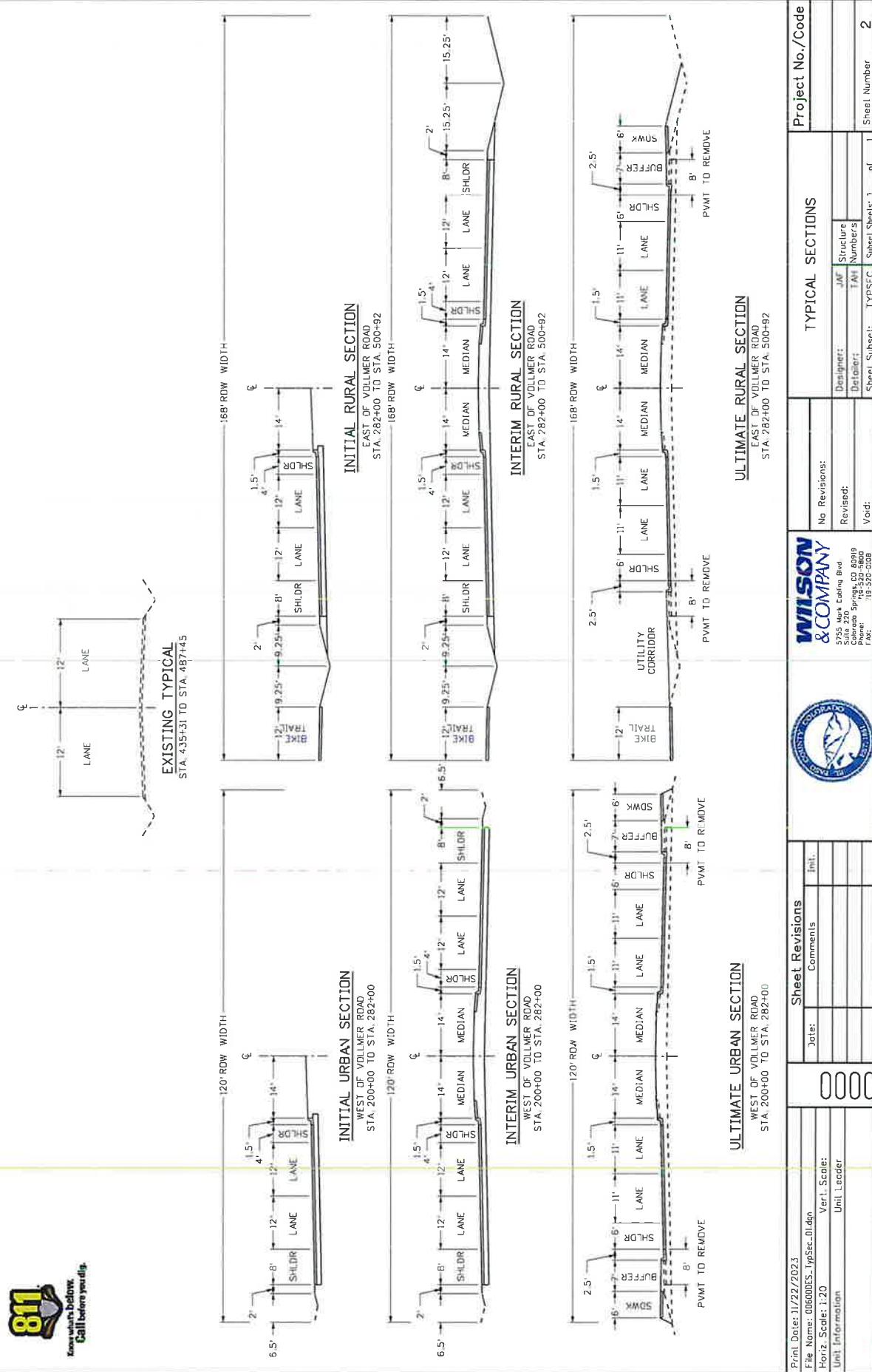
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 2 TYPICAL SECTIONS  
 3-30 ROADWAY PLANS AND PROFILETS



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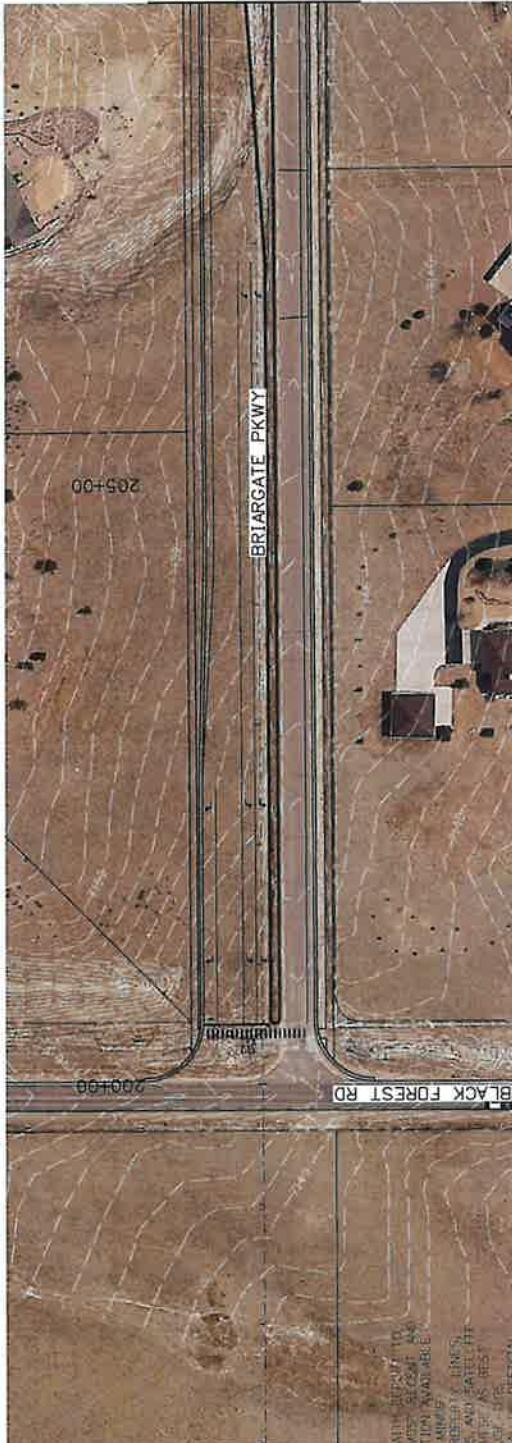


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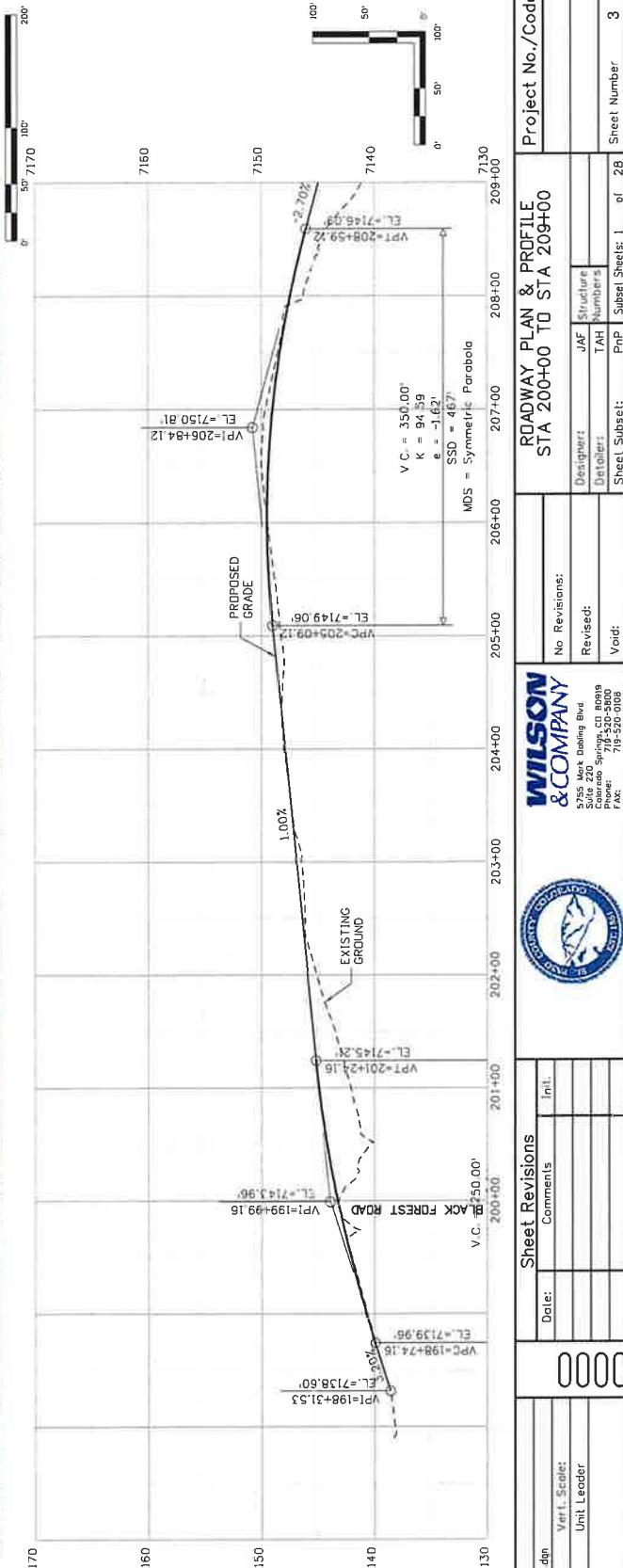
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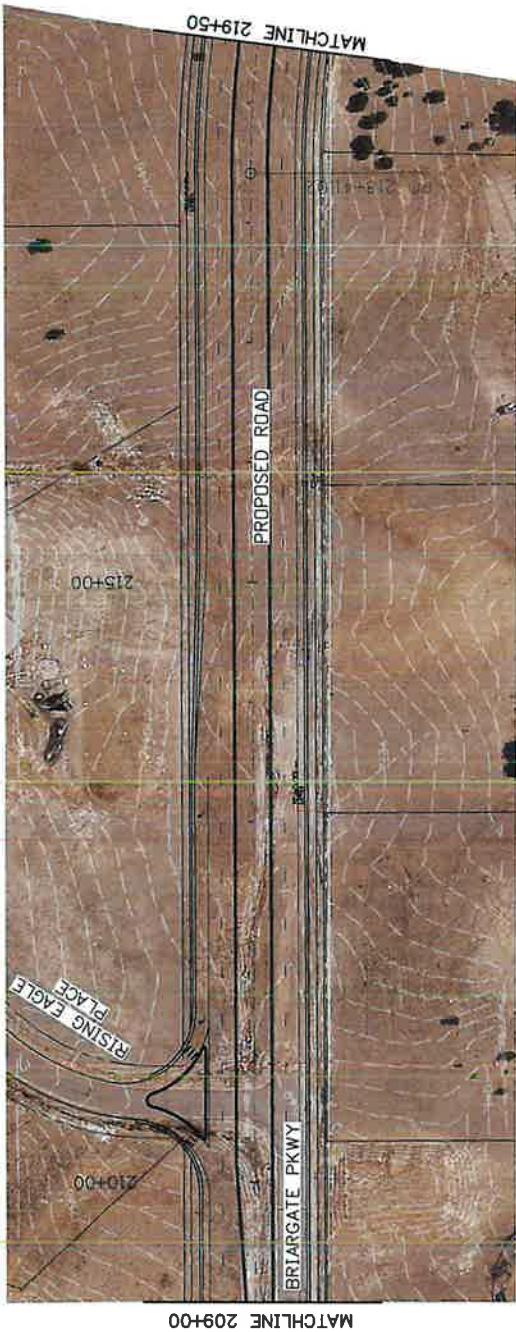
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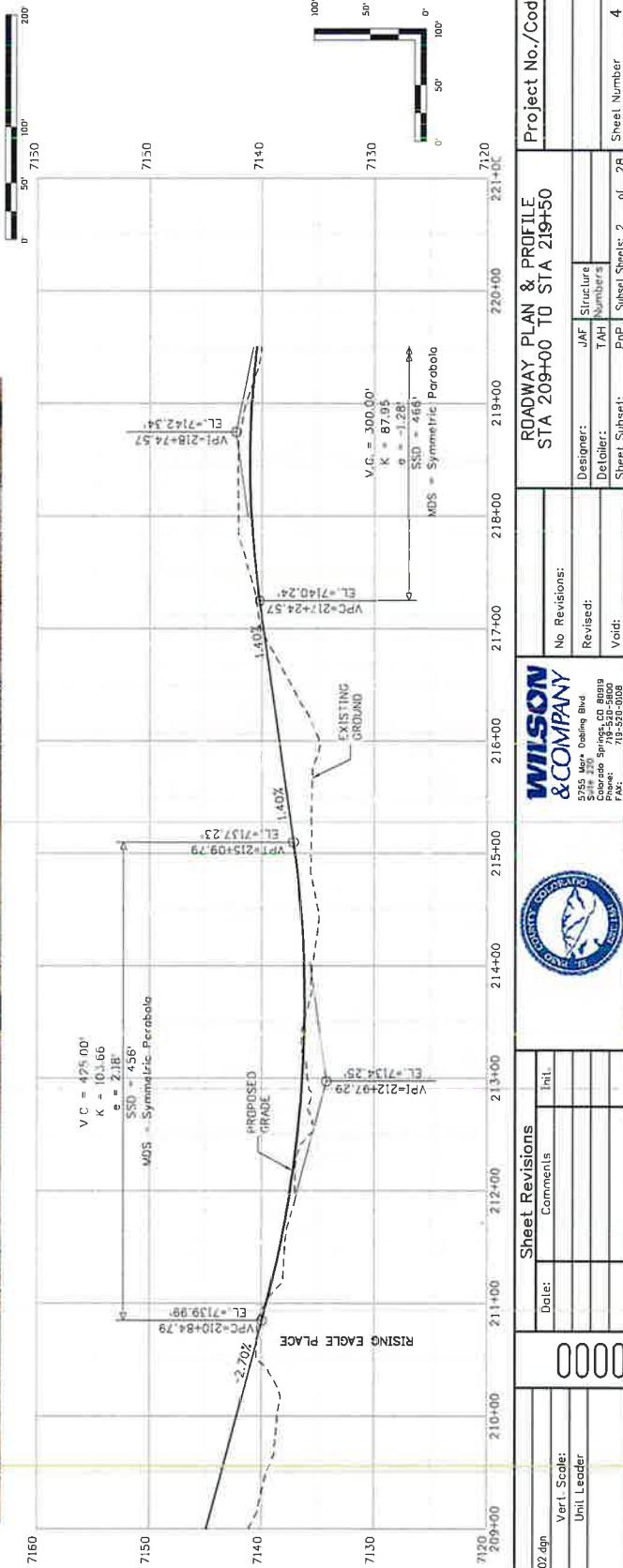
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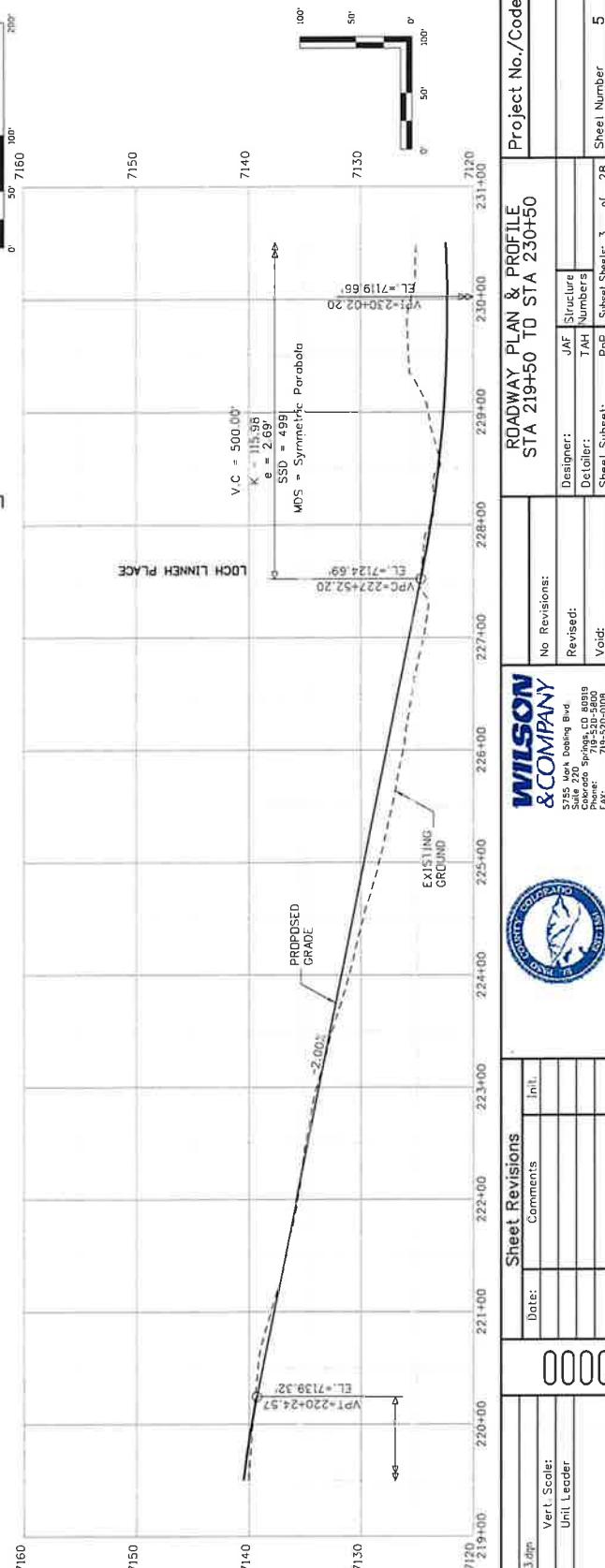
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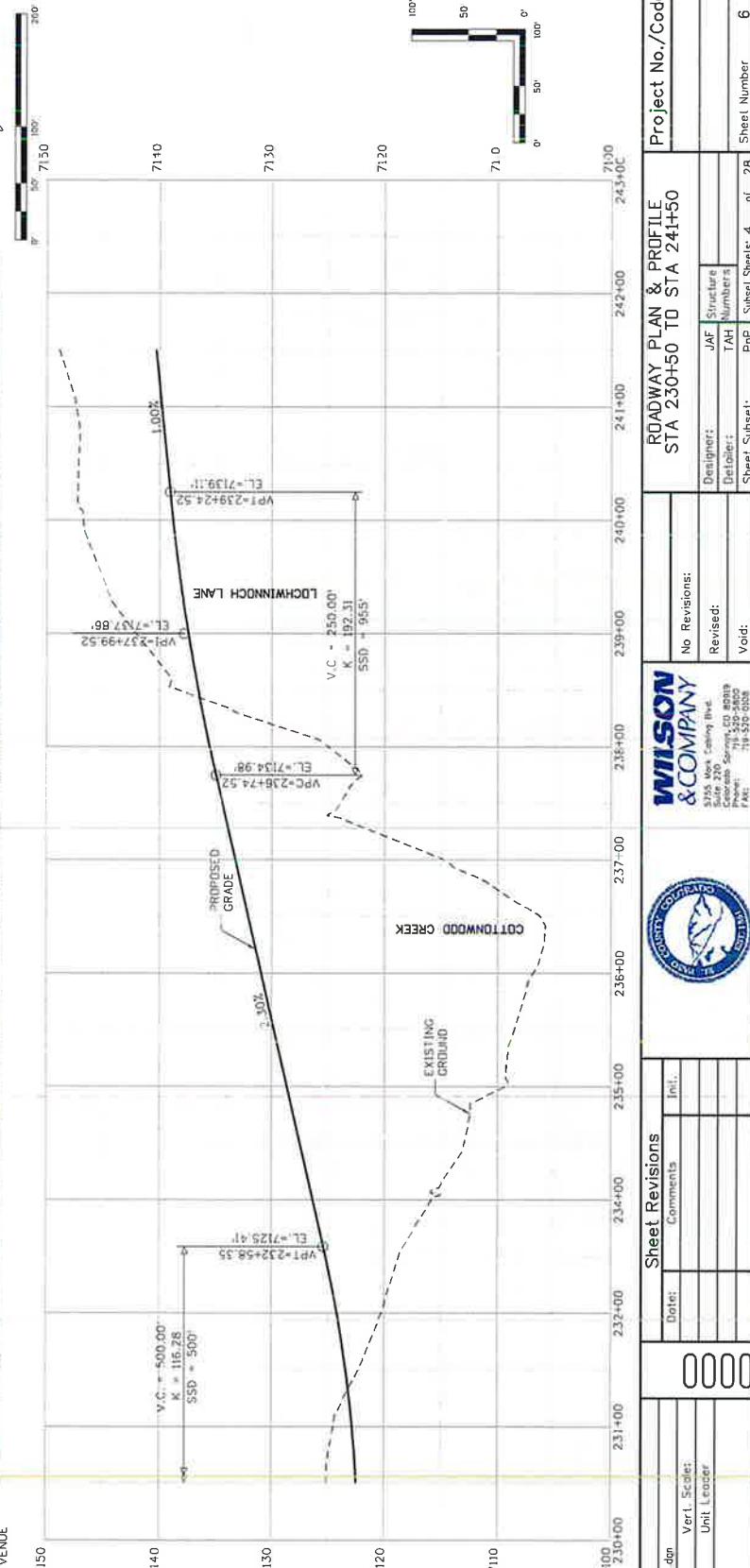
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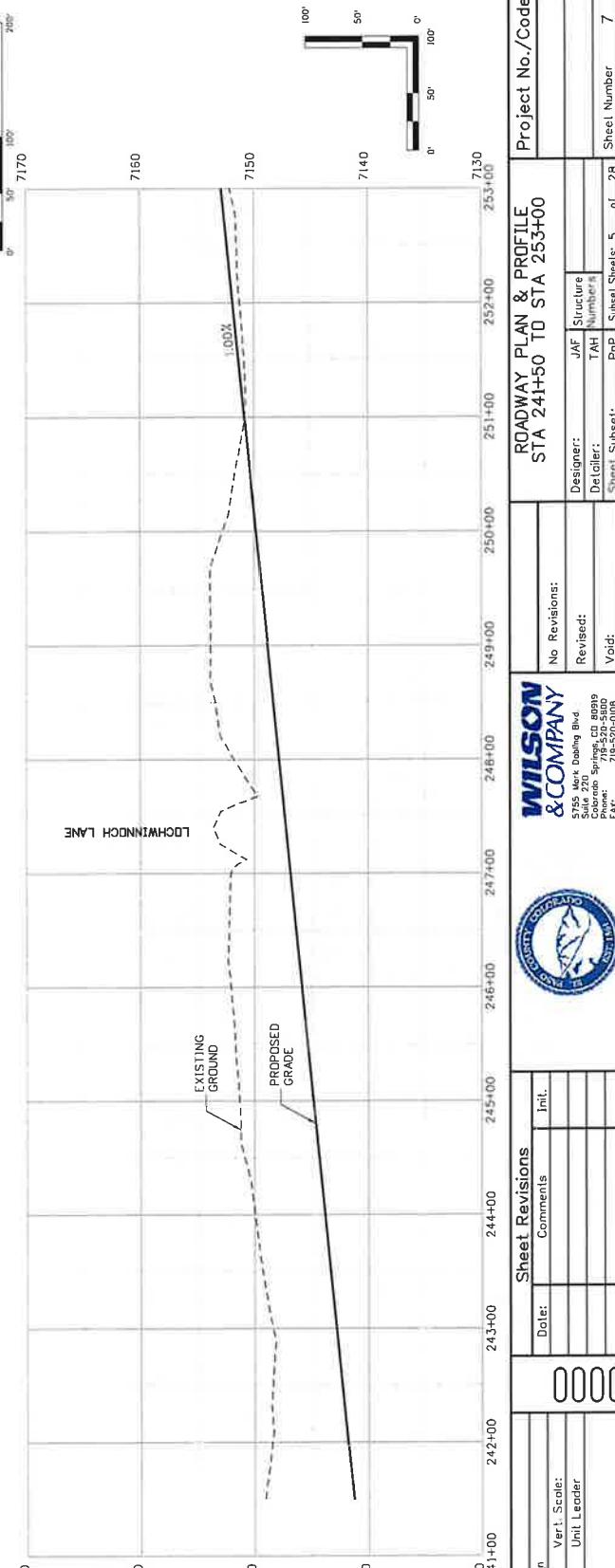




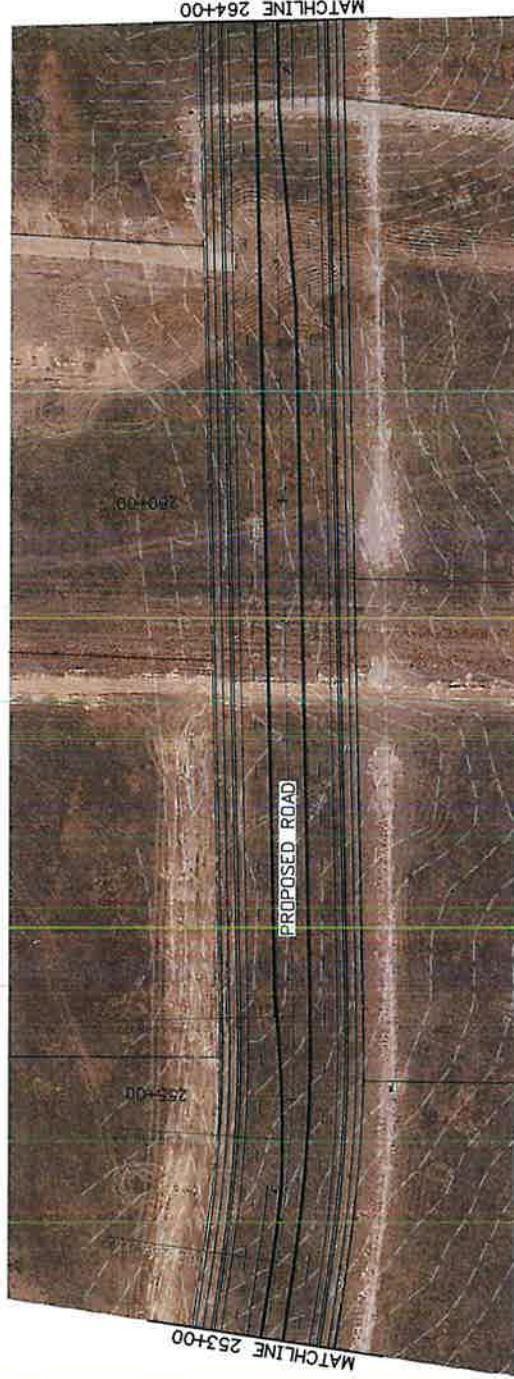
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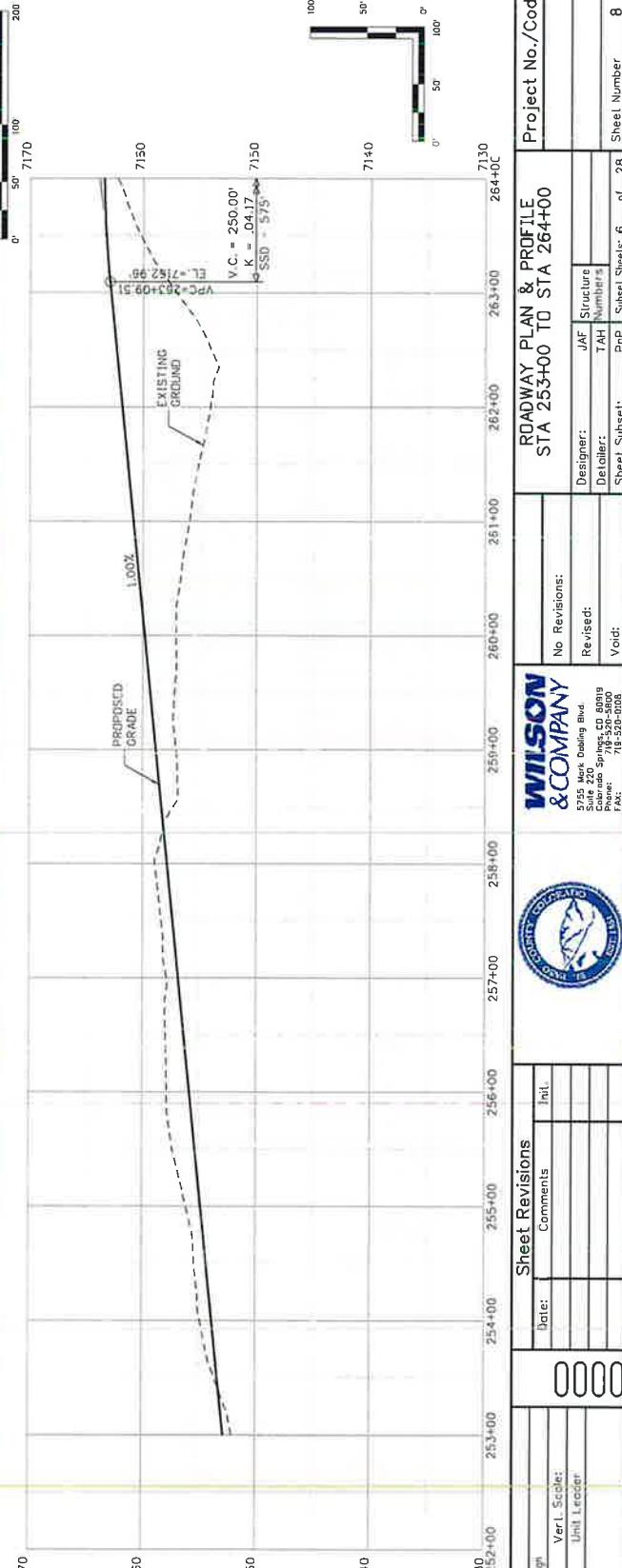


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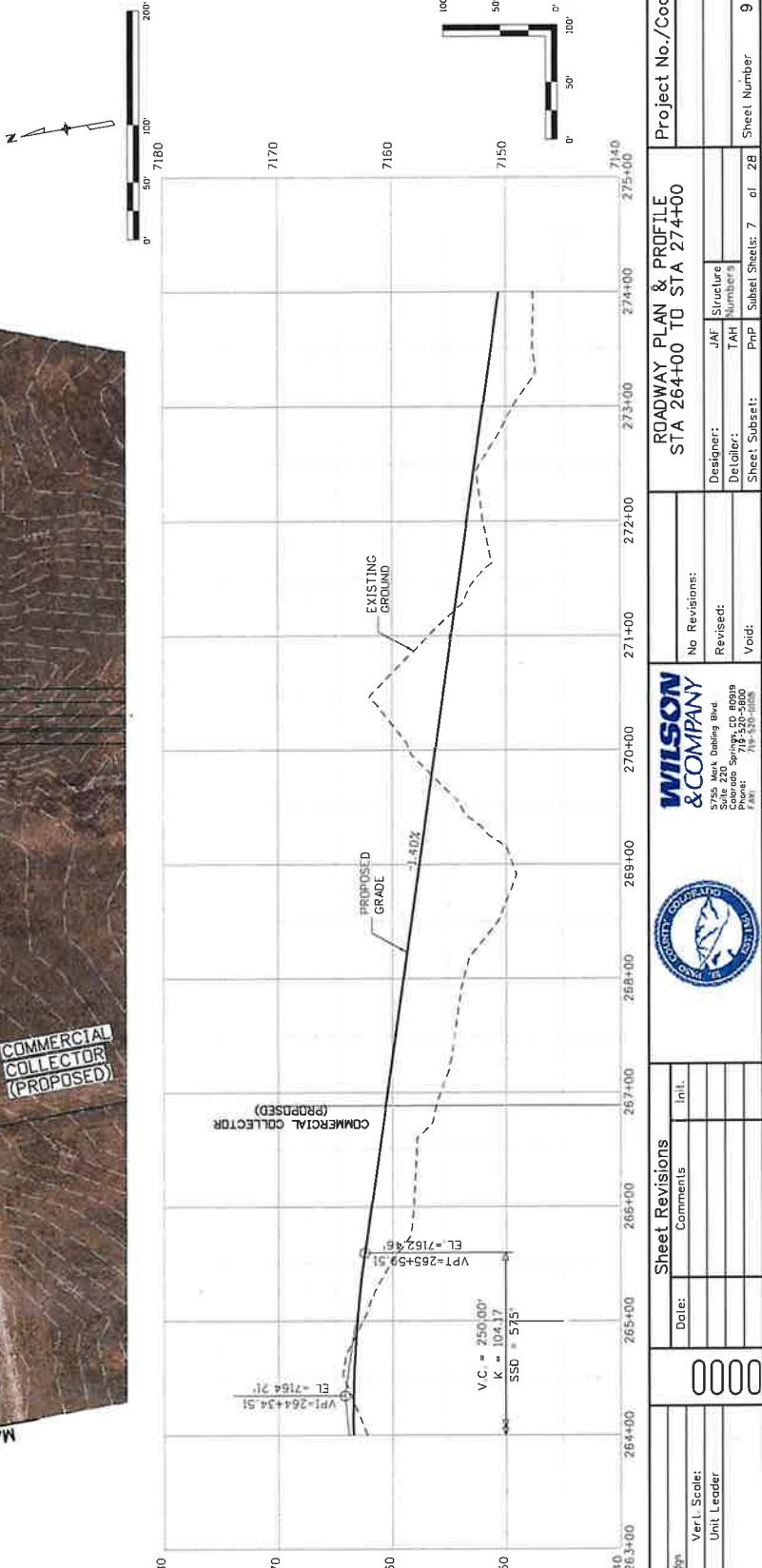
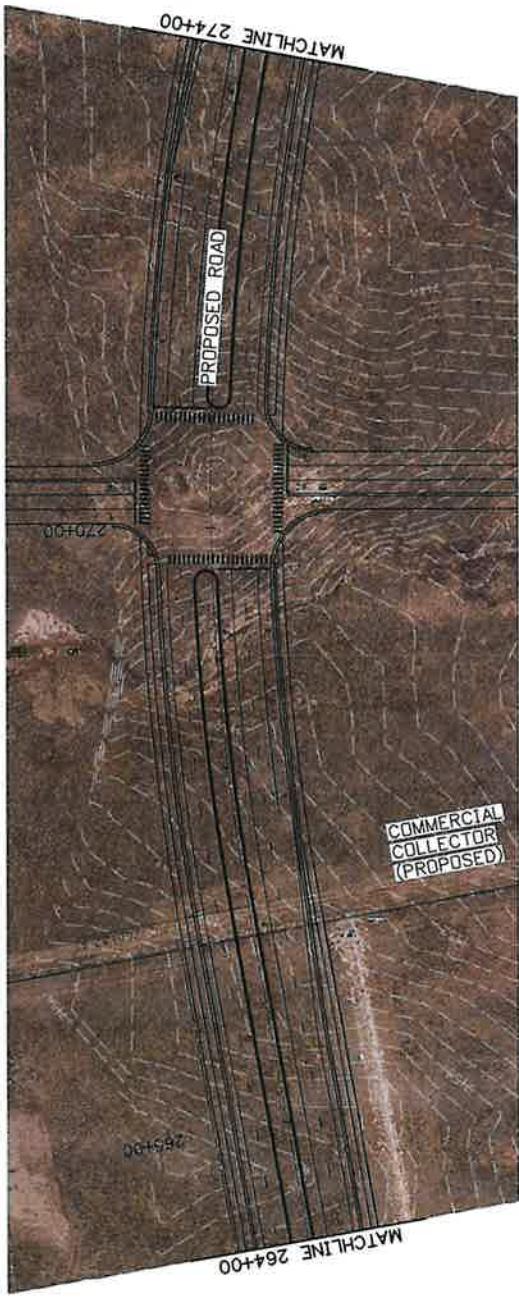
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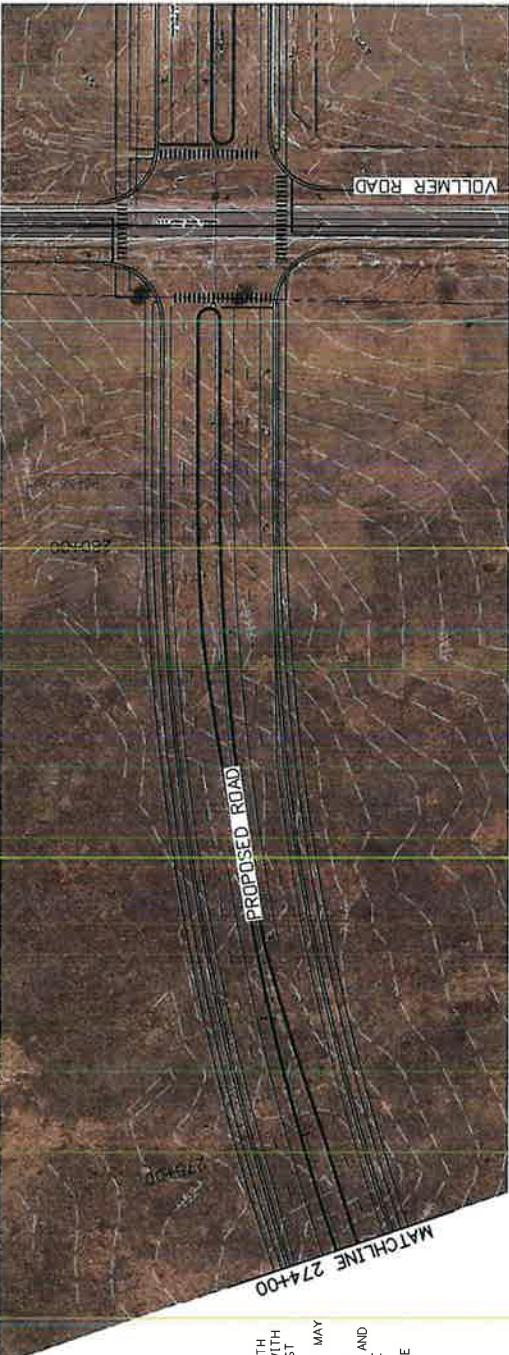
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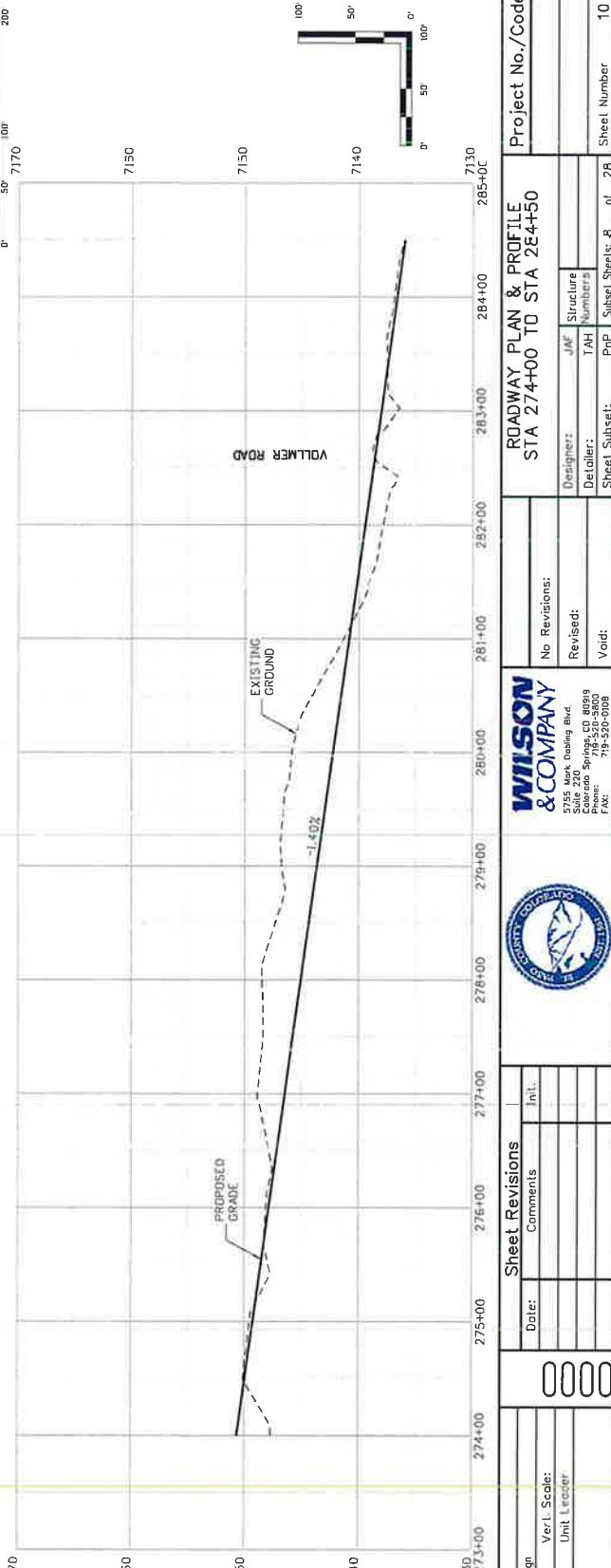


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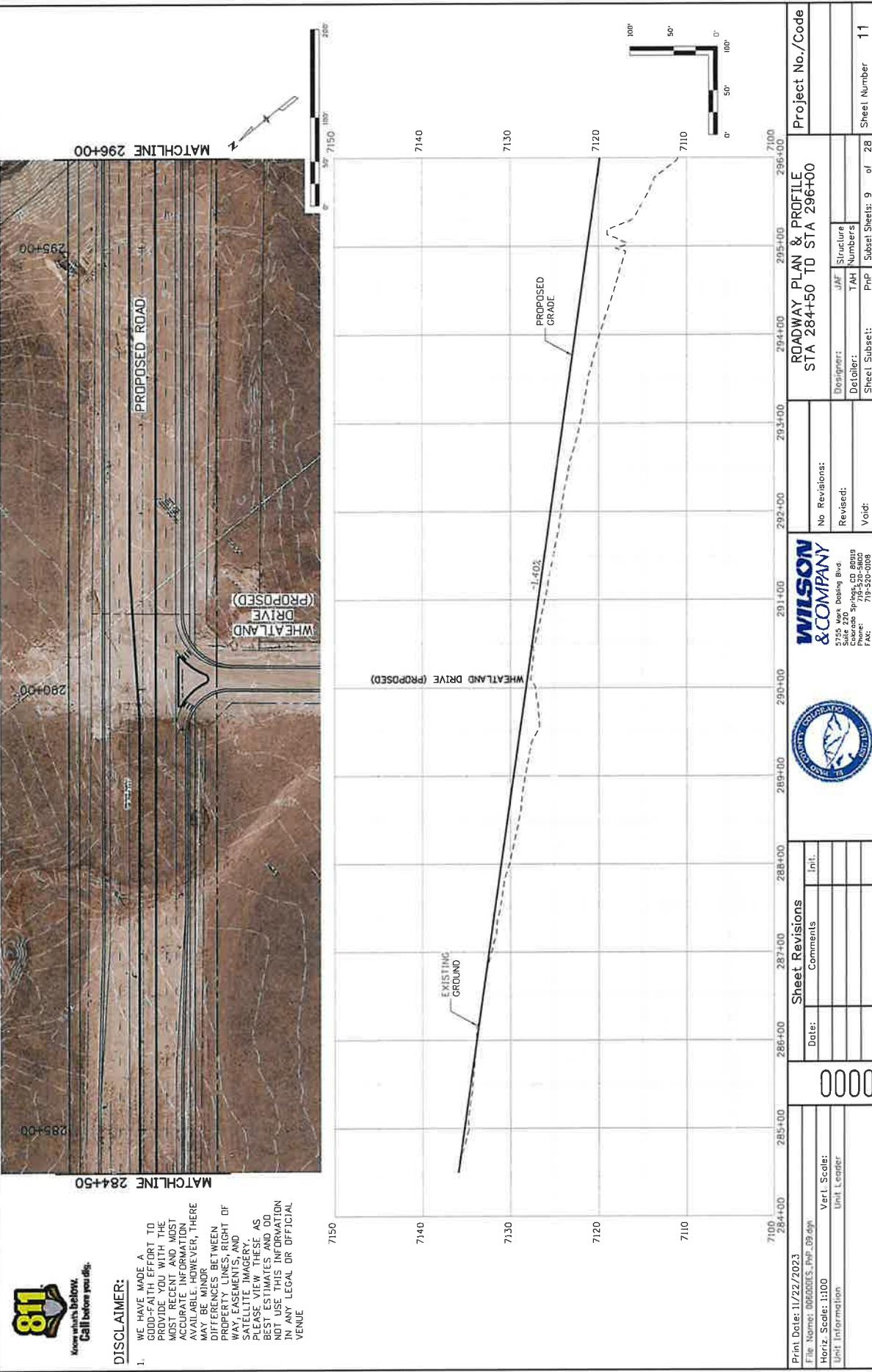
## **DISCLAIMER:**

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			Sheet Subset:	Pn#	Sub Set Spec# B of 28
					Sheet Number 10
 					
Print Date: 11/22/2023 File Name: 00000008.dwg 0.08 degn					
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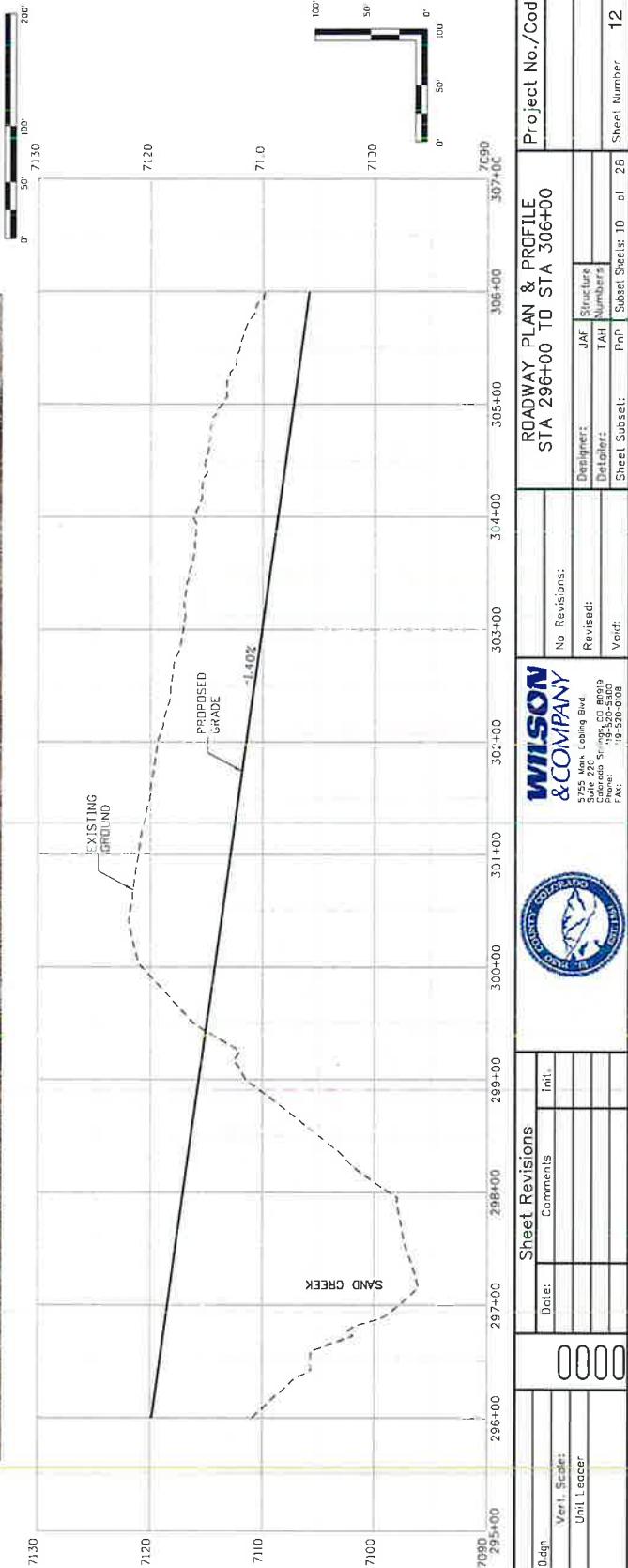
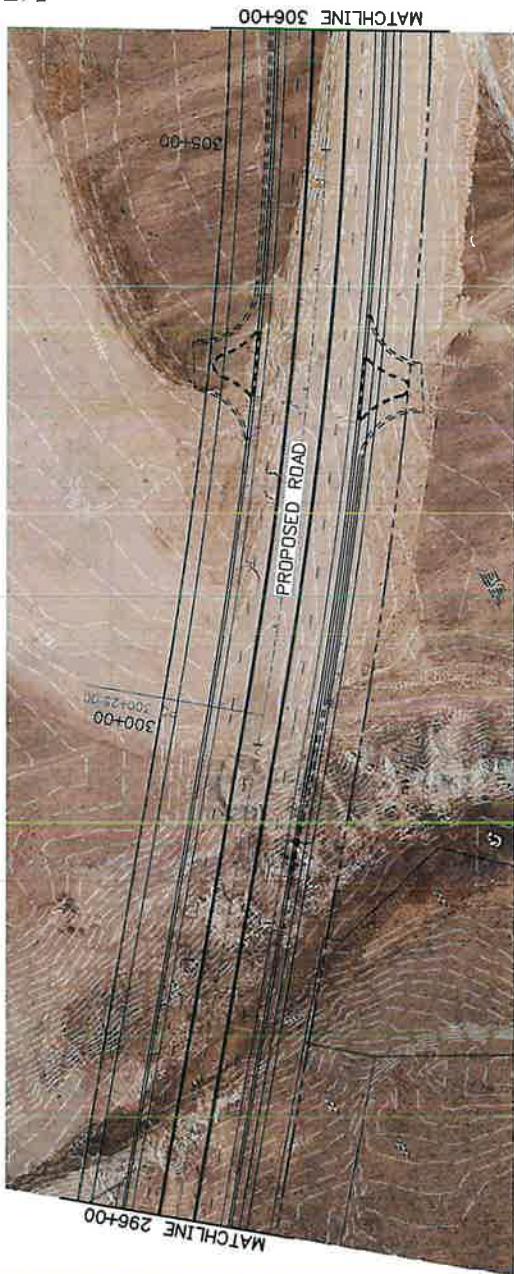
# PRELIMINARY - NOT FOR CONSTRUCTION

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Know where below.  
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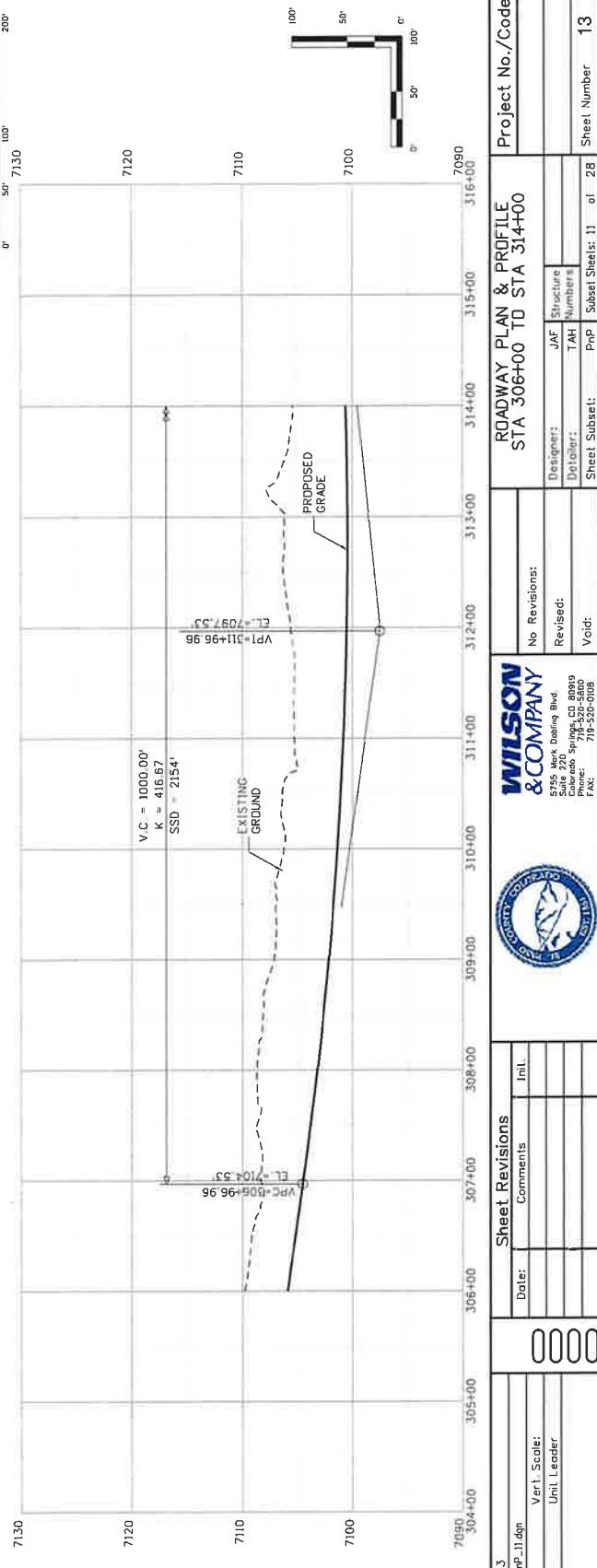
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Vert. Scale:  
Unit Leader  
Sheet 220  
Chartered: Sept 22, 2019  
Sole Proprietor:  
Vic F. Wilson  
Vcld: 19-320-0008  
FA:

Sheet Revisions		ROADWAY PLAN & PROFILE STA 296+00 TO STA 306+00		Project No./Code
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Date:				
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Unit Leader:				
Vertical:				
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# PRELIMINARY - NOT FOR CONSTRUCTION

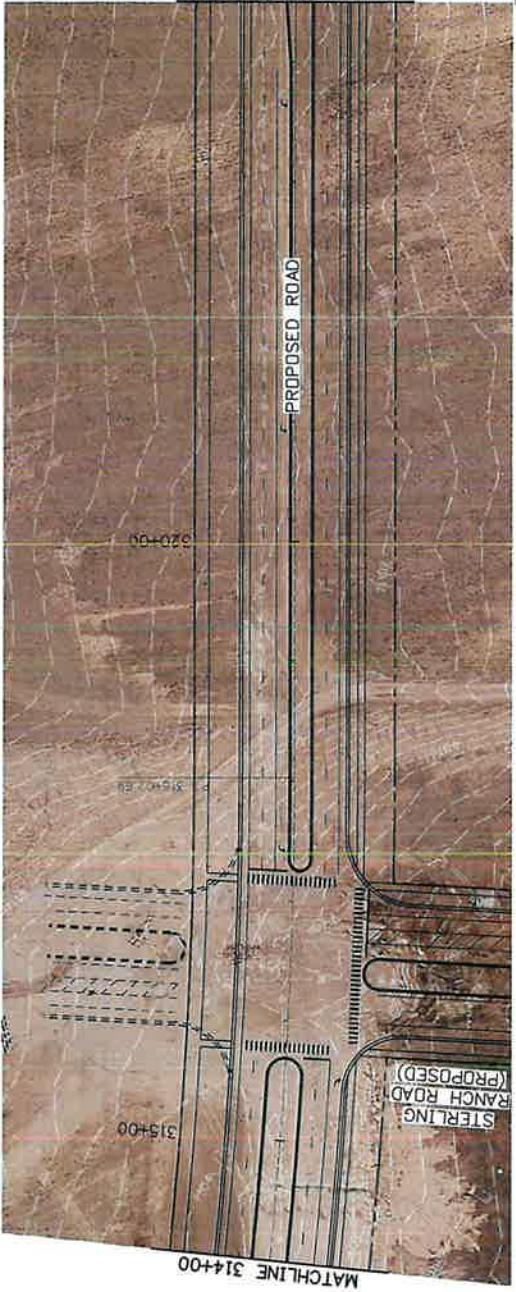
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ROADWAY PLAN & PROFILE STA 306+00 TO STA 314+00		Project No./Code
Designer:	JAF	
Detailer:	TAH	
Sheet:	Sheet 11 of 28	Sheet Number
Subsheet:	PnP	

Print Date: 11/22/2023	Sheet Revisions		No. Revisions:
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Unit Information	Unit Leader		

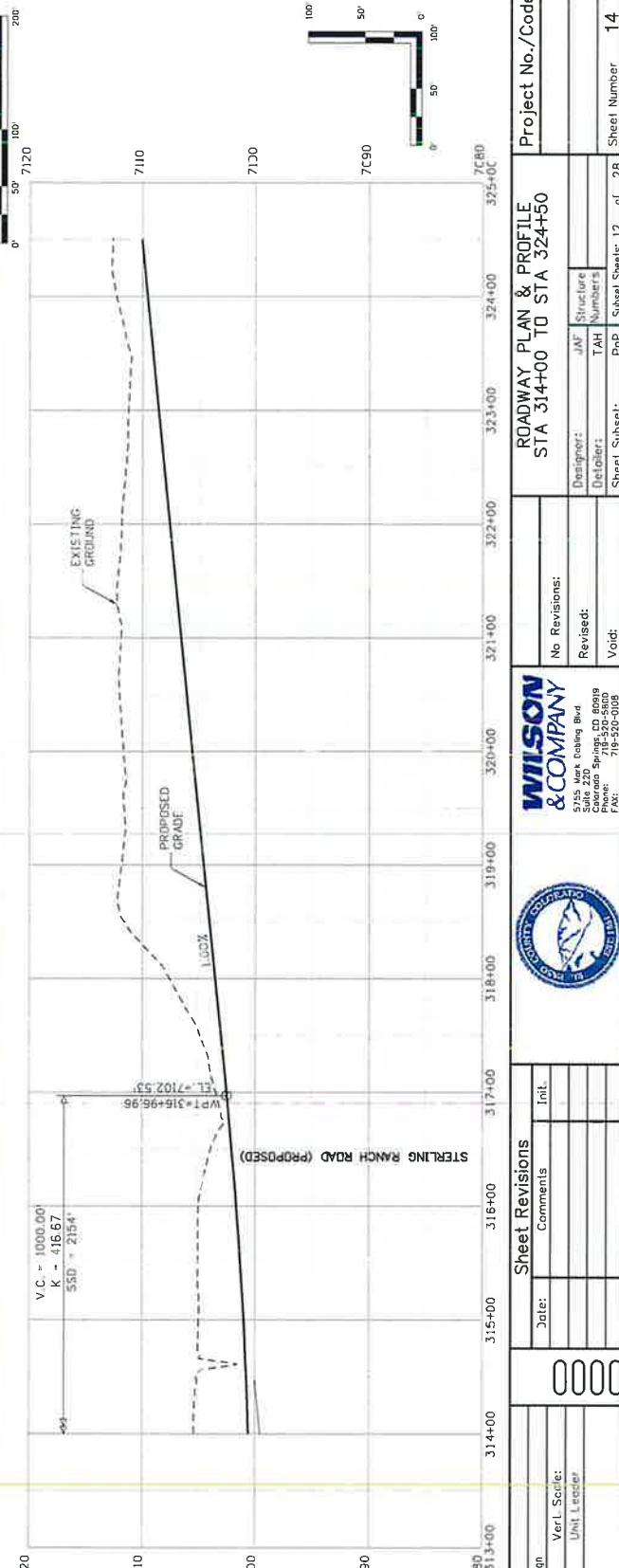


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Designator:		JAF Structure		
Revised:	No Revisions:	TAH	Structural	

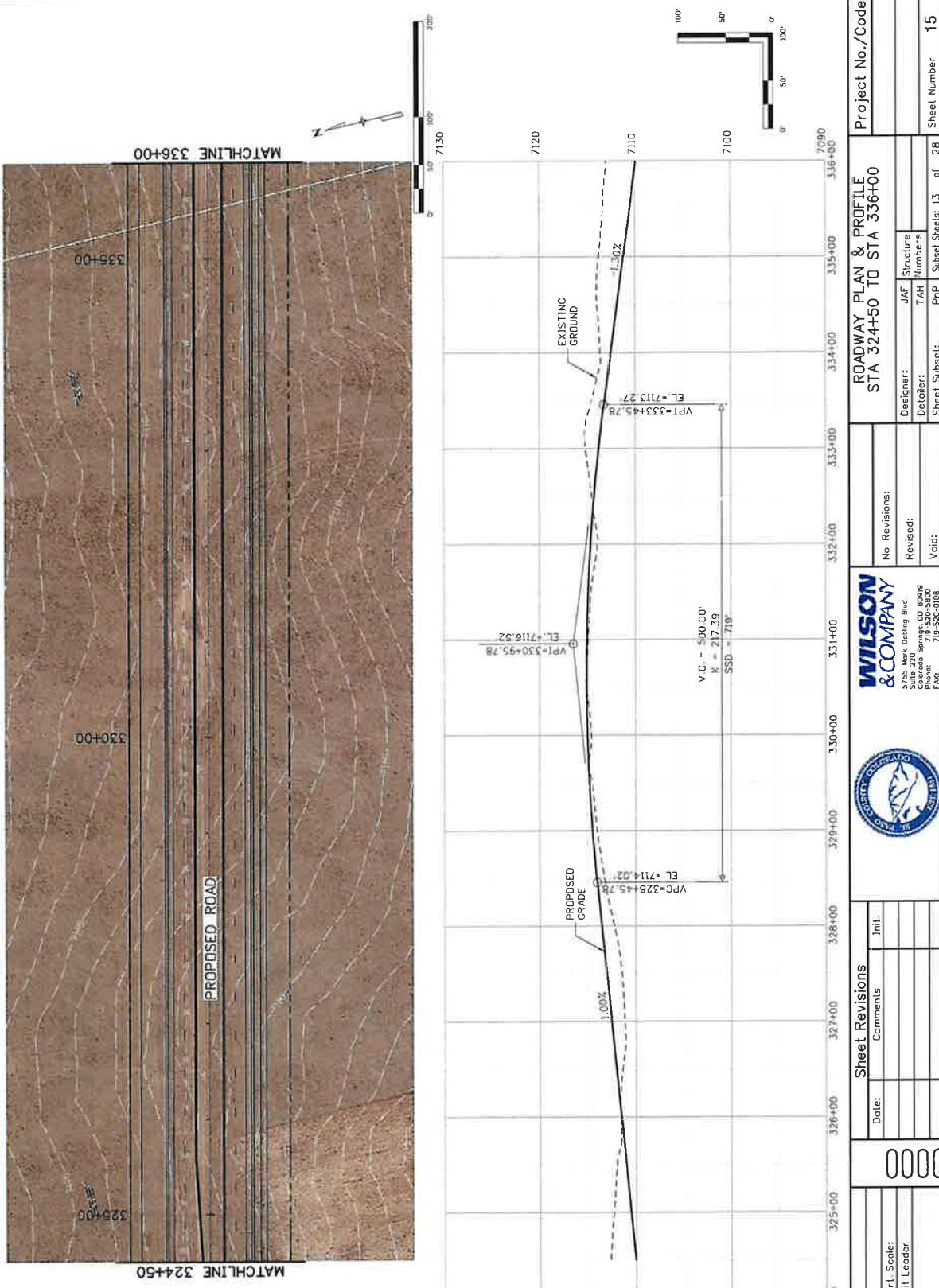
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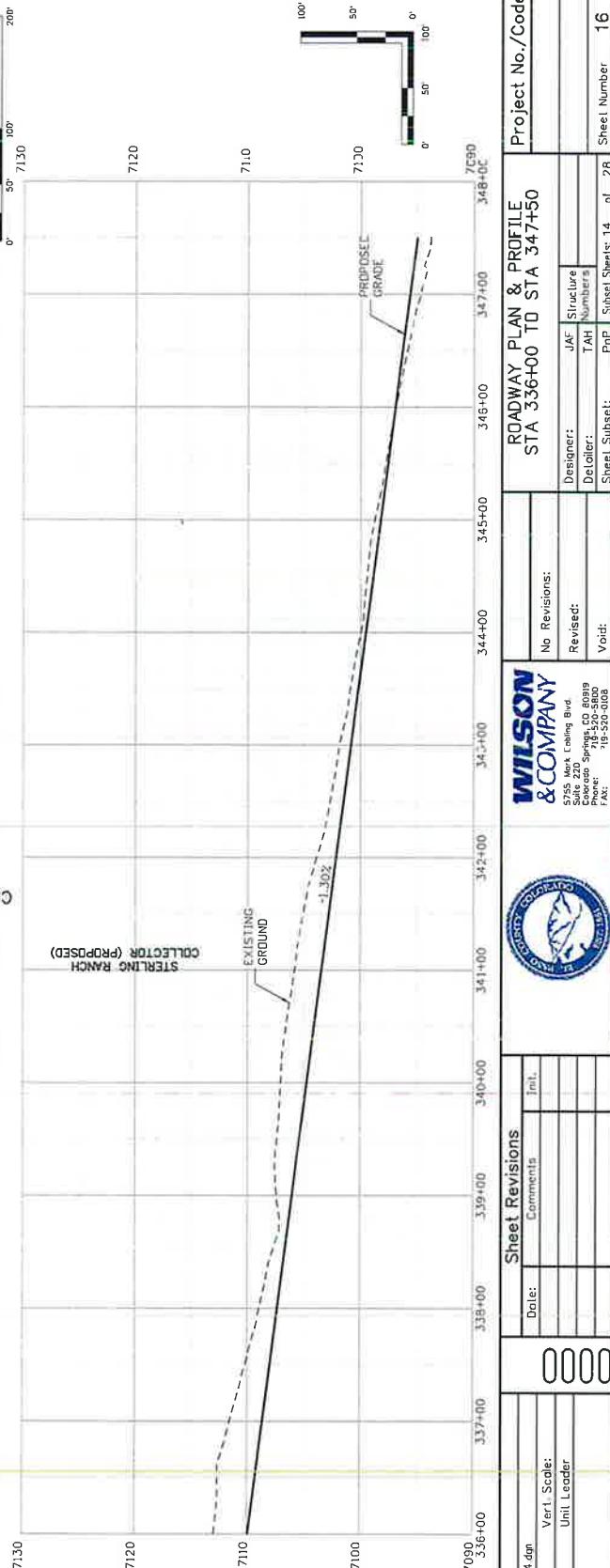
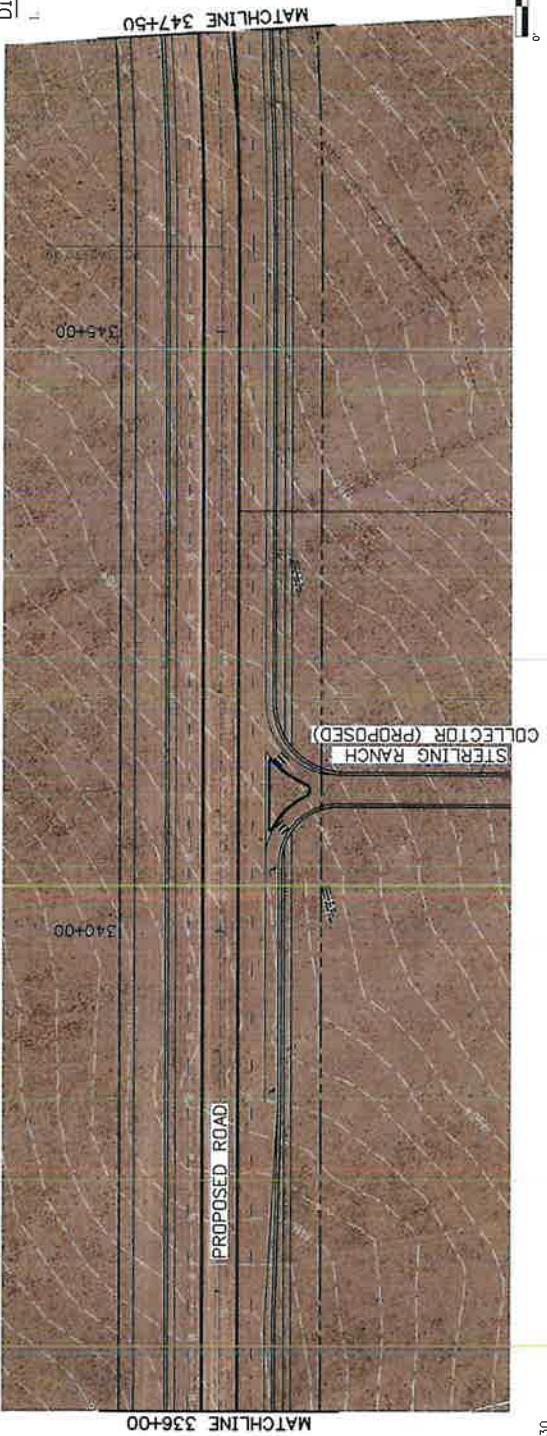
WE HAVE MADE A  
GOOD-FAITH EFFORT TO  
PROVIDE YOU WITH THE  
MOST RECENT AND MOST  
ACCURATE INFORMATION  
AVAILABLE. HOWEVER,  
THERE MAY BE MINOR  
DIFFERENCES BETWEEN  
PROPERTY LINES, RIGHT  
OF WAY ELEMENTS, AND  
SATELLITE IMAGERY.  
PLEASE VIEW THESE AS  
BEST ESTIMATES AND DO  
NOT USE THIS  
INFORMATION IN ANY  
LEGAL OR OFFICIAL VENUE.



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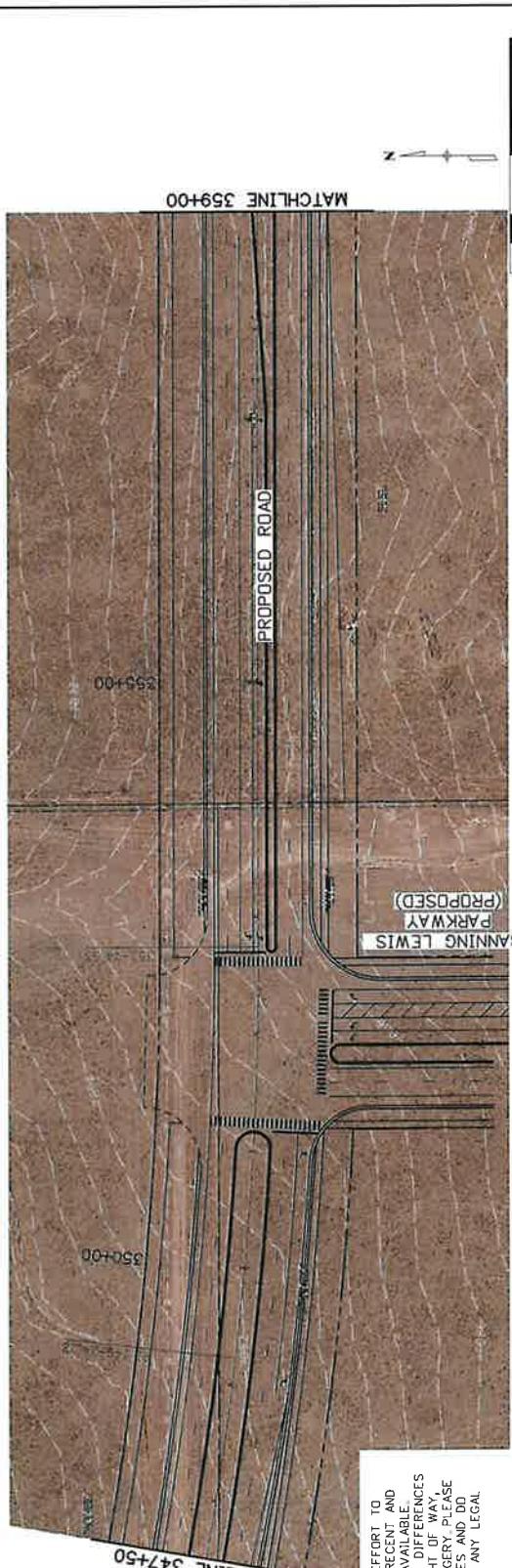


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File Name: 008000ES_PnP14.dwg	No. Revisions:	
Horiz Scale: 1:100	Date:	5755 North Landing Blvd
Vert. Scale:	Comments:	Suite 220 Denver, CO 80219
Unit Leader	mil.	Phone: 713-220-5000
		Fax: 713-220-0108

PRELIMINARY - NOT FOR CONSTRUCTION

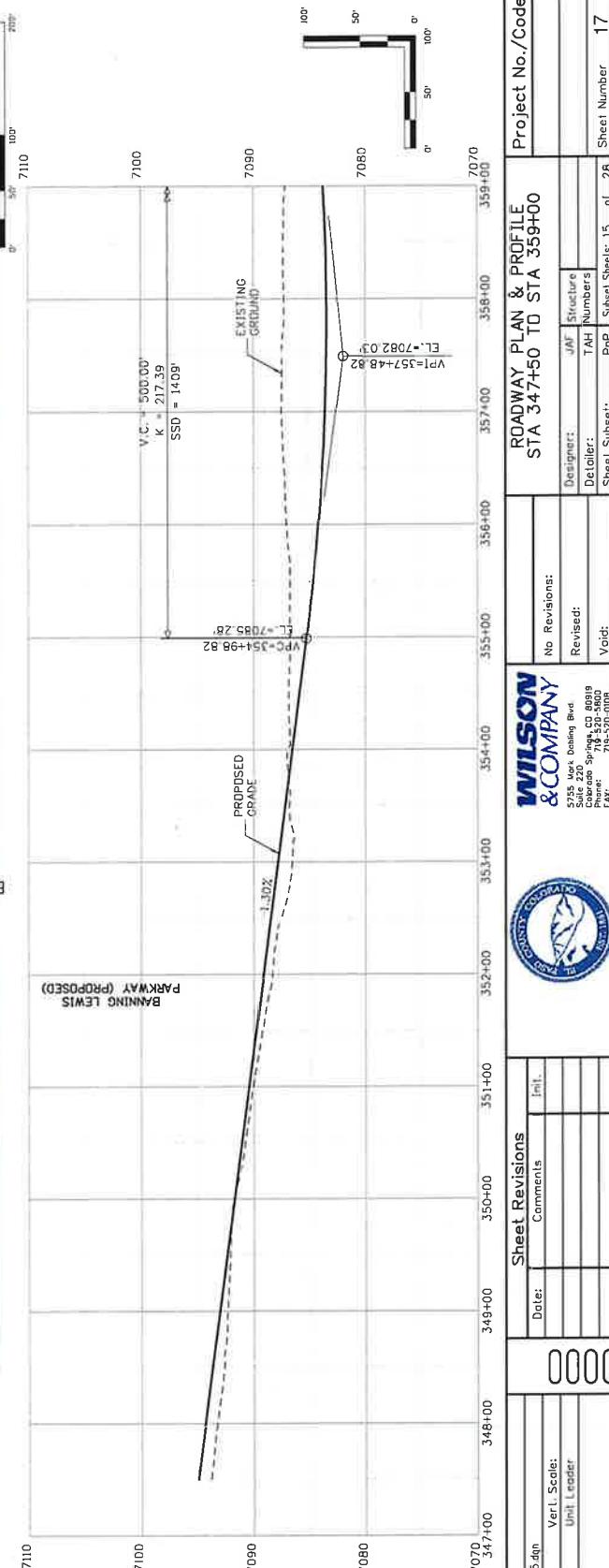


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			Initials:		JAF
				Structural	
				TAH	
				Prep.	Sheet Starts: 15. 01
				Sheet Subsets:	2A
				Void:	Sheet Number 17
<b>WILSON &amp; COMPANY</b>				5255 West Banning Blvd Colorado Springs, CO 80919 Phone: 719-590-3500 Fax: 719-590-3501	

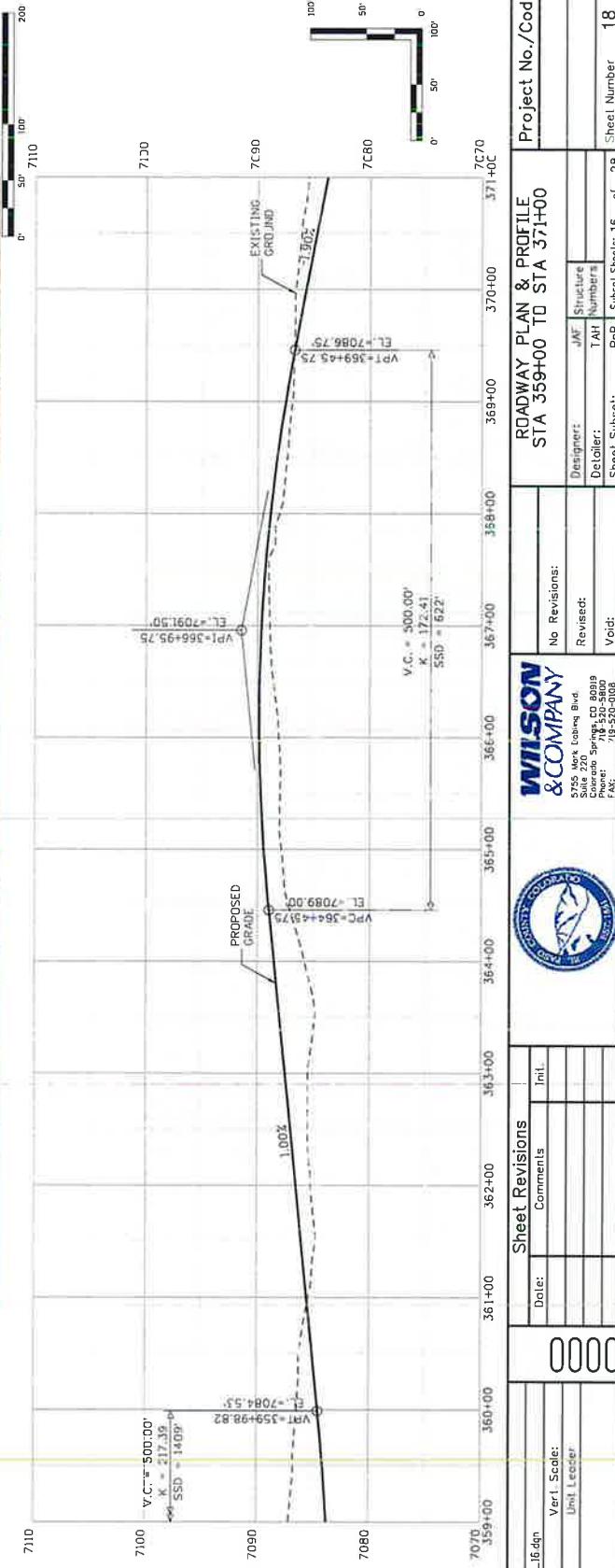


#### **DISCLAIMER:**

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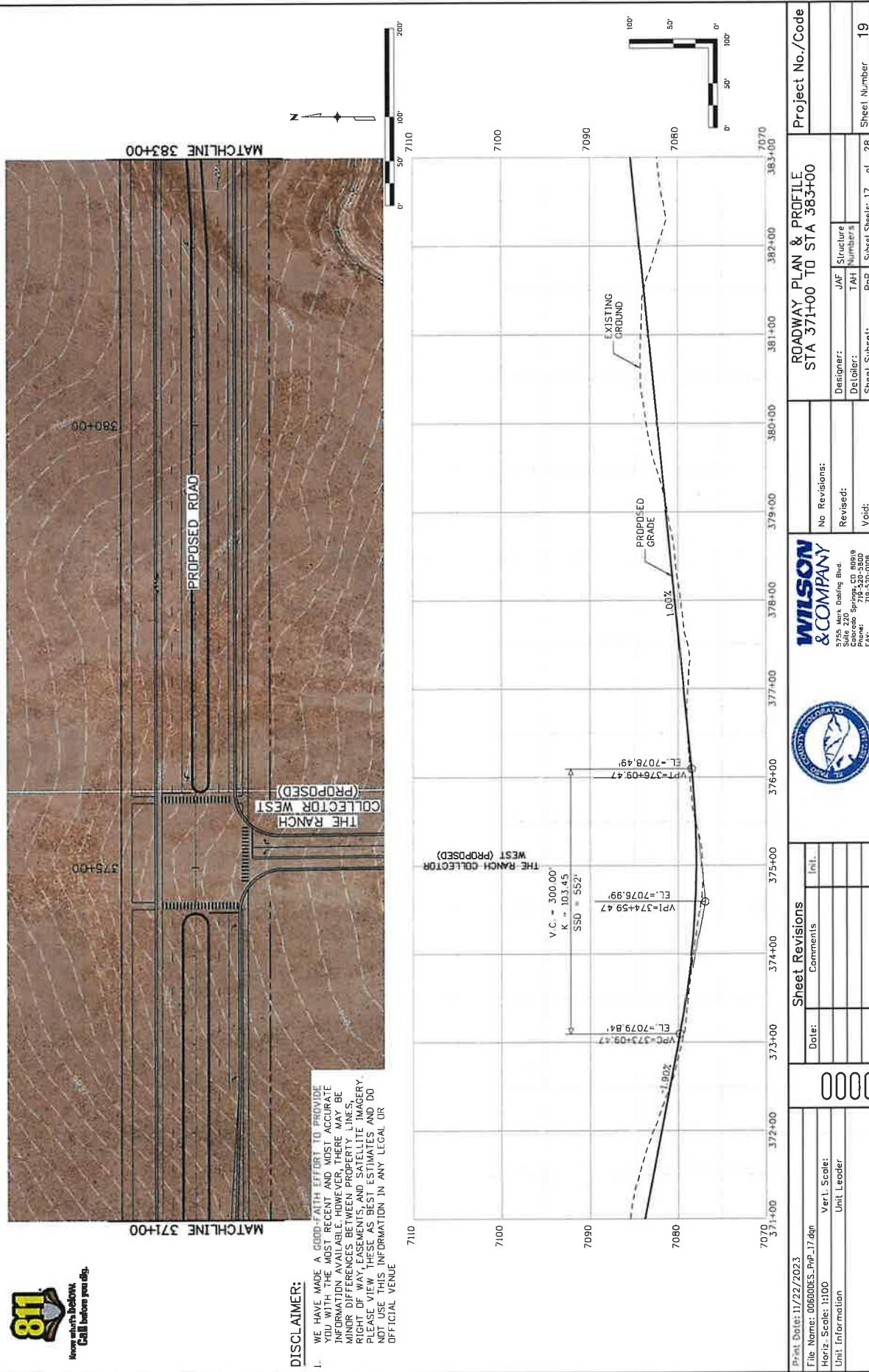


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ROADWAY PLAN & PROFILE STA 359+00 TO STA 371+00						Project No./Code
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			Detailer:	D-0	Construction	
			Sheet Number:	16	of	28
			Void:			
WILSON & COMPANY			No Revisions:			
5475 Rock Ledge Blvd Colorado Springs, CO 80919 Phone: 719.590.8818 Fax: 719.590.8819 E-mail: info@wilsonandcompany.com			Revised:			
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Sheet Revisions			Comments	Init.		

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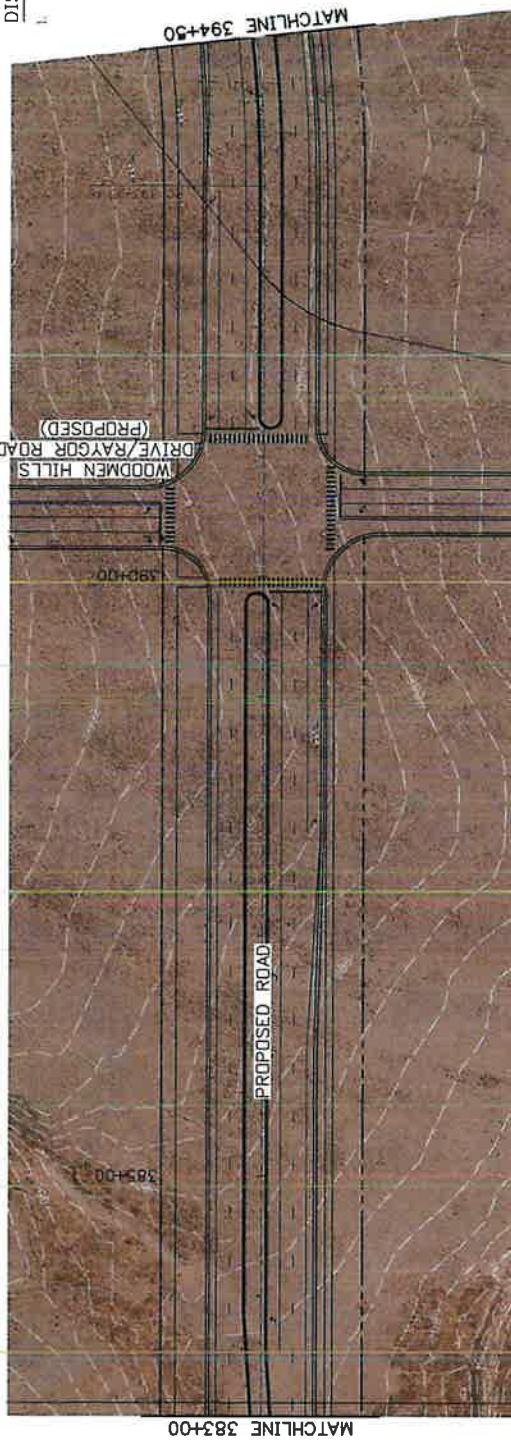
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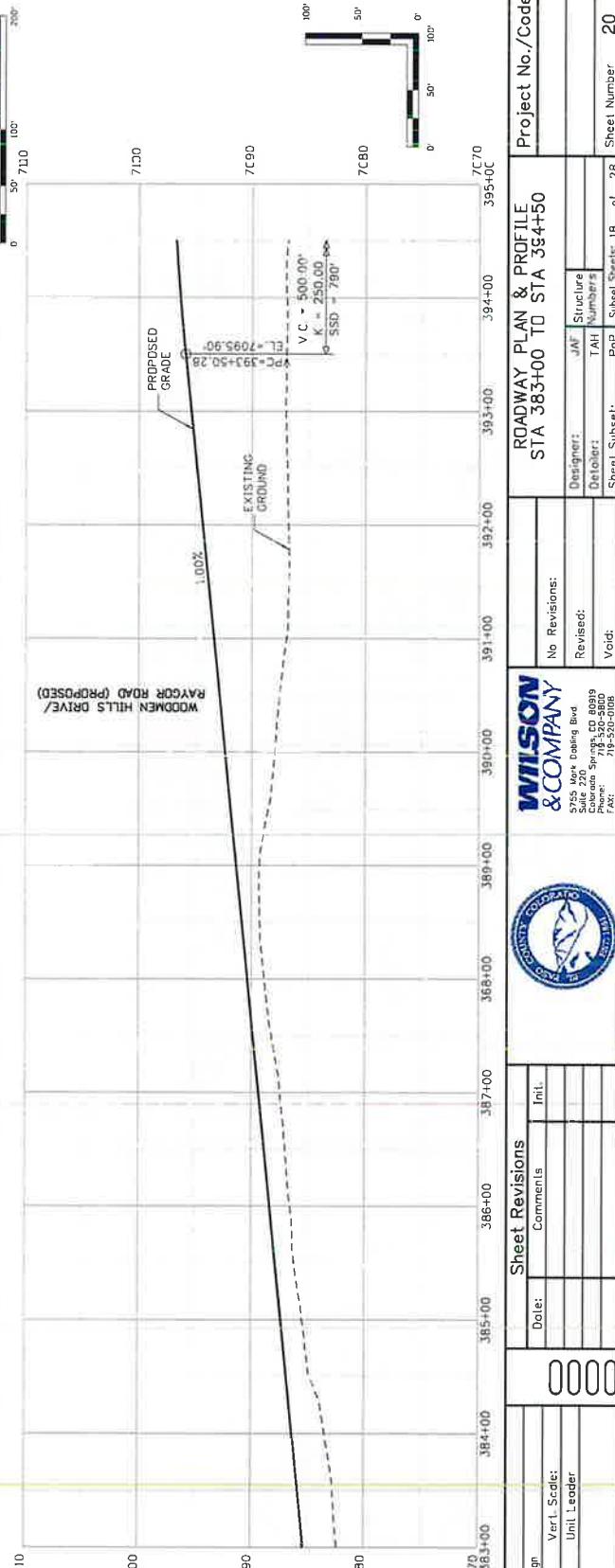
WE HAVE MADE A GOOD-FAITH  
EFFORT TO PROVIDE YOU  
WITH THE MOST RECENT AND  
MOST ACCURATE INFORMATION  
AVAILABLE. HOWEVER, THERE  
MAY BE MISCUES, FERRENCES  
BETWEEN PROPERTY LINES,  
RIGH OF WAY, EASEMENTS,  
AND SATELLITE IMAGERY.  
PLEASE VIEW THESE AS BEST  
ESTIMATES, AND DO NOT USE  
THIS INFORMATION IN ANY  
LEGAL OR OFFICIAL VENUE.

WOODMEN HILLS  
DRIVE/RAYGOR ROAD  
(PROPOSED)

PROPOSED ROAD



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ROADWAY PLAN & PROFILE STA 383+00 TO STA 394+50		Project No./Code
No.	Revisions:	
WILSON & COMPANY	Initial	
5755 W. Dahlberg Blvd.	Date:	Designer:
Colorado Springs, CO 80919	Comments:	J/N
Phone: 719-522-0100	Init.	Structure Number:
Fax: 719-522-0105	Unit Leader:	T/AH
	Revised:	Sheet Subsets:
	Void:	Sheet Spec's:
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Print Date: 11/22/2023  
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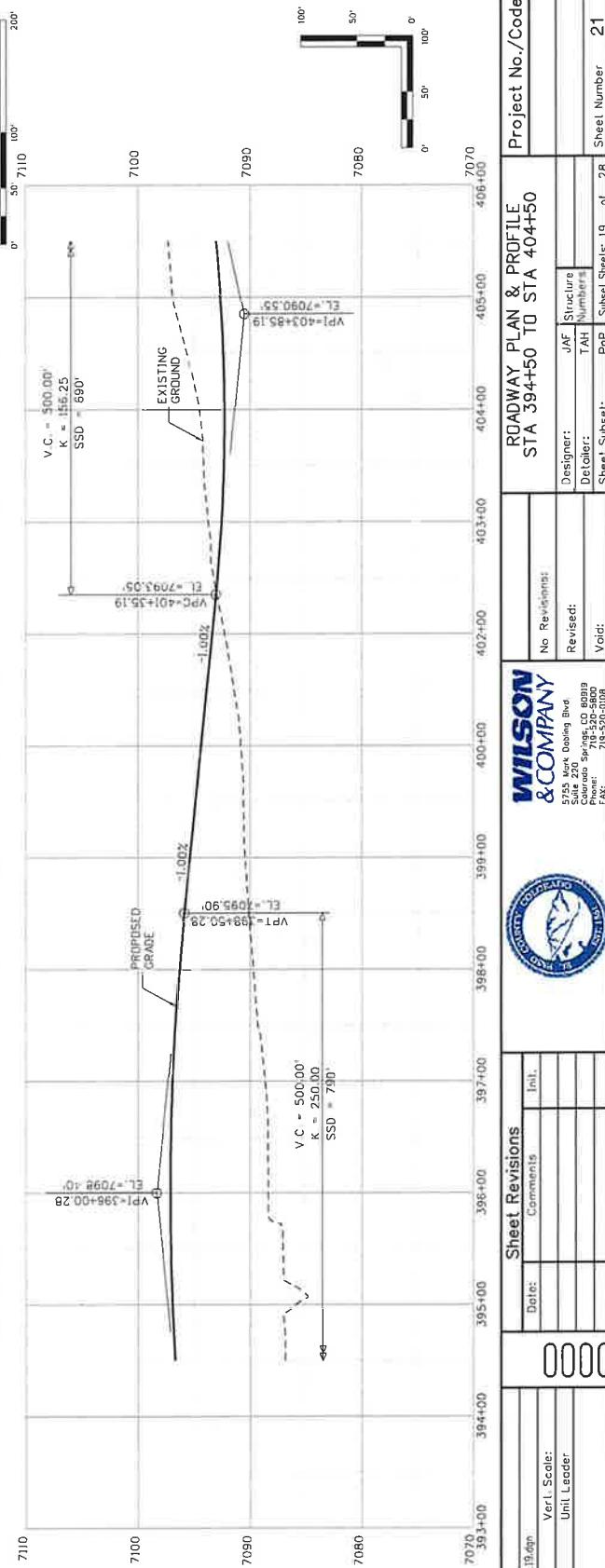
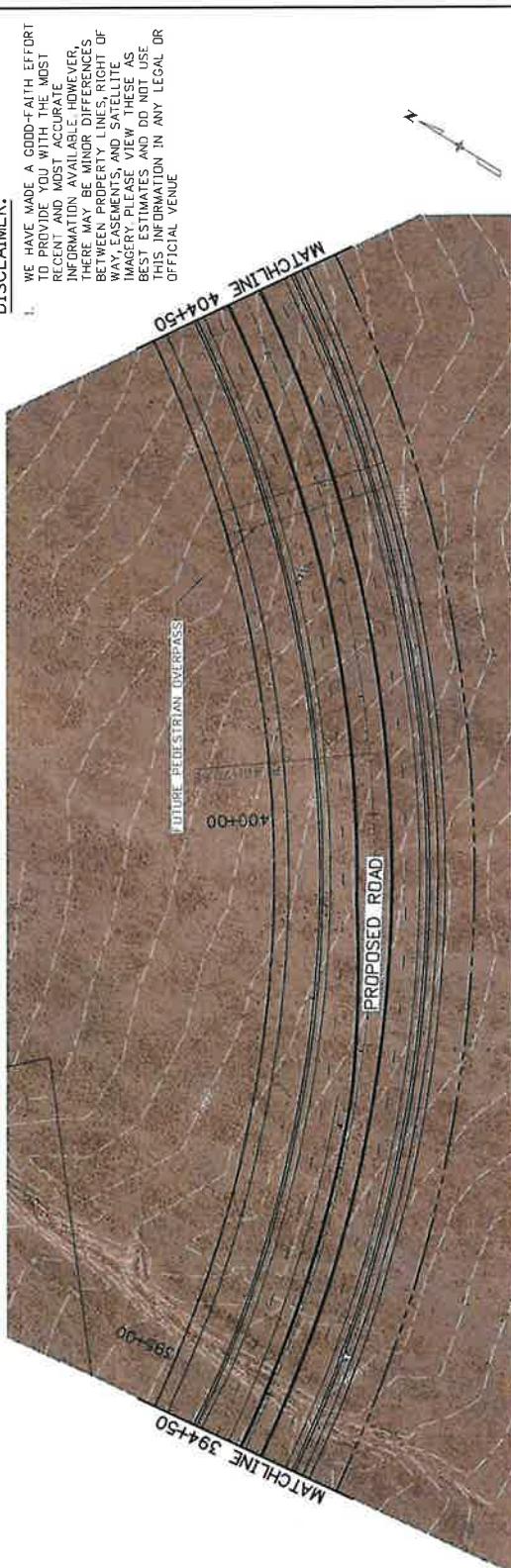
PRELIMINARY - NOT FOR CONSTRUCTION

## **DISCLAIMER:**

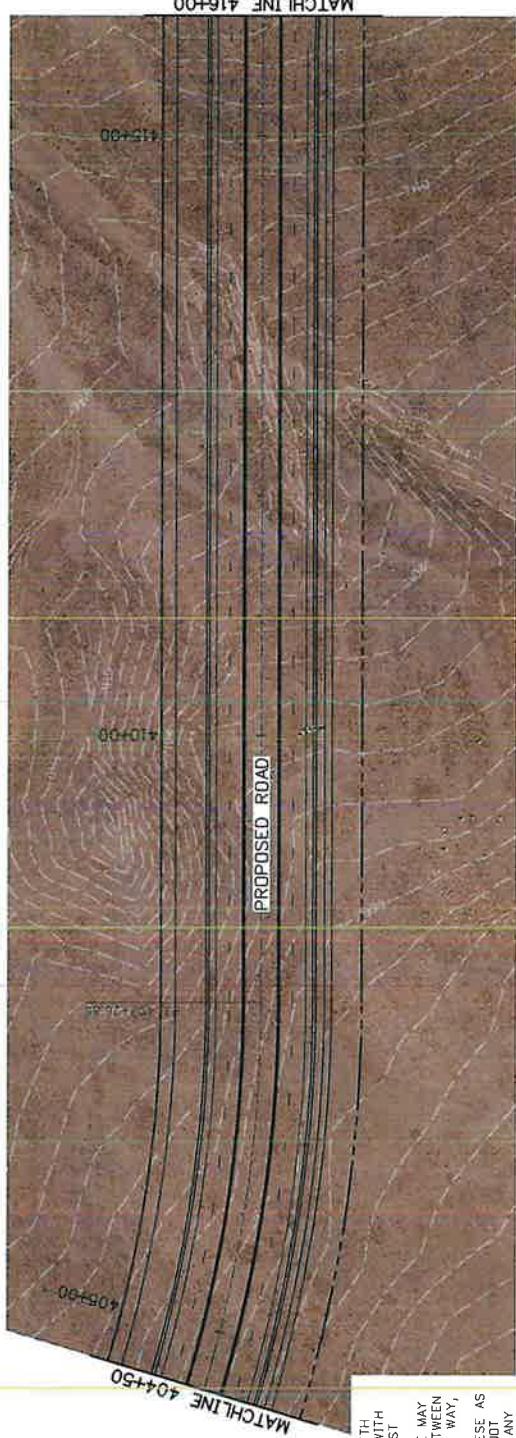
WE HAVE MADE A GOOD FAITH EFFORT TO PROVIDE YOU WITH THE MOST RECENT AND MOST ACCURATE INFORMATION AVAILABLE; HOWEVER, THERE MAY BE MINOR DIFFERENCES BETWEEN PROPERTY LINES, RIGHT OF WAY, EASEMENTS, AND SATELLITE IMAGERY. PLEASE VIEW THESE AS BEST ESTIMATES AND DO NOT USE THIS INFORMATION IN ANY LEGAL OR FINANCIAL VENUE.



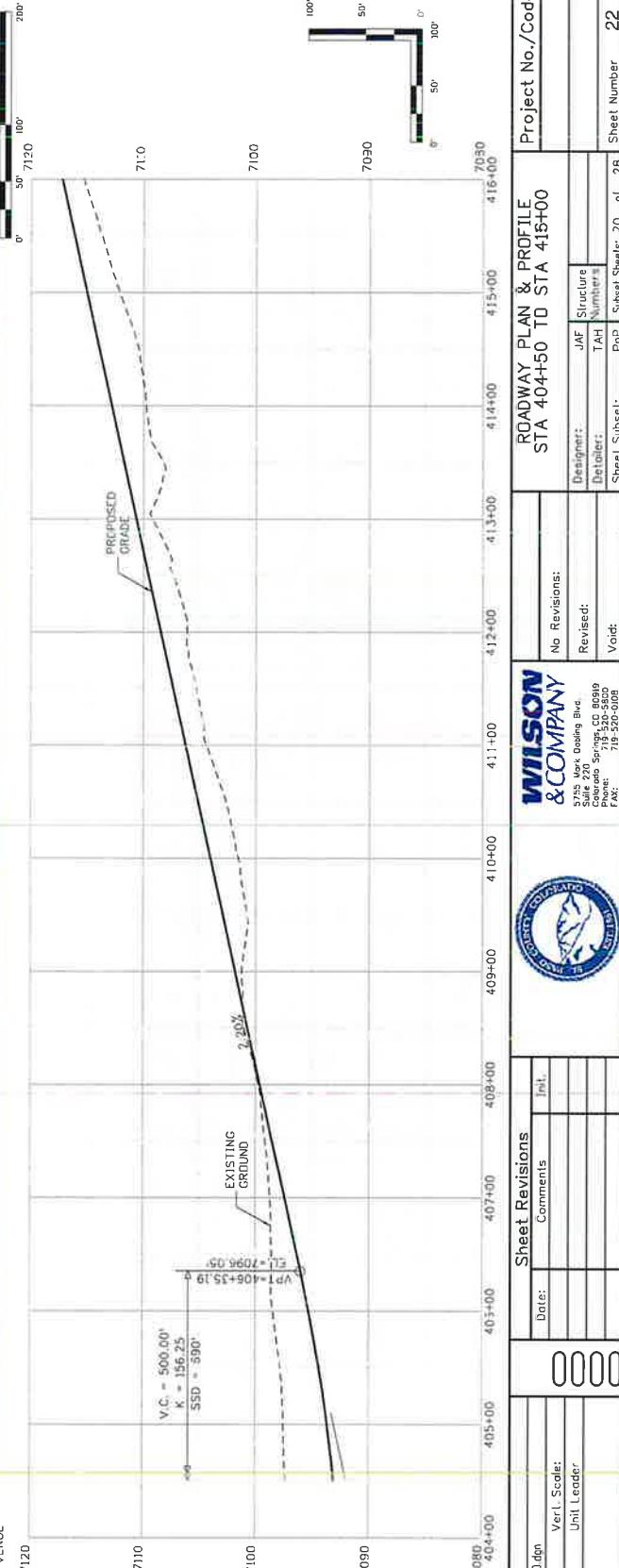
Look it up,  
Call before you dig.



ROADWAY PLAN & PROFILE STA 39+450 TO STA 40+50				Project No./Code	
<b>WILSON</b> <b>&amp; COMPANY</b>		No Revisions:		JAF	
		Revised:		Structure	
5255 Park Loop Blvd Colorado Springs, CO 80919 Phone: 719-590-3800 Fax: 719-590-3801 www.wilsonandcompany.com		Designer: Drafter: Sheet Subse: Sheet Subse: Sheet Subse:		TAH Proj Subse Subse Subse	
Print Date: 11/22/2023 File Name: D:\E00015_Proj_19.dwg		Sheet Revisions		Sheet Number	
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**DISCLAIMER:**

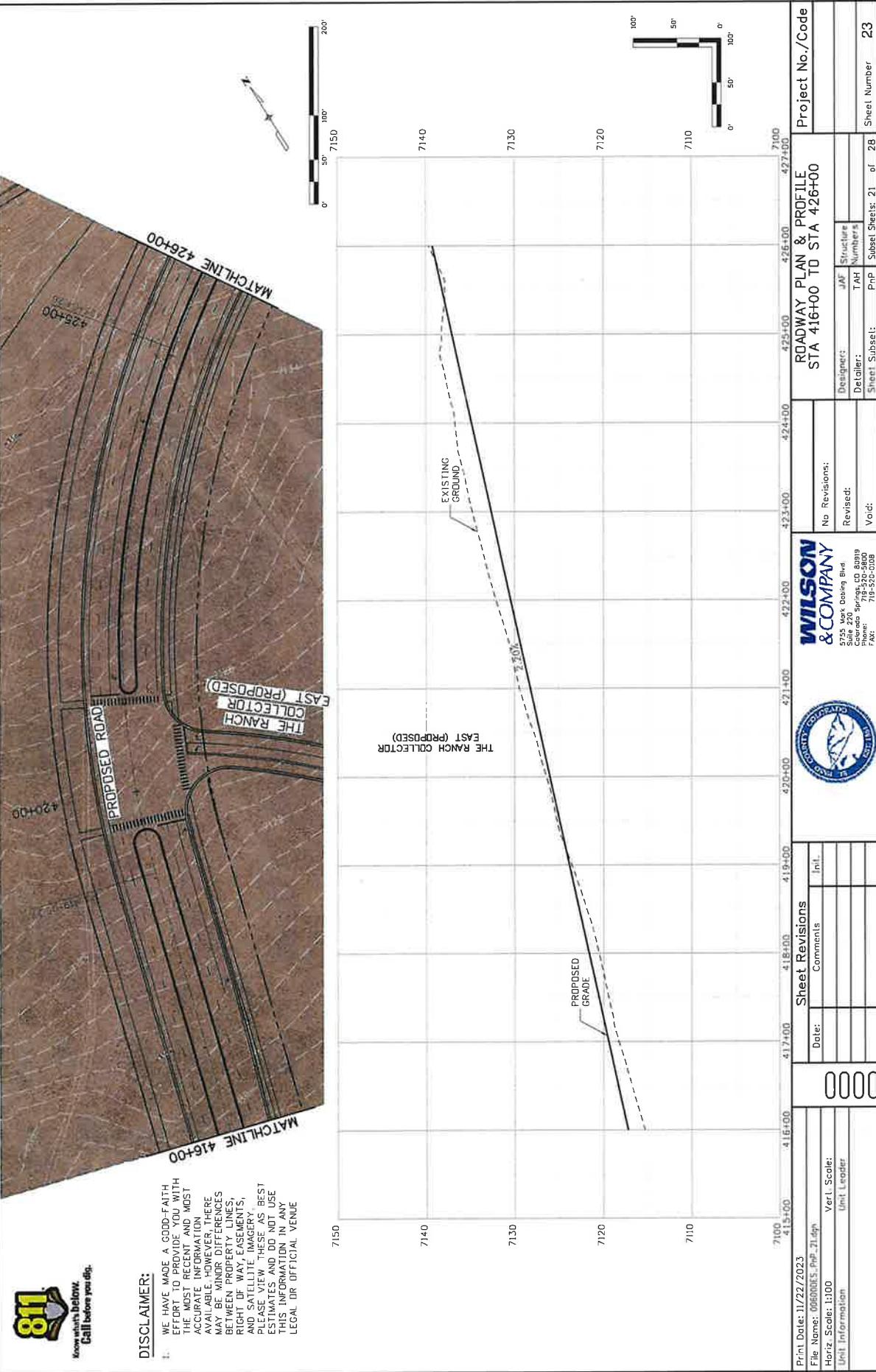
1. WE HAVE MADE A GOOD-FAITH EFFORT TO PROVIDE YOU WITH THE MOST RECENT AND MOST ACCURATE INFORMATION AVAILABLE; HOWEVER, THERE MAY BE MINOR DIFFERENCES BETWEEN PROPERTY LINES, RIGHT OF WAY, EASEMENTS, AND SATELLITE IMAGERY. PLEASE VIEW THESE AS BEST ESTIMATES AND DO NOT USE THIS INFORMATION IN ANY LEGAL OR OFFICIAL VENUE.



ROADWAY PLAN & PROFILE STA 404+50 TD STA 416+00		Project No./Code
Design:	JAF	
Detailer:	TAH	
Sheet Subsel:	PhP	
Sheet Number:	22	
Subel Sheets:	20	of 28

Print Date:	3/1/22/2023	Sheet Revisions	Roadway Plan & PROFILE STA 404+50 TD STA 416+00
File Name:	008000TS_PnP_20den	Date:	No Revisions:
Horiz Scale:	1:100	Comments:	
Unit Information	Unit Leader:		

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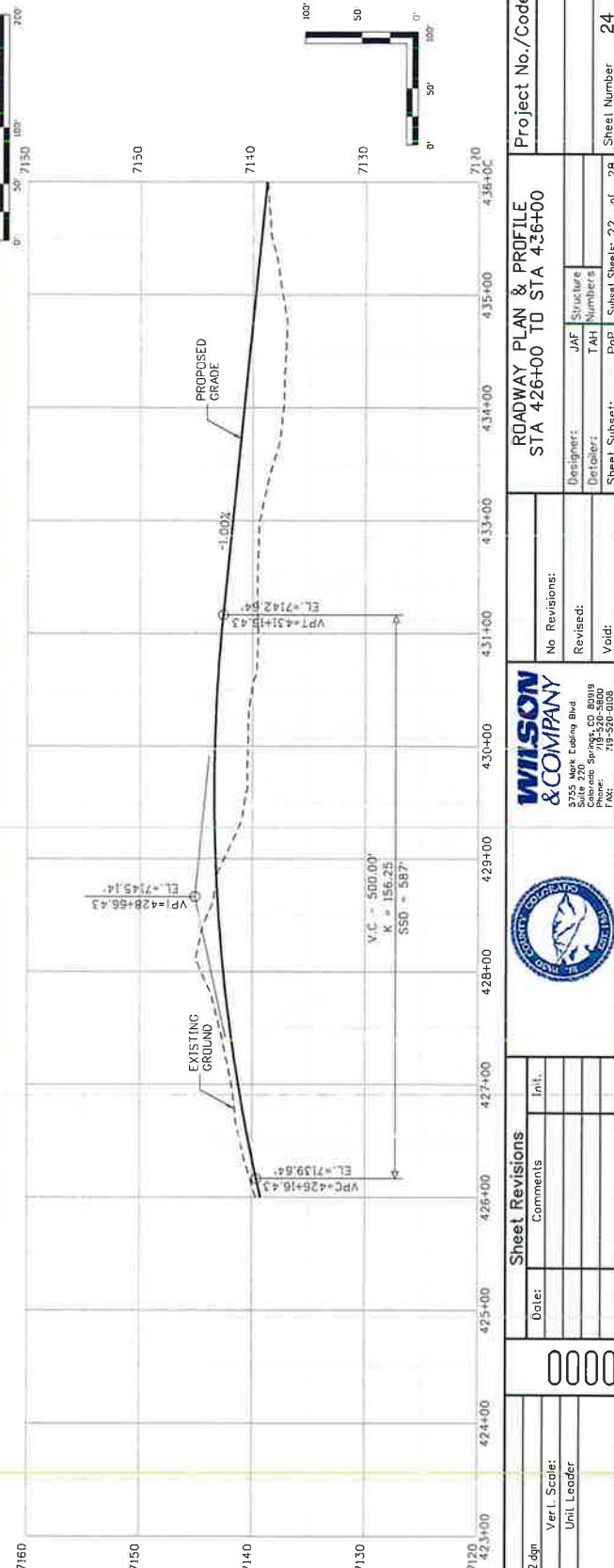


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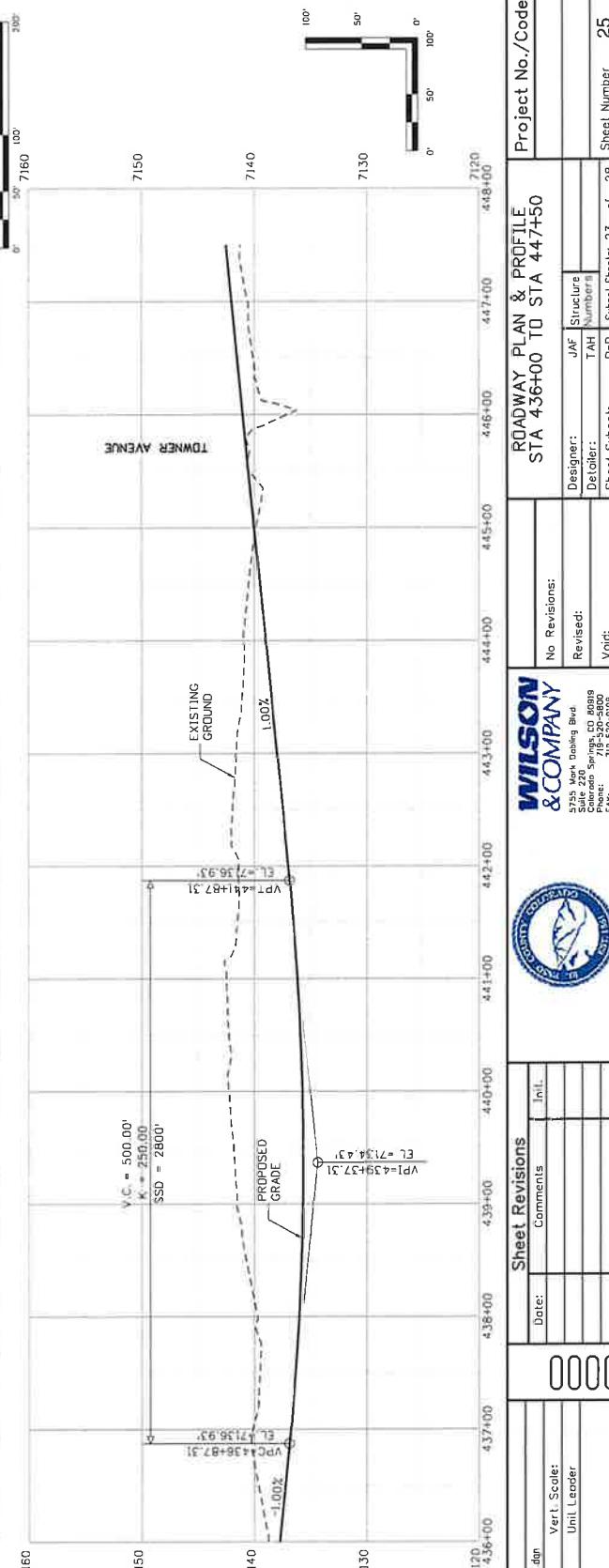
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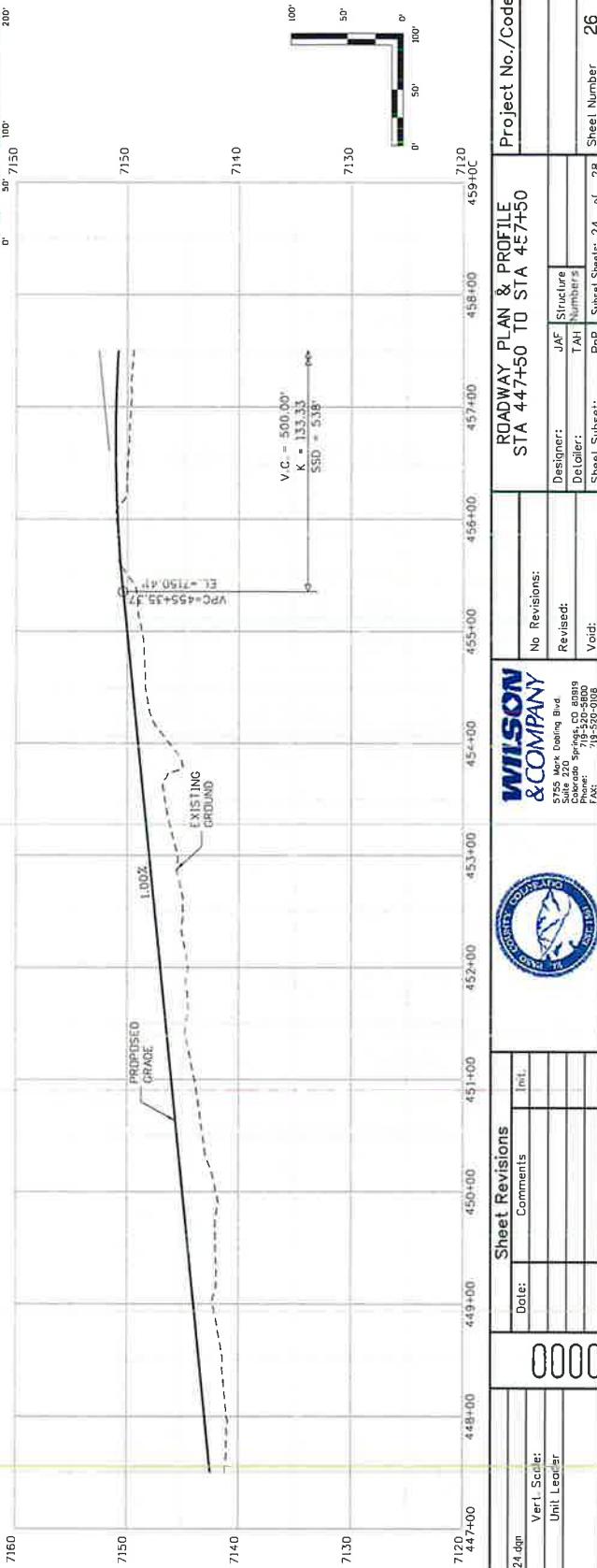
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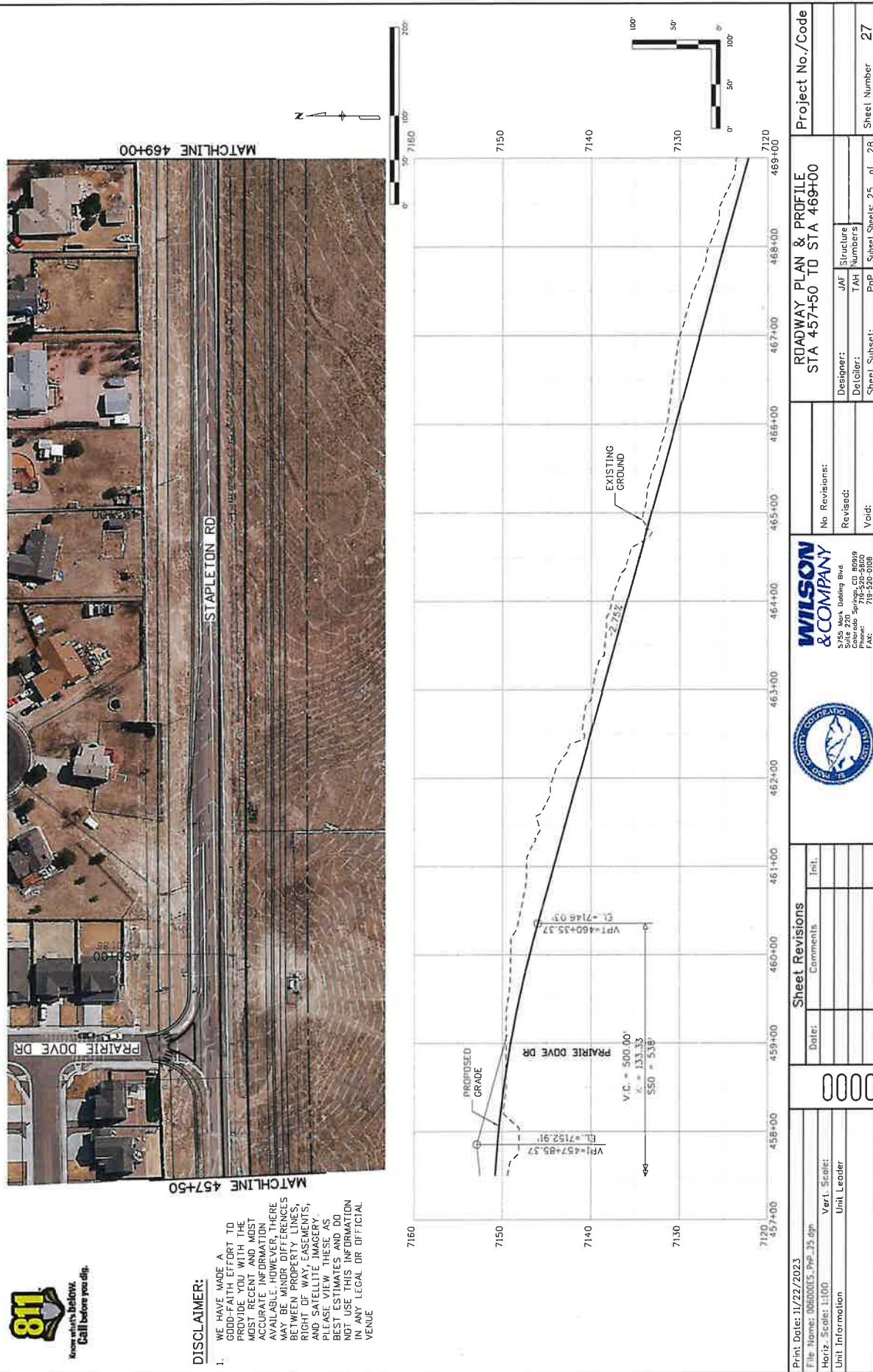
WE HAVE MADE A GOOD FAIRY EFFORT TO PROVIDE YOU WITH THE MOST RECENT AND MOST ACCURATE INFORMATION AVAILABLE. HOWEVER, THERE MAY BE MILD DIFFERENCES BETWEEN PROPERTY LINES, RIDS, WAY EASEMENTS, AND SATELLITE IMAGERY. PLEASE VIEW THESE AS BEST ESTIMATES, AND DO NOT USE THIS INFORMATION IN ANY LEGAL OR OFFICIAL ENVIRONMENT.



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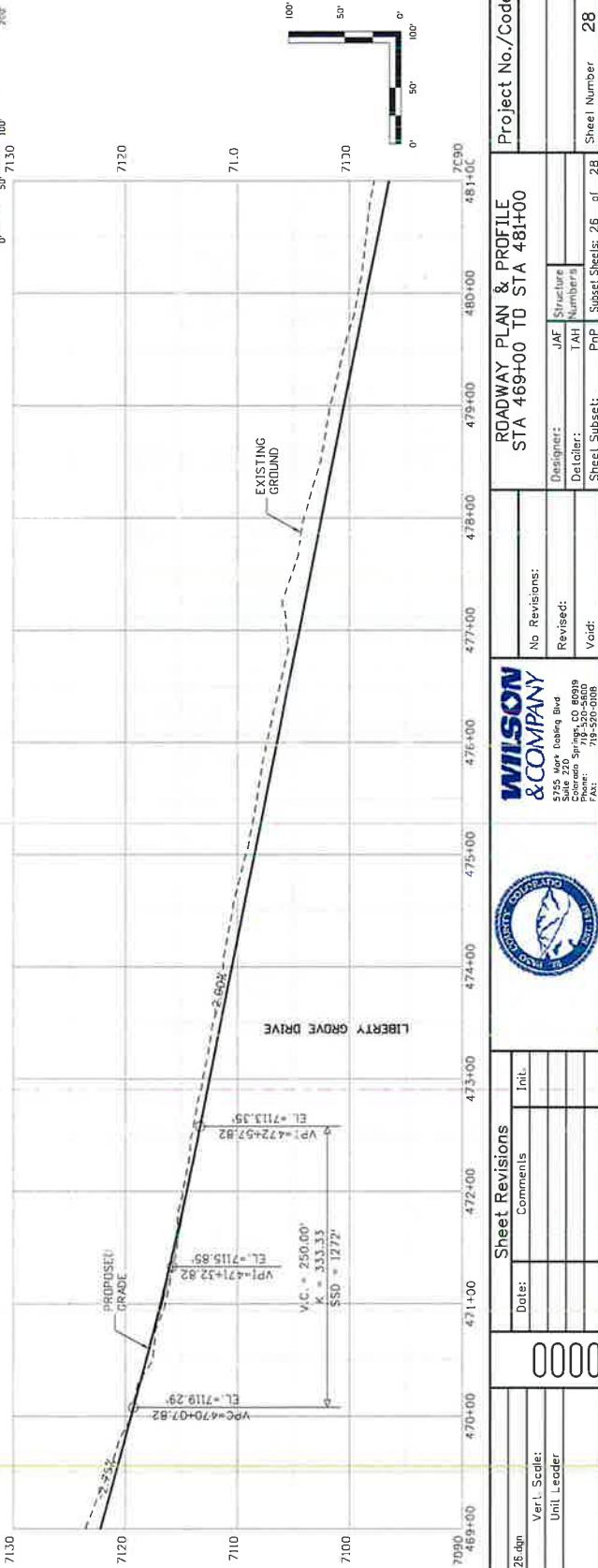
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ROADWAY PLAN & PROFILE STA 4-69+00 TO STA 4-81+00				Project No./Code
WILSON & COMPANY		No Revisions:		
5725 New Robing Blvd Suite 220 Colorado Springs, CO 80919 (719) 520-0018 Fax:		Revised:	JAF	Structure
Unit Information		Void:	TAH	
Date:	Sheet Revisions	Sheet Subsets:	26	of 2B
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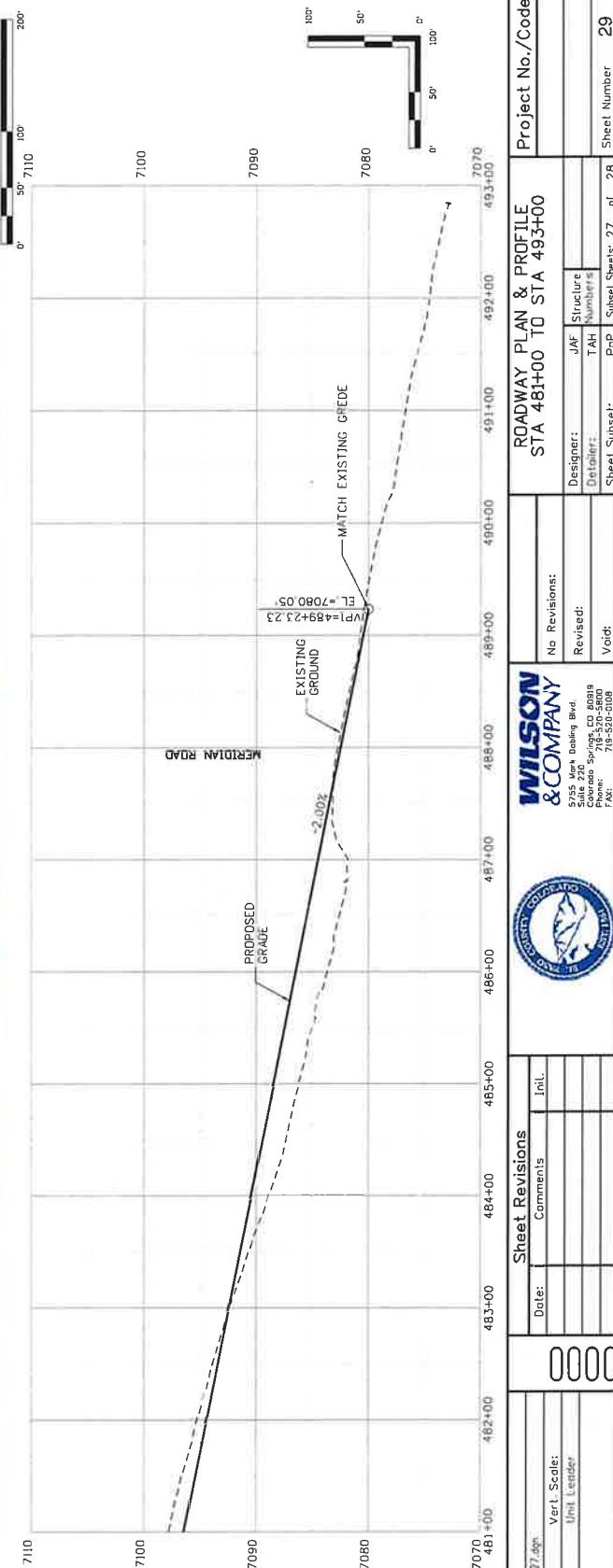
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TO PROVIDE YOU WITH THE MOST  
RECENT AND MOST ACCURATE  
INFORMATION AVAILABLE; HOWEVER,  
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BETWEEN PROPERTY LINES, RIGHT OF  
WAY, EASEMENTS, AND SATELLITE  
IMAGERY. PLEASE VIEW THESE AS BEST  
ESTIMATES AND DO NOT USE THIS  
INFORMATION IN ANY LEGAL OR  
OTHER PROFESSIONAL VENUE.



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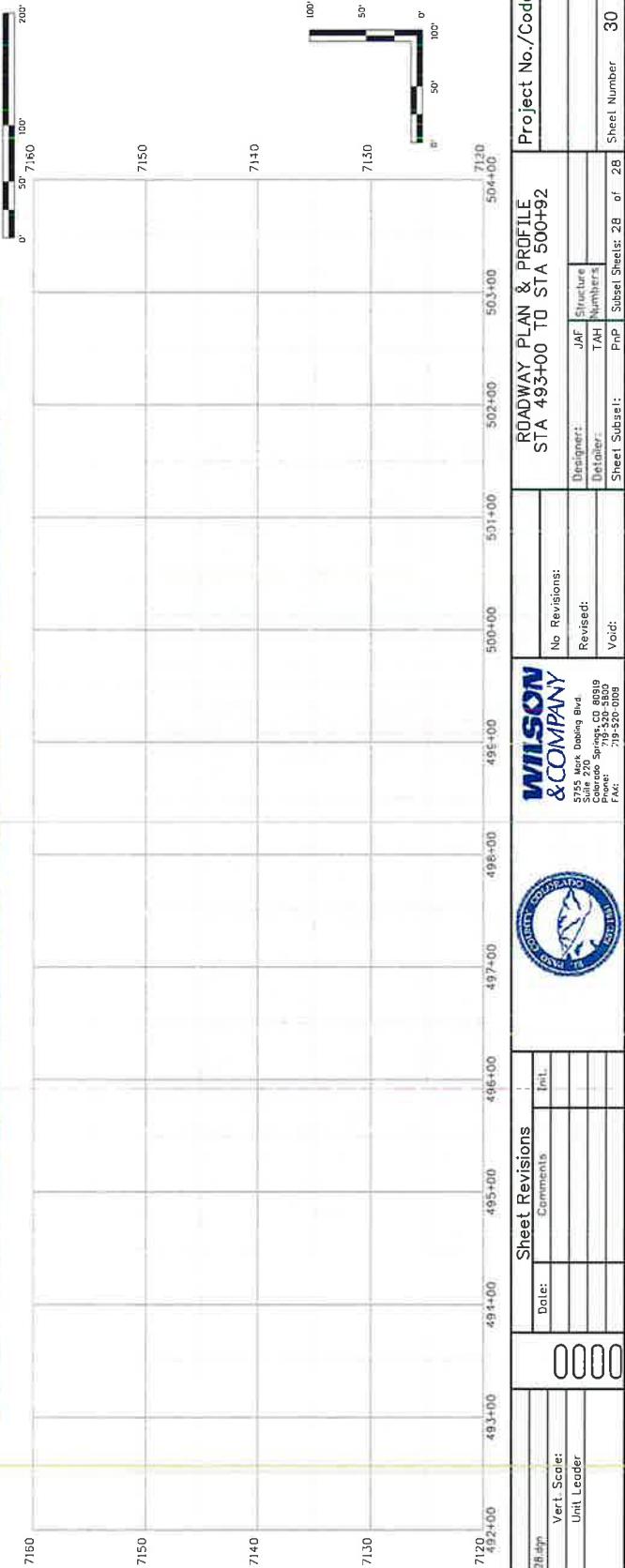
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ROADWAY PLAN & PROFILE STA 493+00 TO STA 500+92		Project No./Code
No Revisions:	JAF	
5755 Mark Dabling Blvd.	Structure Number:	
Suite 220	TAH	
Colorado Springs, CO 80919	Voice:	
FAX:		
719-522-0099		
Print Sub-sel:	Print	Sheet Number 30
Sheet Number: 28 of 28		

Print Date: 11/22/2023	Sheet Revisions	ROADWAY PLAN & PROFILE STA 493+00 TO STA 500+92
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Unit Leader:	<input type="checkbox"/>	
Unit Information	<input type="checkbox"/>	

**WILSON**

& COMPANY

5755 Mark Dabling Boulevard, Suite 220  
Colorado Springs, CO 80919  
719-520-5800 Office  
719-520-0108 Fax  
[www.wilsonco.com](http://www.wilsonco.com)

# Briargate-Stapleton Corridor Study

## Appendix B: Traffic Report

El Paso County Department of Public Works

On-Call Contract:  
#17-067-51 12/09/2021

DRAFT

# Briargate-Stapleton Corridor Study

## Appendix B: Traffic Report



Prepared for

El Paso County Department of Public Works  
On-Call Contract: #17-067-51

**DRAFT**

December 9, 2021

Prepared by

**WILSON**  
**& COMPANY**

5755 Mark Dabling Boulevard, Suite 220  
Colorado Springs, CO 80919  
719-520-5800

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# List of Acronyms and Definitions

Acronym/ Term/ Phrase	Definition
<b>AM</b>	Refers to the morning weekday peak traffic period, which includes primarily work and school trips.
<b>ADT</b>	<b>Average Daily Traffic:</b> The amount of vehicular traffic that crosses an imaginary line across a roadway in a 24-hour period. ADT information typically includes both directions of vehicle travel (if on a two-way street).).
<b>AWDT</b>	<b>Average Weekday Daily Traffic:</b> When the term ADT is used specifically to mean typical weekday traffic, it is often called AWDT.
<b>AWSC</b>	<b>All-Way Stop Controlled:</b> All intersection approaches are controlled by STOP signs.
<b>CDOT</b>	<b>Colorado Department of Transportation:</b> CDOT has jurisdiction over Colorado's State Highway System, including facilities within the project study area.
<b>Gap in Traffic</b>	A gap in traffic is the space between vehicles approaching the pedestrian crossing. Gaps are typically measured in seconds, not distance, as it is the length of the gap in time in which a pedestrian must be able to cross the street. A directional gap is the gap between vehicles approaching in a single direction. A directional gap can be measured between vehicles in a single lane, or between vehicles approaching in the same direction but in different lanes on a multi-lane approach. If there is no median refuge at the crossing, a pedestrian will need to find an acceptable gap in traffic approaching from two directions at once. This is much more challenging than finding a gap in each approach direction separately.
<b>HCM</b>	<b>Highway Capacity Manual:</b> A publication of the U.S. Transportation Research Board of the National Academies of Science. It contains concepts, guidelines, and computational procedures for computing the capacity and quality of service of various highway facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, rural highways, and the effects of mass transit, pedestrians, and bicycles on the performance of these systems. The <i>Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis</i> (HCM6) was used as part of this study.
<b>Lane</b>	A portion of the roadway surface designated for motor vehicle travel, typically in a single direction, that is delineated by pavement marking stripes. Types of lanes include: "through lanes" for travel along the length of the roadway, often through intersections; "turn lanes," which are typically on intersection approaches and provide space for left- or right-turning motorists; "bike lanes," which are designated for bicycle travel in the same direction as the automobile travel, are typically narrower than vehicle lanes, and are usually located along the outside edges of the roadway.

<b>LT</b>	<b>Left Turn:</b> Refers to traffic that turns left at an intersection, often using a designated left-turn lane and sometimes afforded a dedicated left-turn phase in traffic signal timing.
<b>LOS</b>	<b>Level of Service:</b> A qualitative measure used to relate the quality of traffic service. LOS is used to analyze highways by categorizing traffic flow and assigning quality levels of traffic based on performance measure like speed, density, etc.
<b>MPO</b>	<b>Metropolitan Planning Organization:</b> A federally mandated and federally funded transportation policy-making organization that is composed of representatives from local government and governmental transportation authorities. MPOs were introduced by the Federal-Aid Highway Act of 1962, which required the formation of an MPO for any urbanized area with more than 50,000 residents.
<b>NCRHP</b>	<b>National Cooperative Highway Research Program:</b> A forum for coordinated and collaborative research, addressing issues integral to the state Departments of Transportation and transportation professionals at all levels of government and the private sector.
<b>NB</b>	<b>Northbound:</b> Refers to traffic flowing from the south toward the north, and the lanes that carry such traffic.
<b>OTIS)</b>	<b>Online Transportation Information System:</b> A publicly available website maintained by the Colorado Department of Transportation, providing information on current and projected traffic volumes, state highway attributes, summary roadway statistics, demographics, and geographic data. It was used in this study as a data source for historical trends-based annual and 20-year traffic growth factors.
<b>PPACG</b>	<b>Pikes Peak Area Council of Governments:</b> A voluntary organization of municipal and county governments serving as the federally mandated Metropolitan Planning Organization serving El Paso County, Park County, Teller County, Alma, Calhan, Colorado Springs, Cripple Creek, Fairplay, Fountain, Green Mountain Falls, Manitou Springs, Monument, Palmer Lake, Ramah, Victor, and Woodland Park.
<b>PM</b>	Refers to the afternoon/evening weekday peak traffic period, which includes work trips plus other trip types.
<b>RIRO</b>	<b>Right-In/Right-Out</b>
<b>ROW</b>	<b>Right-of Way</b>
<b>RT</b>	<b>Right Turn:</b> Refers to traffic that turns right at an intersection, sometimes using a designated right-turn lane.
<b>(SB)</b>	<b>Southbound:</b> Refers to traffic flowing from the north toward the south, and the lanes that carry such traffic.
<b>Through/Right Turn</b>	Refers to traffic (and the lane that carries it) at an intersection that is continuing forward straight through without turning, together with traffic that turns right at the intersection.
<b>TWSC</b>	<b>Two-Way Stop Controlled:</b> Cross street minor approaches are controlled by STOP signs.
<b>Turning-Movement Counts</b>	Traffic counts for a given time interval that specify how many vehicles turn left or right, as well as counting vehicles that proceed straight forward through the intersection.

## Appendix B – Traffic Report

<b>V/C Ratio</b>	<b>Volume-to-Capacity Ratio:</b> Measures roadway level of congestion, or degree of saturation, by dividing the existing or future volume of traffic by the capacity of roadway.
<b>VPD</b>	<b>Vehicles Per Day</b>
<b>Vehicle Queue</b>	A line of stopped vehicles in a single travel lane, commonly caused by traffic control at an intersection.
<b>WB</b>	<b>Westbound:</b> Refers to one-way traffic flowing from the east to the west (e.g., from Colorado Springs toward Manitou Springs), and the lanes that carry such traffic.

# 1.0 Introduction

## 1.1 Background

The Briargate Parkway–Stapleton Road corridor is an integral part of a larger transportation system in the Pikes Peak Region. The full 14-mile-long corridor will ultimately connect I-25 to US Highway 24 on the north side of the greater Colorado Springs area as shown in **Figure 1.1**. The 5.5-mile-long project corridor for the Briargate-Stapleton Traffic Study extends from Meridian Road on the east to Black Forest Road on the west. The project corridor is mostly undeveloped at this time, with some portions containing existing roadways of various types and phases of construction associated with adjacent development, most notably a nearly one-mile-long segment west of Meridian Road. There is, however, a significant amount of development occurring in this rapidly growing area of El Paso County.

### 1.1.1 Purpose and Objectives

The El Paso County 2016 *Major Transportation Corridors Plan* (2016 MTCP) identifies the ultimate need for a four-lane section throughout the Briargate Parkway–Stapleton Road project corridor both to meet forecasted travel demand and to fulfill broader county system and connectivity needs. The 2016 MTCP also includes specific recommendations regarding functional classification, transportation modes, and other uses for the Briargate-Stapleton corridor. The 2016 MTCP identifies the Briargate Parkway–Stapleton Road project corridor as a principal arterial from the eastern city limits of Colorado Springs (Black Forest Road) to Judge Orr Road (southeast of US 24). Additional mobility provisions that are necessary, such as bike routes, pedestrian accommodations, and public transit, are also identified for the corridor by the 2016 MTCP. This study was undertaken to confirm and ensure the appropriate spacing of proposed development access along the corridor to maintain operational functionality appropriate for the corridor's functional classification.

The Briargate-Stapleton Traffic Study is a component of the Briargate Parkway–Stapleton Road Corridor Preservation Plan. The purpose of the study is to evaluate existing and future (2045) traffic operations along the roadway, to confirm the proposed number of travel lanes and intersection traffic controls shown in the conceptual design plans, and to develop conceptual design for the full corridor. To address this overarching purpose, this study includes: an evaluation of current corridor traffic operations, forecasts of 2045 traffic volumes, an evaluation of traffic operations for the forecasted 2045 conditions, and a confirmation of the feasibility of the planned intersection spacing and access restrictions (e.g., full-access, right-in/right-out (RIRO) only access).

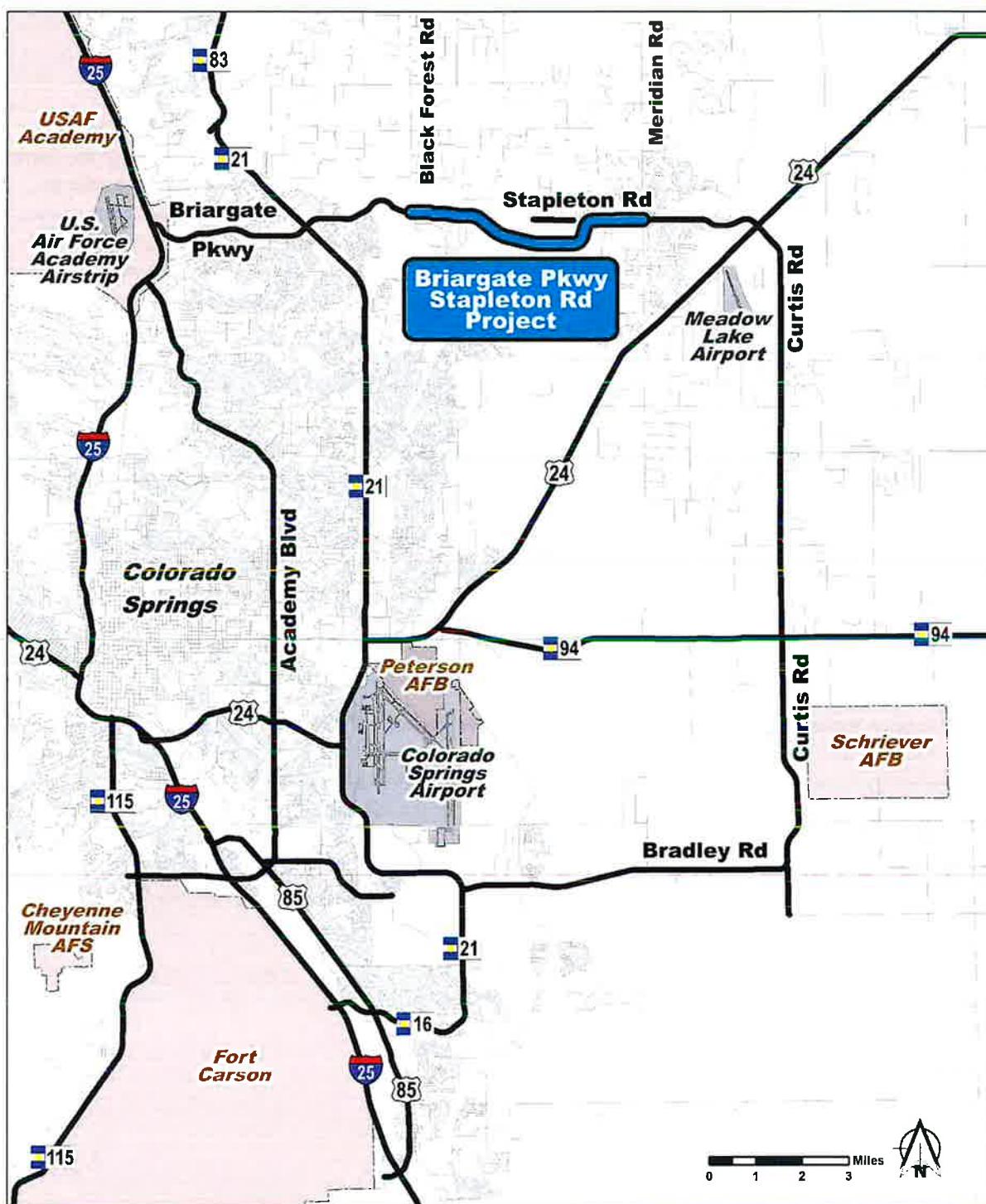


Figure 1.1 Project Corridor Location Map

## 1.1.2 Methodology and Assumptions

### Software Packages

Synchro version 11 software, implementing the Transportation Research Board's *Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis* (HCM6, 2016) delay and Level of Service (LOS) evaluation criteria, was used to perform the traffic operations analysis. Travel demand forecasts were developed using the Pikes Peak Area Council of Governments (PPACG) travel model as a foundation. Full and partial runs of the PPACG travel model and analysis of model inputs and outputs were performed using a PTV Group VISUM version 18 software platform per PPACG model use guidance.

### Analysis Area

The analysis area includes the full project corridor extending from Black Forest Road to Meridian Road. Intersection traffic volume forecasts were prepared only for existing and proposed intersections along the project corridor. Existing average daily traffic (ADT) volume counts were collected for a larger area, which included Meridian Road, Woodmen Road, Briargate Parkway (west of Black Forest Road), and Vollmer Road, to support travel demand model validation and adjustment of 2045 traffic forecasts.

### Travel Demand Forecasts

The current PPACG VISUM version 18 travel model was used to develop travel demand forecasts for the Briargate Parkway–Stapleton Road corridor study area. Full model scenarios for a 2020 base year and 2045 planning horizon were run for each of these scenarios. Raw traffic assignment volumes produced by the model were adjusted using modeled percent growth and absolute growth in traffic flows between the 2020 and 2045 model scenarios, together with observed traffic count data for 2020, as input. Adjustments to base, raw assignment volumes were made in accordance with industry standard guidance.<sup>1</sup> Adjusted assignment results for 2050 were post-processed to generate balanced peak period intersection turning movements as input to the Synchro-based analyses.

### Intersection Analysis

The traffic operations analysis addressed unsignalized and signalized intersection operations using the procedures and methodologies contained in the HCM6 for weekday AM and PM peak hour traffic operations. Study intersection operations were evaluated using LOS and queue length calculations as analyzed in the Synchro version 11 software.

To measure and describe the operational status of the local roadway network and corresponding intersections, transportation engineers and planners commonly use the LOS grading system. LOS is a description of an intersection's operation, ranging from a LOS A (indicating free flow traffic conditions with little or no delay) to a LOS F (representing oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays).

### Signalized Intersections

At signalized intersections, traffic conditions were evaluated using procedures and methodologies contained in the HCM6. The operational analysis uses various intersection characteristics (such as traffic volumes, lane

<sup>1</sup> NCHRP Report 255 – Highway Traffic Data for Urbanized Area Project Planning and Design, 1982; NCHRP Report 765 – Analytical Travel Forecasting Approaches for Project-Level Planning and Design, 2014.

geometry, and signal phasing) to estimate the intersection's volume-to-capacity (v/c) ratio. For signalized intersections, the HCM6 defines the LOS as the average delay per vehicle for the overall intersection.

**Table 1.1** summarizes the relationship between delay and LOS for signalized intersections.

**Table 1.1. LOS Criteria for Signalized Intersections**

Level of Service	Interpretation	Control Delay (seconds/vehicle)
A	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may contribute to low delay.	≤10
B	Good progression, short cycle lengths, or both. More vehicles stop than with LOS A.	>10 – 20
C	Fair progression, longer cycle lengths, or both. The number of vehicles stopping is significant, though many still pass through without stopping.	>20 – 35
D	Longer delays result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop.	>35 – 55
E	High delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	>55 – 80
F	This level often occurs with oversaturation when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may be major contributing factors to such delays.	>80

*Source:* Transportation Research Board, *Highway Capacity Manual, 6th Edition: A Guide for Multimodal Mobility Analysis*, 2010, 19-2.

## Unsignalized Intersections

For unsignalized (all-way stop-controlled [AWSC] and two-way stop-controlled [TWSC]) intersections, the HCM6 was utilized. With this methodology, operations are defined by the average control delay per vehicle (measured in seconds) for each stop-controlled movement. The method incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For AWSC intersections, the HCM6 defines the LOS as the average delay per vehicle for the overall intersection. For TWSC intersections, LOS is reported for the approach with the highest average delay/vehicle. **Table 1.2** summarizes the relationship between delay and LOS for unsignalized intersections.

**Table 1.2. LOS Criteria for Unsignalized Intersections**

Level of Service	Interpretation	Control Delay (seconds/vehicle)
A	Little or no delay	0–10
B	Short traffic delays	>10–15
C	Average traffic delays	>15–25
D	Long traffic delays	>25–35
E	Very long traffic delays	>35–50
F	When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing that may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improving the intersection.	>50

*Source:* Transportation Research Board, *Highway Capacity Manual, 6th Edition: A Guide for Multimodal Mobility Analysis*, 2010, 18-6.

*Note:* For TWSC intersections, level of service is determined by the control delay for each minor movement; LOS is not defined for the overall intersection.

## 2.0 EXISTING CONDITIONS

### 2.1 Roadway Classification

Although the study corridor extends approximately 5.5 miles, from Black Forest Road to Meridian Road, approximately 4.3 miles of the corridor has not yet been constructed. The sections that have been built are not consistent with the proposed roadway classification and use. Existing Briargate Parkway extends from the west at Interstate 25 and currently ends approximately one mile west of Black Forest Road. Through the Wolf Ridge development, Briargate Parkway is a 4-lane divided section with curb and gutter and a 30' raised median. In this area, 160' of right-of-way (ROW) has been set aside for the roadway. Another portion of Briargate Parkway currently exists as about 0.2 miles of two-lane, 24'-wide asphalt roadway extending east from Black Forest Road. The ROW indicates that 120' has been set aside for this corridor. Similarly, from the east, Stapleton Drive/Road exists for about 1.0 mile as a two-lane, 24'-wide asphalt roadway from Meridian Road to west of Towner Avenue. ROW that has been set aside in this area varies from 120' to 160'. East of the project, Stapleton Drive/Road is a two-lane section with open drainage and an intermittent painted median.

### 2.2 Existing Traffic and Roadway Conditions

Available traffic count data was assembled for use in this traffic analysis for the Briargate-Stapleton Corridor Study from sources including the Colorado Department of Transportation (CDOT) traffic statistics database, the PPACG, and both El Paso County and the City of Colorado Springs (traffic count data and recent development traffic impact studies). Count data from these sources included: weekday peak period turning-movement counts, 48-hour counts, hourly counts, and adjusted average daily traffic (ADT) counts. Additional peak hour intersection turning-movement counts were collected at five existing intersections. Directional counts were also conducted hourly at five locations on Stapleton Drive (east of the project corridor), Meridian Road (north and south of the project corridor), Vollmer Road, and Black Forest Road (south of the proposed alignment) in August 2021. **Figure 2.1** shows the existing weekday AM and PM peak hour intersection turning-movement counts. **Figure 2.2** shows the existing lane geometry and traffic control at the study intersections. The raw traffic count data is included in **Attachment A**.

### 2.3 Traffic Operations

The LOS and delay measures shown in **Table 2.1** are for 2021 existing traffic volumes, roadway geometry, and traffic control. The results show that all the analyzed intersections currently operate at LOS C or better. The Synchro LOS outputs are included in **Attachment B**.

**Table 2.1. 2021 Existing Conditions Traffic Operations Summary**

Control	Intersection	LOS/Delay [in seconds/vehicle] (Critical Movement)	
		AM Peak Hour	PM Peak Hour
TWSC	Briargate Parkway & Black Forest Road	<b>b</b> / 12.3 (WB Approach)	<b>b</b> / 13.6 (WB Approach)
AWSC	Stapleton Road & Towner Avenue	<b>A</b> / 9.6	<b>A</b> / 8.4
TWSC	Stapleton Road & Prairie Dove Drive	<b>b</b> / 13.4 (SB Approach)	<b>b</b> / 11.2 (SB Approach)
TWSC	Stapleton Road & Liberty Grove Drive	<b>b</b> / 14.9 (SB LT)	<b>b</b> / 11.5 (SB LT)
Signal	Stapleton Road & Meridian Road	<b>C</b> / 28.6	<b>B</b> / 19.0

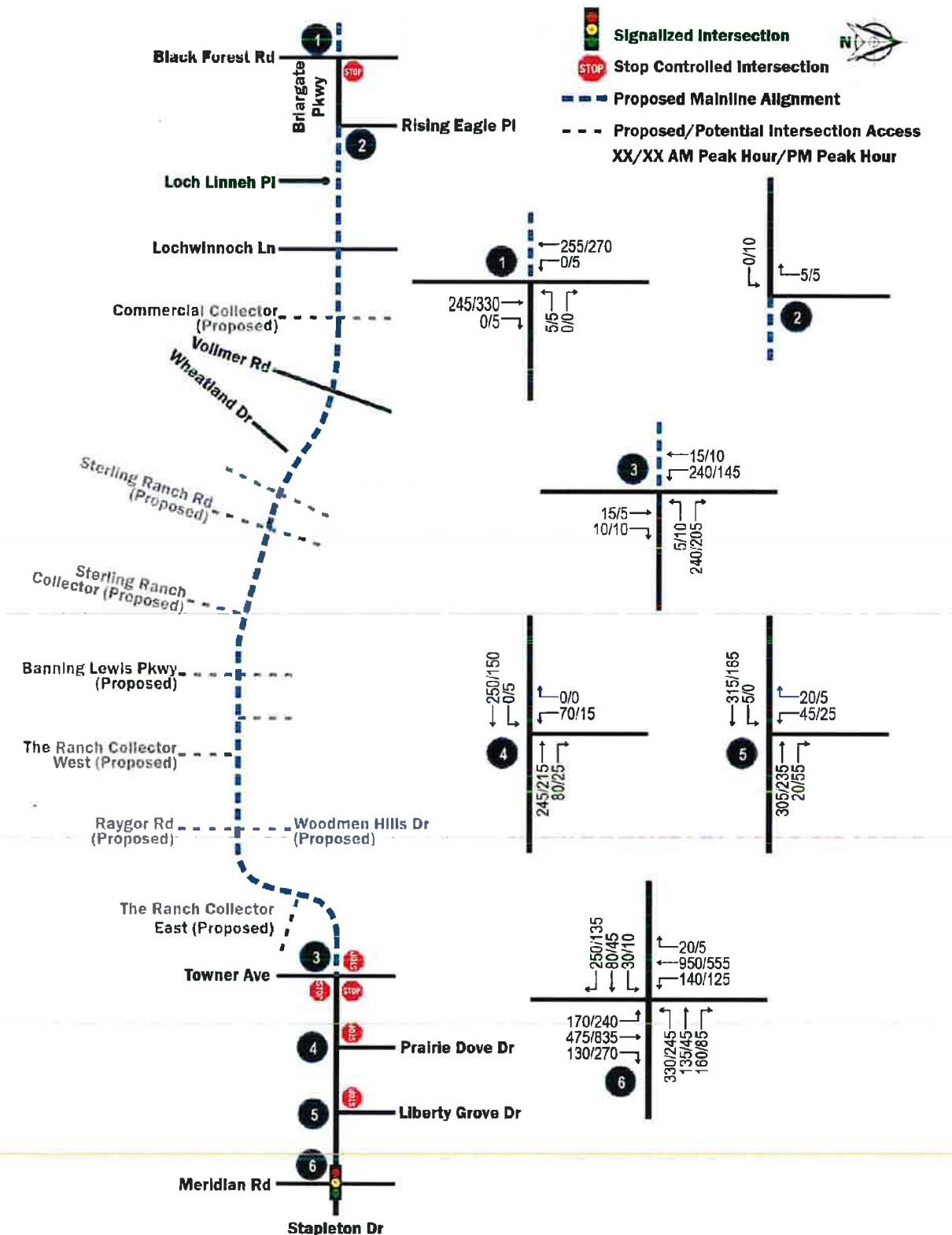


Figure 2.1 Existing Intersection Peak Hour Turning-Movement Volumes

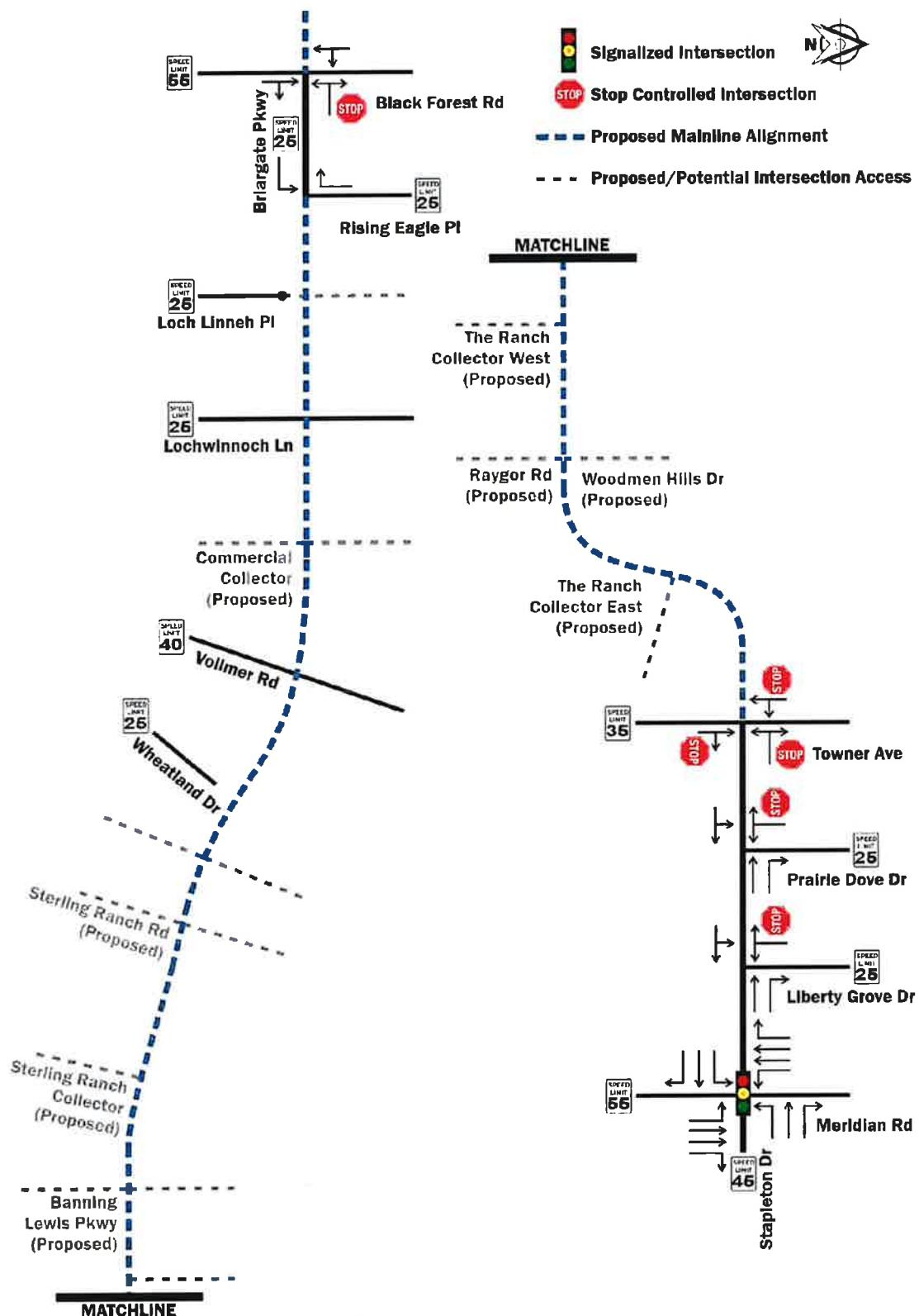


Figure 2.2 Existing Intersection Geometry and Traffic Control

## 3.0 TRAVEL DEMAND FORECASTS

### 3.1 Methodology

Forecasts for 2045 total traffic volumes were developed using a synthesis of historic trends-based methods and regional travel model-based methods that incorporated estimates of development site-generated traffic in a consistent manner.

The PPACG 2045 fiscally constrained RTP model was used to develop future ADT volume forecasts along the corridor. The model scenario is coded with four lanes east of Black Forest Road and six lanes west of Black Forest Road. The model results were used in conjunction with traffic studies for other projects within the area to develop intersection peak hour turning-movement traffic volumes. Reference studies included the Black Forest Road Widening Project Traffic Impact Study (February 2020) and traffic impact studies completed for Wolf Ranch, The Ranch, Sterling Ranch, Highland Park, and Eagle Rising developments.

### 3.2 2045 Traffic Forecasts

The traffic impact study included in the City of Colorado Springs Black Forest Road Corridor Study and traffic impact study submittals for the adjacent existing and proposed developments were used to estimate development traffic not included in 2045 regional forecasts. Trends-based 20-year growth factors for US 24, the closest state highway facility, were also obtained from the CDOT Online Traffic Information System (OTIS) database. The average 25-year growth factor was calculated from this data for the corridor segments of interest and was determined to be 1.6. The collected traffic count data is included as **Attachment A**.

The PPACG model and industry-standard adjustment procedures were used, as shown in **Table 3.1**, to calculate unadjusted 2045 forecasts and growth rates. Calculated growth factors were compared, balanced, and applied to 2021 intersection volumes to calculate 2045 total traffic intersection volumes.

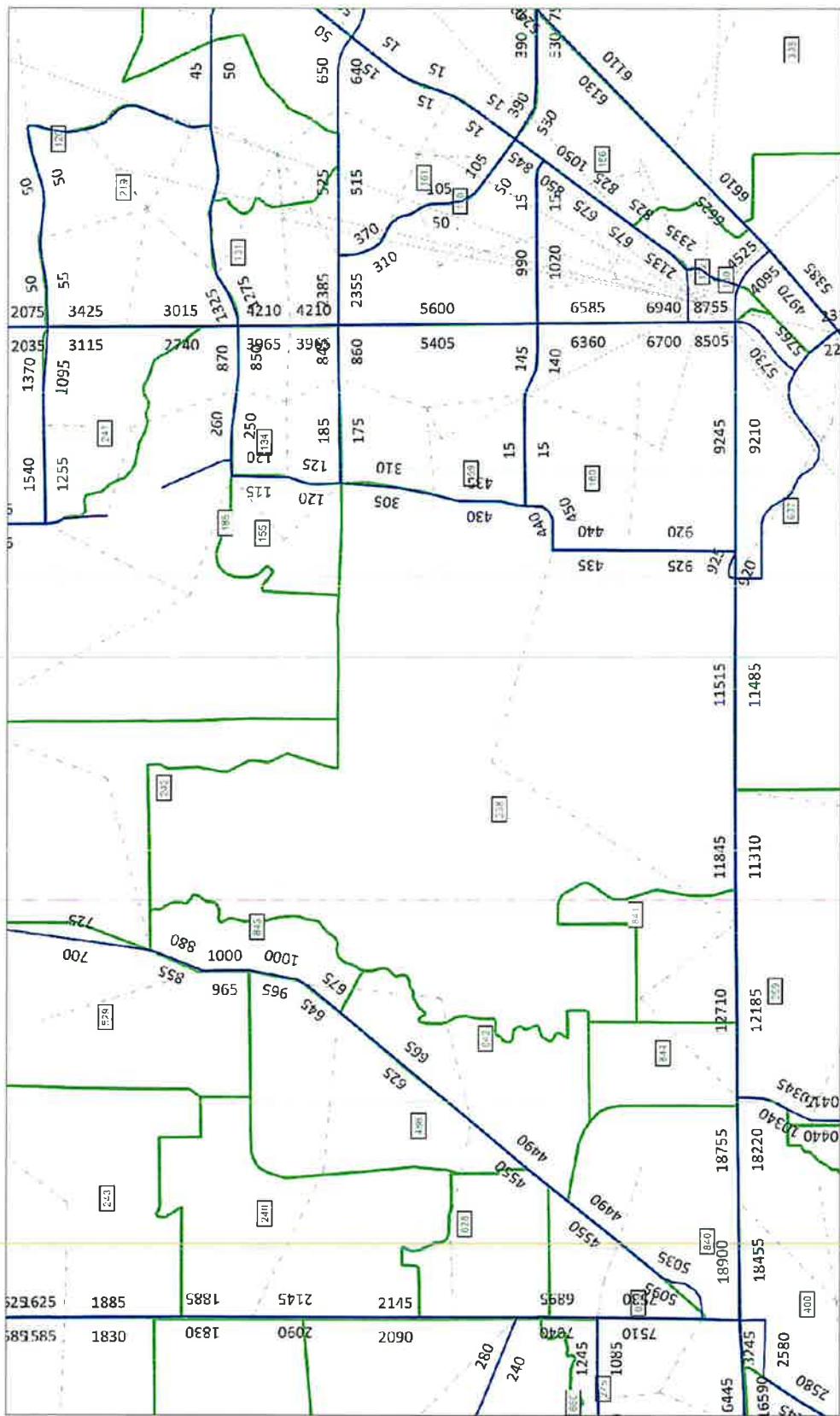
**Figure 3.1** shows PPACG travel model raw assignment volumes for the 2020 base year model scenario, and **Figure 3.2** shows raw assignment volume for the adopted 2045 PPACG Regional Transportation Plan model scenario.

**Figure 3.3** shows the adjusted, forecasted 2045 ADT volumes along the corridor, which range from 16,000 vehicles per day (vpd) west of Meridian Road, at the east end of the study limits, to 25,000 vpd east of Black Forest Road, at the west end of the study limits.

Table 3.1. 2021 Forecast Background Traffic Growth Rate Calculations

SEGMENT LOCATION	ADT VOLUMES										Adjusted 2045 ADT Volume
	Ground Count Volumes			PPACG Model Volumes			Difference			% Difference	
	Year	Count	Adj. Count	2020	2040	2045	2020 vs Count	% Difference	2020 vs Count	2045 vs 2020	
BLACK FOREST ROAD											
Black Forest Road North of Briargate Parkway	2021*	4,000	4,000	4,200	8,000	8,250	200	5%	105%	196%	8,450
Black Forest Road South of Briargate Parkway	2021*	15,000	15,000	15,000	33,800	35,000	0	0%	100%	233%	35,000
<b>BLACK FOREST ROAD AVERAGE</b>		<b>9,500</b>	<b>9,500</b>	<b>9,600</b>	<b>20,900</b>	<b>21,625</b>	<b>100</b>	<b>3%</b>	<b>103%</b>	<b>215%</b>	<b>21,725</b>
TOWNER AVENUE											
Towner Avenue North of Stapleton Drive	2021*	4,275	4,275	100	225	310	-4,175	98%	2%	310%	2,398
<b>TOWNER AVENUE AVERAGE</b>		<b>4,275</b>	<b>4,275</b>	<b>100</b>	<b>225</b>	<b>310</b>	<b>-4,175</b>	<b>98%</b>	<b>2%</b>	<b>310%</b>	<b>2,398</b>
STAPLETON DRIVE											
Stapleton Drive East of Towner Avenue	2021*	3,500	3,500	500	13,500	14,000	-3,000	86%	14%	2,800%	15,250
Stapleton Drive West of Meridian Road	2021*	6,250	6,250	1,700	14,500	15,000	-4,550	73%	27%	882%	19,050
Stapleton Drive East of Meridian Road	2021	8,900	8,900	4,800	15,400	16,000	-4,100	46%	54%	333%	19,500
<b>STAPLETON DRIVE AVERAGE</b>		<b>6,217</b>	<b>6,217</b>	<b>2,333</b>	<b>14,467</b>	<b>15,000</b>	<b>-3,883</b>	<b>68%</b>	<b>32%</b>	<b>1,339%</b>	<b>17,933</b>
MERIDIAN ROAD											
North of Stapleton Drive	2021	8,000	8,000	12,200	12,700	0	0%	100%	159%	12,700	
South of Stapleton Drive	2021	23,000	23,000	11,000	21,200	22,000	-12,000	52%	48%	200%	34,000
<b>MERIDIAN ROAD AVERAGE</b>		<b>15,500</b>	<b>15,500</b>	<b>9,500</b>	<b>16,700</b>	<b>17,350</b>	<b>-6,000</b>	<b>26%</b>	<b>74%</b>	<b>179%</b>	<b>23,350</b>
US 24											
North of Falcon Highway	2020	16,000	16,000	22,400	24,000	0	0%	100%	150%	24,000	
North of Woodmen Road	2020	11,000	11,000	16,000	17,200	0	0%	100%	156%	17,200	
North Judge Orr Road	2020	11,000	11,000	16,000	17,200	0	0%	100%	156%	17,200	
<b>US 24 AVERAGE</b>		<b>12,867</b>	<b>12,867</b>	<b>12,667</b>	<b>18,133</b>	<b>19,467</b>	<b>0</b>	<b>0%</b>	<b>100%</b>	<b>154%</b>	<b>19,467</b>

\* ADT volume was estimated from a peak hour intersection collected at the indicated intersection approaches.



**Figure 3.1 PPACG Model 2020 Network and 2020 ADT Traffic Assignment**

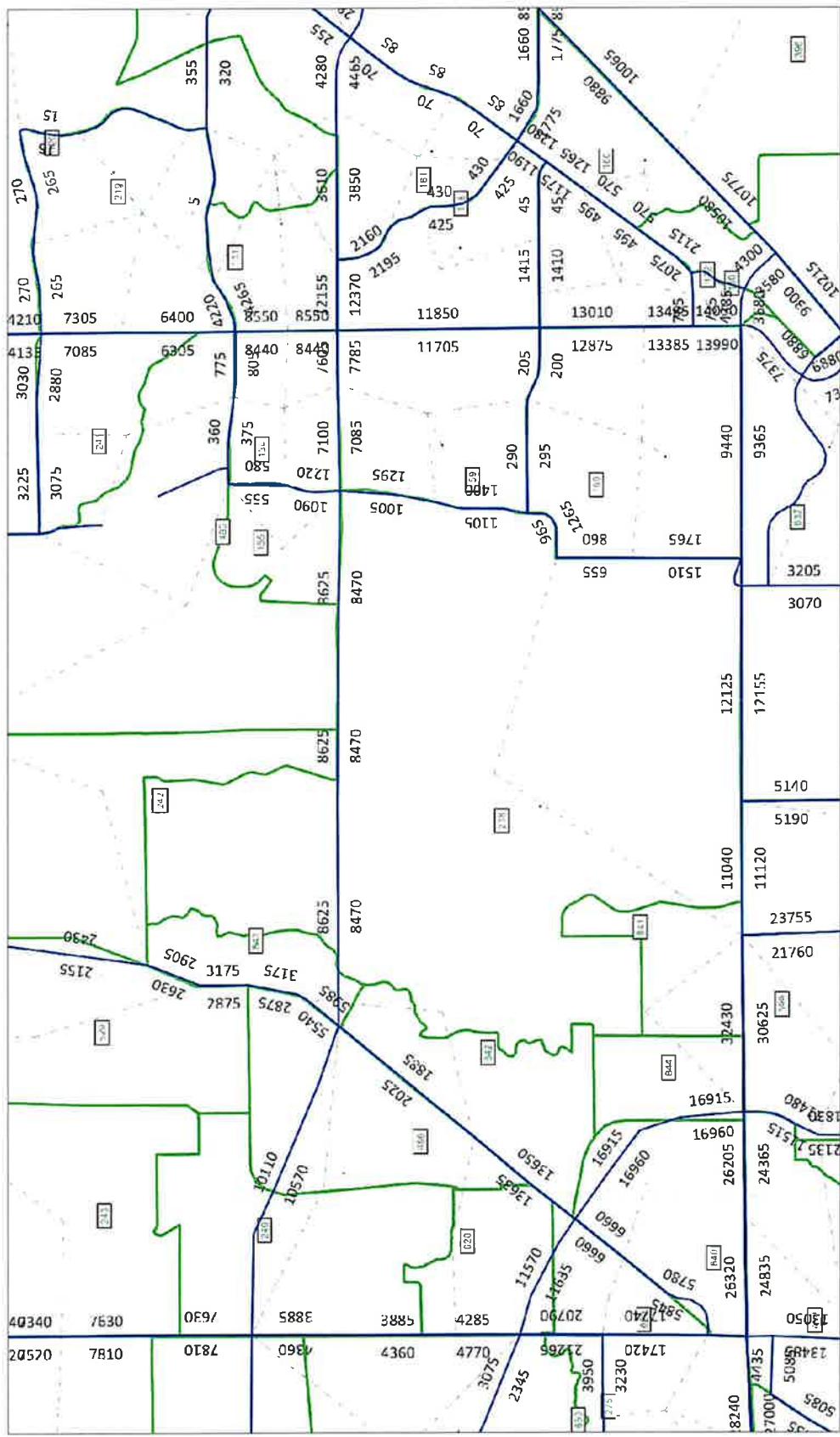


Figure 3.2 PPACG Model 2045 Network and 2045 ADT Traffic Assignment

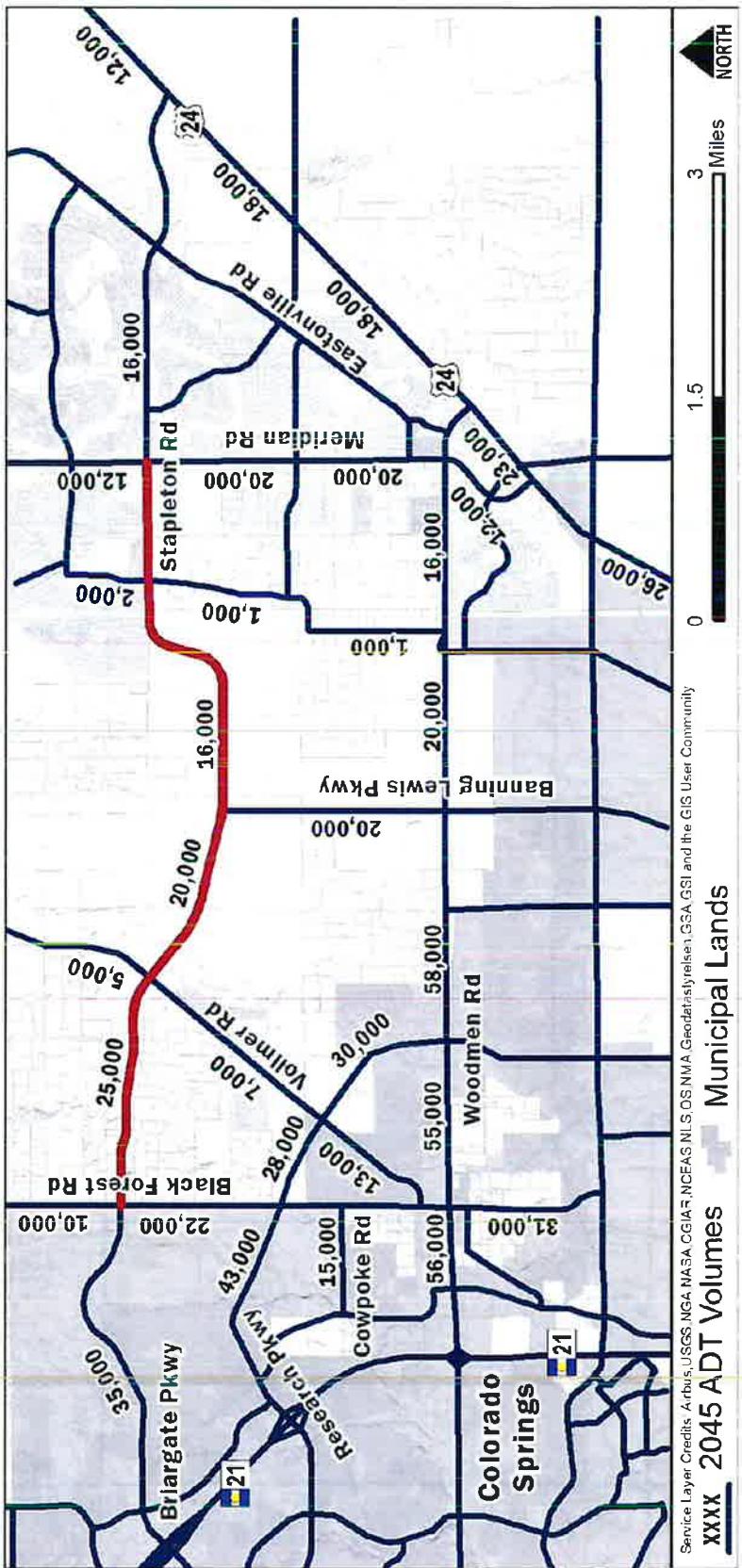


Figure 3.3 2045 Forecast ADT Traffic Volumes

## 4.0 SIGNAL WARRANT ANALYSIS

### 4.1 Existing Conditions

There are six intersections along the existing segments of Briargate Parkway–Stapleton Drive/Stapleton Road. These intersections are located at Black Forest Road, Rising Eagle Place, Towner Avenue, Prairie Dove Drive, Liberty Grove Drive, and Meridian Road. There is an existing traffic signal at the intersection of Stapleton Drive and Meridian Road. The other five unsignalized intersections currently experience relatively low traffic volumes. None of these intersections currently meet warrants for signalization.

### 4.2 Proposed Improvements

The proposed ultimate corridor improvements will include a total of 12 full-access intersections. With forecast daily traffic flow along the corridor ranging from 16,000 to 25,000 ADT, all the full-access intersections are expected to warrant signalization to accommodate forecasted 2045 traffic flow. This traffic study assumed signalized control for purposes of 2045 traffic operations analysis. Both signalized and roundabout alternatives will be evaluated as a part of the preliminary and final roadway design.

## 5.0 ANALYSIS OF FUTURE CONDITIONS

### 5.1 Forecast Intersection Traffic Volumes

Figures 5.1 and 5.2 show the 2045 forecast peak hour intersection turning-movement volumes for the west and east segments of the proposed corridor intersections, respectively. Locations at which additional right-in/right-out-only access or additional intersection legs may be allowed are also shown in the figures' key maps.

### 5.2 Intersection Level of Service

Figure 5.3 shows the proposed lane geometry and traffic control at the study intersections. The intersection LOS and delay measures for the 2045 traffic conditions are shown in Table 5.1. As shown in the table, other than at the western and eastern study limits, the analyzed intersections are projected to operate at LOS C or better during the AM and PM peak hours. The Stapleton Road/Meridian Road intersection is projected to operate at LOS D during the AM and PM peak hours. The Briargate Parkway/Black Forest Road intersection is projected to operate at LOS E during the AM peak hour and LOS D during the PM peak hour. The projected level of service at Briargate Parkway/Black Forest Road indicates a potential need for three through lanes in each direction of Briargate Parkway across Black Forest Road at some point in time. The Synchro LOS outputs are included in Attachment B.

Table 5.1. 2045 Intersection Level of Service Summary

Control	Intersection	LOS/Delay [in seconds/vehicle] (Critical Movement)	
		AM Peak Hour	PM Peak Hour
Signal	Briargate Parkway & Black Forest Road	E / 60.6	D / 54.8
TWSC	Briargate Parkway & Rising Eagle Place	c / 16.3 (SB RT)	b / 14.7 (SB RT)
Signal	Briargate Parkway & Loch Linneh Place	A / 1.4	A / 1.5
Signal	Briargate Parkway & Lochwinnoch Lane	A / 2.9	A / 2.7
Signal	Briargate Parkway & Commercial Collector	A / 6.7	B / 13.9
Signal	Briargate Parkway & Vollmer Road	B / 17.7	C / 24.0
TWSC	Briargate Parkway & Wheatland Drive	b / 13.5 (NB RT)	c / 16.2 (NB RT)
Signal	Briargate Parkway & Sterling Ranch Road	B / 12.7	B / 15.9
TWSC	Briargate Parkway & Sterling Ranch Collector	b / 13.0 (NB RT)	b / 14.6 (NB RT)
Signal	Briargate Pkwy-Stapleton Rd & Banning Lewis Pkwy	C / 27.1	C / 28.7
Signal	Stapleton Road & The Ranch Collector West	A / 1.5	A / 2.0
Signal	Stapleton Road & Woodmen Hills-Raygor Road	B / 10.8	B / 12.1
Signal	Stapleton Road & The Ranch Collector East	A / 5.5	A / 7.5
Signal	Stapleton Road & Towner Avenue	C / 26.7	B / 17.7
TWSC	Stapleton Road & Prairie Dove Drive	b / 11.4 (SB RT)	b / 10.0 (SB RT)
TWSC	Stapleton Road & Liberty Grove Drive	b / 12.1 (SB RT)	b / 10.1 (SB RT)
Signal	Stapleton Road & Meridian Road	D / 37.2	D / 41.4

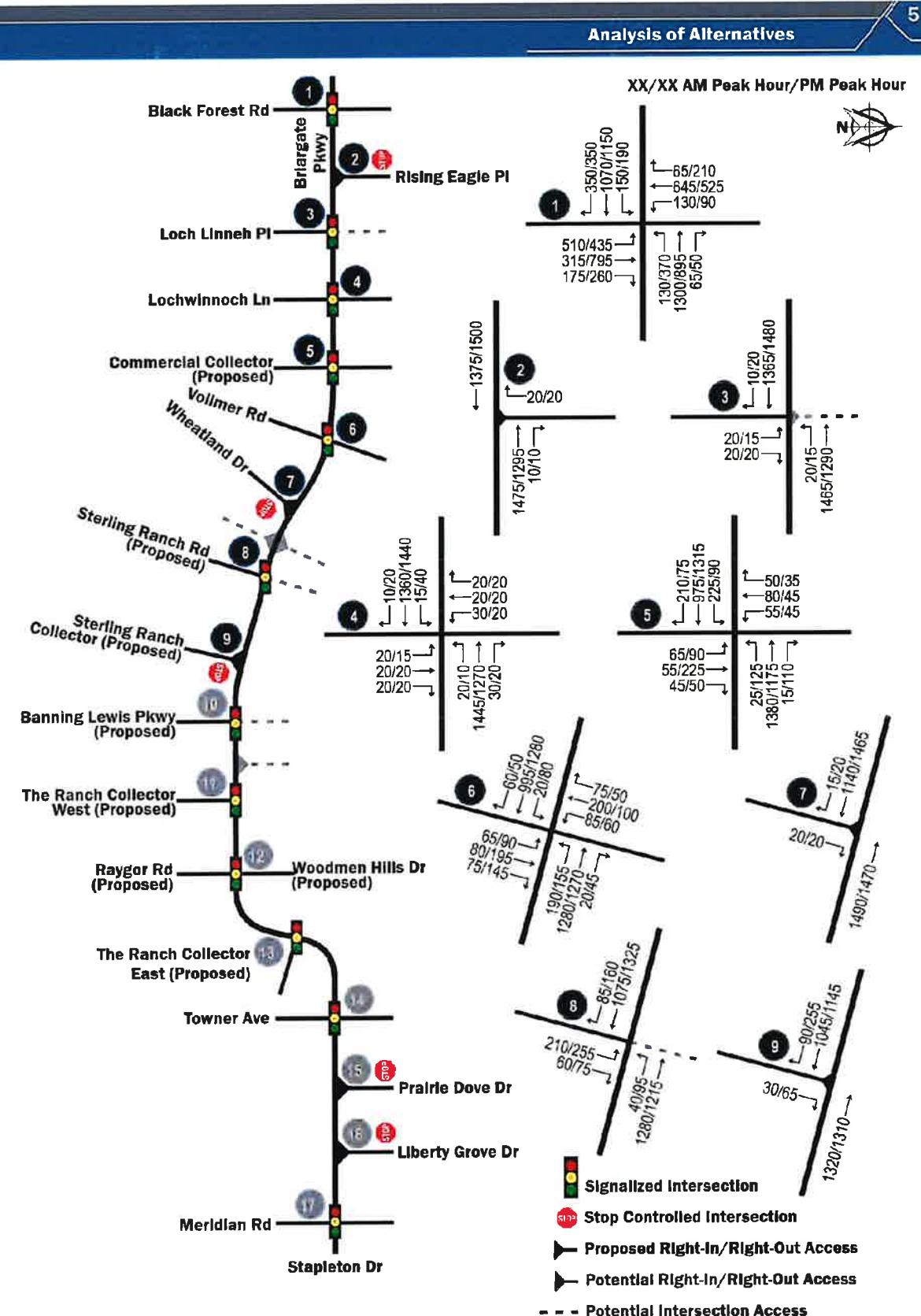


Figure 5.1 2045 Forecast Intersection Peak Hour Turning-Movement Volumes – West Segment

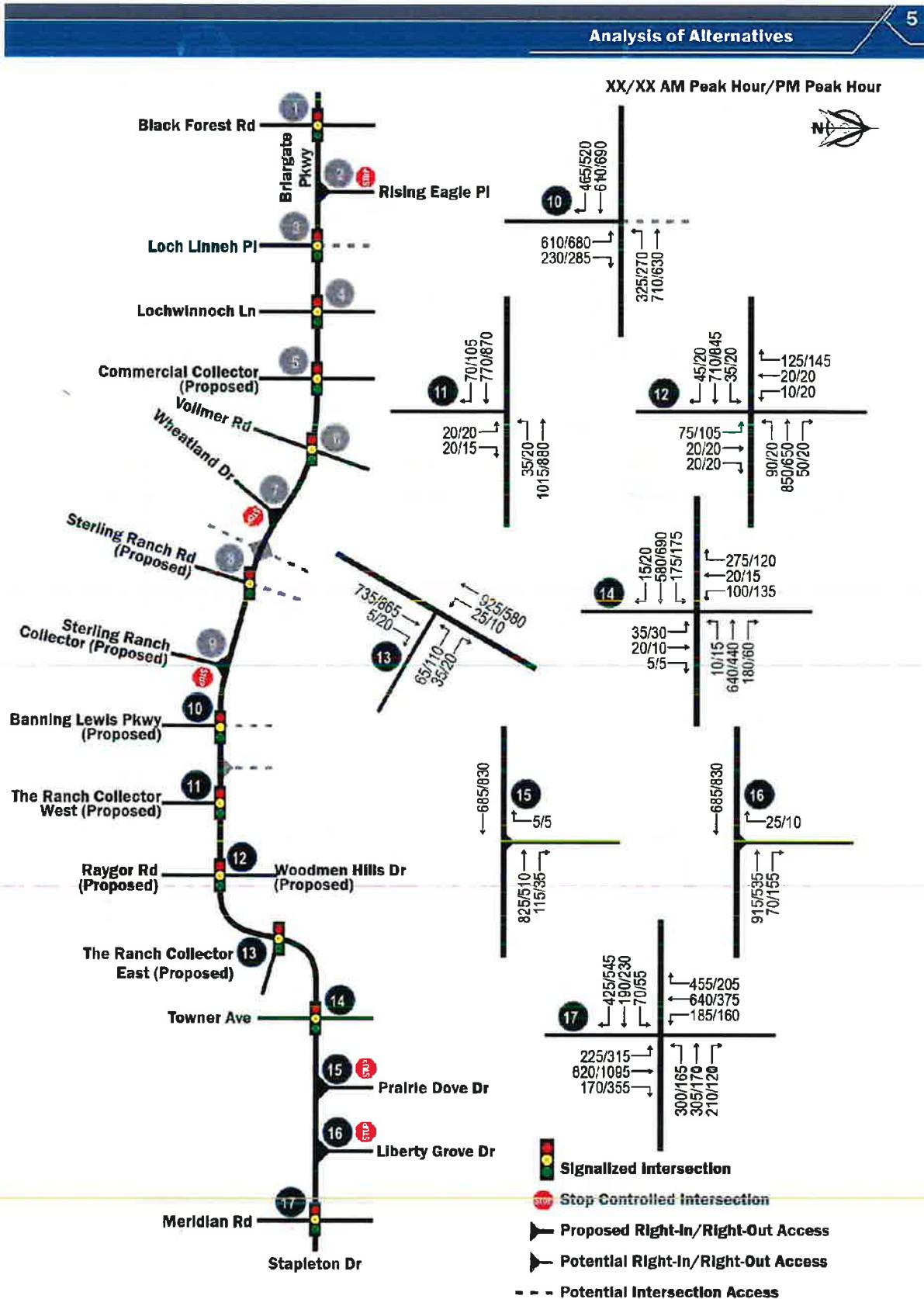


Figure 5.2 2045 Forecast Intersection Peak Hour Turning-Movement Volumes – East Segment

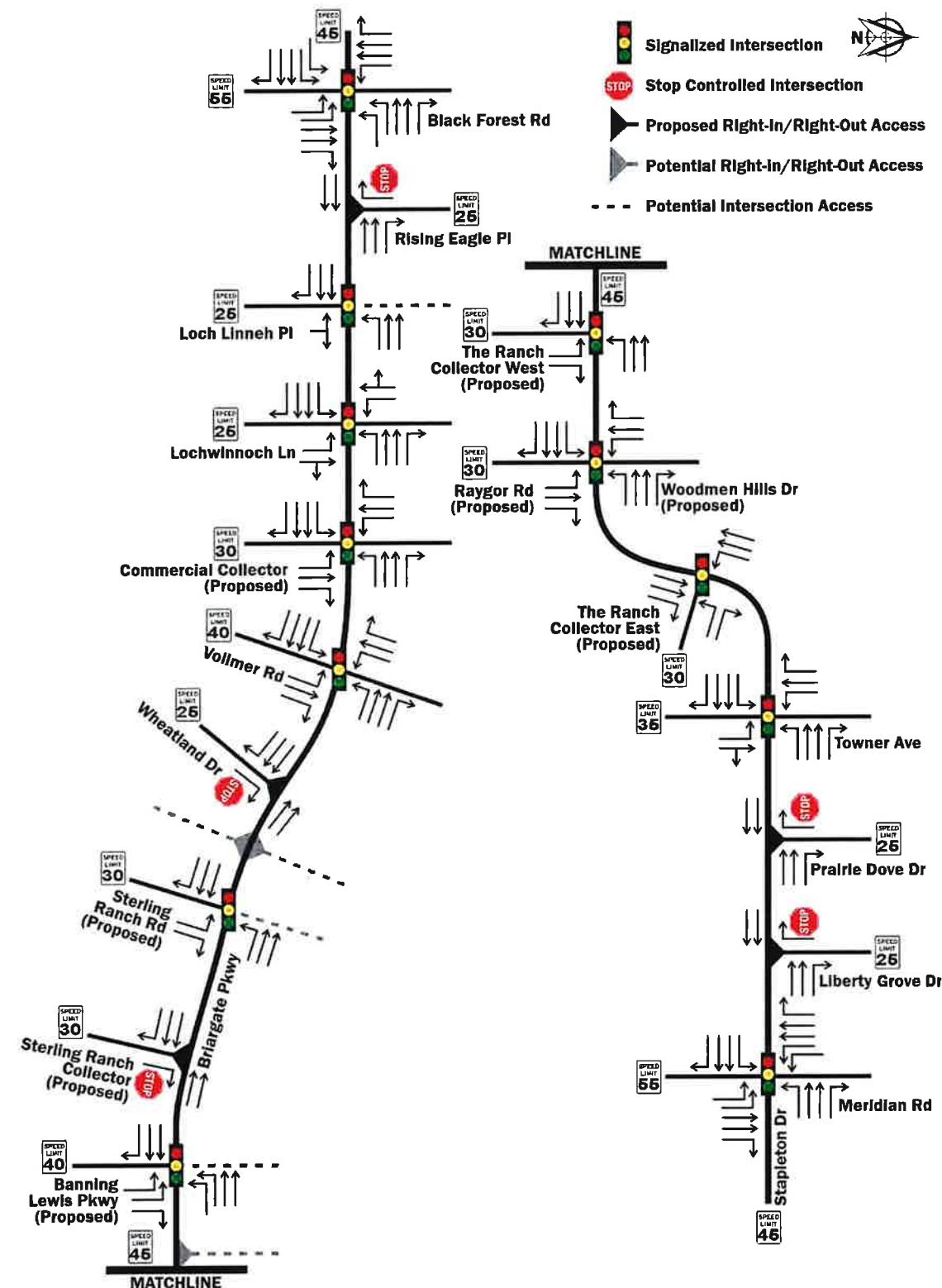


Figure 5.3 2045 Intersection Geometry and Traffic Control

## 5.3 Queuing Analysis

The queuing analysis results for the left-turn movements at the signalized intersections based on the 2045 AM and PM peak hour traffic conditions are summarized in **Table 5.2**.

The values in the table are the 95th percentile queue lengths as reported by Synchro. As shown, most left-turn movements are projected to have queues of less than 200 feet in length. Exceptions are at Black Forest Road (AM Peak Hour - NB 331'/PM Peak Hour - WB 251' and NB 285'), Sterling Ranch Road (AM Peak Hour - NB 236'/PM Peak Hour - 280'), Banning Lewis Parkway (AM Peak Hour - NB 287'/PM Peak Hour - 309'), and Meridian Road (AM Peak Hour - WB 255'). Synchro Queueing Reports are included in **Attachment B**.

Table 5.2 2045 Left Turn Queuing Summary

Intersecting Road	Approach Direction	95th Percentile Vehicle Queue Length [in feet]	
		AM Peak Hour	PM Peak Hour
Black Forest Road	EB	131*	117
	WB	108*	251 *
	NB	331 *	285 *
	SB	112	105 *
Loch Linneh Place	WB	3†	0†
Lochwinnoch Lane	EB	2†	6†
	WB	0†	4†
	NB	42	35
	SB	56	42
Commercial Collector	EB	129	18
	WB	3†	80†
	NB	96	118
	SB	84	73
Vollmer Road	EB	13†	23†
	WB	103	158
	NB	74	114
	SB	92	85
Sterling Ranch Road	WB	12†	49†
	NB	236	280
Banning Lewis Pkwy	WB	189	167
	NB	287	309
The Ranch Collector West	WB	6	18
	NB	42	42
Woodmen Hills-Raygor	EB	3	3
	WB	40	18
	NB	107	138
	SB	26	38
The Ranch Collector East	WB	6†	5†
	NB	96	143
Towner Avenue	EB	45	34
	WB	6†	17†
	NB	50	47
	SB	113	153
Meridian Road	EB	37	28†
	WB	255	140
	NB	134	174
	SB	112	104

\*The 95th percentile volume exceeds capacity; queue may be longer.

†The volume for 95th percentile queue is metered by upstream signal.

# 6.0 CONCLUSIONS & RECOMMENDATIONS

## 6.1 Proposed Functional Classification

The forecasted 2045 ADT volumes range from 16,000 vpd west of Meridian Road, at the east end of the study limits, to 25,000 vpd east of Black Forest Road, at the west end of the study limits. These forecasted daily traffic volumes are within the range of a four-lane principal arterial (10,000–25,000 vpd), as specified in the City of Colorado Springs "Traffic Criteria Manual" (Section III, *Engineering Criteria Manual*, year)

Furthermore, the traffic operations analysis of the forecasted 2045 weekday AM and PM peak hour traffic conditions confirm that the Briargate Parkway–Stapleton Road corridor will function acceptably as a four-lane arterial. All analyzed intersections are projected to operate at LOS D or better during the peak hours, except at the Briargate Parkway/Black Forest Road intersection, which is projected to operate at LOS E during the AM peak hour. The projected level of service at Briargate Parkway/Black Forest Road indicates a potential need for three through lanes in each direction of Briargate Parkway across Black Forest Road at some point in time.

## 6.2 Intersection Geometry and Traffic Control

Ultimate intersection layouts will be designed for RIRO and full-access intersections and a four-lane section with center median. Full-access intersections may be configured as signalized intersections or roundabout intersections, with alternatives analysis and selection to be determined during preliminary and final design. Conceptual layouts of ultimate RIRO, signalized, and roundabout alternatives are illustrated in **Figure 6.1**, **Figure 6.2**, and **Figure 6.3**, respectively.



Figure 6.1 Typical Right-In/Right-Out Only Intersection Layout

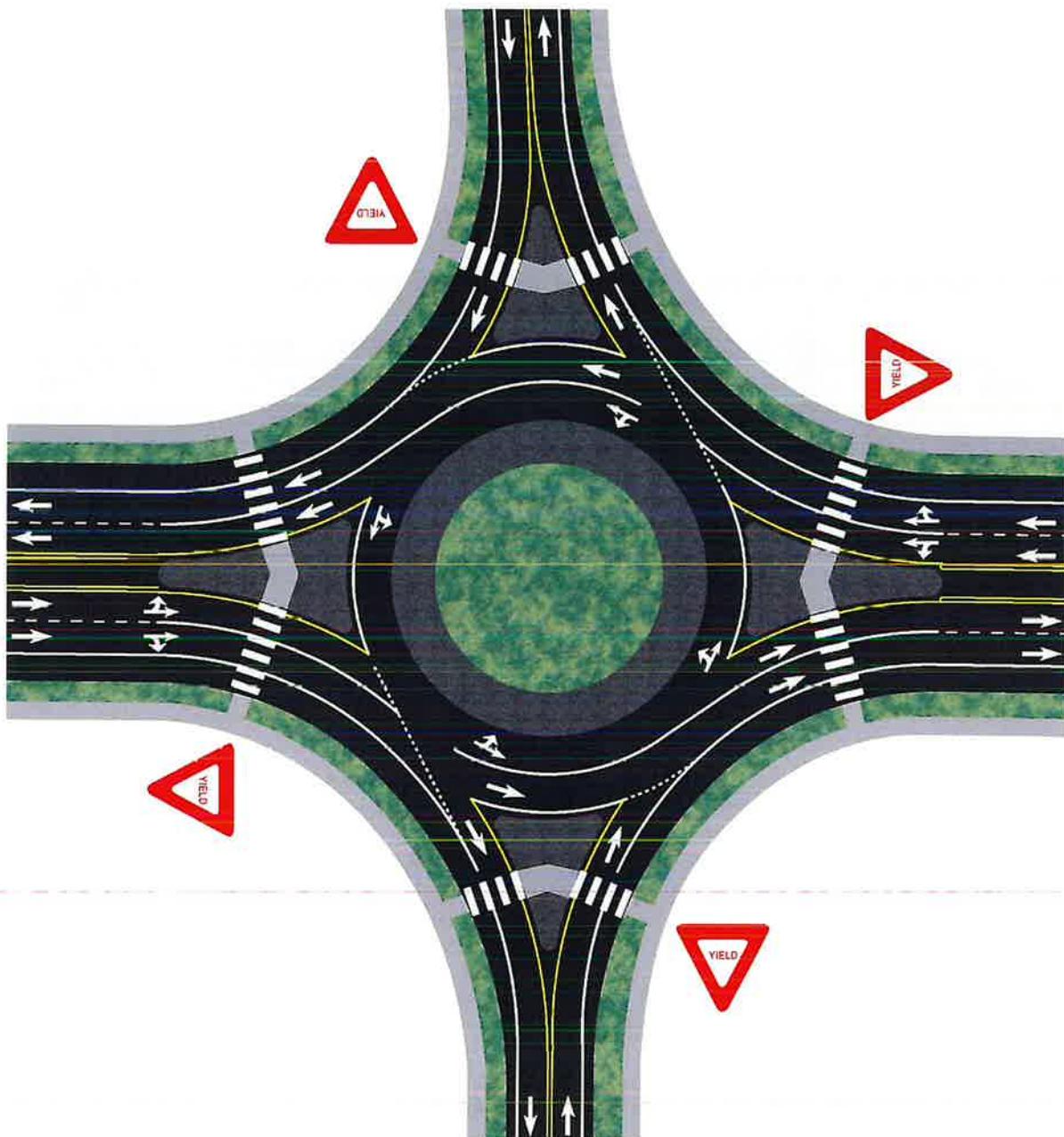


Figure 6.2 Typical Roundabout Intersection Layout

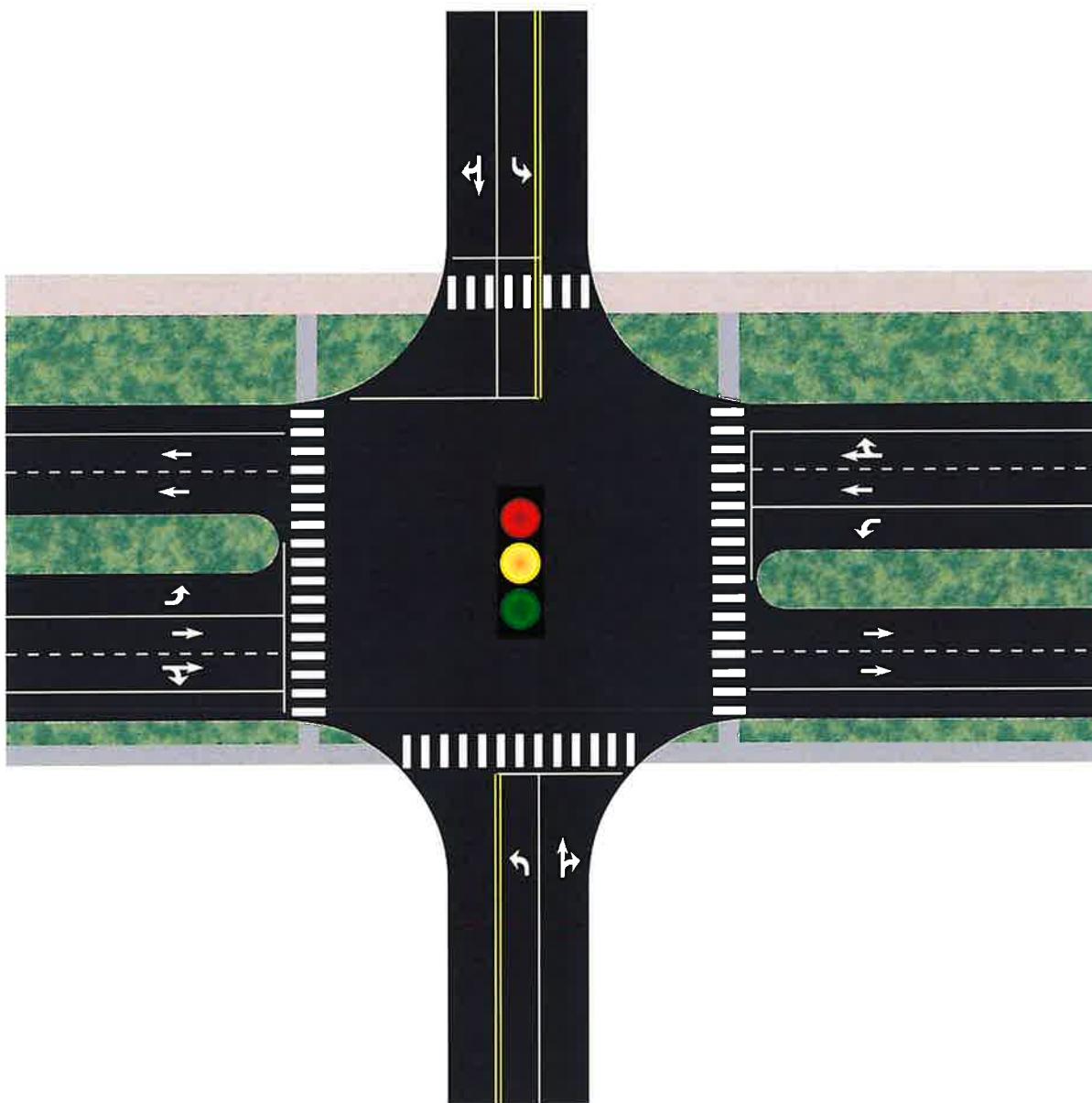


Figure 6.3 Typical Signalized Intersection Layout

WILL REPLACE WITH VERSION WITH DEDICATED RT LANES

## Attachment A – Traffic Count Data

Date Start: 10-Aug-21  
 Site Code: 6  
 Station ID: 6  
**BLACK FOREST RD S.O. BRIGATE PKWY**

Start Time	10-Aug-21 Tue	NB	SB	Total
12:00 AM		9	7	16
01:00		4	4	8
02:00		0	2	2
03:00		4	3	7
04:00		6	13	19
05:00		28	39	67
06:00		116	161	277
07:00		206	232	438
08:00		243	250	493
09:00		192	236	428
10:00		190	203	393
11:00		180	222	402
12:00 PM		206	216	422
01:00		194	258	452
02:00		234	221	455
03:00		271	278	549
04:00		318	273	591
05:00		287	298	585
06:00		234	192	426
07:00		150	121	271
08:00		99	81	180
09:00		62	48	110
10:00		37	27	64
11:00		20	12	32
Total		3290	3397	6687
Percent		49.2%	50.8%	
AM Peak Vol.	-	08:00	08:00	-
PM Peak Vol.	-	16:00	17:00	-
Grand Total		3290	3397	6687
Percent		49.2%	50.8%	
ADT	6,687		AADT 6,687	

**All Traffic Data Services**  
[www.alltrafficdata.net](http://www.alltrafficdata.net)

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Date Start: 10-Aug-21  
 Site Code: 7  
 Station ID: 7  
 VOLLMER RD N.O. GLIDER LOOP

Start Time	10-Aug-21	NB	SB	Total
12:00 AM			2	9
01:00		2	1	3
02:00		5	4	9
03:00		2	6	8
04:00		5	18	23
05:00		14	47	61
06:00		60	139	199
07:00	<b>189</b>	<b>236</b>		<b>425</b>
08:00	'80	217		397
09:00	'70	172		342
10:00	'44	182		326
11:00	'76	206		382
12:00 PM	208	<b>209</b>		417
01:00	'71	189		360
02:00	'48	172		320
03:00	224	198		422
04:00	228	199		427
05:00	<b>237</b>	195		<b>432</b>
06:00	'85	136		321
07:00	'20	80		200
08:00	86	60		146
09:00	53	24		77
10:00	36	11		47
11:00	14	11		25
Total	2664	2714		5378
Percent	49.5%	50.5%		
AM Peak Vol.	-	07:00	07:00	
PM Peak Vol.	-	'89	236	
Grand Total Percent	2664	2714	50.5%	5378
ADT	ADT 5,378	AADT 5,378		

**All Traffic Data Services**  
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Page 1

Date Start: 10-Aug-21  
 Site Code: 8  
 Station ID: 8  
 MERIDIAN RD N.O. STAPLETON DR

Start Time	10-Aug-21	NB	SB	Total
12:00 AM		34	13	47
01:00	01:00	19	12	31
02:00	02:00	17	8	25
03:00	03:00	15	17	32
04:00	04:00	15	73	88
05:00	05:00	63	229	292
06:00	06:00	262	643	905
07:00	667	1110		1777
08:00	08:00	499	673	1172
09:00	09:00	405	550	955
10:00	10:00	462	559	1021
11:00	11:00	479	569	1048
12:00 PM	12:00 PM	578	603	1181
01:00	01:00	589	539	1128
02:00	02:00	684	569	1253
03:00	03:00	815	841	1656
04:00	04:00	876	722	1598
05:00	05:00	931	687	1618
06:00	06:00	735	498	1233
07:00	07:00	528	317	845
08:00	08:00	402	249	651
09:00	09:00	249	128	377
10:00	10:00	115	73	188
11:00	11:00	64	31	95
Total Percent		9503	9713	19216
AM Peak Vol.	-	49.5%	50.5%	-
PM Peak Vol.	-	07:00	07:00	07:00
Grand Total Percent		667	1110	1777
		17:00	15:00	15:00
		931	841	1656
ADT	ADT 19,216	AADT 19,216		

Date Start: 10-Aug-21  
Site Code: 9  
Station ID: 9  
MERIDIAN RD S.O. STAPLETON DR

Start Time	10-Aug-21 Tue	NB	SB	Total
12:00 AM		59	20	79
01:00		28	16	44
02:00		22	18	40
03:00		16	35	51
04:00		12	123	135
05:00		59	344	403
06:00		276	918	1194
07:00	<b>775</b>	<b>1528</b>		<b>2303</b>
08:00	587	896		1483
09:00	539	793		1332
10:00	601	802		1403
11:00	659	827		1486
12:00 PM	774	821		1595
01:00	806	734		1540
02:00	967	848		1815
03:00	1120	<b>1072</b>		2192
04:00	1185	959		2144
05:00	<b>1349</b>	934		<b>2283</b>
06:00	1090	695		1785
07:00	787	450		1237
08:00	615	338		953
09:00	384	202		586
10:00	169	93		262
11:00	102	45		147
Total	12981	13511		26492
Percent	49.0%	51.0%		
AM Peak Vol.	-	07:00	07:00	-
PM Peak Vol.	-	17:00	15:00	-
Grand Total	12981	13511		
Percent	49.0%	51.0%		
ADT	ADT 5,378	AADT 5,378		

**All Traffic Data Services**  
[www.alltrafficdata.net](http://www.alltrafficdata.net)

Page 1

Date Start: 10-Aug-21  
 Site Code: 10  
 Station ID: 10  
 STAPLETON DR E.O. MERIDIAN RD

Start Time	10-Aug-21	EB	WB	Total
12:00 AM		23	9	32
01:00	4	3		7
02:00	7	6		13
03:00	4	12		16
04:00	7	43		50
05:00	46	102		148
06:00	175	316		491
07:00	<b>348</b>	<b>622</b>		<b>970</b>
08:00	211	294		505
09:00	203	261		464
10:00	223	290		513
11:00	213	265		478
12:00 PM	248	266		514
01:00	247	243		490
02:00	<b>276</b>	<b>403</b>		679
03:00	<b>493</b>	381		<b>874</b>
04:00	366	383		749
05:00	442	377		819
06:00	364	281		645
07:00	258	196		454
08:00	195	138		333
09:00	111	89		200
10:00	49	24		73
11:00	33	17		50
Total	4546	5021		9567
Percent	47.5%	52.5%		
AM Peak Vol.	-	07:00	07:00	-
PM Peak Vol.	-	348	622	-
Grand Total Vol.	-	15:00	14:00	-
Percent	47.5%	52.5%		-
ADT	ADT 9,567			AADT 9,567

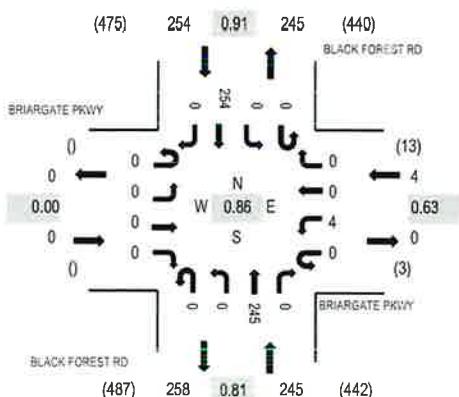
**Location:** 1 BLACK FOREST RD & BRIARGATE PKWY AM

**Date:** Tuesday, August 10, 2021

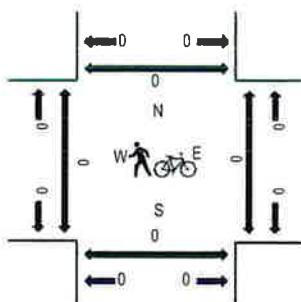
**Peak Hour:** 07:45 AM - 08:45 AM

**Peak 15-Minutes:** 08:15 AM - 08:30 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	BRIARGATE PKWY				BRIARGATE PKWY				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		Total		West	East	South		North			West	East	South	North	
U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North		
7:00 AM	0	0	0	0	0	3	0	0	0	0	38	1	0	0	50	0	92	438	0	0	0	0
7:15 AM	0	0	0	0	0	2	0	0	0	0	45	0	0	0	49	0	96	451	0	0	0	0
7:30 AM	0	0	0	0	0	4	0	0	0	0	60	0	0	0	65	0	129	502	0	0	0	0
7:45 AM	0	0	0	0	0	1	0	0	0	0	59	0	0	0	61	0	121	503	0	0	0	0
8:00 AM	0	0	0	0	0	1	0	0	0	0	48	0	0	0	56	0	105	492	0	0	0	0
8:15 AM	0	0	0	0	0	1	0	0	0	0	76	0	0	0	70	0	147	0	0	0	0	0
8:30 AM	0	0	0	0	0	1	0	0	0	0	62	0	0	0	67	0	130	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	52	1	0	1	56	0	110	0	0	0	0	0
Count Total	0	0	0	0	0	13	0	0	0	0	440	2	0	1	474	0	930	0	0	0	0	0
Peak Hour	0	0	0	0	0	4	0	0	0	0	245	0	0	0	254	0	503	0	0	0	0	0

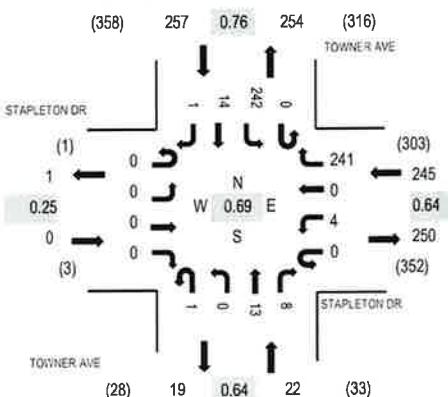
Location: 2 TOWNER AVE & STAPLETON DR AM

Date: Tuesday, August 10, 2021

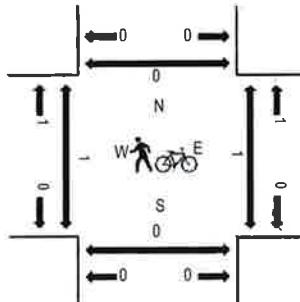
Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:15 AM - 07:30 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR Eastbound				STAPLETON DR Westbound				TOWNER AVE Northbound				TOWNER AVE Southbound				Rolling Hour	Pedestrian Crossings					
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		Total	West	East	South	North	
7:00 AM	0	0	0	0	0	0	1	0	34	0	0	0	4	0	57	3	0	99	524	0	0	0	0
7:15 AM	0	0	0	0	0	0	1	0	95	1	0	7	1	0	74	10	1	190	463	0	1	0	0
7:30 AM	0	0	0	0	0	0	2	0	71	0	0	5	0	0	75	1	0	154	312	1	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	41	0	0	1	3	0	36	0	0	81	211	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	11	0	0	2	3	0	20	2	0	38	173	1	0	1	0
8:15 AM	0	0	0	0	0	0	0	0	14	0	0	0	0	0	24	1	0	39	0	0	0	0	0
8:30 AM	0	1	2	0	0	0	0	0	14	0	0	0	3	0	28	5	0	53	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	19	0	0	1	2	0	20	1	0	43	0	0	0	0	0
Count Total	0	1	2	0	0	4	0	299	1	0	16	16	0	334	23	1	697	2	1	1	0	0	
Peak Hour	0	0	0	0	0	4	0	241	1	0	13	8	0	242	14	1	524	1	1	0	0	0	

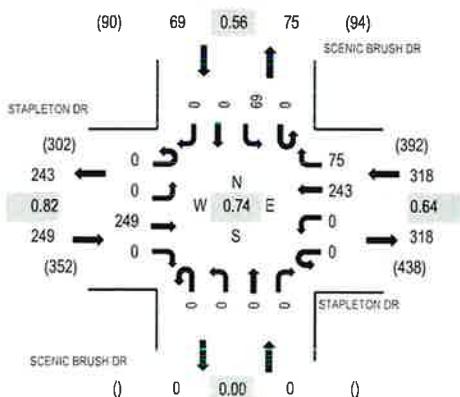
**Location:** 3 SCENIC BRUSH DR & STAPLETON DR AM

**Date:** Tuesday, August 10, 2021

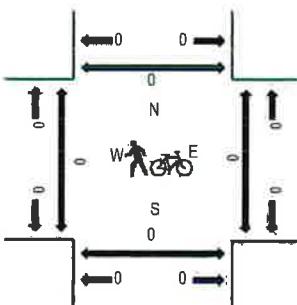
**Peak Hour:** 07:00 AM - 08:00 AM

**Peak 15-Minutes:** 07:15 AM - 07:30 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR Eastbound				STAPLETON DR Westbound				SCENIC BRUSH DR Northbound				SCENIC BRUSH DR Southbound				Rolling Hour Total	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		West	East	South	North	
7:00 AM	0	0	58	0	0	0	0	93	9	0	0	0	0	0	13	0	0	112	636	0	0	0
7:15 AM	0	0	76	0	0	0	0	99	25	0	0	0	0	0	16	0	0	216	561	0	0	0
7:30 AM	0	0	73	0	0	0	0	67	32	0	0	0	0	0	31	0	0	203	393	0	0	0
7:45 AM	0	0	42	0	0	0	0	39	9	0	0	0	0	0	5	0	0	99	250	0	0	0
8:00 AM	0	1	20	0	0	0	0	10	6	0	0	0	0	0	5	0	1	43	198	0	0	0
8:15 AM	0	0	27	0	0	0	0	15	2	0	0	0	0	0	4	0	0	48	0	0	0	0
8:30 AM	0	1	31	0	0	0	0	13	7	0	0	0	0	0	7	0	1	60	0	0	0	0
8:45 AM	0	0	23	0	0	0	0	19	2	0	0	0	0	0	3	0	0	47	0	0	0	0
Count Total	0	2	350	0	0	0	0	300	92	0	0	0	0	0	88	0	2	834	0	0	0	0
Peak Hour	0	0	249	0	0	0	0	243	75	0	0	0	0	0	69	0	0	636	0	0	0	0

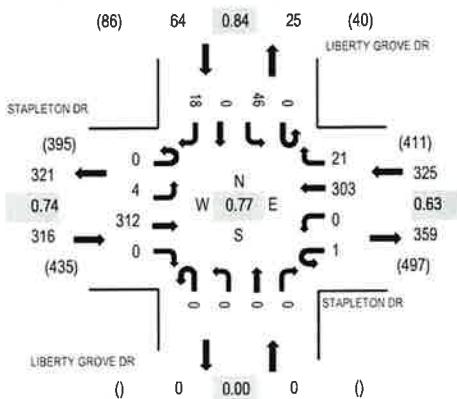
Location: 4 LIBERTY GROVE DR & STAPLETON DR AM

Date: Tuesday, August 10, 2021

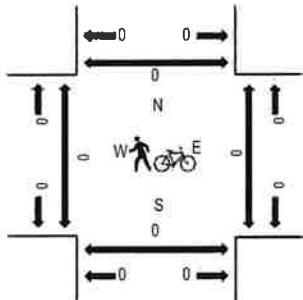
Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:15 AM - 07:30 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR Eastbound				STAPLETON DR Westbound				LIBERTY GROVE DR Northbound				LIBERTY GROVE DR Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North	
7:00 AM	0	1	69	0	0	0	48	4	0	0	0	0	0	0	17	0	1	140	705	0	0	0
7:15 AM	0	0	86	0	0	0	126	4	0	0	0	0	0	0	11	0	3	230	616	0	0	0
7:30 AM	0	1	106	0	1	0	90	3	0	0	0	0	0	0	7	0	6	214	442	0	0	0
7:45 AM	0	2	51	0	0	0	39	10	0	0	0	0	0	0	11	0	8	121	297	0	0	0
8:00 AM	0	1	25	0	0	0	17	3	0	0	0	0	0	0	5	0	0	51	227	0	0	0
8:15 AM	0	0	30	0	0	0	15	6	0	0	0	0	0	0	5	0	0	56		0	0	0
8:30 AM	0	0	39	0	0	0	19	3	0	0	0	0	0	0	7	0	1	69		0	0	0
8:45 AM	0	0	24	0	0	0	21	2	0	0	0	0	0	0	3	0	1	51		0	0	0
Count Total	0	5	430	0	1	0	375	35	0	0	0	0	0	0	66	0	20	932		0	0	0
Peak Hour	0	4	312	0	1	0	303	21	0	0	0	0	0	0	46	0	18	705		0	0	0

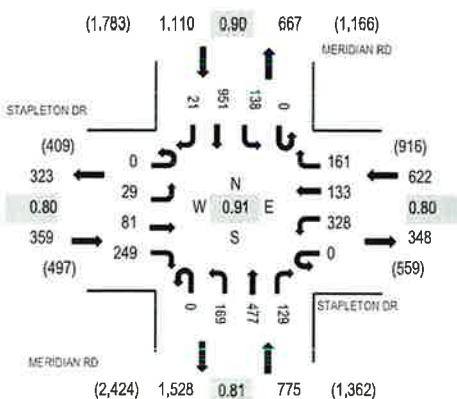
**Location:** 5 MERIDIAN RD & STAPLETON DR AM

**Date:** Tuesday, August 10, 2021

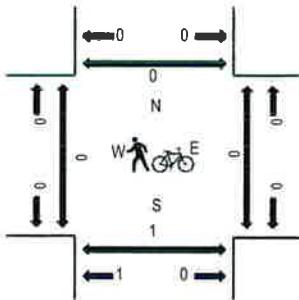
**Peak Hour:** 07:00 AM - 08:00 AM

**Peak 15-Minutes:** 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR				STAPLETON DR				MERIDIAN RD				MERIDIAN RD				Pedestrian Crossings
	Eastbound		Westbound		Northbound		Southbound		Total		Hour	West	East	South	North		
7:00 AM	0	2	17	66	0	95	19	27	0	33	76	39	0	21	236	1	632 2,866 0 0 1 0
7:15 AM	0	4	22	71	0	89	57	48	0	65	108	30	0	24	205	12	735 2,680 0 0 0 0
7:30 AM	0	12	35	65	0	81	54	50	0	29	127	27	0	44	262	4	790 2,407 0 0 0 0
7:45 AM	0	11	7	47	0	63	3	36	0	42	166	33	0	49	248	4	709 2,052 0 0 0 0
8:00 AM	0	4	5	21	0	62	2	20	1	16	119	14	0	33	148	1	446 1,692 0 0 0 0
8:15 AM	0	2	9	24	0	29	4	23	0	17	130	30	0	18	175	1	462 0 0 0 0
8:30 AM	0	4	5	35	0	63	4	19	0	20	86	36	0	17	146	0	435 0 0 0 0
8:45 AM	0	2	3	24	0	50	1	17	0	20	73	25	0	16	118	0	349 0 0 0 0
Count Total	0	41	103	353	0	532	144	240	1	242	885	234	0	222	1,538	23	4,558 0 0 1 0
Peak Hour	0	29	81	249	0	328	133	161	0	169	477	129	0	138	951	21	2,866 0 0 1 0

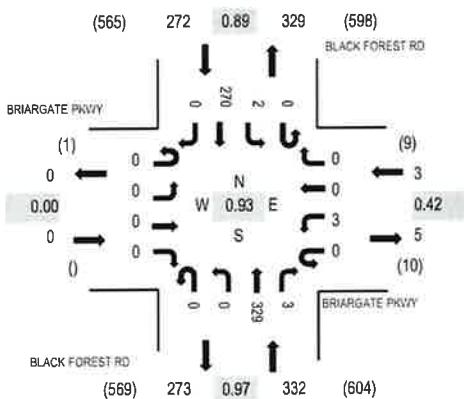
Location: 1 BLACK FOREST RD & BRIARGATE PKWY PM

Date: Tuesday, August 10, 2021

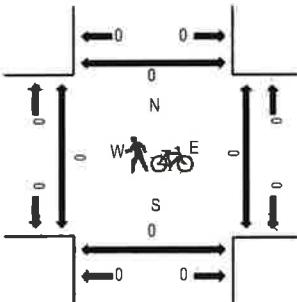
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:15 PM - 05:30 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	BRIARGATE PKWY						BLACK FOREST RD						BLACK FOREST RD						Pedestrian Crossings			
	Eastbound			Westbound			Northbound			Southbound			Rolling Hour		West		East		South		North	
U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	Hour	West	East	South	North	
4:00 PM	0	0	0	0	0	1	1	0	0	0	66	0	0	1	76	0	145	587	0	0	0	0
4:15 PM	0	0	0	0	0	1	0	0	0	0	73	2	0	0	68	0	144	588	0	0	0	0
4:30 PM	0	0	0	0	0	1	0	0	0	0	85	0	0	0	64	0	150	607	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	65	1	0	0	62	0	143	607	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	82	1	0	0	68	0	145	591	0	0	0	0
5:15 PM	0	0	0	0	0	2	0	0	0	0	77	1	0	2	81	0	163	0	0	0	0	0
5:30 PM	0	0	0	0	0	3	0	0	0	0	66	1	0	0	80	0	150	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	64	0	0	1	67	0	132	0	0	0	0	0
Count Total	0	0	0	0	0	8	1	0	0	0	598	6	0	4	561	0	1,178	0	0	0	0	0
Peak Hour	0	0	0	0	0	3	0	0	0	0	329	3	0	2	270	0	607	0	0	0	0	0

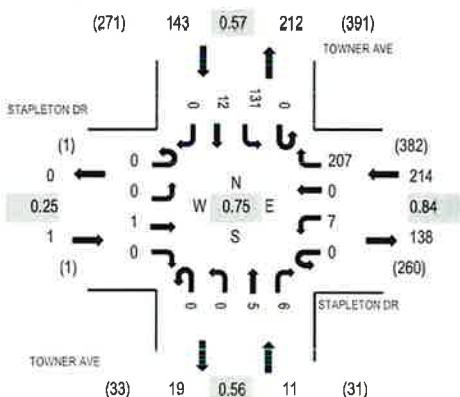
Location: 2 TOWNER AVE & STAPLETON DR PM

Date: Tuesday, August 10, 2021

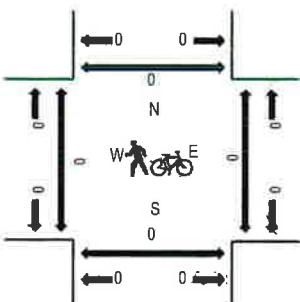
Peak Hour: 04:45 PM - 05:45 PM

Peak 15-Minutes: 05:30 PM - 05:45 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR Eastbound				STAPLETON DR Westbound				TOWNER AVE Northbound				TOWNER AVE Southbound				Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North	
4:00 PM	0	0	0	0	0	0	0	1	45	0	0	1	1	0	26	4	0	78	319	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	41	0	0	2	2	0	25	1	0	71	319	0	0	0
4:30 PM	0	0	0	0	0	1	0	45	0	0	5	3	0	35	4	0	93	339	0	0	0	0
4:45 PM	0	0	0	0	0	3	0	45	0	0	2	0	0	25	2	0	77	369	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	46	0	0	0	0	0	29	3	0	78	366	0	0	0	0
5:15 PM	0	0	0	0	0	4	0	60	0	0	3	5	0	18	1	0	91	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	0	56	0	0	0	1	0	59	6	0	123	0	0	0	0	0
5:45 PM	0	0	0	0	0	1	0	34	0	0	6	0	0	30	3	0	74	0	0	0	0	0
Count Total	0	0	1	0	0	9	1	372	0	0	19	12	0	247	24	0	685	0	0	0	0	0
Peak Hour	0	0	1	0	0	7	0	207	0	0	5	6	0	131	12	0	369	0	0	0	0	0

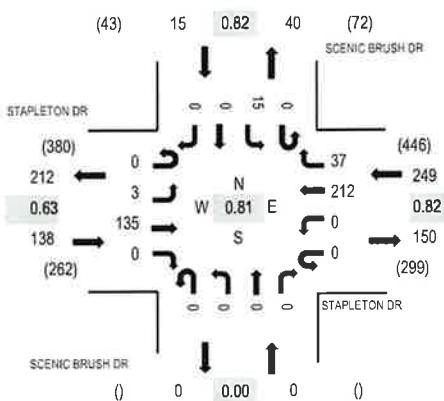
Location: 3 SCENIC BRUSH DR & STAPLETON DR PM

Date: Tuesday, August 10, 2021

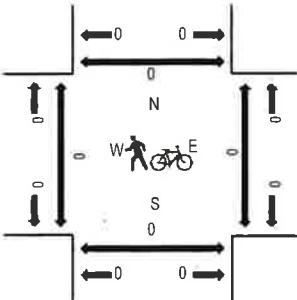
Peak Hour: 04:45 PM - 05:45 PM

Peak 15-Minutes: 05:30 PM - 05:45 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR				STAPLETON DR				SCENIC BRUSH DR				SCENIC BRUSH DR				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		Total		West	East	South		Total	West	East	South	North			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North	
4:00 PM	0	0	28	0	0	0	42	7	0	0	0	0	0	7	0	0	84	349	0	0	0	0
4:15 PM	0	1	25	0	0	0	39	11	0	0	0	0	0	3	0	1	80	353	0	0	0	0
4:30 PM	0	1	36	0	0	0	48	5	0	0	0	0	0	7	0	0	97	375	0	0	0	0
4:45 PM	0	1	25	0	0	0	47	10	0	0	0	0	0	5	0	0	88	402	0	0	0	0
5:00 PM	0	0	31	0	0	0	46	11	0	0	0	0	0	0	0	0	88	402	0	0	0	0
5:15 PM	0	1	22	0	0	0	69	7	0	0	0	0	0	3	0	0	102		0	0	0	0
5:30 PM	0	1	57	0	0	50	9	0	0	0	0	0	0	7	0	0	124		0	0	0	0
5:45 PM	0	0	33	0	0	0	38	7	0	0	0	0	0	10	0	0	88		0	0	0	0
Count Total	0	5	257	0	0	0	379	67	0	0	0	0	0	42	0	1	751		0	0	0	0
Peak Hour	0	3	135	0	0	0	212	37	0	0	0	0	0	15	0	0	402		0	0	0	0

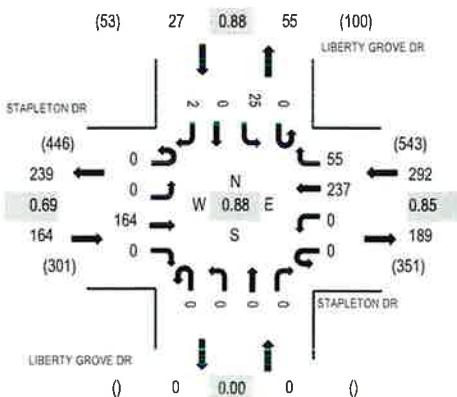
Location: 4 LIBERTY GROVE DR & STAPLETON DR PM

Date: Tuesday, August 10, 2021

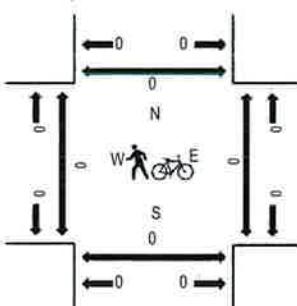
Peak Hour: 05:00 PM - 06:00 PM

Peak 15-Minutes: 05:30 PM - 05:45 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR				STAPLETON DR				LIBERTY GROVE DR				LIBERTY GROVE DR				Rolling Hour	Pedestrian Crossings				
	Eastbound				Westbound				Northbound				Southbound					West	East	South	North	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		0	0	0	0	
4:00 PM	0	1	35	0	0	0	46	7	0	0	0	0	0	4	0	0	93	414	0	0	0	0
4:15 PM	0	0	26	0	0	0	50	16	0	0	0	0	0	6	0	0	98	429	0	0	0	0
4:30 PM	0	0	43	0	0	0	53	13	0	0	0	0	0	8	0	0	117	449	0	0	0	0
4:45 PM	0	0	32	0	0	0	58	8	0	0	0	0	0	8	0	0	106	470	0	0	0	0
5:00 PM	0	0	31	0	0	0	58	13	0	0	0	0	0	6	0	0	108	483	0	0	0	0
5:15 PM	0	0	26	0	0	0	76	11	0	0	0	0	0	5	0	0	118	0	0	0	0	0
5:30 PM	0	0	59	0	0	0	58	14	0	0	0	0	0	6	0	1	138	0	0	0	0	0
5:45 PM	0	0	48	0	0	0	45	17	0	0	0	0	0	8	0	1	119	0	0	0	0	0
Count Total	0	1	300	0	0	0	444	99	0	0	0	0	0	51	0	2	897	0	0	0	0	0
Peak Hour	0	0	164	0	0	0	237	55	0	0	0	0	0	25	0	2	483	0	0	0	0	0

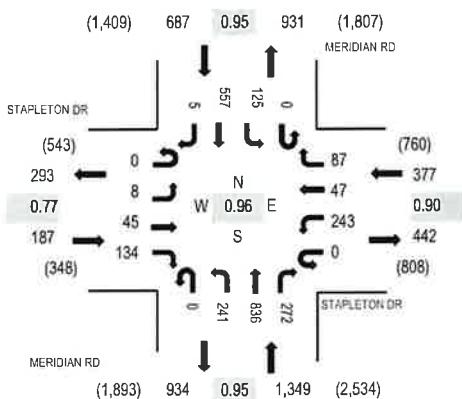
Location: 5 MERIDIAN RD & STAPLETON DR PM

Date: Tuesday, August 10, 2021

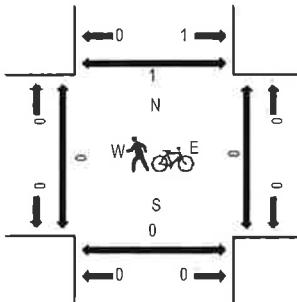
Peak Hour: 05:00 PM - 06:00 PM

Peak 15-Minutes: 05:30 PM - 05:45 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	STAPLETON DR				STAPLETON DR				MERIDIAN RD				MERIDIAN RD				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		Total		West	East	South		Total	West	East	South	North			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North	
4:00 PM	0	1	6	32	0	48	13	27	0	42	171	57	0	29	151	0	577	2,451	0	0	0	0
4:15 PM	0	1	2	29	0	46	12	28	0	58	207	51	0	22	168	1	625	2,511	0	0	0	0
4:30 PM	0	1	10	39	0	57	18	26	0	46	185	58	0	26	156	1	623	2,529	0	0	0	0
4:45 PM	0	4	10	26	0	71	8	29	0	47	196	67	0	28	136	4	626	2,583	0	0	0	0
5:00 PM	0	2	7	26	0	60	7	27	0	64	212	79	0	29	122	2	637	2,600	0	0	0	0
5:15 PM	0	1	10	21	0	49	18	20	0	69	198	57	0	34	164	2	643		0	0	0	0
5:30 PM	0	4	14	43	0	60	13	17	0	58	217	64	0	35	161	1	677		0	0	0	1
5:45 PM	0	1	14	44	0	74	9	23	0	50	209	72	0	27	120	0	643		0	0	0	0
Count Total	0	15	73	260	0	465	98	197	0	434	1,595	505	0	230	1,168	11	5,051		0	0	0	1
Peak Hour	0	8	45	134	0	243	47	87	0	241	836	272	0	125	557	5	2,600		0	0	0	1



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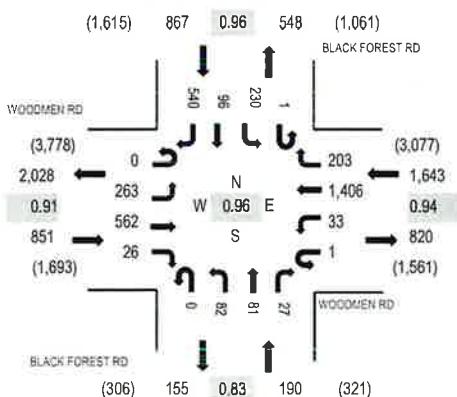
Location: 1 BLACK FOREST RD & WOODMEN RD AM

Date: Thursday, July 11, 2019

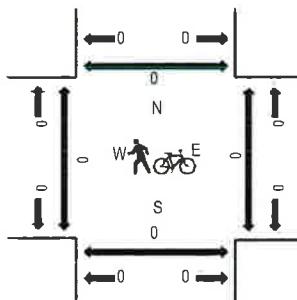
Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	WOODMEN RD				WOODMEN RD				BLACK FOREST RD				BLACK FOREST RD				Pedestrian Crossings	
	Eastbound				Westbound				Northbound				Southbound					
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
6:30 AM	0	43	129	18	1	4	308	40	0	10	6	3	0	54	17	113	746 3,313 0 0 0 0	
6:45 AM	0	68	139	20	1	7	338	36	0	13	19	3	0	59	24	120	847 3,473 0 0 0 0	
7:00 AM	0	47	133	9	1	8	321	33	0	16	25	7	1	71	28	112	812 3,551 0 0 0 0	
7:15 AM	0	48	151	6	0	9	376	52	0	18	16	5	0	60	23	144	908 3,461 0 0 0 0	
7:30 AM	0	82	130	4	0	9	353	55	0	27	15	4	0	57	23	147	906 3,393 0 0 0 0	
7:45 AM	0	86	148	7	0	7	356	63	0	21	25	11	0	42	22	137	925 0 0 0 0	
8:00 AM	0	74	136	6	0	7	237	51	0	13	24	4	0	32	21	117	722 0 0 0 0	
8:15 AM	0	68	134	7	0	4	337	63	0	11	21	4	0	42	16	133	840 0 0 0 0	
Count Total	0	516	1,100	77	3	55	2,626	393	0	129	151	41	1	417	174	1,023	6,706 0 0 0 0	
Peak Hour	0	263	562	26	1	33	1,406	203	0	82	81	27	1	230	96	540	3,551 0 0 0 0	



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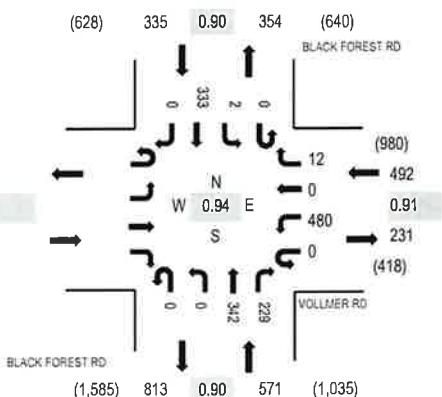
Location: 2 BLACK FOREST RD & VOLLMER RD AM

Date: Thursday, July 11, 2019

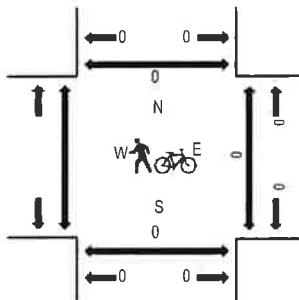
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	VOLLMER RD				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		U-Turn	Left	Thru	Right	Total	West	East	South	North	
6:30 AM					0	126	0	2	0	0	54	31	0	1	56	0	270	1,245
6:45 AM					0	114	0	2	0	0	67	54	0	0	85	0	322	1,347
7:00 AM					0	129	0	1	0	0	64	40	0	0	71	0	305	1,388
7:15 AM					0	142	0	2	0	0	73	41	0	1	89	0	348	1,398
7:30 AM					0	132	0	5	0	0	92	59	0	0	84	0	372	1,398
7:45 AM					0	98	0	2	0	0	95	74	0	0	94	0	363	
8:00 AM					0	108	0	3	0	0	82	55	0	1	66	0	315	
8:15 AM					0	111	0	3	0	0	93	61	0	0	80	0	348	
Count Total					0	960	0	20	0	0	620	415	0	3	625	0	2,643	
Peak Hour					0	480	0	12	0	0	342	229	0	2	333	0	1,398	



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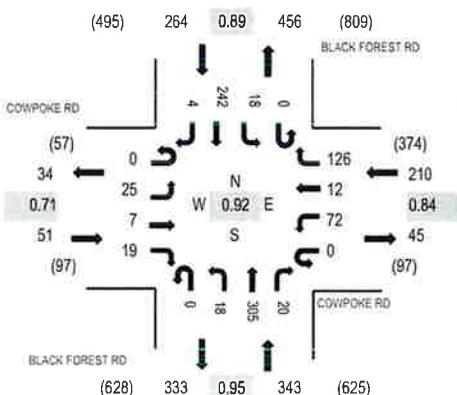
Location: 3 BLACK FOREST RD & COWPOKE RD AM

Date: Thursday, July 11, 2019

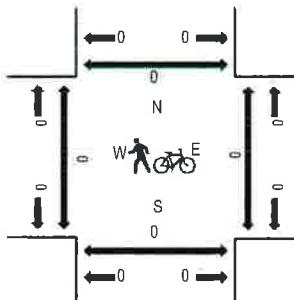
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	COWPOKE RD Eastbound				COWPOKE RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North
6:30 AM	0	6	0	5	0	18	4	23	0	2	48	7	0	2	37	1	153	724	0	0	0
6:45 AM	0	7	0	8	0	23	2	18	0	2	57	6	0	8	53	0	184	801	0	0	0
7:00 AM	0	5	0	6	0	19	0	21	0	0	60	8	0	5	51	2	177	854	0	0	0
7:15 AM	0	2	0	9	0	21	4	39	0	1	65	6	0	3	60	0	210	868	0	0	0
7:30 AM	0	4	1	4	0	18	3	36	0	5	89	2	0	3	63	2	230	867	0	0	0
7:45 AM	0	10	2	6	0	18	1	34	0	8	76	5	0	7	68	2	237	0	0	0	0
8:00 AM	0	9	4	0	0	15	4	17	0	4	75	7	0	5	51	0	191	0	0	0	0
8:15 AM	0	3	1	5	0	12	2	22	0	4	83	5	0	10	58	4	209	0	0	0	0
Count Total	0	46	8	43	0	144	20	210	0	26	553	46	0	43	441	11	1,591	0	0	0	0
Peak Hour	0	25	7	19	0	72	12	126	0	18	305	20	0	18	242	4	868	0	0	0	0



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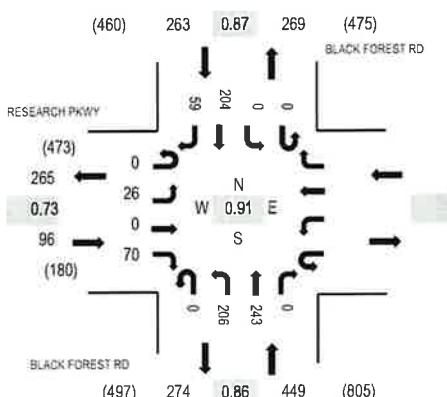
Location: 4 BLACK FOREST RD & RESEARCH PKWY AM

Date: Thursday, July 11, 2019

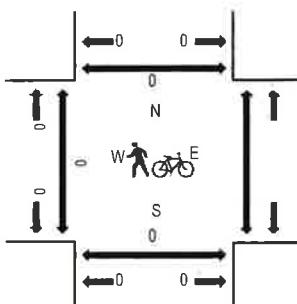
Peak Hour: 07:30 AM - 08:30 AM

Peak 15-Minutes: 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	RESEARCH PKWY				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings					
	Eastbound		Westbound		Northbound		Southbound		U-Turn	Left	Thru	Right	Total	West	East	South	North		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total						
6:30 AM	0	3	0	11			0	38	40	0	0	0	30	10	132	637	0	0	0
6:45 AM	0	3	0	22			0	37	47	0	0	0	37	9	155	726	0	0	0
7:00 AM	0	4	0	19			0	39	49	0	0	0	42	10	163	785	0	0	0
7:15 AM	0	9	0	13			0	55	51	0	0	0	49	10	187	790	0	0	0
7:30 AM	0	4	0	12			0	69	62	0	0	0	58	16	221	808	0	0	0
7:45 AM	0	8	0	15			0	54	61	0	0	0	55	21	214	0	0	0	0
8:00 AM	0	6	0	18			0	46	48	0	0	0	42	8	168	0	0	0	0
8:15 AM	0	8	0	25			0	37	72	0	0	0	49	14	205	0	0	0	0
Count Total	0	45	0	135			0	375	430	0	0	0	362	98	1,445	0	0	0	0
Peak Hour	0	26	0	70			0	206	243	0	0	0	204	59	808	0	0	0	0



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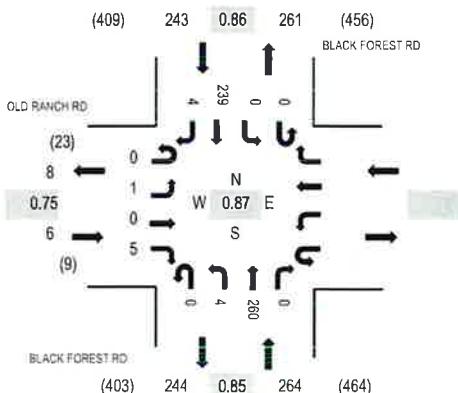
Location: 5 BLACK FOREST RD & OLD RANCH RD AM

Date: Thursday, July 11, 2019

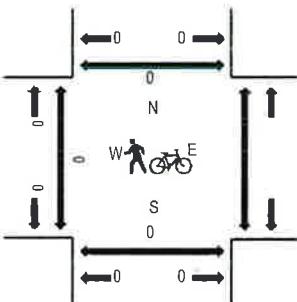
Peak Hour: 07:30 AM - 08:30 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	OLD RANCH RD				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		Total		West	East	South	North				
6:30 AM	0	1	0	0			0	2	41	0	0	0	37	2	83	369	0	0
6:45 AM	0	0	0	0			0	2	45	0	0	0	32	6	85	412	0	0
7:00 AM	0	1	0	0			0	1	52	0	0	0	37	0	91	475	0	0
7:15 AM	0	0	0	1			0	2	55	0	0	0	52	0	110	480	0	0
7:30 AM	0	0	0	2			0	0	53	0	0	0	71	0	126	513	0	0
7:45 AM	0	1	0	1			0	3	72	0	0	0	70	1	148	0	0	0
8:00 AM	0	0	0	1			0	1	57	0	0	0	36	1	96	0	0	0
8:15 AM	0	0	0	1			0	0	78	0	0	0	62	2	143	0	0	0
Count Total	0	3	0	6			0	11	453	0	0	0	397	12	882	0	0	0
Peak Hour	0	1	0	5			0	4	260	0	0	0	239	4	513	0	0	0



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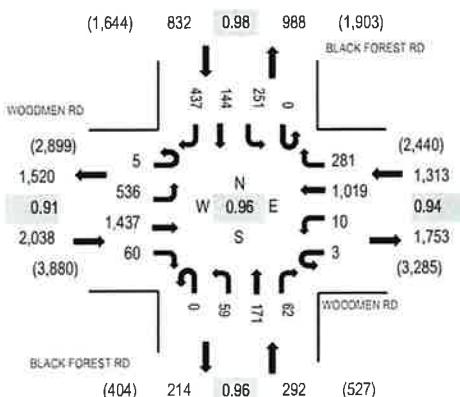
Location: 1 BLACK FOREST RD & WOODMEN RD PM

Date: Thursday, July 11, 2019

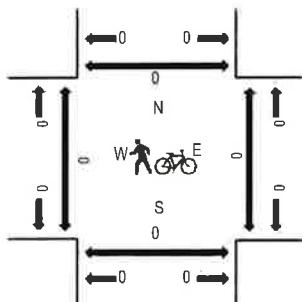
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 04:45 PM - 05:00 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	WOODMEN RD				WOODMEN RD				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian	Crossings		
	Eastbound		Westbound		Northbound		Southbound		Total		West		East		South						
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	West	East	South	North
4:30 PM	2	135	330	17	1	4	260	66	0	18	50	8	0	53	28	102	1,074	4,475	0	0	0
4:45 PM	0	135	407	16	0	2	248	72	0	11	39	23	0	63	37	114	1,165	4,451	0	0	0
5:00 PM	1	130	328	12	0	1	276	73	0	18	40	16	0	70	39	104	1,108	4,412	0	0	0
5:15 PM	2	136	372	15	2	3	237	70	0	12	42	15	0	65	40	117	1,128	4,263	0	0	0
5:30 PM	1	122	329	11	1	4	251	54	0	15	40	6	0	58	38	120	1,050	4,016	0	0	0
5:45 PM	0	132	377	20	0	4	234	65	0	9	55	10	0	66	26	128	1,126		0	0	0
6:00 PM	1	117	288	19	3	3	192	58	0	6	44	4	0	70	28	126	959		0	0	0
6:15 PM	1	136	274	14	1	2	196	59	0	7	33	6	0	39	21	92	881		0	0	0
Count Total	8	1,043	2,705	124	8	23	1,892	517	0	96	343	88	0	484	257	903	8,491		0	0	0
Peak Hour	5	536	1,437	60	3	10	1,019	281	0	59	171	62	0	251	144	437	4,475		0	0	0



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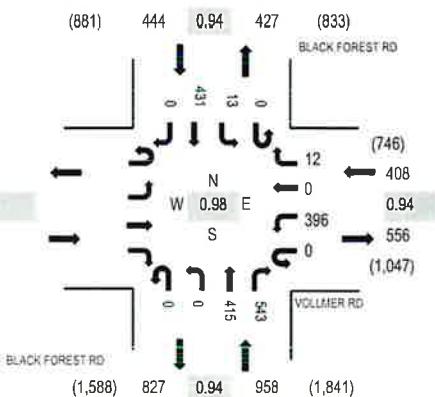
Location: 2 BLACK FOREST RD & VOLLMER RD PM

Date: Thursday, July 11, 2019

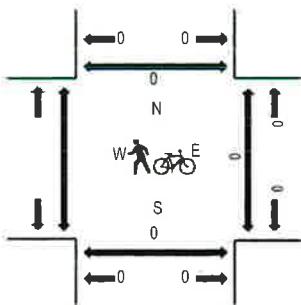
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	VOLLMER RD				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		Total		West	East	South	North				
U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total						
4:30 PM				0	94	0	3	0	0	110	144	0	4	99	0	454	1,810	0 0 0 0
4:45 PM				0	97	0	1	0	0	100	140	0	3	113	0	454	1,776	0 0 0 0
5:00 PM				0	102	0	6	0	0	107	134	0	4	108	0	461	1,774	0 0 0 0
5:15 PM				0	103	0	2	0	0	98	125	0	2	111	0	441	1,735	0 0 0 0
5:30 PM				0	76	0	2	0	0	108	115	0	1	118	0	420	1,658	0 0 0 0
5:45 PM				0	94	0	4	0	0	101	133	0	2	118	0	452		0 0 0 0
6:00 PM				0	84	0	1	0	0	104	106	0	2	125	0	422		0 0 0 0
6:15 PM				0	75	0	2	0	0	84	132	0	0	71	0	364		0 0 0 0
Count Total				0	725	0	21	0	0	812	1,029	0	18	863	0	3,468		0 0 0 0
Peak Hour				0	396	0	12	0	0	415	543	0	13	431	0	1,810		0 0 0 0



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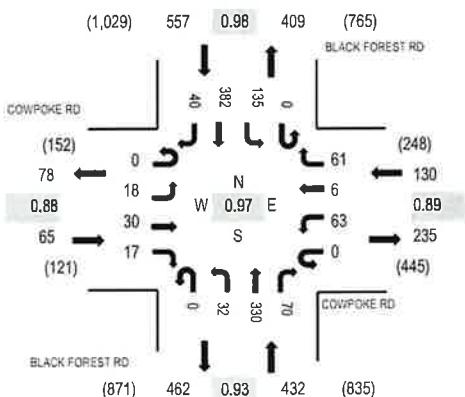
Location: 3 BLACK FOREST RD & COWPOKE RD PM

Date: Thursday, July 11, 2019

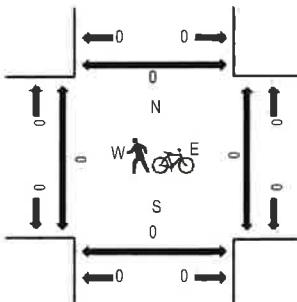
Peak Hour: 05:00 PM - 06:00 PM

Peak 15-Minutes: 05:45 PM - 06:00 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	COWPOKE RD				COWPOKE RD				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings				
	Eastbound		Westbound		Northbound		Southbound		U-Turn	Left	Thru	Right	Total	West	East	South	North					
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total									
4:30 PM	0	2	3	3	0	13	1	12	0	8	79	27	0	23	98	14	283	1,152	0	0	0	0
4:45 PM	0	8	10	3	0	19	1	14	0	10	76	15	0	33	88	6	283	1,162	0	0	0	0
5:00 PM	0	6	7	7	0	19	2	12	0	10	80	19	0	36	85	14	297	1,184	0	0	0	0
5:15 PM	0	5	7	4	0	14	0	11	0	5	81	20	0	40	94	8	289	1,175	0	0	0	0
5:30 PM	0	5	9	3	0	13	3	19	0	5	81	15	0	34	100	6	293	1,081	0	0	0	0
5:45 PM	0	2	7	3	0	17	1	19	0	12	88	16	0	25	103	12	305	0	0	0	0	0
6:00 PM	0	7	4	2	0	23	2	9	0	10	78	20	0	35	88	10	288	0	0	0	0	0
6:15 PM	0	7	4	3	0	16	1	7	0	3	57	20	0	16	53	8	195	0	0	0	0	0
Count Total	0	42	51	28	0	134	11	103	0	63	620	152	0	242	709	78	2,233	0	0	0	0	0
Peak Hour	0	18	30	17	0	63	6	61	0	32	330	70	0	135	382	40	1,184	0	0	0	0	0



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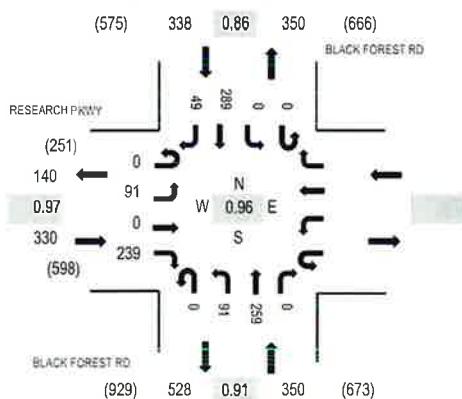
Location: 4 BLACK FOREST RD & RESEARCH PKWY PM

Date: Thursday, July 11, 2019

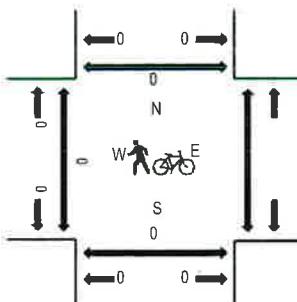
Peak Hour: 05:00 PM - 06:00 PM

Peak 15-Minutes: 05:30 PM - 05:45 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	RESEARCH PKWY				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings					
	Eastbound		Westbound		Northbound		Southbound		U-Turn	Left	Thru	Right	Total	West	East	South	North		
4:30 PM	0	23	0	40			0	25	65	0	0	0	68	5	226	956	0	0	0
4:45 PM	0	22	0	60			0	24	57	0	0	0	53	3	219	996	0	0	0
5:00 PM	0	27	0	56			0	27	70	0	0	0	63	11	254	1,018	0	0	0
5:15 PM	0	15	0	70			0	26	58	0	0	0	76	12	257	957	0	0	0
5:30 PM	0	29	0	51			0	22	66	0	0	0	88	10	266	890	0	0	0
5:45 PM	0	20	0	62			0	16	65	0	0	0	62	16	241		0	0	0
6:00 PM	0	23	0	46			0	21	56	0	0	0	40	7	193		0	0	0
6:15 PM	0	13	0	41			0	18	57	0	0	0	53	8	190		0	0	0
Count Total	0	172	0	426			0	179	494	0	0	0	503	72	1,846		0	0	0
Peak Hour	0	91	0	239			0	91	259	0	0	0	289	49	1,018		0	0	0



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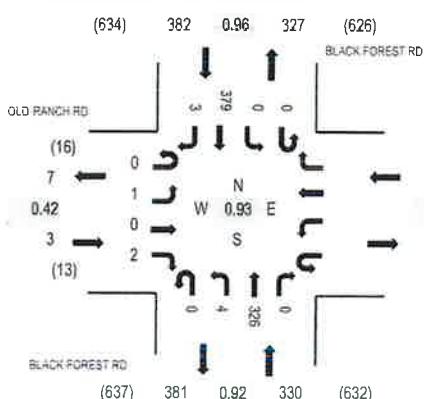
Location: 5 BLACK FOREST RD & OLD RANCH RD PM

Date: Thursday, July 11, 2019

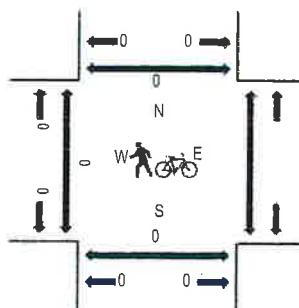
Peak Hour: 05:00 PM - 06:00 PM

Peak 15-Minutes: 05:45 PM - 06:00 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	OLD RANCH RD				BLACK FOREST RD				BLACK FOREST RD				Rolling Hour	Pedestrian Crossings					
	Eastbound		Westbound		Northbound		Southbound		Total	West	East	South	North						
4:30 PM	0	0	0	1			0	1	71	0	0	0	62	1	136	646	0	0	0
4:45 PM	0	2	0	4			0	1	87	0	0	0	76	0	170	693	0	0	0
5:00 PM	0	1	0	0			0	0	73	0	-0	0	91	0	-165	715	0	0	0
5:15 PM	0	0	0	2			0	1	79	0	0	0	91	2	175	692	0	0	0
5:30 PM	0	0	0	0			0	2	83	0	0	0	97	1	183	633	0	0	0
5:45 PM	0	0	0	0			0	1	91	0	0	0	100	0	192	0	0	0	0
6:00 PM	0	0	0	1			0	3	77	0	0	0	59	2	142	0	0	0	0
6:15 PM	0	1	0	1			0	1	61	0	0	0	52	0	116	0	0	0	0
Count Total	0	4	0	9			0	10	622	0	0	0	628	6	1,279	0	0	0	0
Peak Hour	0	1	0	2			0	4	326	0	0	0	379	3	715	0	0	0	0

