El Paso County, Colorado

January 2022

Corridor Preservation Plan

Briargate Parkway/Stapleton Road Corridor Study

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WILSON & COMPANY

CORRIDOR PRESERVATION PLAN

Briargate Parkway–Stapleton Road Corridor Study for El Paso County

January 2022
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1 Introduction and Overview

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 portion 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, 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.

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

1.3 Existing Conditions

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 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.

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

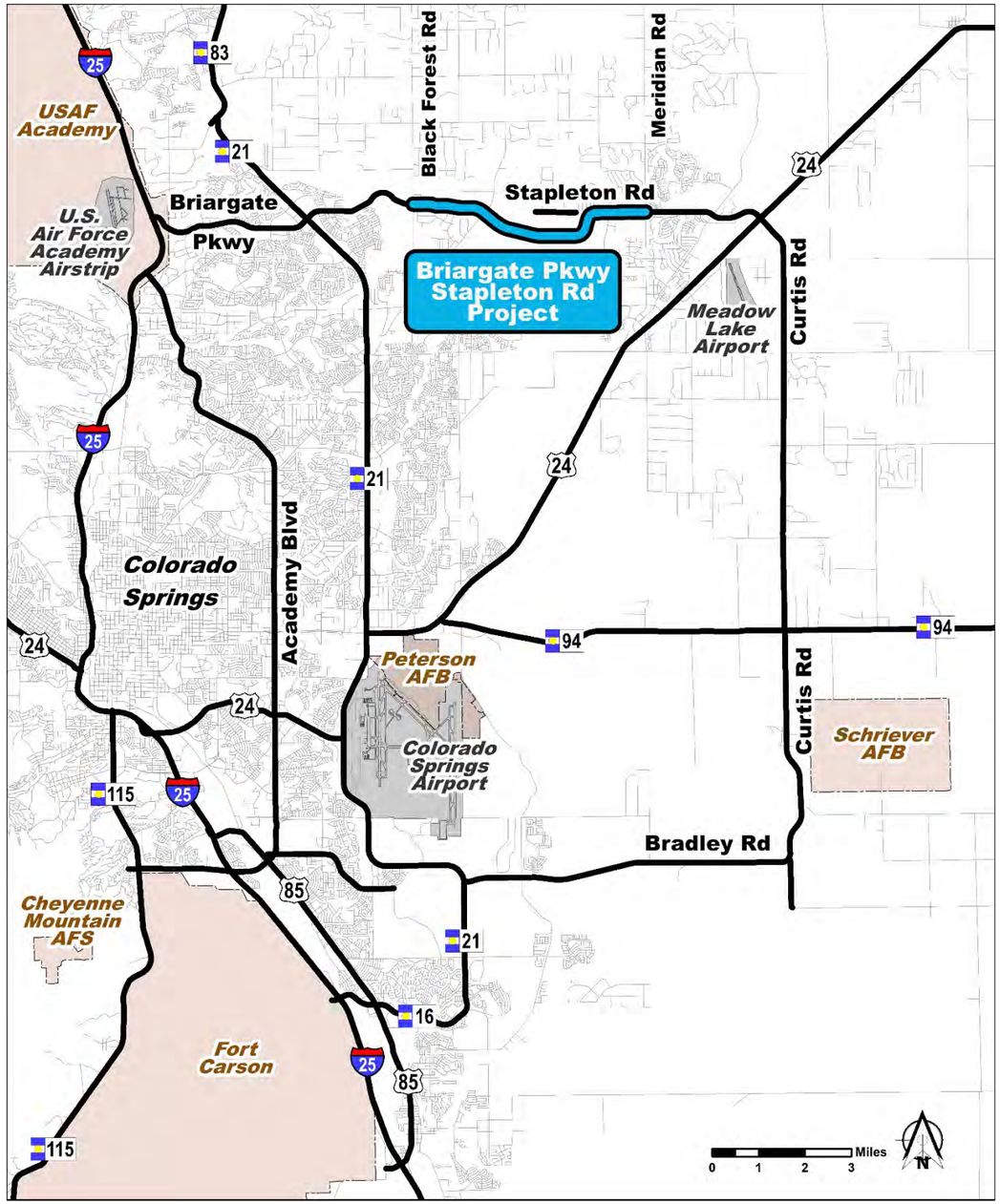
1.4.1 Mobility

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)



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 under consideration. Adjacent planned developments include the list below.

- Wolf Ridge
- Eagle Wing
- Wolf Ranch
- Highland Park
- Eagle Rising
- Wild Ridge
- Sterling Ranch
- Sterling Ranch Homestead
- Indian Wells
- The Ranch
- Stapleton Estates
- The Meadows
- Paint Brush Hills

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

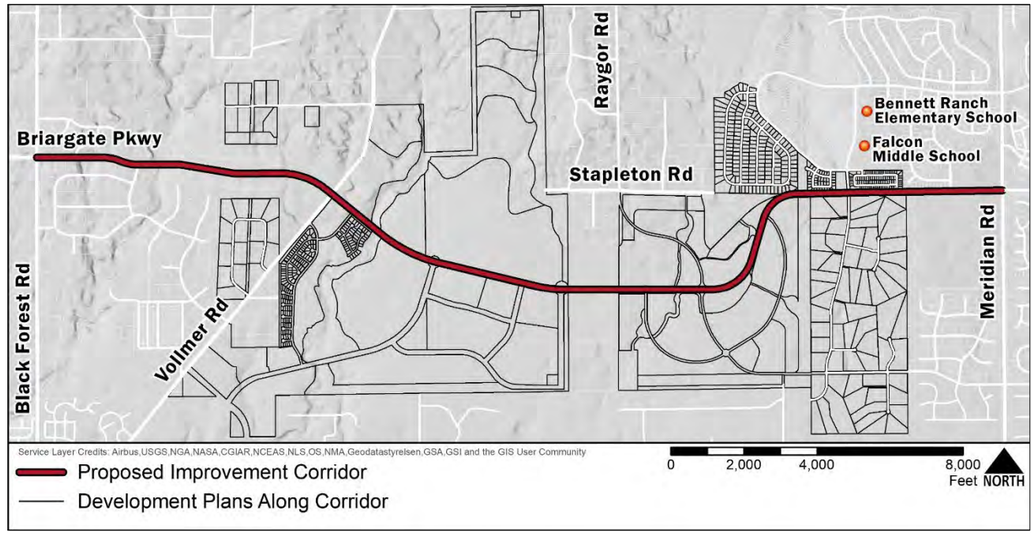


Figure 1.2 Development Plans along the Briargate-Stapleton Corridor

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 Studies

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

- El Paso County 2016 MTCP Update (December 2016)
- Pikes Peak Area Council of Governments 2045 *Moving Forward* RTP (2045 RTP, January 2020)

1.5.1 El Paso County 2016 Major Transportation Corridors Plan Update (2016 MTCP)

In 2016 El Paso County completed the MTCP update. The 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 2016 MTCP is the long-range plan focusing on the multimodal transportation system in unincorporated El Paso County." (p.3). The 2016 MTCP includes specific recommendations regarding functional classification, transportation modes, and other uses for the Corridor.

The 2016 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 2016 MTCP call 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 considered to be a long-term need, needed in the year 2040 or beyond.

1.5.2 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
- 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 (CDBGP)
- Colorado Lottery – Giving Back
- Great Outdoors Colorado (GOCO)
- FTA Funding
- Formula Grants for Rural Access (populations under 50,000)
- Crowd Sourcing
- Enhanced Mobility for Seniors and Individuals with Disabilities (FTA 5310)

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.

1.6.3 El Paso County Parks and Leisure Services Master Plan (2005)

The El Paso County Parks and Leisure Services Master Plan identifies the project corridor for an on-road paved bicycle route. It also identifies future trail facilities with a direct connection to the Briargate-Stapleton corridor. Guidance is included in the Master Plan relative to configuration, function, and use of on-road paved bicycle facilities.

Paved shoulders of 8' width and 10' width, located on both sides of the roadway, will support the use of the project corridor for bicycle travel following the County's standards and guidelines. Bicycle lane signage and striping, per adopted standards, should be included in the preliminary and final design and should be implemented for interim and ultimate implementation phases.

1.6.4 El Paso County Master Plan (May 2021)

The Black Forest Preservation Plan is a small-area plan providing future land-use guidance for the unincorporated area of El Paso County north of Colorado Springs. Its northern boundary is contiguous with County Line Road, and its southern boundary extends as far south as Woodmen Road. The planning area extends west to I-25 and east to Eastonville Road; the Briargate-Stapleton corridor is located within the bounds of this planning area. Briargate-Stapleton will serve as part of the arterial roadway system that is needed to allow Black Forest and Colorado Springs residents to travel quickly and safely over a substantial distance between homes, workplaces, and shopping and from I-25 to US Highway 24. For roads like Briargate-Stapleton that are designated for this purpose, individual access points should be kept to a minimum. Further, the County recommends a spacing of one mile between accesses (cross streets or driveways) to roadways that are classified as principal or minor arterials.

1.6.5 Black Forest Preservation Plan Trails Addendum

The Trails Addendum to the Black Forest Preservation Plan (1999) provides planning for a network of non-motorized, multi-use trails within the Black Forest Planning Area. A proposed trail would travel along the Briargate-Stapleton corridor.

1.7 Master Plan Conformance

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 policy plan augmented by a series of small area plans that respond to conditions and circumstances unique to different areas of the county. As articulated in Section 6.1 of the El Paso County Policy Plan, it is the expectation that private and public bodies will rely on small-area master plans for site-specific land use guidance. The Master Plan is further supported by and related to a series of subject-matter element plans. The overarching county plan is referred to as the County Policy Plan. Other county and city plans and master plan elements that are relevant to this project as well as adjacent Colorado Springs master plan elements include:

1.7.1 El Paso County Policy Plan

The El Paso County Policy Plan (updated 1994) lists goals and policies to address specific transportation issues such as mobility and land-use efficiency. The plan is intended to be implemented through use as a source of guidance in the design and review of land-use applications within the county.

The County Policy Plan supports the identification of ROW needed to serve future travel demand and requires preservation of corridors for transportation facilities through the land development process. The Policy Plan also encourages corridor preservation for pedestrian and bicycle facilities.

Access management policies require limits on direct access to major facilities but also request a balance between support of regional mobility and provision of local access onto major facilities. Another relevant policy requests the provision of noise and visual screening through setbacks, buffers, vegetation, and/or other treatments. This could include noise abatement treatment, if warranted.

1.7.2 City of Colorado Springs Comprehensive Plan Update

The PlanCOS update (2019) designated the area adjacent to the west of the Briargate-Stapleton corridor as an emerging neighborhood. When the area within the Briargate-Stapleton corridor is annexed into Colorado Springs, it would fall into the Future Neighborhoods category.

For Emerging Neighborhoods, PlanCOS recommends:

- Enhancing Off-Street Trail System Interior to the Neighborhood and Providing Connection to Major Trail Systems
- Create Additional Pedestrian / Trail Connections
- Incorporate Higher Density and Mix of Housing Types on Remaining Parcels
- Utilize Drainageway and Small Spaces for Neighborhood Amenities.

For Future Neighborhoods, PlanCOS recommends:

- Integrate Diversity of Housing Types
- Provide Neighborhood Parks and Gathering Places
- Connect to Regional Trails and Open Space
- Utilize Smart Technology and Efficient Utility Infrastructure
- Maximize Connectivity with Paths, Alleys, and Short Blocks

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 be written so that the selection of a specific alternative is predetermined.
>
> 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 measurable objectives or specifications. (p. 4-12–13)

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.

2.2 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 State Air Force Academy (USAFA) property, between Academy Boulevard (Exist 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.

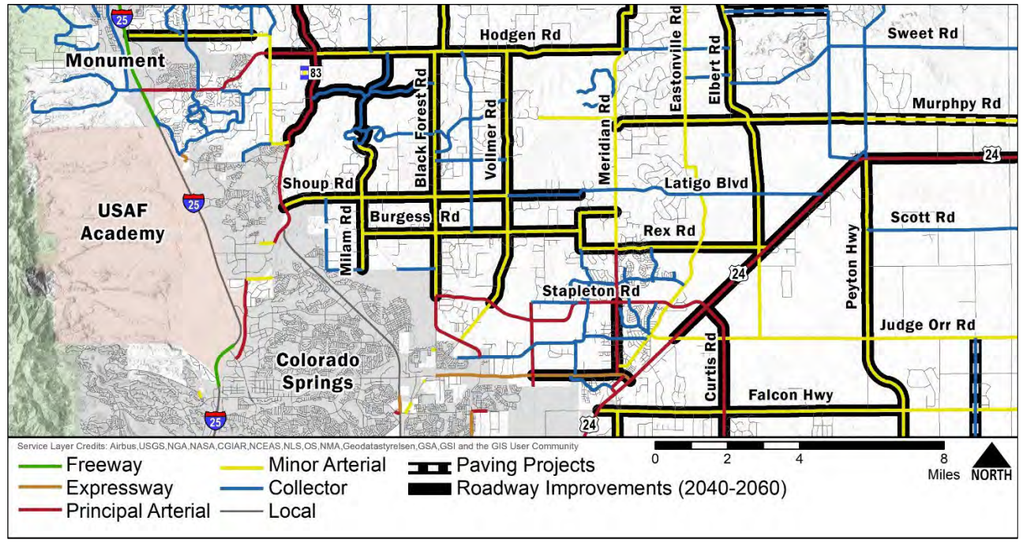


Figure 2.1. Excerpt from El Paso County Major Transportation Corridors Plan

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 burdened east-west highway (future expressway) in Colorado Springs.

For this reason, the 2016 MTCP identified the need for 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 (Black Forest Road) to Judge Orr Road.

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 speed.

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 Towner 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 oncoming 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-Stapleton corridor alternatives analysis 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-Stapleton 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’[1]	2,050'[1]	1,040'
Trip Length	n/a	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'[2] (excluding gutter pan)	38'[2]	28'[2]
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	½mile	n/a	½ mile (signalized) ¼ 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'

[1]Assumes 4% superelevation, 6% for 70 MPH design speeds.
[2]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. https://library.municode.com/co/el_paso_county/codes/engineering_criteria_manual_?nodeId=ENCRMA_CH2TRFA; City of Colorado Springs, *Engineering Criteria Manual*, “Section III: Traffic Criteria Manual,” Table 10: Traffic Engineering Design Standards (Freeways, Expressways and Arterials), p. 39, https://coloradosprings.gov/sites/default/files/images/traffic_criteria_manual.pdf

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

		Rate of Vertical Curvature, K1 For Crest Curves		Rate of Vertical Curvature, K1 For Sag Curves	
Design Speed (mph)	Stopping Sight Distance (feet)	Calculated	Design	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, is the length of the curve per percent algebraic difference in intersection grades (A), K=LIA.
Source: AASHTO, *A Policy on Geometric Design of Highways and Streets*, 7th Edition, 2018.

3.1.3 Typical Sections

The El Paso County Rural Principal Arterial typical section, as shown in **Figure 3.1**, includes two 12' thru 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**.

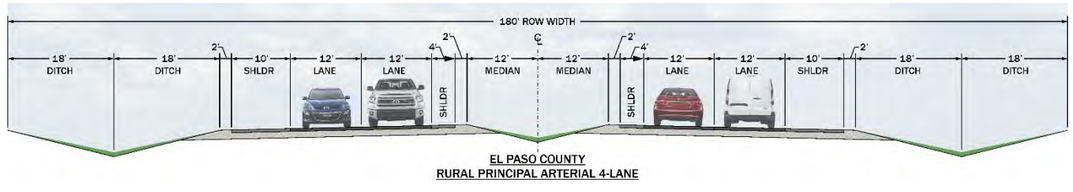


Figure 3.1 El Paso County Rural 4-Lane Principal Arterial

The El Paso County Urban Principal Arterial, as shown in **Figure 3.2**, includes two 12' thru lanes in each direction, with a 4' inside shoulder, a 6' detached sidewalk, a 16' raised median, and an outside curb and gutter for drainage. This cross section was the basis for the design of the roadway in the early phasing, as discussed in Chapter 6.

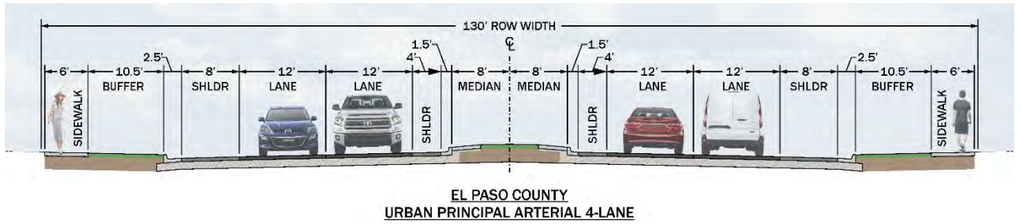


Figure 3.2 El Paso County Urban 4-Lane Principal Arterial

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' thru lanes in each direction, a 6' outside shoulder, a 6' detached sidewalk, and an outside curb and gutter for drainage.

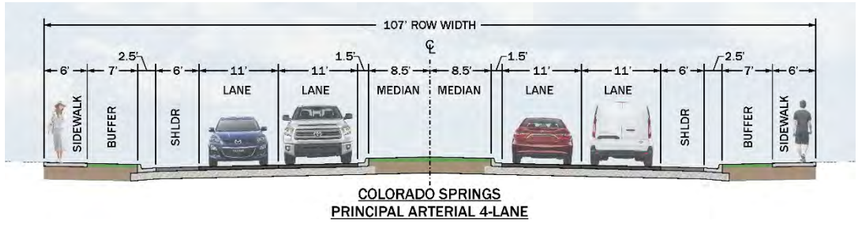


Figure 3.3 City of Colorado Springs 4-Lane Principal Arterial

3.1.4 Existing Conditions

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.

3.1.4.1 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.

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 ½ mile (2,640'), with COS allowing unsignalized intersections to be spaced at ¼ 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	Eastern Road	Full Access Spacing
Black Forest Road	Rising Eagle Place	2,775' (0.52 mi.)
Rising Eagle Place	Loch Linneh Place	
Loch Linneh 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)	3,375' (0.64 mi.)
Wheatland Drive (RIRO access)	*Potential Access* (limited to RIRO)	
RIRO Access (potential)	Sterling Ranch Road (proposed)	
Sterling Ranch Road (proposed)	Sterling Ranch Collector (proposed RIRO)	3,550' (0.67 mi.)
Sterling Ranch Collector (proposed RIRO)	Banning Lewis Parkway (proposed)	
Banning Lewis Parkway (proposed)	*Potential Access* (limited to RIRO)	2,330' (0.44 mi.)
RIRO Access (potential)	*The Ranch Collector West* (proposed)	
The Ranch Collector West (proposed)	Woodmen Hills Drive/Raygor Road (proposed)	1,550' (0.29 mi.)
Woodmen Hills Drive/Raygor 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 (RIRO)	4,250' (0.80 mi.)
Prairie Dove Drive (RIRO)	Liberty Grove Drive (RIRO)	
Liberty Grove 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'
	SB	200'	530'	180'	15:1	910'
Rising Eagle Place	RIRO; No Left Turns					
Loch Linneh Place	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	No NB/SB Dedicated Left Turn Lane				
	SB					
Lochwinnoch Lane	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	No NB/SB Dedicated Left Turn Lane				
	SB					
Commercial Collector (proposed)	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	100'	235'	180'	15:1	515'
	SB	100'	235'	180'	15:1	515'
Vollmer Road	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	100'	435'	180'	15:1	715'
	SB	100'	435'	180'	15:1	715'
Wheatland Drive (proposed)	RIRO; No Left Turns					
Sterling Ranch Road (proposed)	EB	3-Legged Intersection; No EB Left Turn				
	WB	200'	435'	165'	15:1	800'
	NB	100'	435'	180'	15:1	715'
	SB	3-Legged Intersection; No SB Left Turn				
Sterling Ranch Collector (proposed)	RIRO; No Left Turns					
Banning Lewis Parkway (proposed)	EB	3-Legged Intersection; No EB Left Turn				
	WB	200'	435'	165'	15:1	800'
	NB	100'	435'	180'	15:1	715'
	SB	3-Legged Intersection; No SB Left Turn				
The Ranch Collector West (proposed)	EB	3-Legged Intersection; No EB Left Turn				
	WB	200'	435'	165'	15:1	800'
	NB	100'	320'	180'	15:1	600'
	SB	3-Legged Intersection; No SB Left Turn				

Table 3.4. Left Turn Lengths (continued)

Intersecting Road	Direction	Storage	Decel	Taper	Rate	Total
The Ranch Collector West (proposed)	EB	3-Legged Intersection; No EB Left Turn				
	WB	200'	435'	165'	15:1	800'
	NB	100'	320'	180'	15:1	600'
	SB	3-Legged Intersection; No SB Left Turn				
Woodmen Hills Drive/Raygor Road (proposed)	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	100'	435'	180'	15:1	715'
	SB	100'	435'	180'	15:1	715'
The Ranch Collector East (proposed)	EB	3-Legged Intersection; No EB Left Turn				
	WB	200'	435'	165'	15:1	800'
	NB	100'	320'	180'	15:1	600'
	SB	3-Legged Intersection; No SB Left Turn				
Towner Avenue	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	100'	235'	180'	15:1	515'
	SB	100'	235'	180'	15:1	515'
Scenic Brush Drive	Intersection to be RIRO; No Left Turns					
Liberty Grove Drive	Intersection to be RIRO; No Left Turns					
Meridian Road	EB	200'	435'	165'	15:1	800'
	WB	200'	435'	165'	15:1	800'
	NB	Match Existing				
	SB	Match Existing				

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 6.3.

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.

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 area.
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 ½ 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 ¼ mile and ½ 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 ½ mile (2,640'), with COS allowing unsignalized intersection to be spaced at ¼ 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/Raygor Road (proposed)	1,550' (0.29 mi)
Woodmen Hills Drive/Raygor 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**.

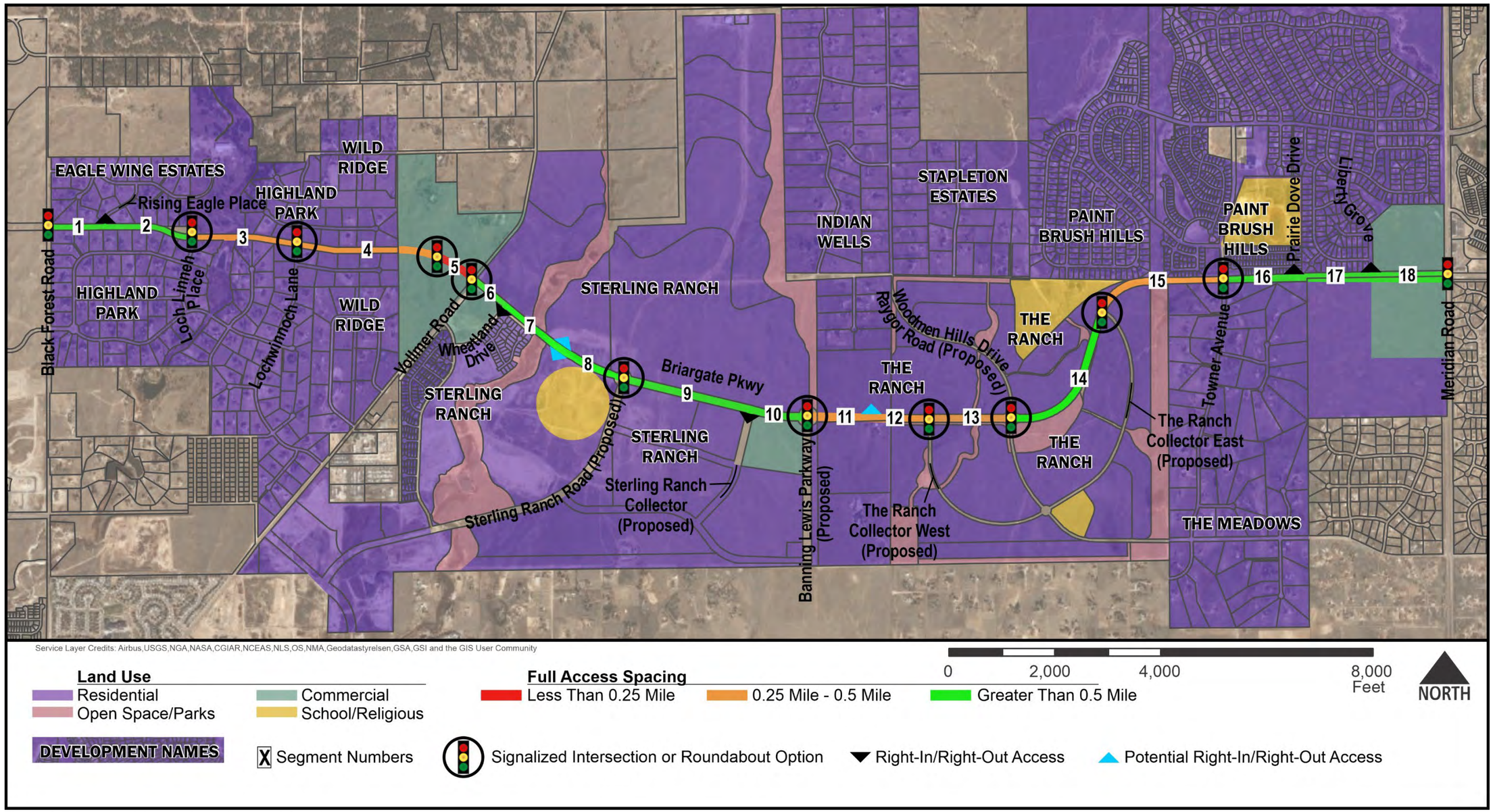


Figure 3.5 Proposed Access Locations and Spacing

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 6th 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 MTCP 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.

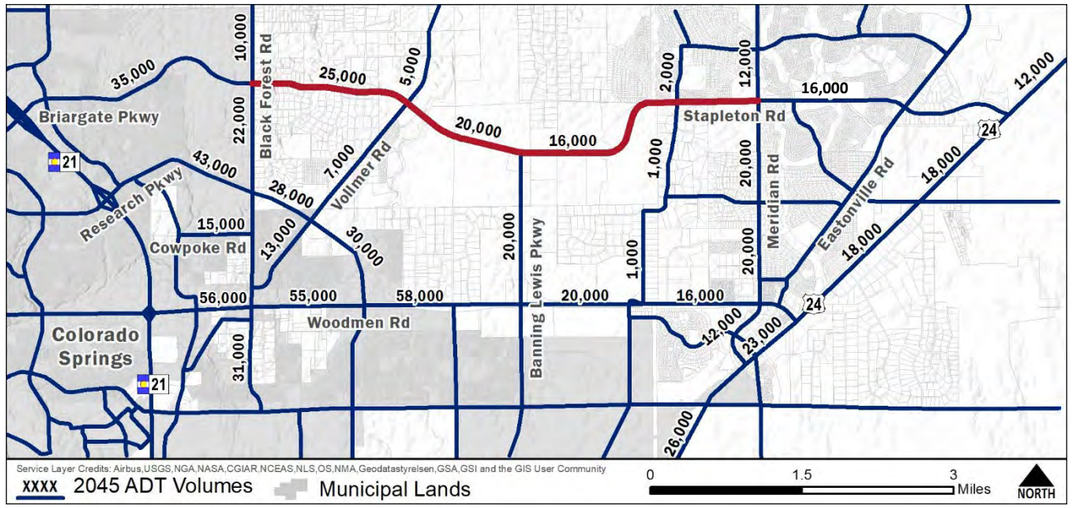


Figure 4.1. Forecast 2045 Average Daily Traffic Flow Volumes

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 6th 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)
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

Note: For two-way stop-controlled (TWSC) intersections, level of service is determined by the control delay for each minor movement. LOS is not defined for the intersection as a whole.
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)
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 and <=20
C	Fair progression, longer cycle lengths, or both. The number of vehicles stopping is significant, though many still pass through without stopping.	>20 and <=35
D	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
E	High delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	>55 and <=80
F	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[1]	
	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

Note: For approaches and intersection wide assessment, LOS is defined solely by unsignalized control delay. Source: HCM2010, 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**.

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 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	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

4.1.6 Future 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 4.6**. The values in the table are the 95th 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**.

Table 4.6. 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†	m7†
	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.

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

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 Center's 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.

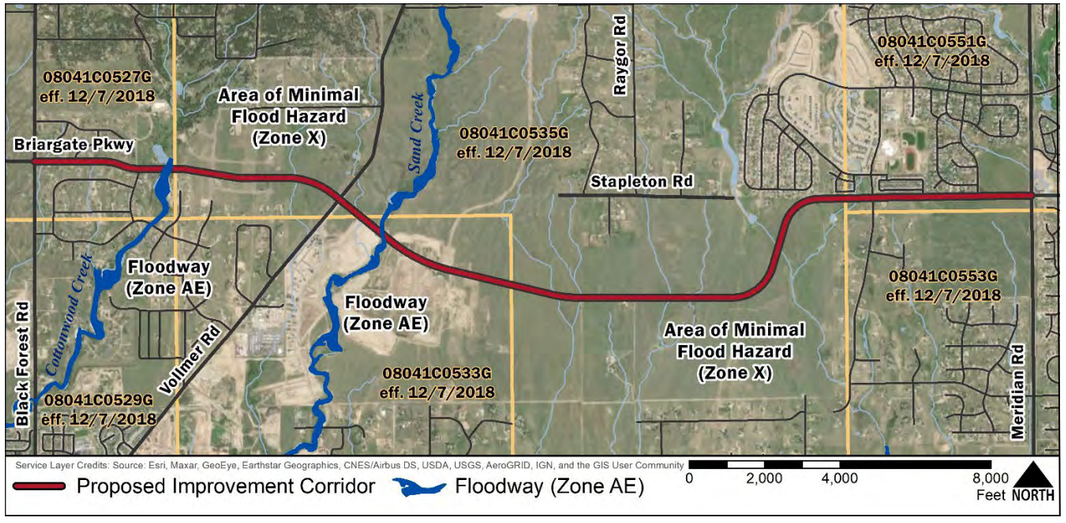


Figure 5.1 FEMA Floodplain Map Information for the Briargate-Stapleton Corridor.
Source: FEMA, 2021.

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**.

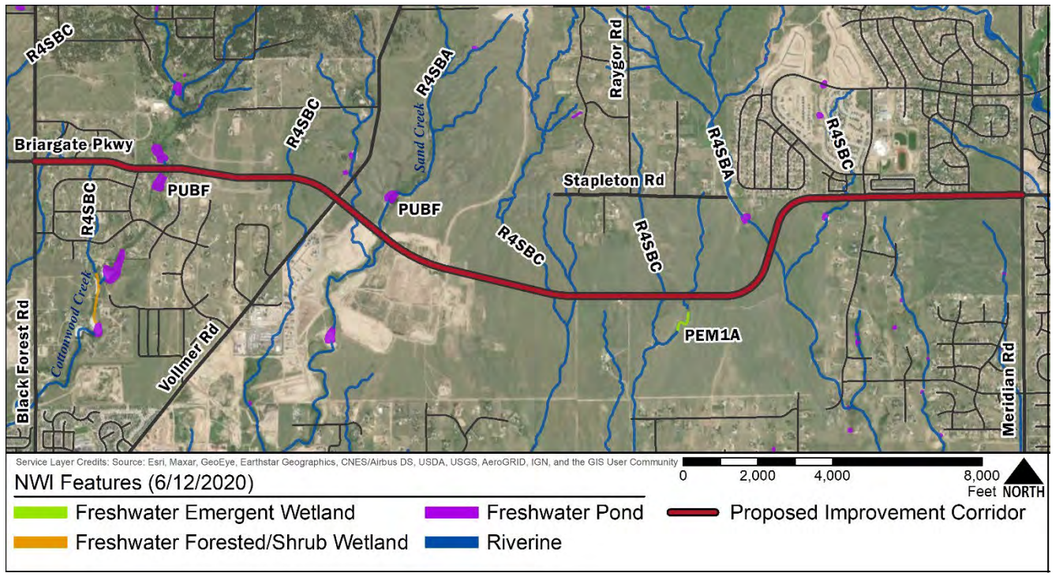


Figure 5.2 Location of Potential Wetlands Identified by USFWS NWI Database
Source: Colorado Springs, El Paso County Map Date June 12, 2020.

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, Seasonally Flooded
- PUBF – Palustrine, Unconsolidated Bottom, Semipermanently Flooded
- PEM1A – 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 (NWPs) 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 CDPHE. 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 CDPHE 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 project 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.

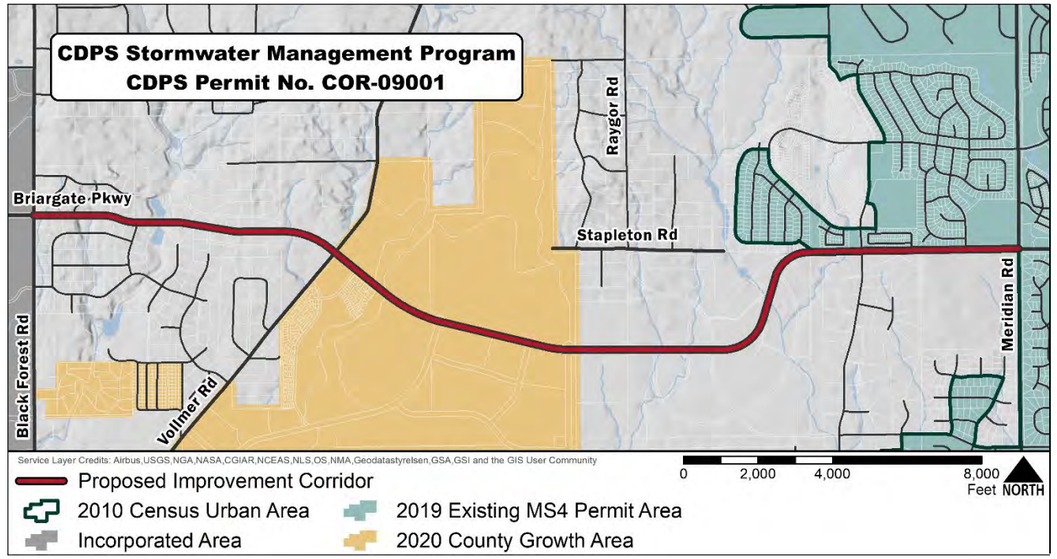


Figure 5.3 2019 El Paso County MS4 Permit Area.
Source: El Paso County, 2021.

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 a 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/.

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 411 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.

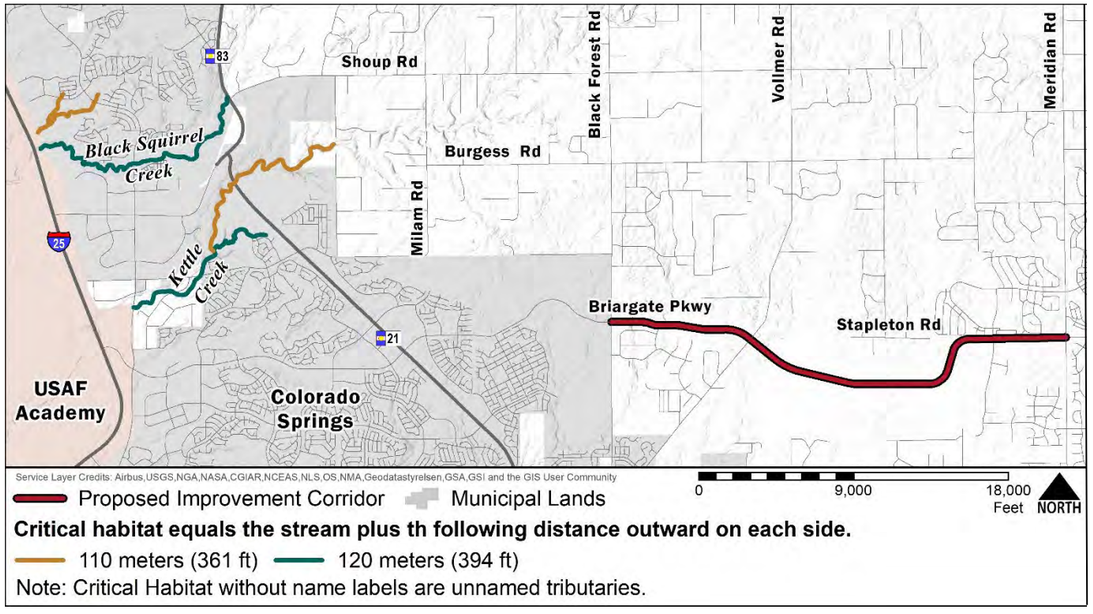


Figure 5.5 Location of Briargate-Stapleton Study Area in Relation to PMJM Critical Habitat

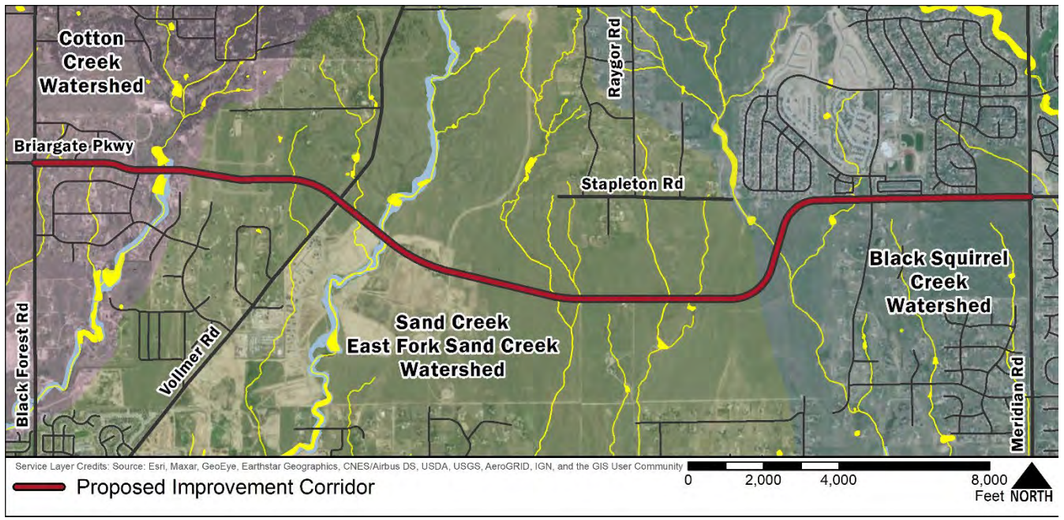


Figure 5.6 Potential Riparian Areas Along Briargate-Stapleton Corridor

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 stomias) – 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.Larger 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 PMJM 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.

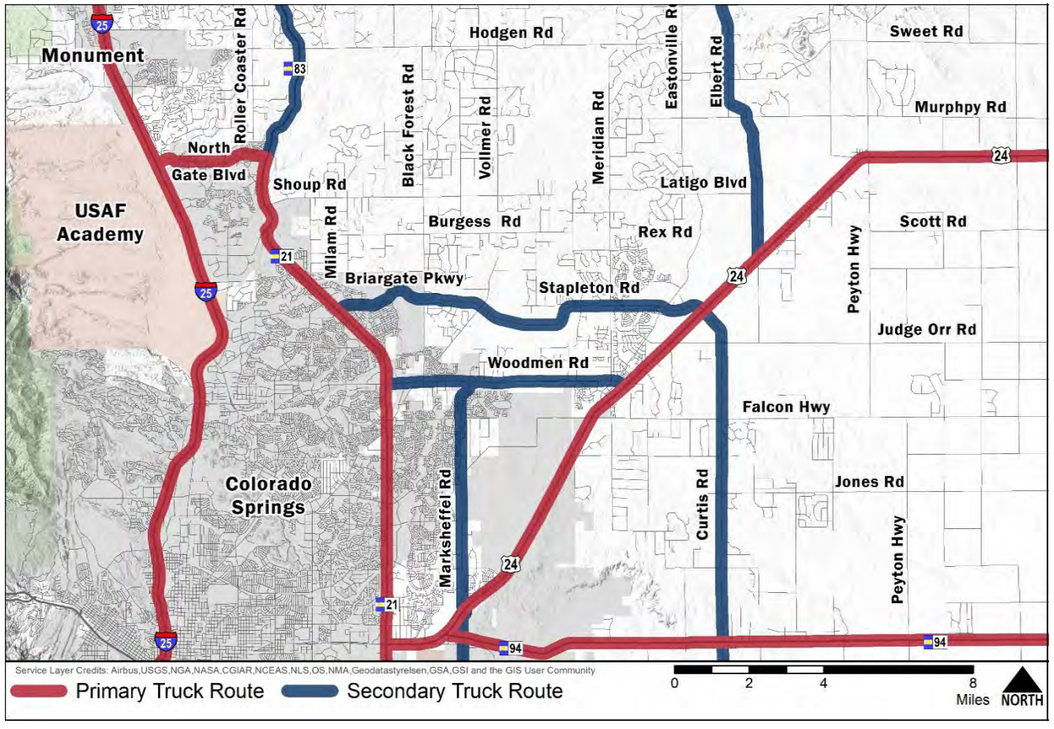


Figure 5.7 Excerpt from MTCP - Truck Route Map.
Source: El Paso County, 2016, Map 16, p. 62.

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 the 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.

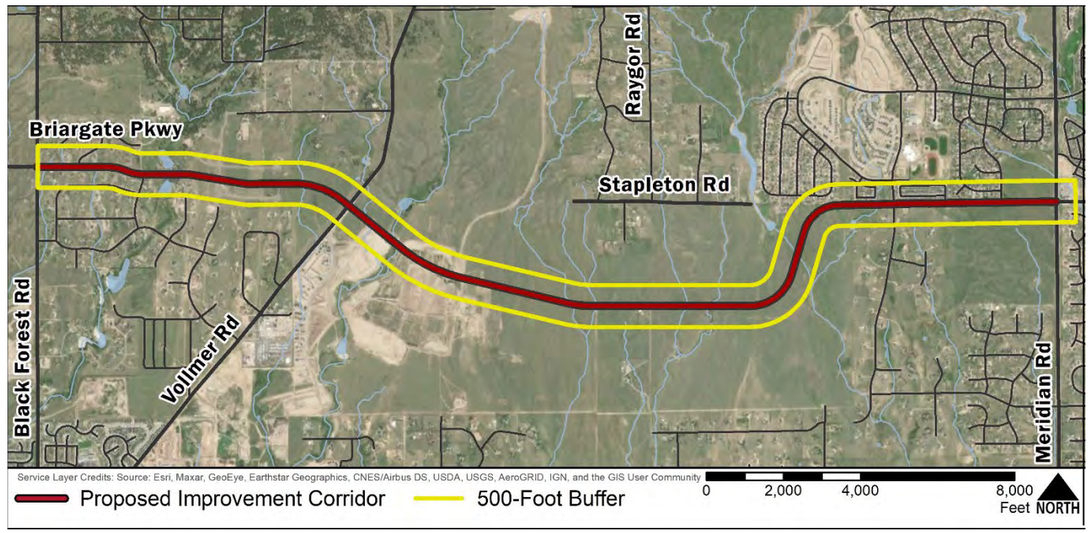


Figure 5.8 Buffer Area 500 Feet from the Proposed Travel Lanes.

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 it—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 Pak 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 revegetation 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.

Table 5.1. Noxious Weed List		
"A" List (8)	**"B' List (20)**	**"C" List (4)**
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 Dalmatian toadflax Diffuse knapweed Hoary cress (whitetop) 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 additional ROW 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 was used because it requires a more conservative design.

6.3 Plan and Profile

The conceptual plan and profile design for the interim four-lane principal arterial section is included as **Appendix A**. ROW has been confirmed and will require a 168' corridor to meet the requirements of the City and the County throughout the life of the corridor. Parcel limits are shown to provide a preliminary understanding of proposed ROW. Required future ROW limits are indicated on the plan views by virtue of toe of slope limits and retaining wall locations.

6.4 Phasing

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 are proposed.

The following describes each phase and the proposed improvements. The bases for the estimated costs for each phase are detailed in **Section 6.3.1**. Initial Phase is the first priority for final design and construction when funding becomes available.

6.4.1 Initial Phase

Due to the forecasted traffic volumes in this area, it is recommended to use a hybrid of EPC's urban and rural Principal Arterial sections and the COS Principal Arterial section.

As a result of lower anticipated volumes immediately upon construction, it becomes more financially viable to construct only half of the roadway during initial construction. In the Initial Phase, a two-lane roadway, made up of the westbound lanes of the Interim Phase Section, as shown in **Figure 7.1**, would be striped to allow for travel in both directions.

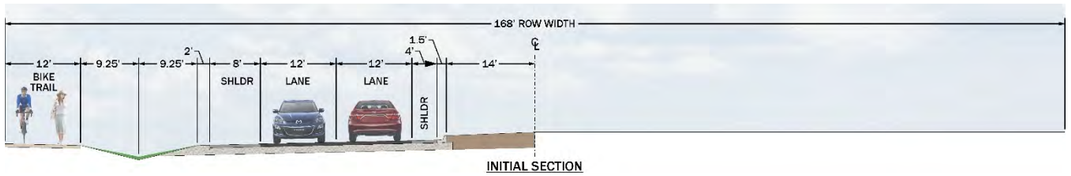


Figure 6.1 Initial Hybrid Section

6.4.2 Interim Phase

As development occurs, the Briargate-Stapleton roadway can grow to meet development demands. The interim phase, as shown in Figure 7.2, will more closely resemble an EPC typical section with a 28' raised median to allow for double left-turn lanes, inside curb and gutter, a 4' inside shoulder, two 12' thru lanes in each direction, an 8' outside shoulder, and graded ditches for drainage. Additionally, a 12' bike trail would be included on the edge of the ROW. This bike path would be separated from the sidewalk by a dedicated utility corridor.

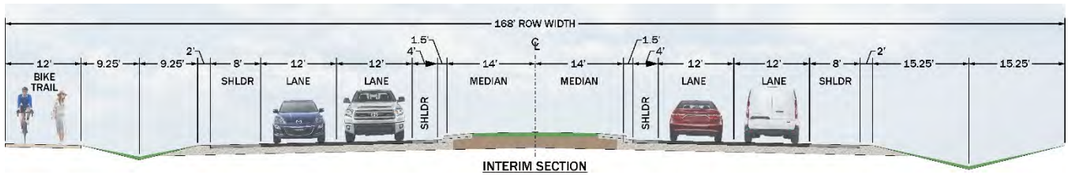


Figure 6.2 Interim Hybrid Section

6.4.3 Ultimate Phase

The ultimate phase cross section, as shown in Figure 7.3, will more closely resemble the City of Colorado Springs typical section with 11' thru lanes in each direction and a 6' outside shoulder. In this phase, the outer edge will be defined by a curb. The 6' outside shoulder provides a shared facility for bicycles, and a 6' detached sidewalk ensures increased pedestrian safety. This phase will require the removal of 8 feet of previously constructed pavement from each side of the roadway.

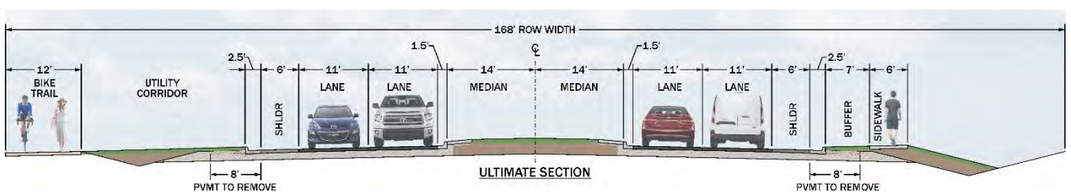


Figure 6.3 Ultimate Hybrid Section

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 $52.9M, 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 $88.9M, 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

Item No.	Item Description	Unit	Unit Cost	Quantity	Cost
202-00240	Rem Asphalt Mat (Planning)	SY	$2.60	54,000	$140,400
203-00060	Embankment Material (CIP)	CY	$17.00	412,500	$7,012,500
304-06000	ABC (CL 6)	TON	$29.00	107,000	$3,103,000
403-34721	HMA (Gr SX) (75) (PG 58-28)	TON	$93.00	79,000	$7,347,000
606-00301	Guardrail Type 3 (6-3)	LF	$37.00	6,000	$222,000
606-00910	Guardrail Type 9 (Style CA)	LF	$110.00	600	$66,000
608-00000	Concrete Sidewalk	SY	$85.00	57,600	$4,896,000
609-21010	Curb and Gutter Type 2 I-B	LF	$36.00	60,500	$2,178,000
609-21020	Curb and Gutter Type 2 II-B	LF	$35.00	60,500	$2,117,500
610-00026	Median Cover (6 In Pattern Conc)	SF	$12.00	64,800	$777,600
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
614-70336	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
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
	ITEM COST SUBTOTAL:				$44,388,000
	Contingency*			30%	$13,317,000.00
	Item Cost with Contingency				**$57,705,000**
	Mobilization			10%	$5,771,000
	Utilities			5%	$2,886,000
	Right-of-Way			2%	$1,155,000
	Force Account Provision			10%	$5,771,000
	CONSTRUCTION SUBTOTAL:				$15,583,000
	Engineering and Environmental Fees				
	Design Fee			10%	$5,771,000
	Environmental Clearance Fee			2%	$1,155,000
	Construction Engineering			10%	$5,771,000
	FEE SUBTOTAL:				$12,697,000
	TOTAL PROGRAM COST				**$86,000,000**

* 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.

Notes: 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

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

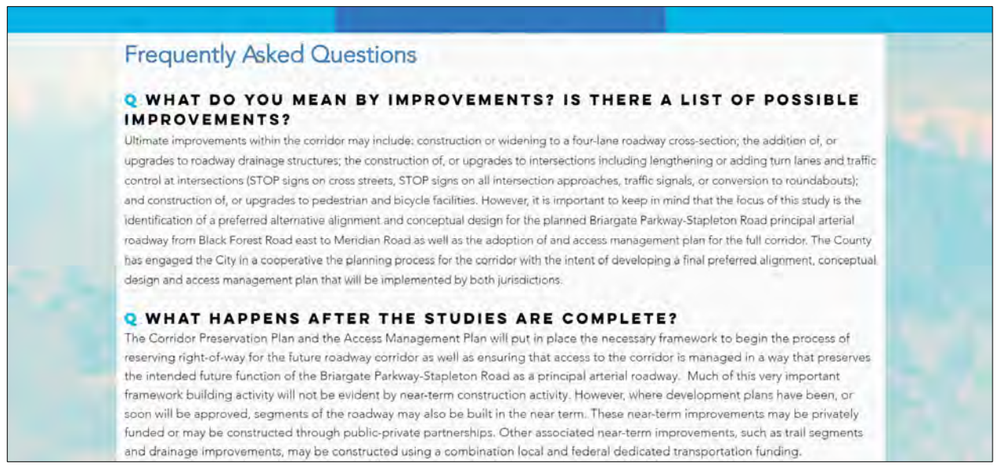


Figure 7.2 Website Frequently Q&A Posting

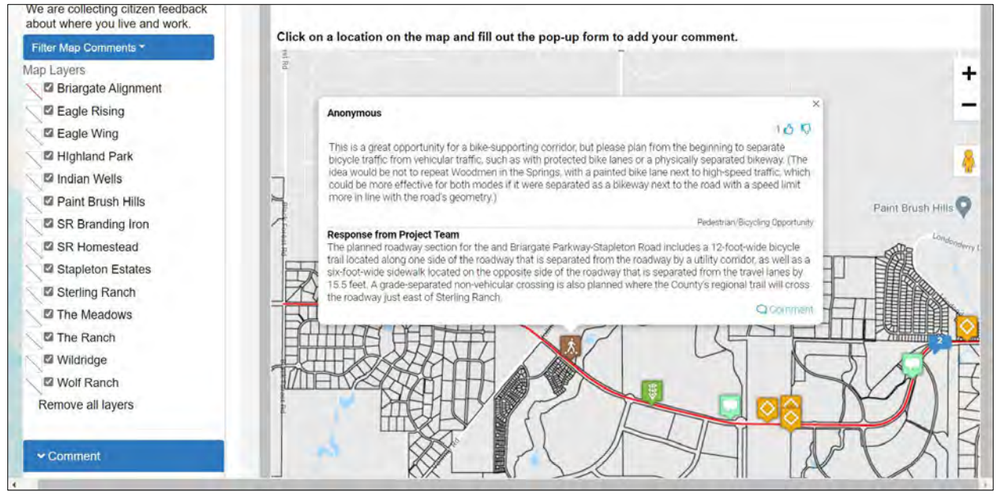


Figure 7.3 Website Comment Map – Example Comment and Response

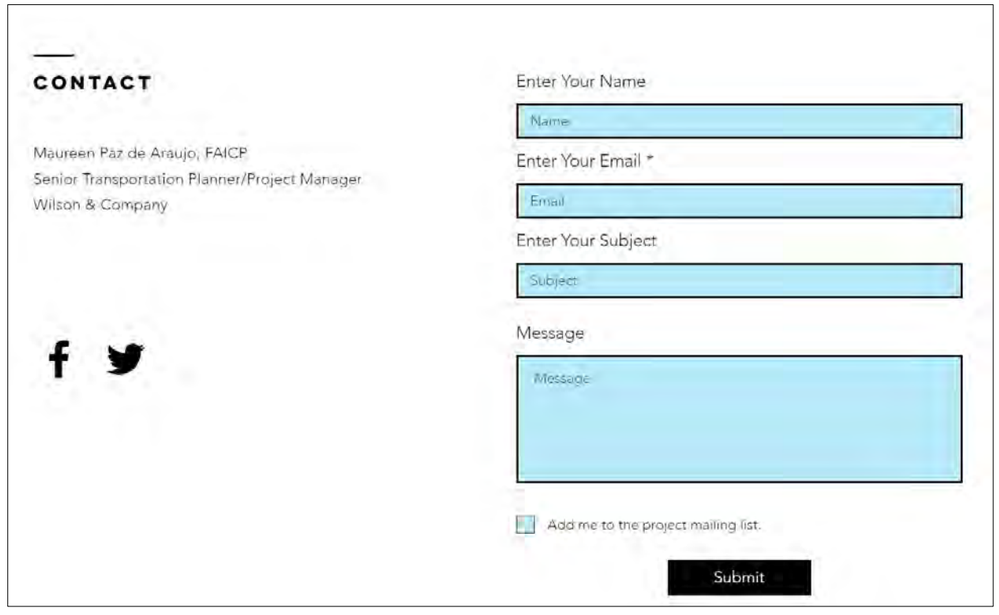


Figure 7.4 Website Comment Form

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 – Welcome & Project Overview

Figure 7.5 Virtual Public Open House – Alignment & Typical Sections

Figure 7.6 Virtual Public Open House – Access & Environmental Considerations

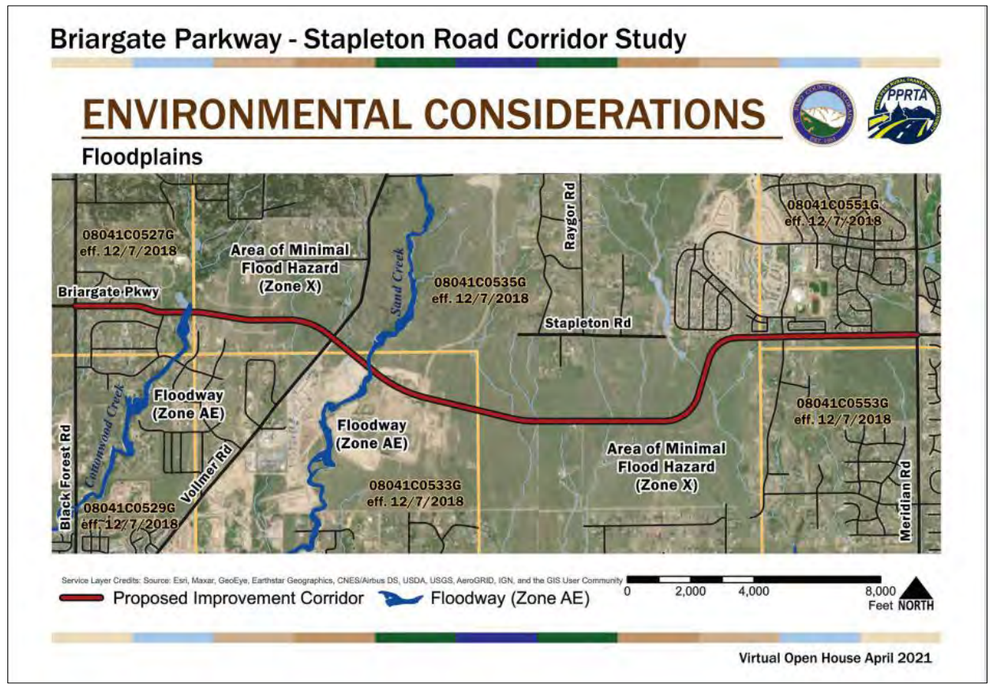


Figure 7.7 Virtual Public Open House – Floodplains Exhibit

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 was prepared as a part of the CPP. The IGA will be executed by the City and the County upon adoption 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 IGA that were developed collaboratively by the county and City are 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 option 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.**

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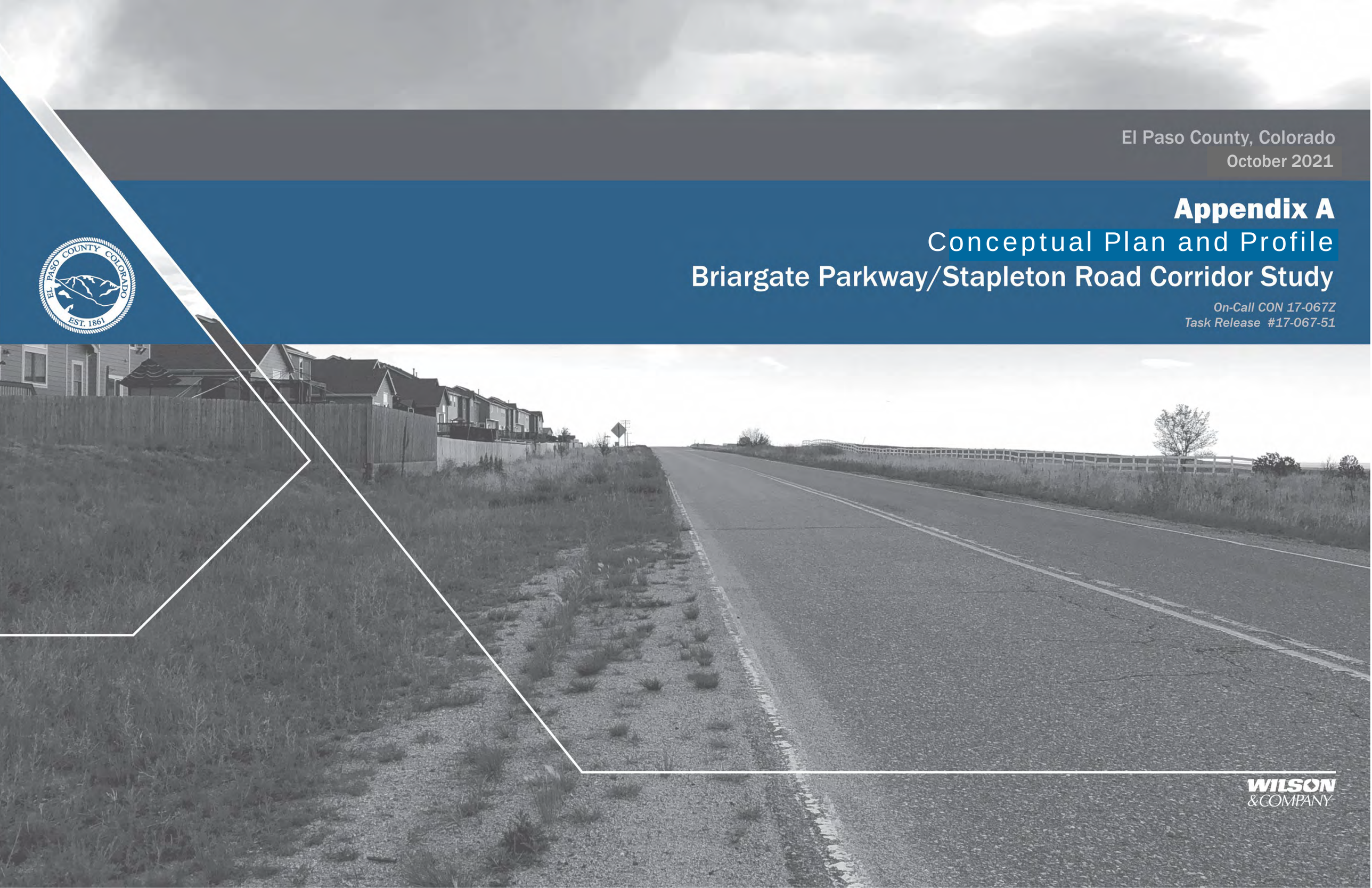
El Paso County, Colorado
October 2021

Appendix A

Conceptual Plan and Profile

Briargate Parkway/Stapleton Road Corridor Study

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



WILSON & COMPANY

EL PASO COUNTY

BRIARGATE PARKWAY-STAPLETON ROAD STUDY

PRELIMINARY DESIGN

EL PASO COUNTY

Project #_____-__

Bid #____-____

TABULATION OF LENGTH & DESIGN DATA

STATION	FEET ROADWAY BRIARGATE PKWY/ STAPLETON RD
BEGIN = STA. 200+00.00 END = STA. 445+58.90	24558.9
TOTAL	24558.9
SUMMARY OF PROJECT LENGTH	FEET / MILES
ROADWAY (NET LENGTH)	24558.9 / 4.65

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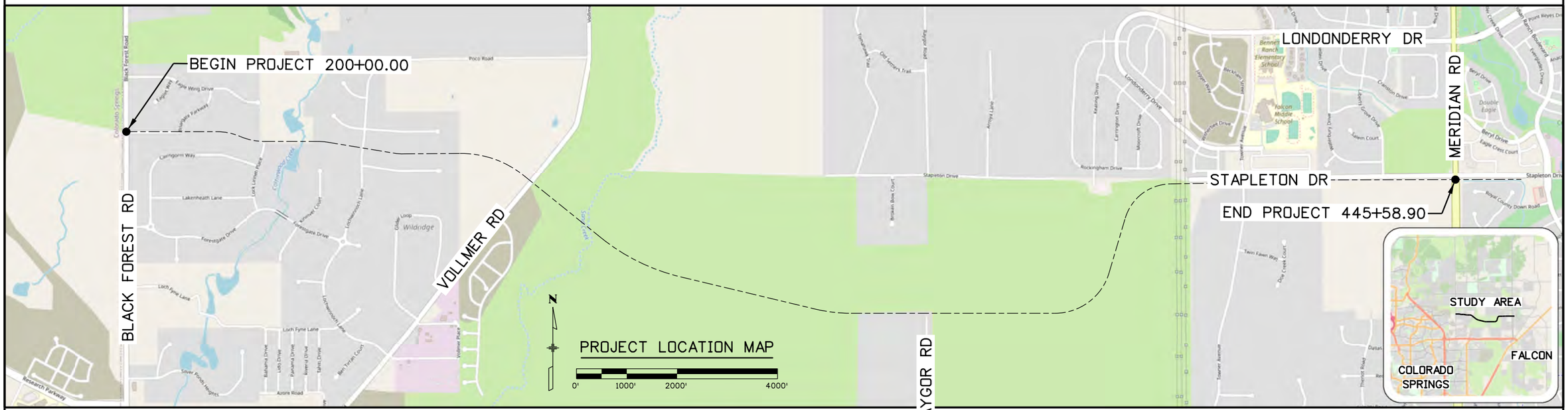
2	TYPICAL SECTIONS
3-30	ROADWAY PLANS AND PROFILES



PROJECT LOCATION MAP

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Unit Information Unit Leader Initials			

WILSON & COMPANY
5755 Mark Dabling Blvd.
Suite 220
Colorado Springs, CO 80919
Phone: 719-520-5800
FAX: 719-520-0108

AS-CONSTRUCTED	Contract Information	Project No./Code
No Revisions:	Contractor:	Project #___-_
Revised:	City Engineer:	Bid #__-__
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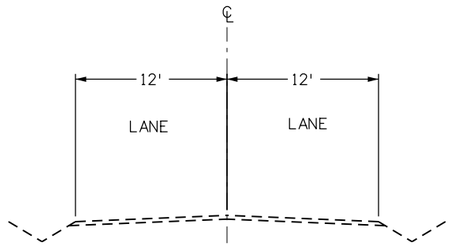
	PROJECT STARTED: ACCEPTED:	
	Comments:	

Know what's below. Call before you dig.



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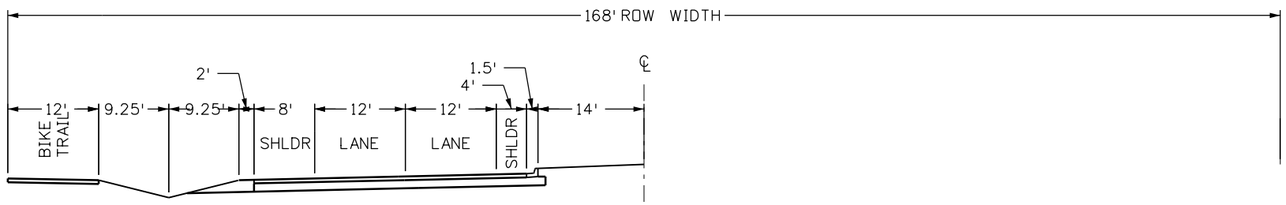
STA. 435+31 TO STA. 487+45



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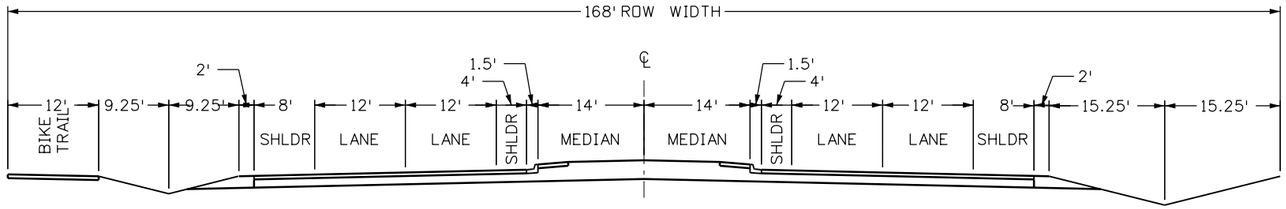

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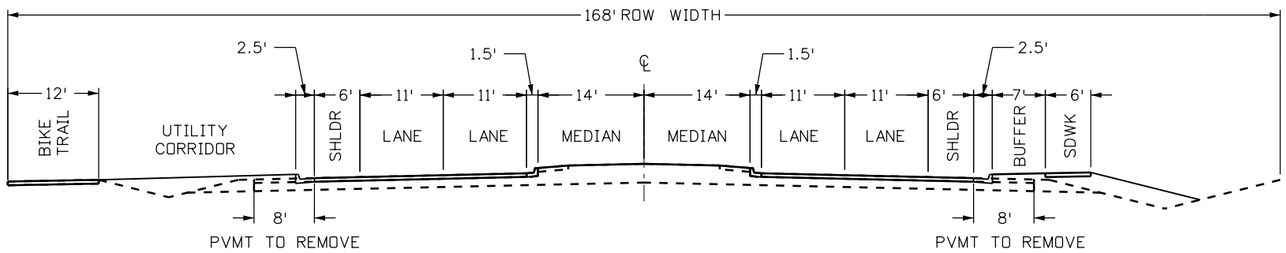

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Unit Information	Unit Leader		

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Colorado Springs, CO 80919
Phone: 719-520-5800
FAX: 719-520-0108

No Revisions:

Revised:

Void:

TYPICAL SECTIONS

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	TYPSEC	Subset Sheets: 1 of 1	

Project No./Code

Sheet Number

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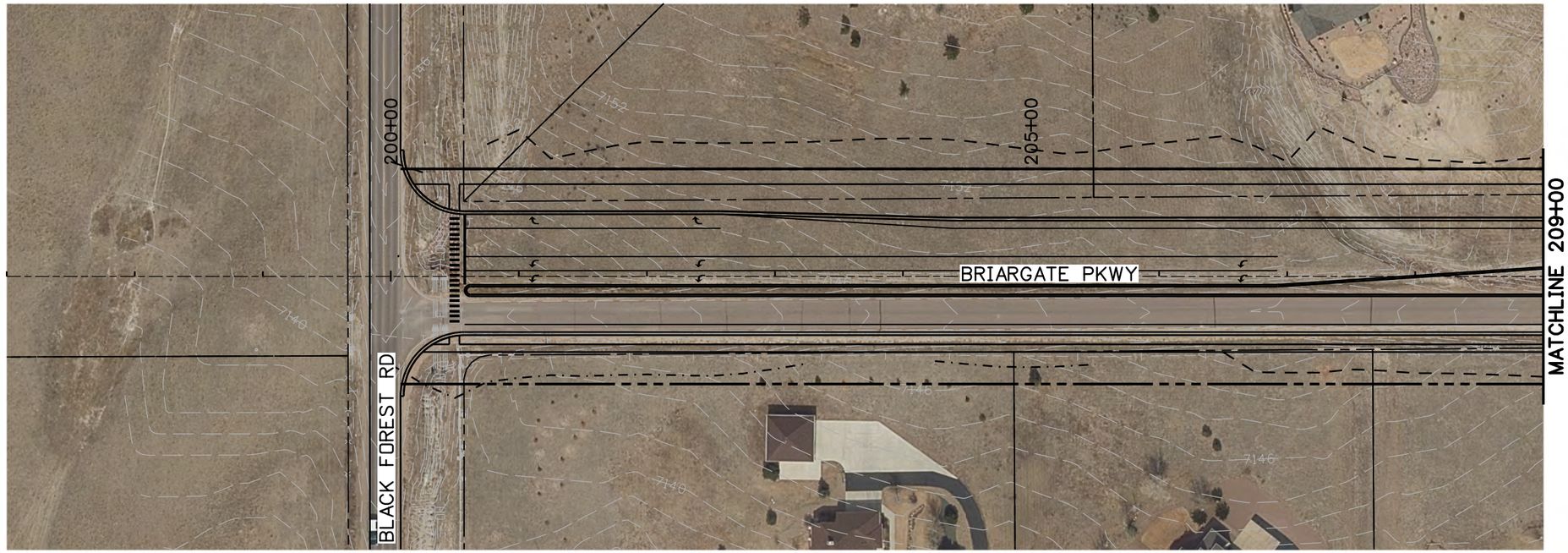

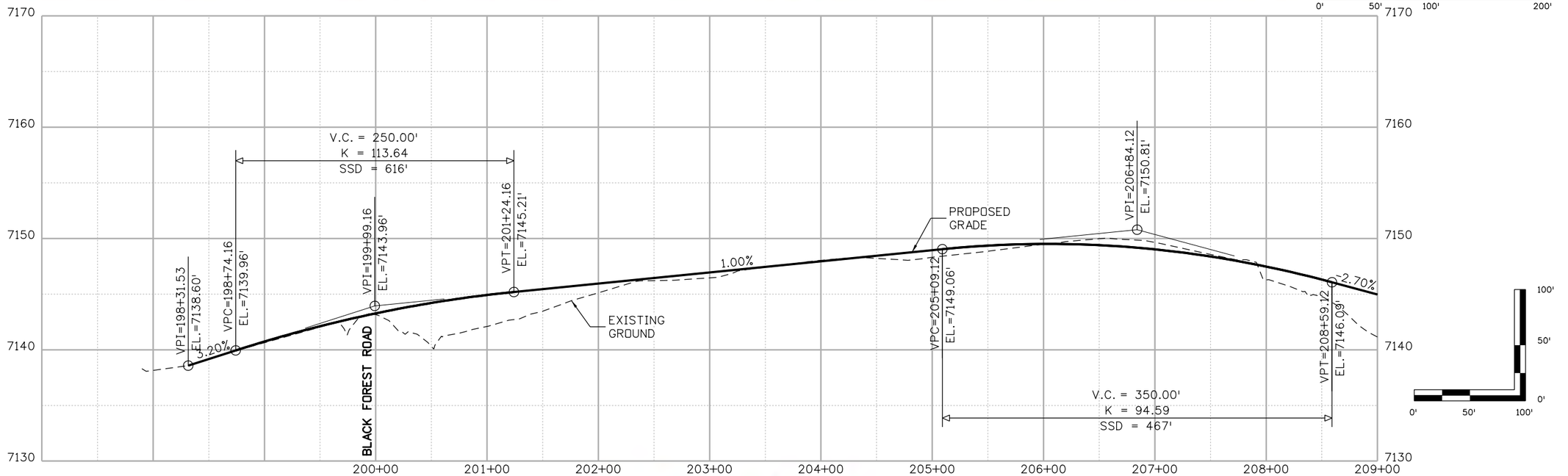

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Unit Information	Unit Leader		

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Sheet Revisions

Date:	Comments	Init.

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Colorado Springs, CO 80919
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FAX: 719-520-0108

No Revisions:	
Revised:	
Void:	

ROADWAY PLAN & PROFILE
STA 200+00 TO STA 209+00

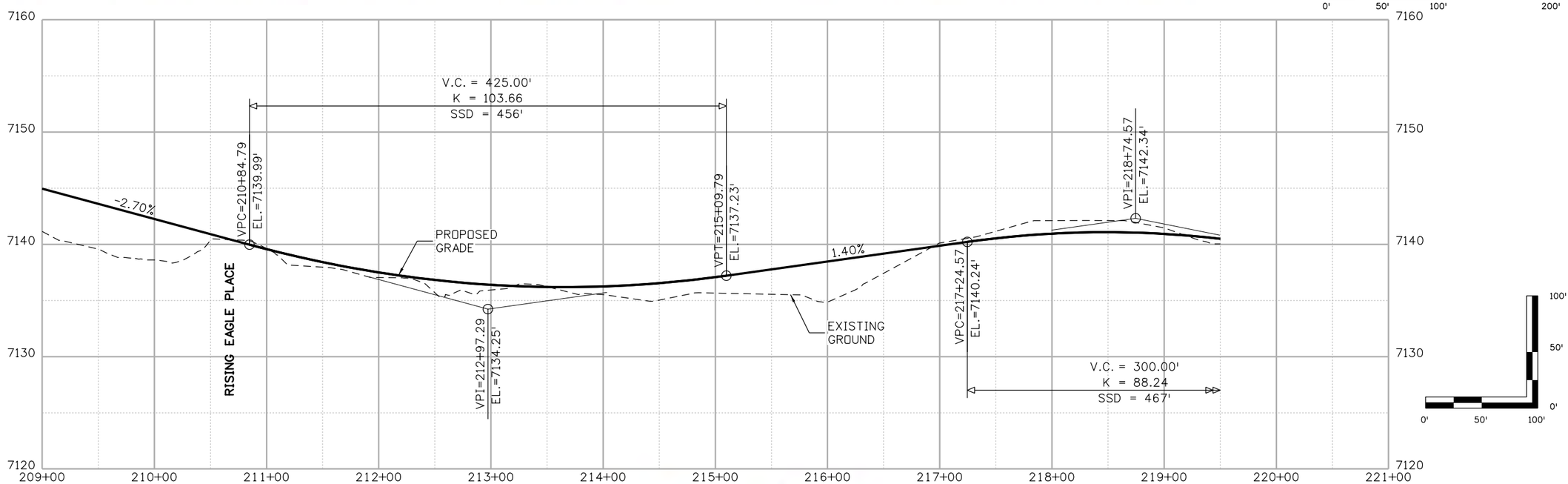
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 1 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.

0' 50' 100' 200'



100' 50' 0'
0' 50' 100'

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Print Date: 11/2/2021			
File Name: 00600DES_PnP_02.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Sheet Revisions

Date:	Comments	Init.

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ROADWAY PLAN & PROFILE STA 209+00 TO STA 219+50

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 2 of 28	

Project No./Code

Sheet Number

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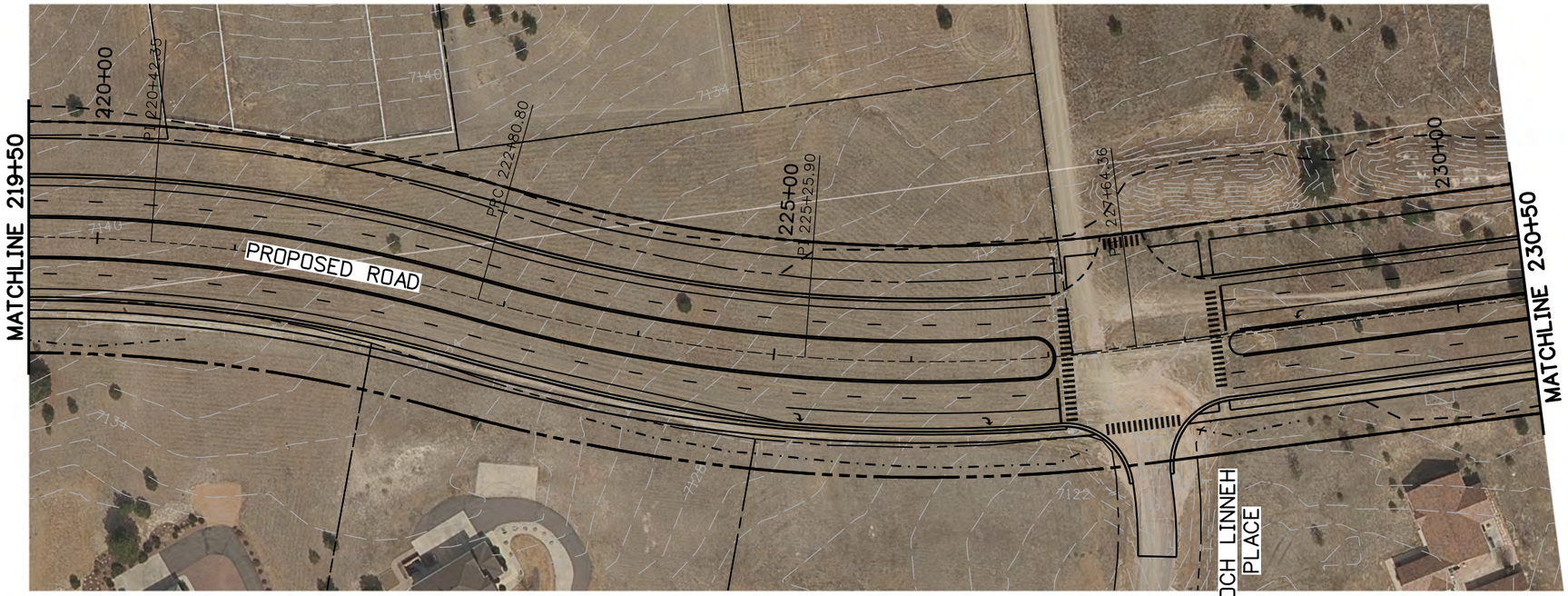

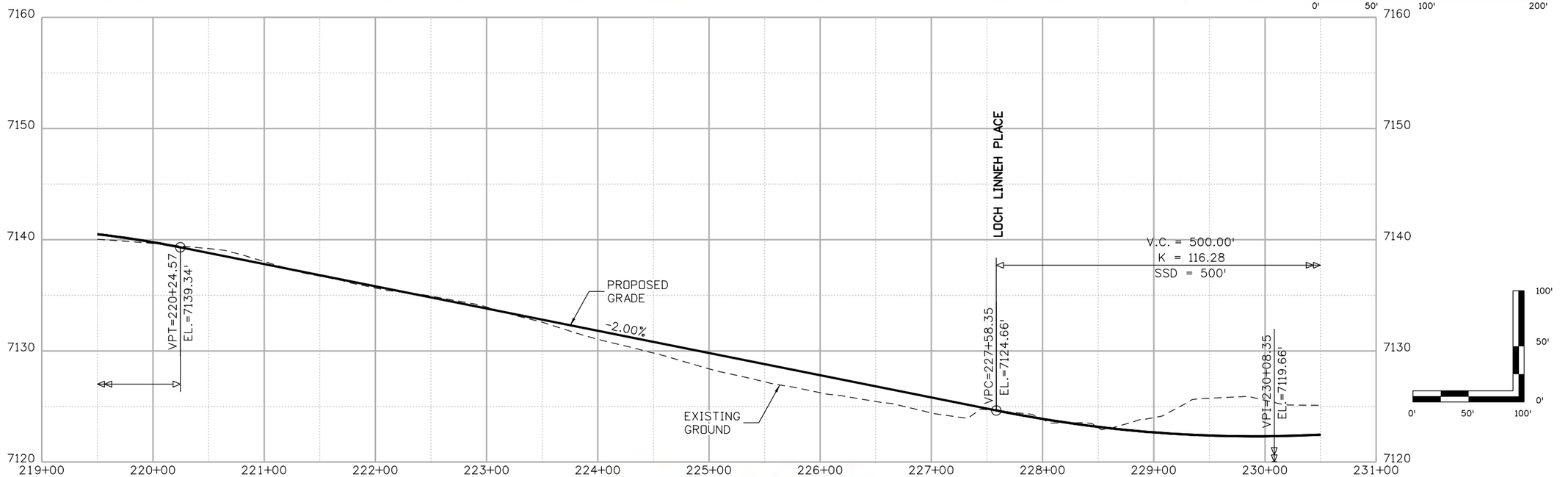

PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021		Sheet Revisions			WILSON & COMPANY		ROADWAY PLAN & PROFILE STA 219+50 TO STA 230+50
File Name: 00600DES_PnP_03.dgn		Date:	Comments	Init.	5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108	No Revisions:	Designer: JAF / Detailer: TAH / Sheet Subset: PnP
Horiz. Scale: 1:100	Vert. Scale:					Revised:	Structure Numbers:
Unit Information	Unit Leader					Void:	Subset Sheets: 3 of 28
							Project No./Code
							Sheet Number

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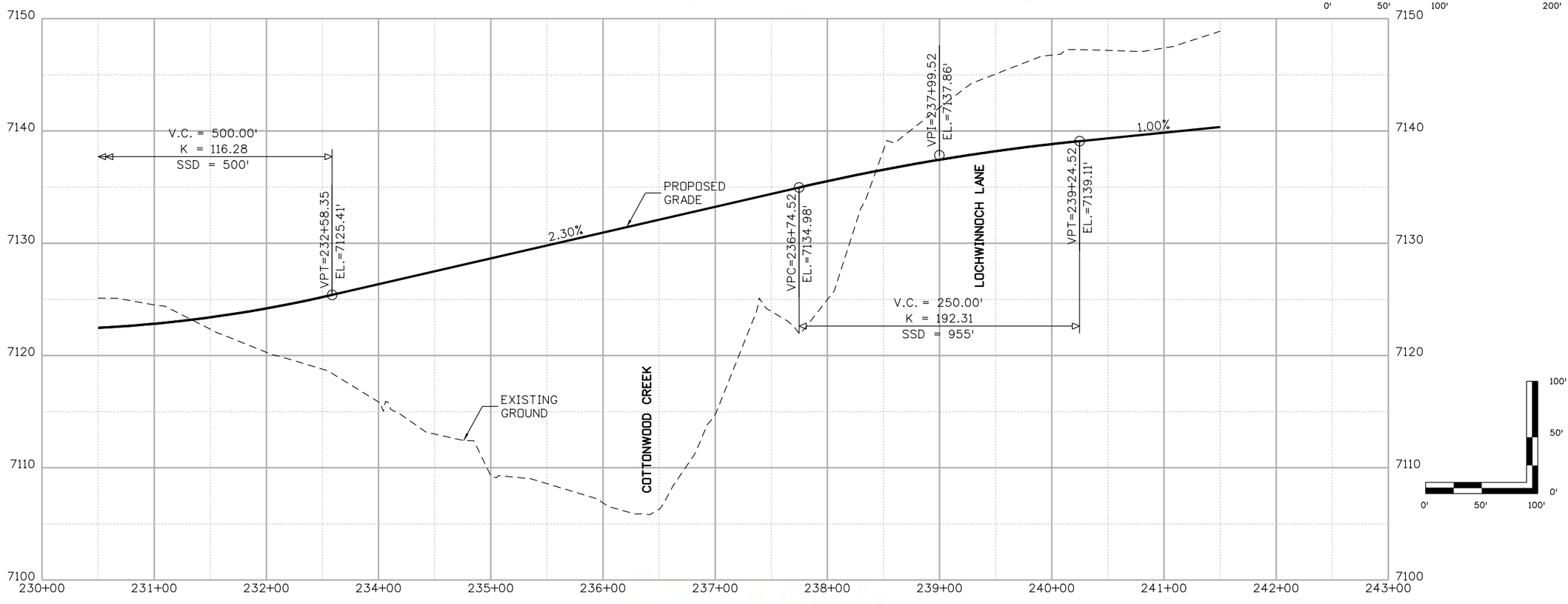
Know what's below. Call before you dig.



PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 2/2/2022		Sheet Revisions			WILSON & COMPANY		ROADWAY PLAN & PROFILE STA 230+50 TO STA 241+50
File Name: 00600DES_PnP_04.dgn		Date:	Comments	Init.	5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108	No Revisions:	Designer: JAF / Detailer: TAH / Sheet Subset: PnP / Structure Numbers / Subset Sheets: 4 of 28
Horiz. Scale: 1:100	Vert. Scale:					Revised:	Project No./Code
Unit Information	Unit Leader					Void:	Sheet Number

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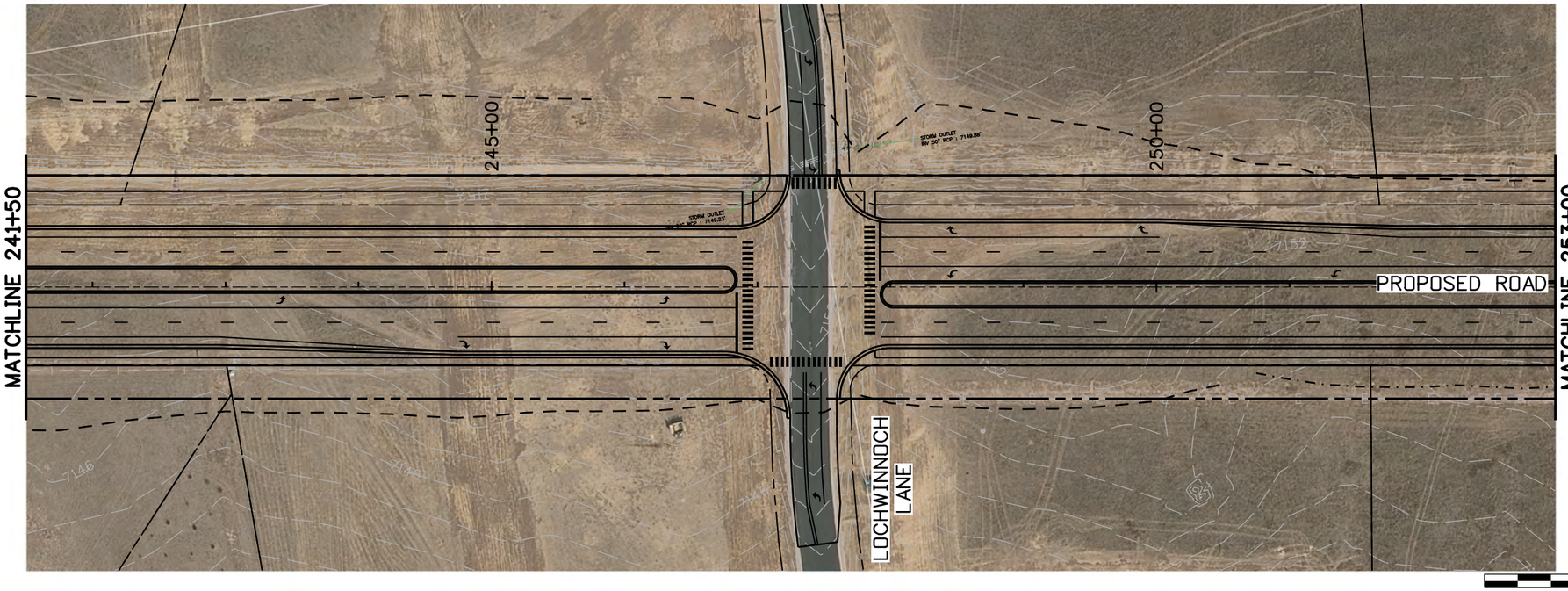
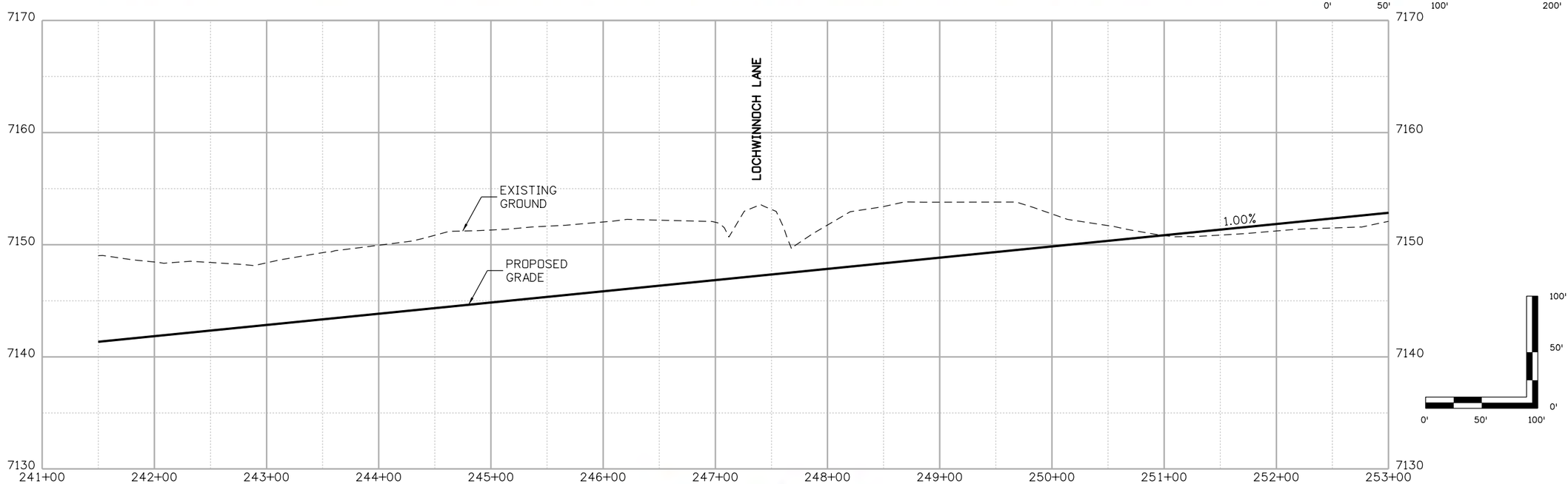
Know what's below. Call before you dig.





PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_05.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Date:	Comments	Init.

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Revised:	
Void:	

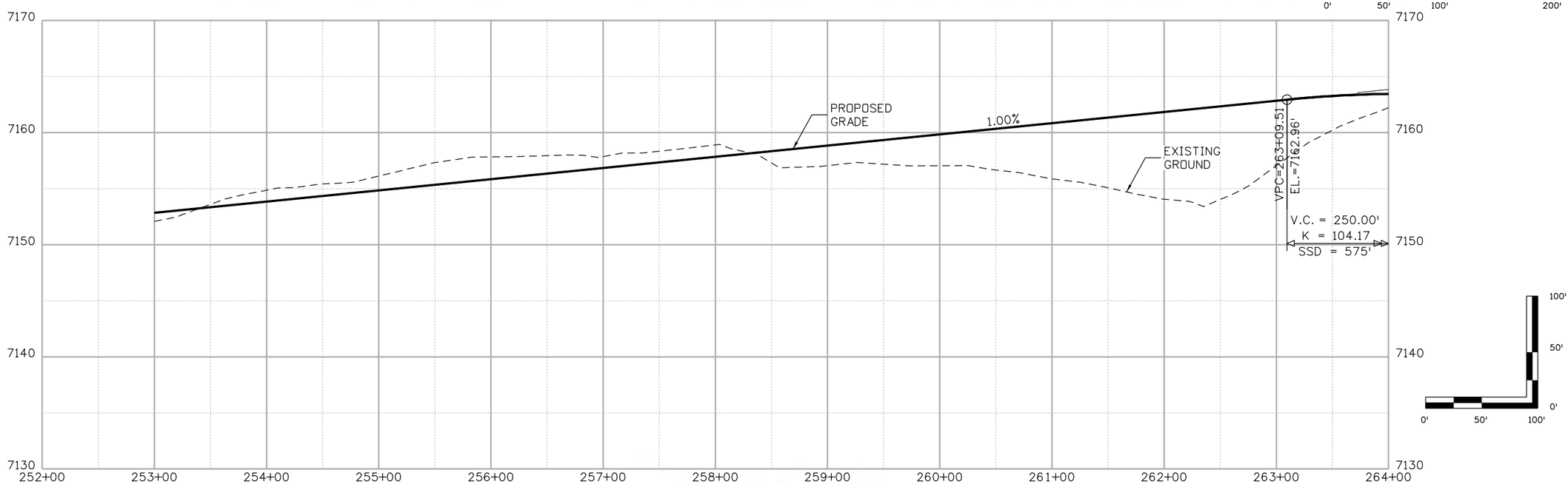
ROADWAY PLAN & PROFILE STA 241+50 TO STA 253+00

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 5 of 28	

Project No./Code

Sheet Number

Know what's **below.** **Call** before you dig.



PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_06.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

Sheet Revisions		
Date:	Comments	Init.

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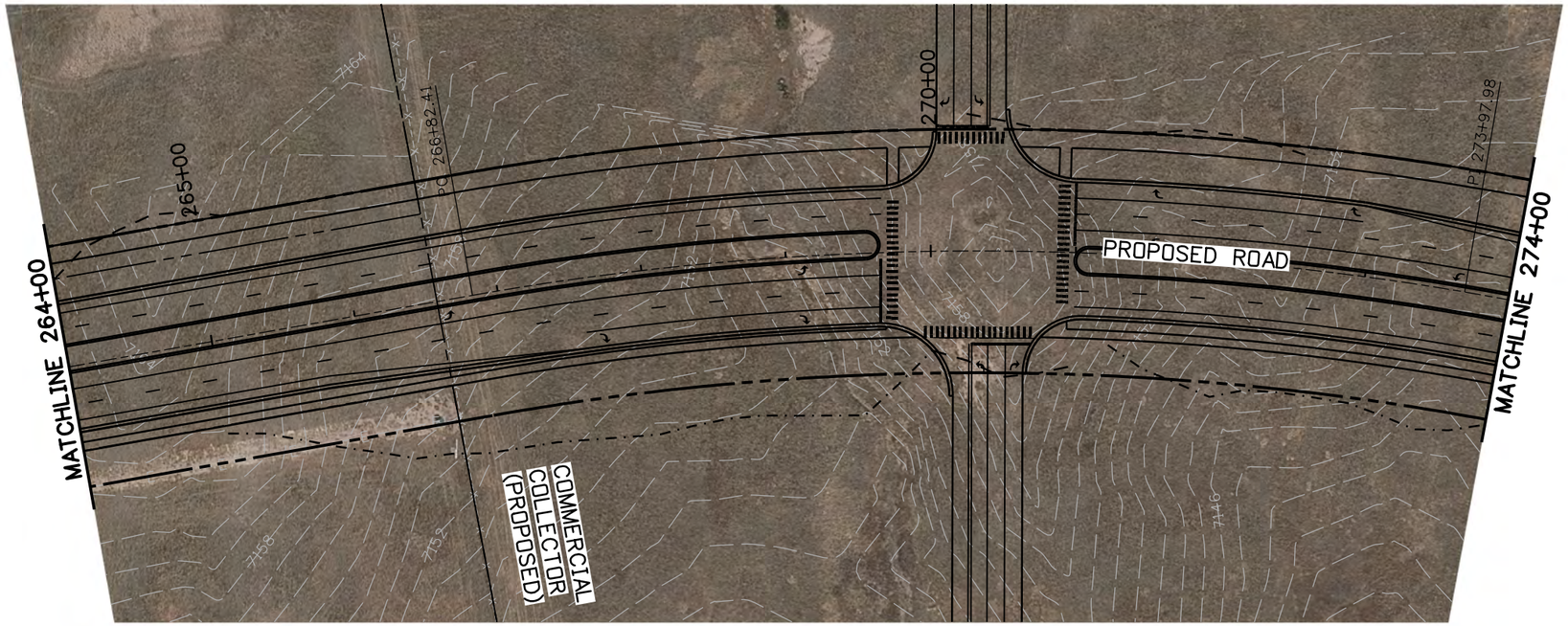
ROADWAY PLAN & PROFILE STA 253+00 TO STA 264+00

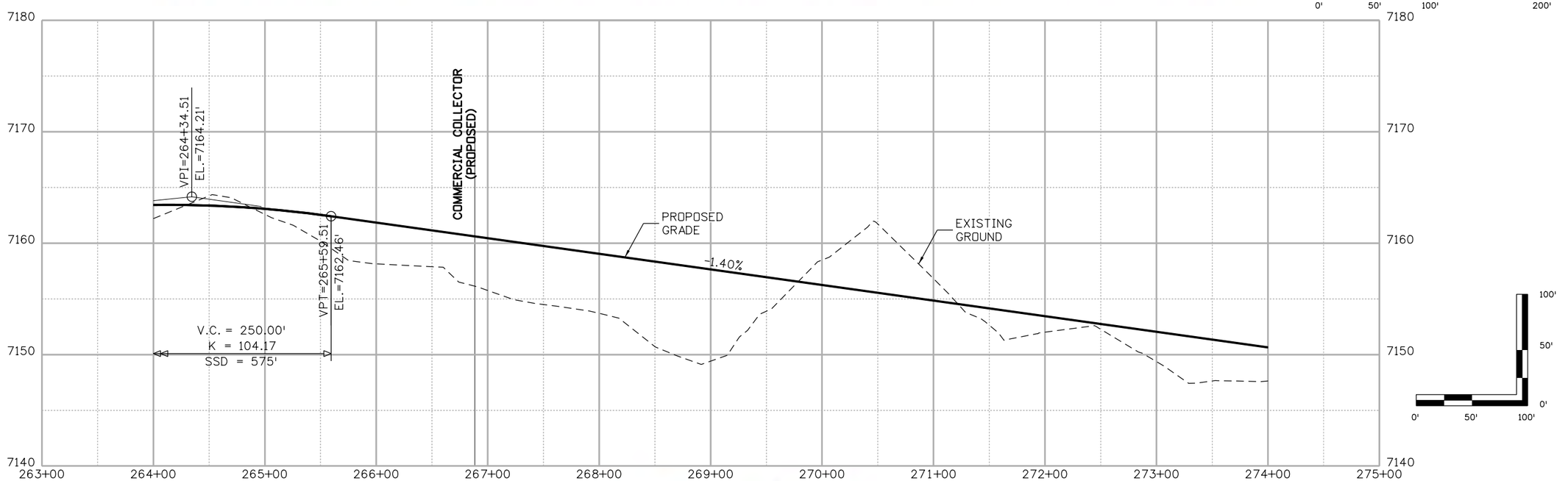
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 6 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.





PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_07.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Sheet Revisions

Date:	Comments	Init.

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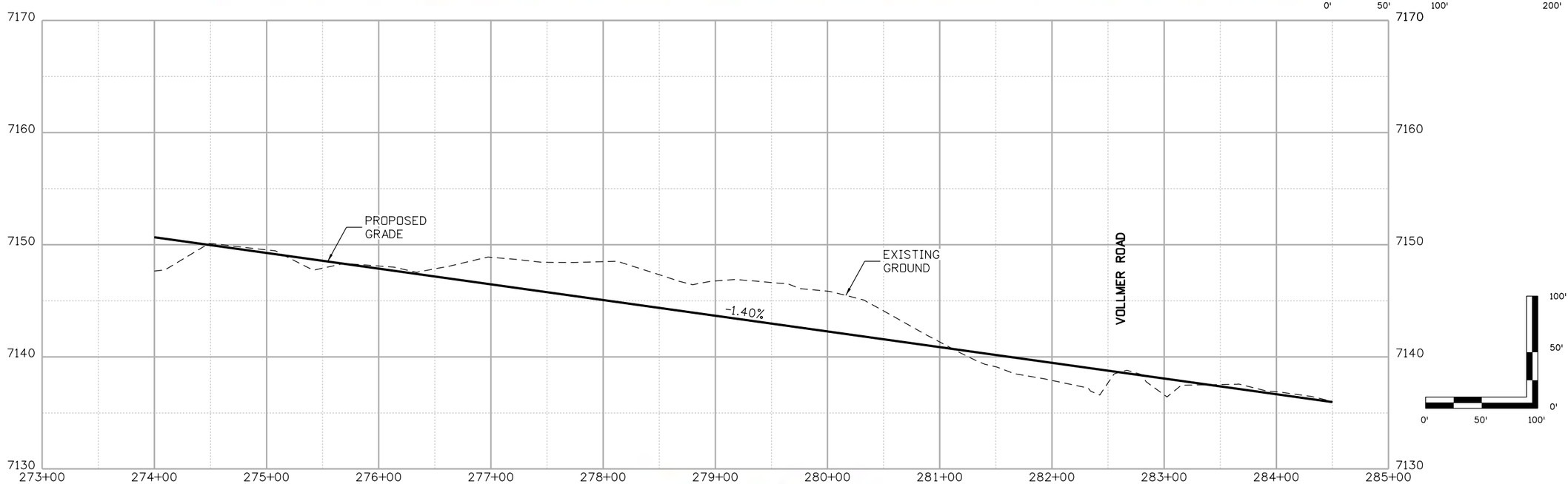
ROADWAY PLAN & PROFILE STA 264+00 TO STA 274+00

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 7 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.



PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_08.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

Sheet Revisions		
Date:	Comments	Init.

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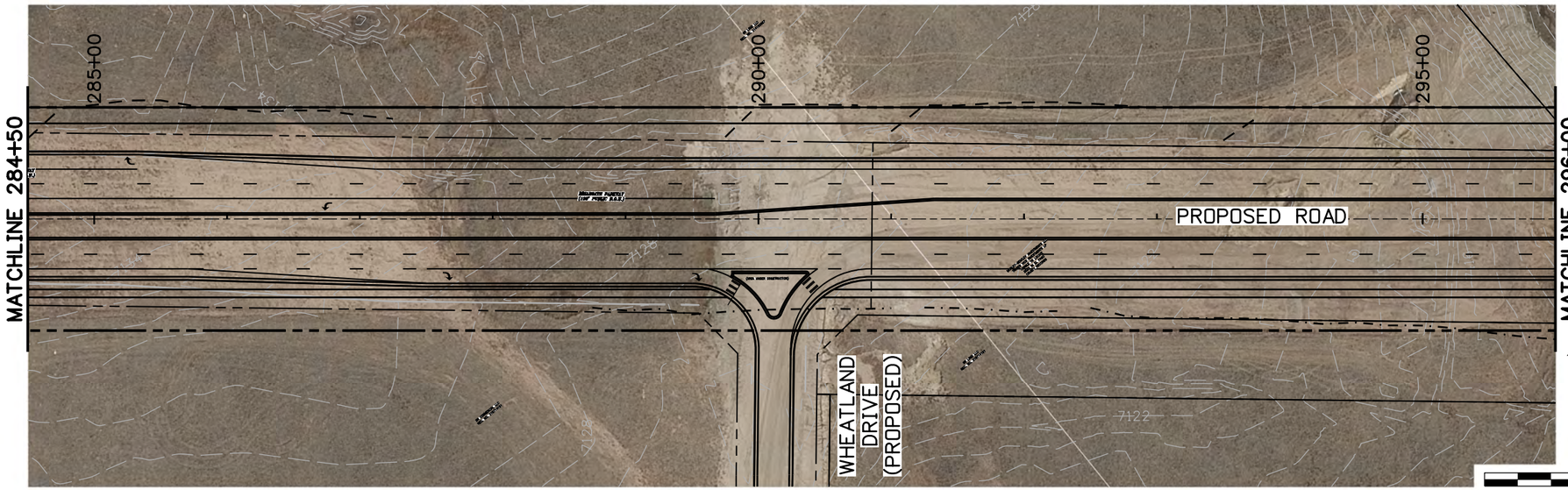
ROADWAY PLAN & PROFILE
STA 274+00 TO STA 284+50

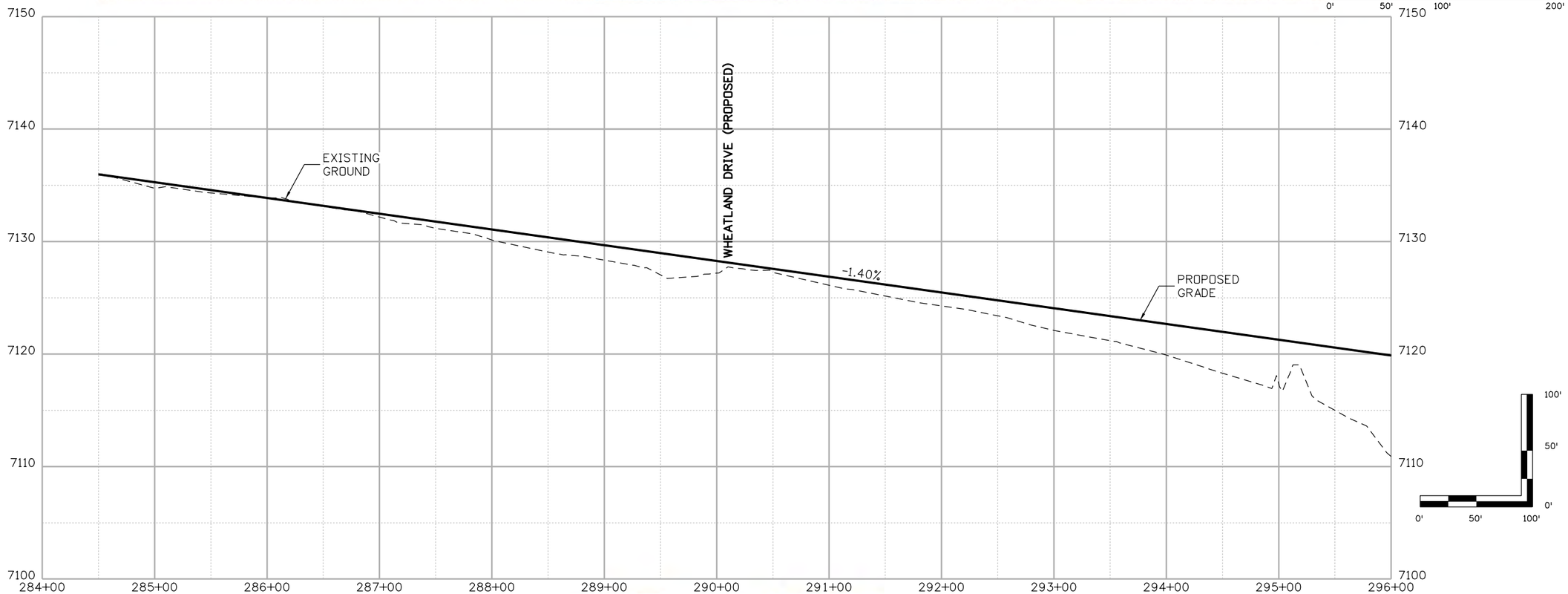
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 8 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.





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Print Date: 11/2/2021			
File Name: 00600DES_PnP_09.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

Sheet Revisions

Date:	Comments	Init.

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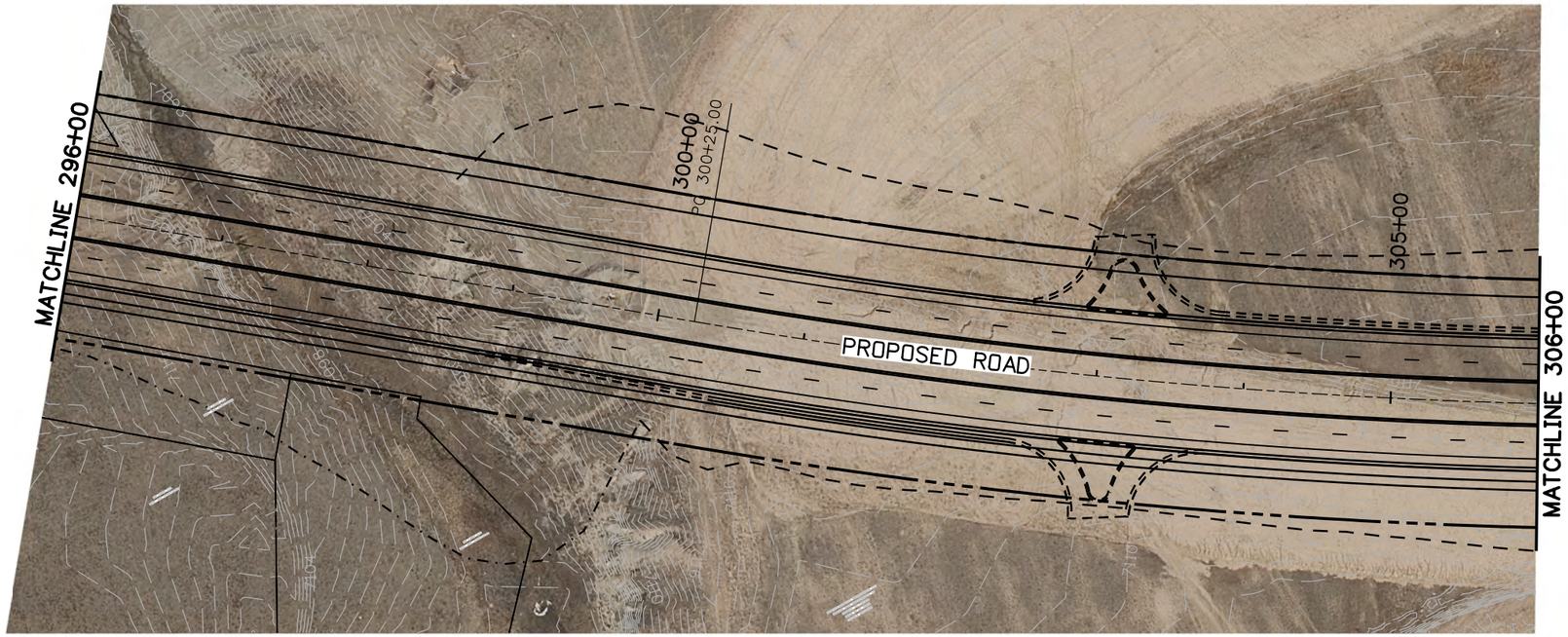
ROADWAY PLAN & PROFILE STA 284+50 TO STA 296+00

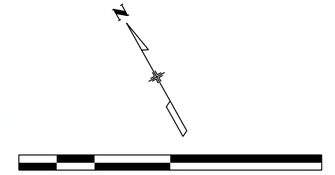
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 9 of 28	

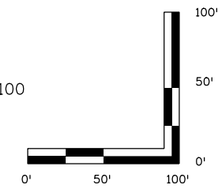
Project No./Code

Sheet Number

Know what's below. Call before you dig.







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Print Date: 2/2/2022			
File Name: 00600DES_PnP_10.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Sheet Revisions

Date:	Comments	Init.

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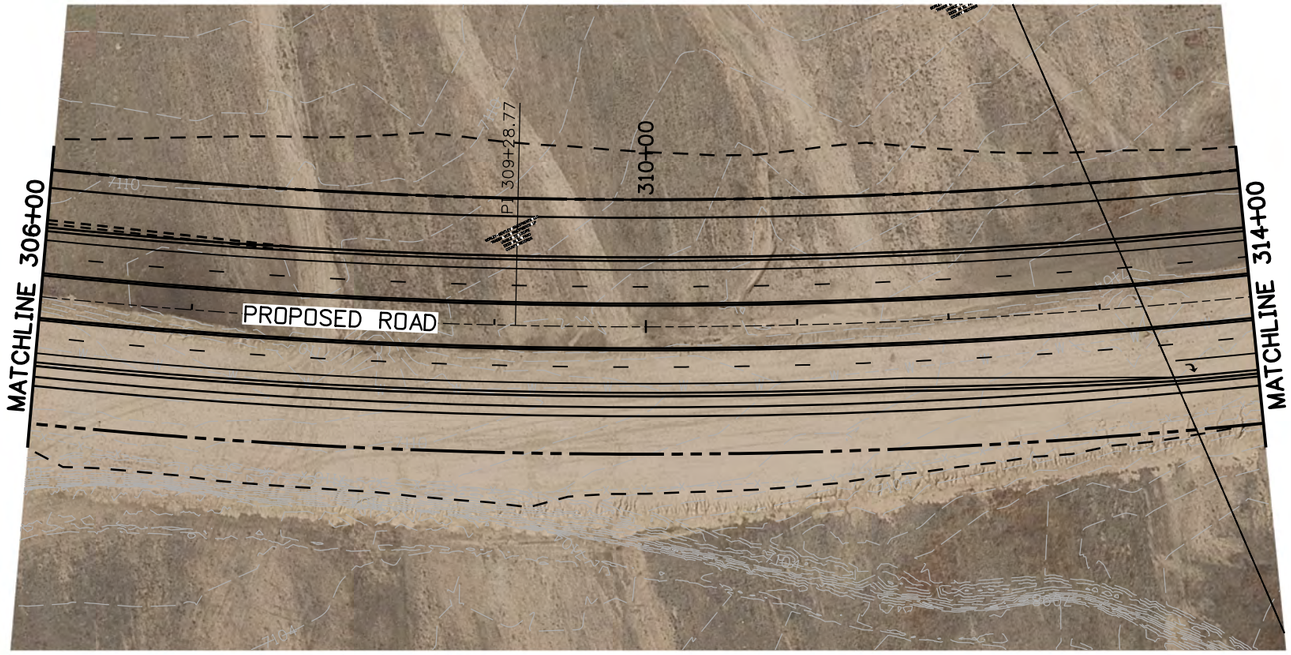
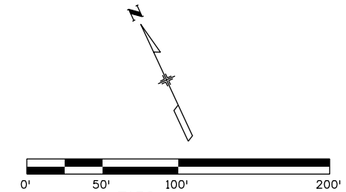
ROADWAY PLAN & PROFILE
STA 296+00 TO STA 306+00

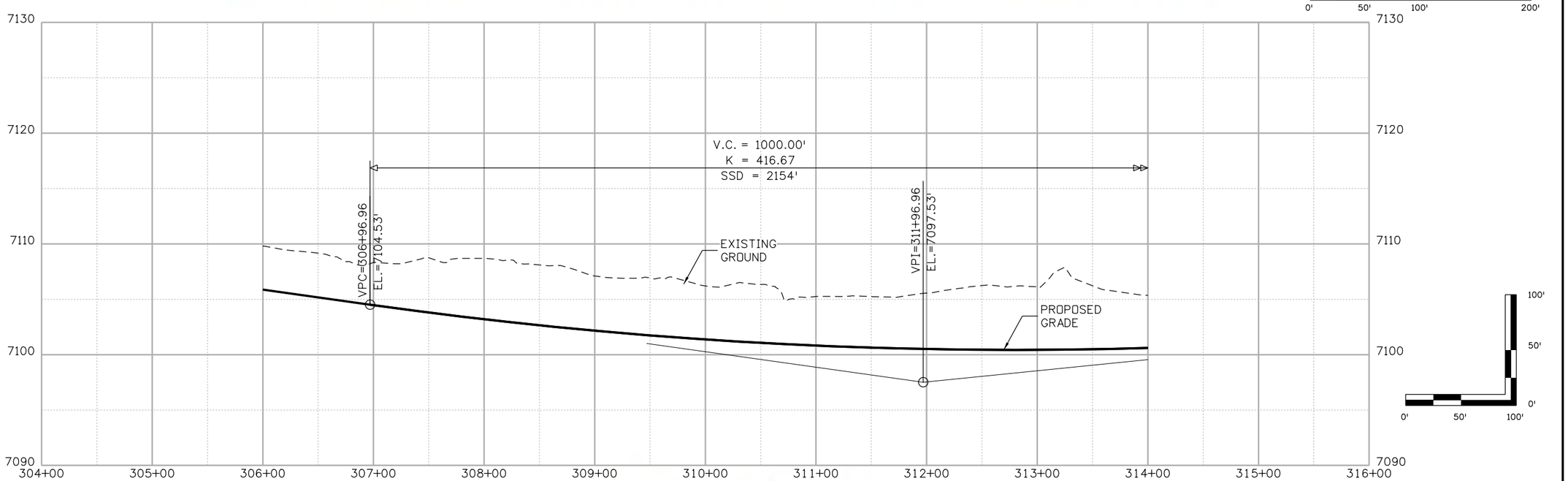
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 10 of 28	

Project No./Code

Sheet Number







Print Date: 11/2/2021		Sheet Revisions			WILSON & COMPANY		ROADWAY PLAN & PROFILE STA 306+00 TO STA 314+00	Project No./Code
File Name: 00600DES_PnP_11.dgn		Date:	Comments	Init.	5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108	No Revisions:		
Horiz. Scale: 1:100	Vert. Scale:					Revised:	Designer: JAF / Detailer: TAH	Structure Numbers
Unit Information	Unit Leader					Void:	Sheet Subset: PnP	Subset Sheets: 11 of 28
								Sheet Number

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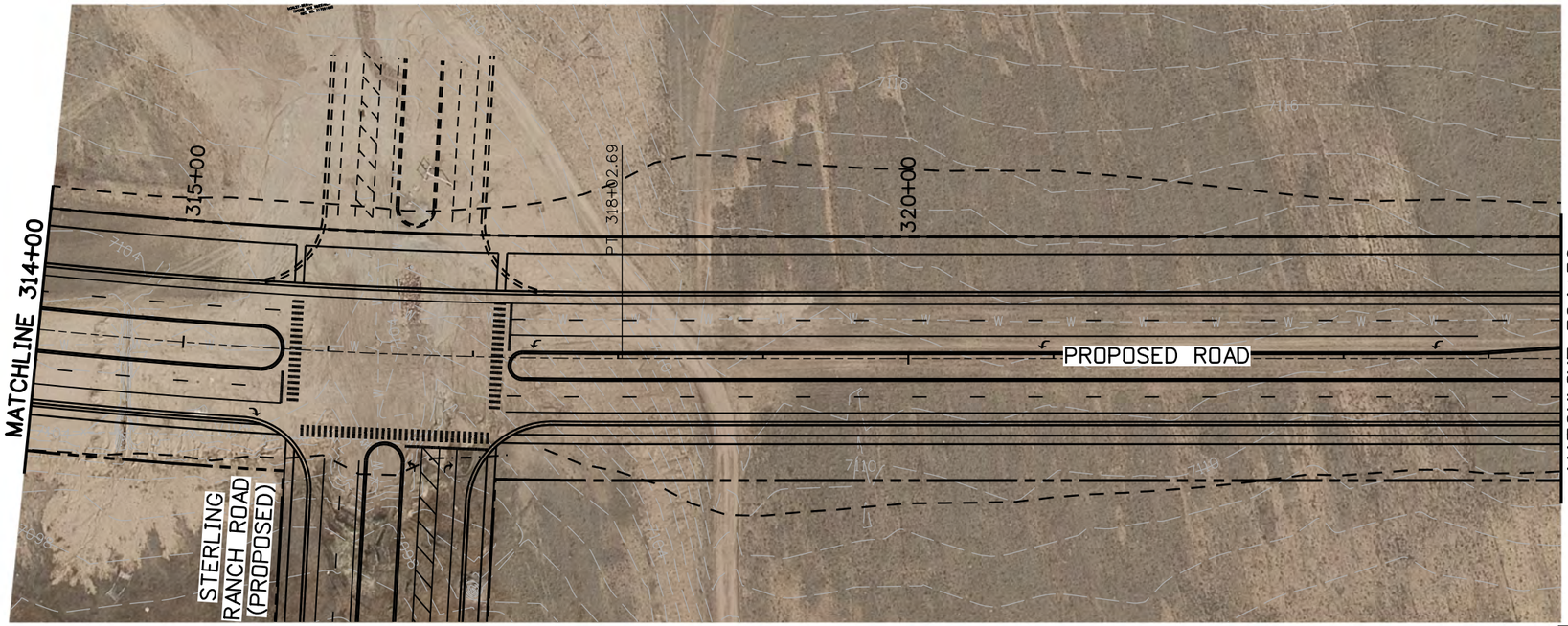

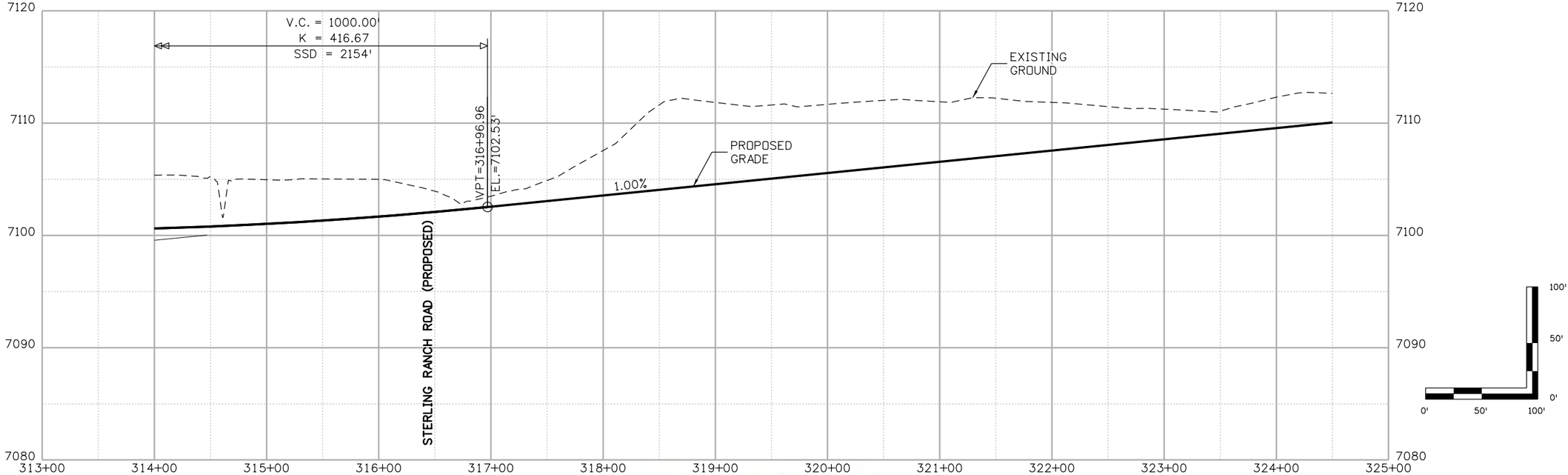

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Print Date: 11/2/2021			
File Name: 00600DES_PnP_12.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Sheet Revisions

Date:	Comments	Init.

EL PASO COUNTY COLORADO EST. 1861

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Revised:	
Void:	

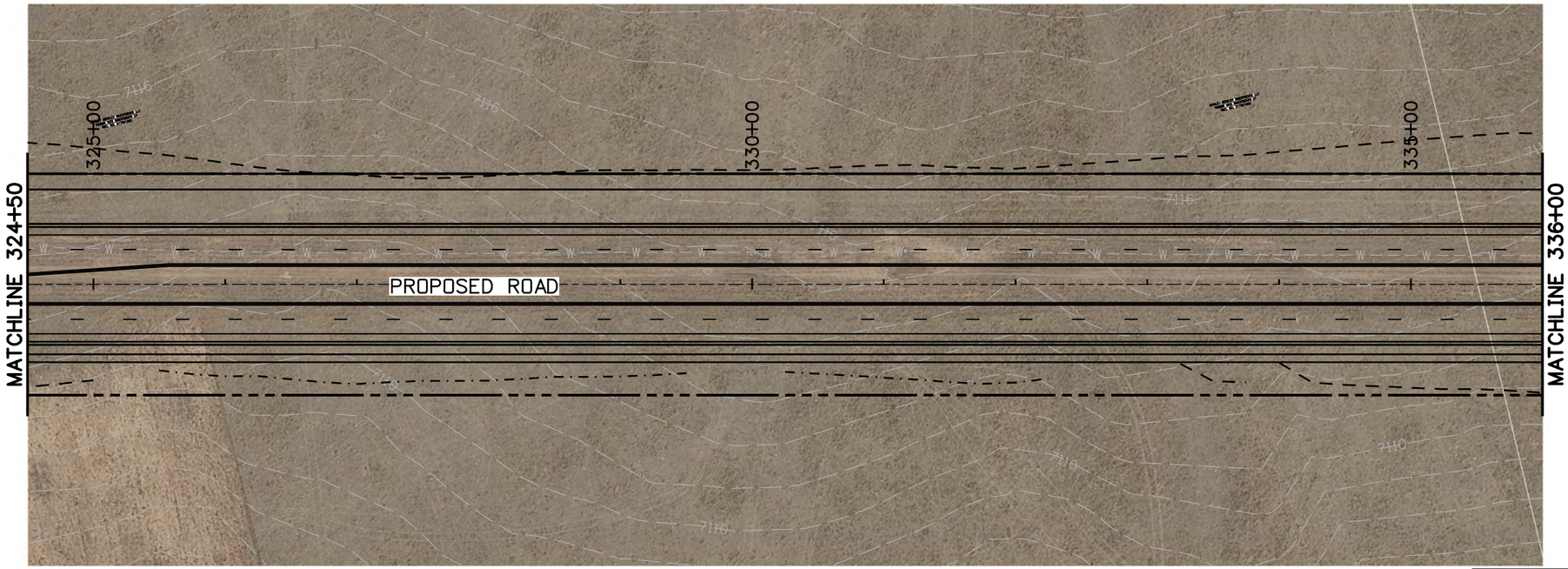
ROADWAY PLAN & PROFILE STA 314+00 TO STA 324+50

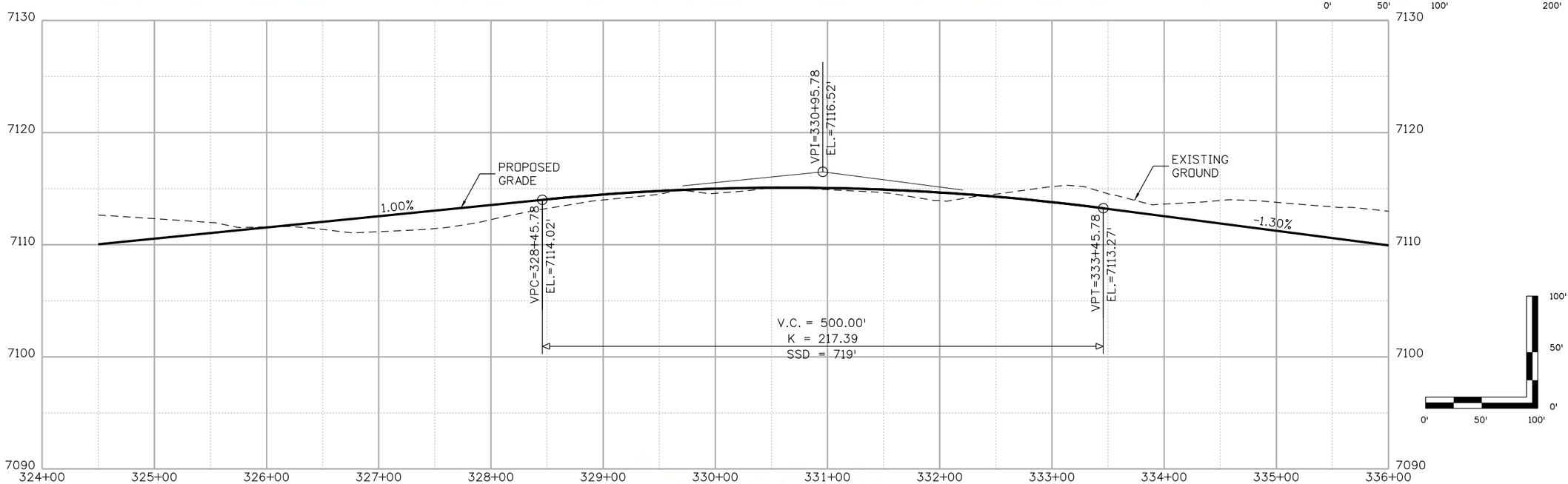
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 12 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.





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Print Date: 11/2/2021			
File Name: 00600DES_PnP_13.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Sheet Revisions

Date:	Comments	Init.

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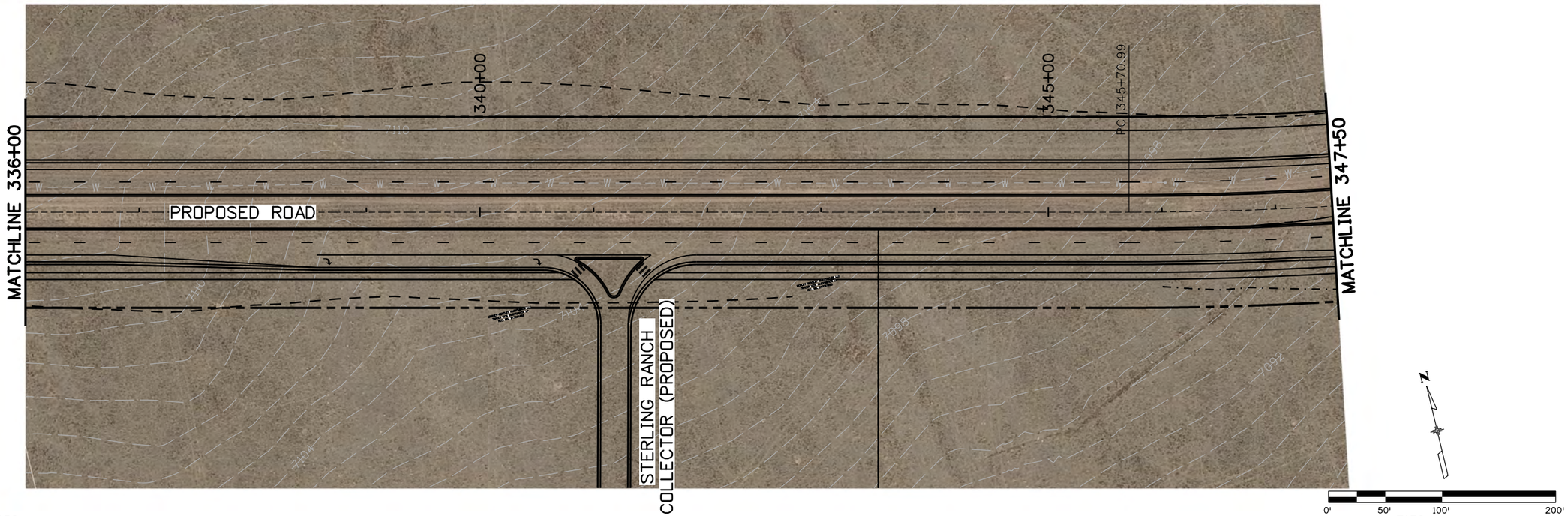
ROADWAY PLAN & PROFILE STA 324+50 TO STA 336+00

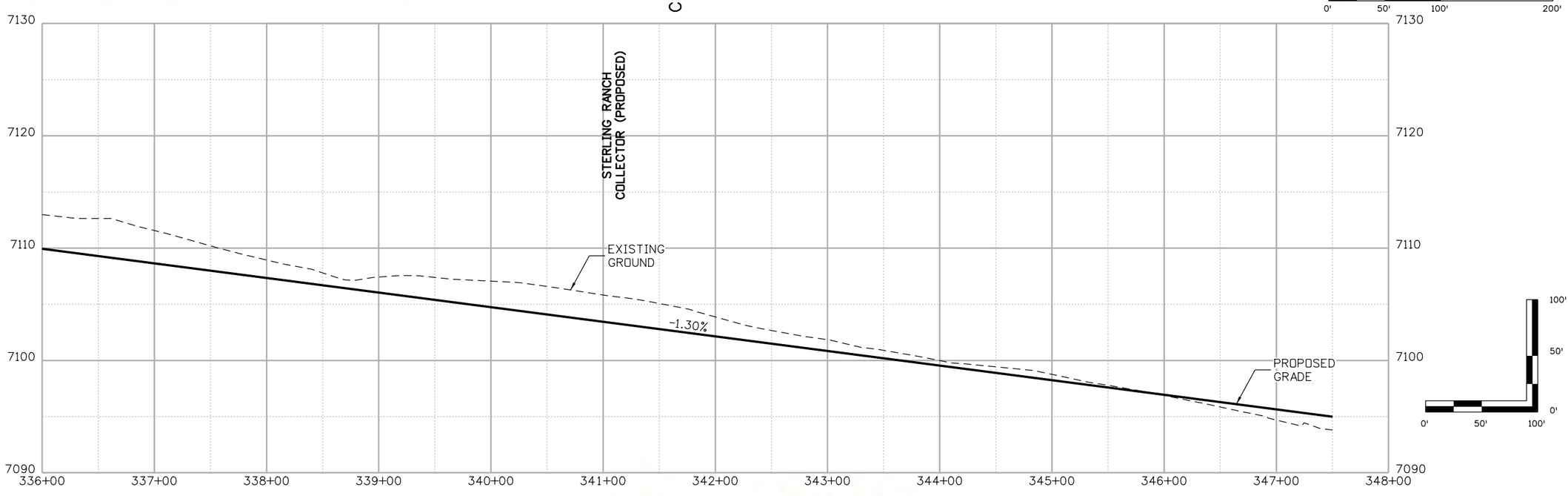
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 13 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.





PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_14.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

Sheet Revisions		
Date:	Comments	Init.

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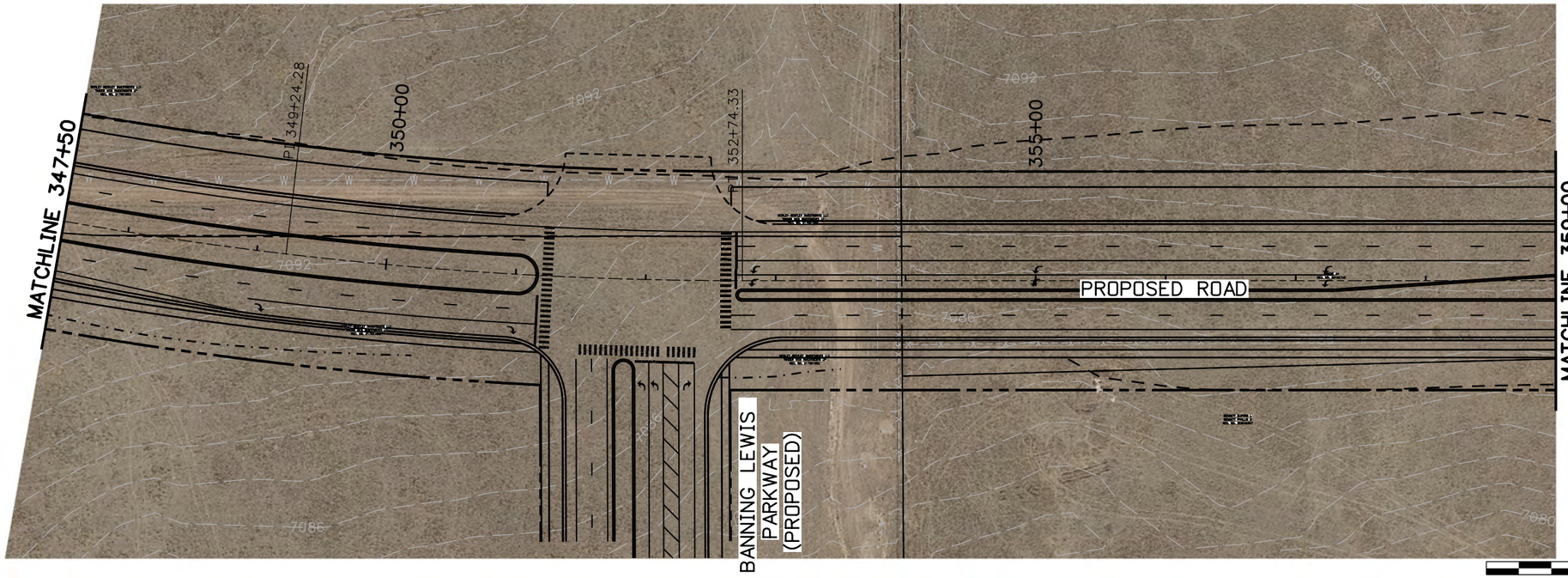
ROADWAY PLAN & PROFILE STA 336+00 TO STA 347+50

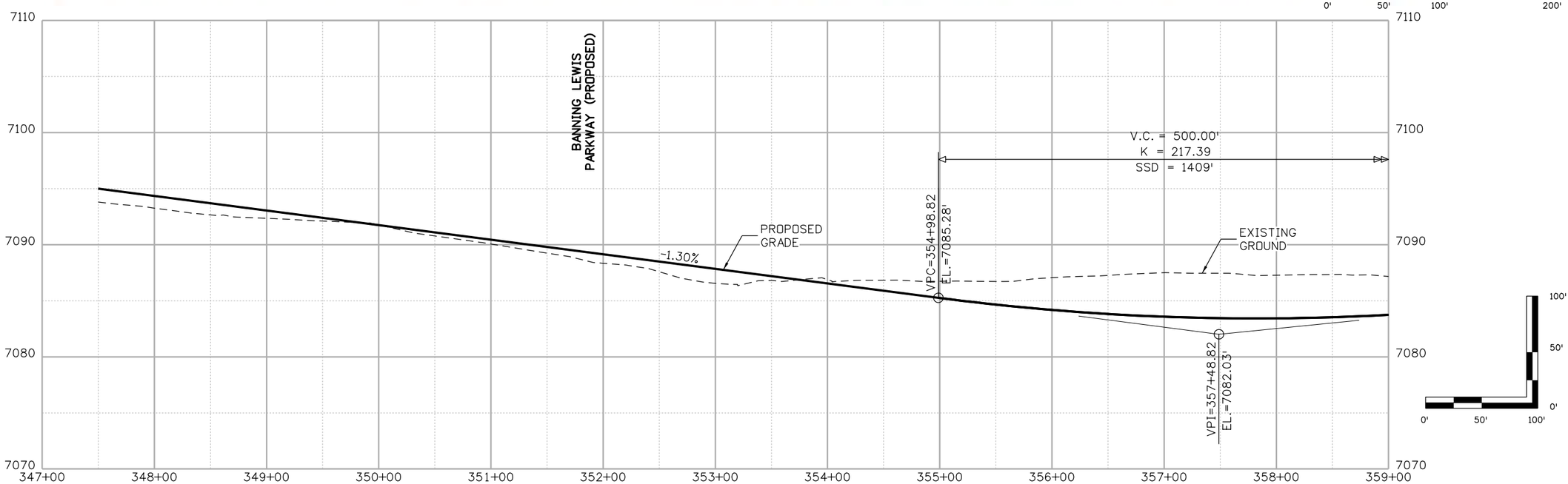
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 14 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.





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Print Date: 11/2/2021		Sheet Revisions			EL PASO COUNTY COLORADO EST. 1861	WILSON & COMPANY	ROADWAY PLAN & PROFILE STA 347+50 TO STA 359+00	Project No./Code
File Name: 00600DES_PnP_15.dgn		Date:	Comments	Init.		5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108		
Horiz. Scale: 1:100	Vert. Scale:							
Unit Information	Unit Leader					No Revisions:		
						Revised:	Designer: JAF / Detailer: TAH / Sheet Subset: PnP	Structure Numbers
						Void:	Subset Sheets: 15 of 28	Sheet Number

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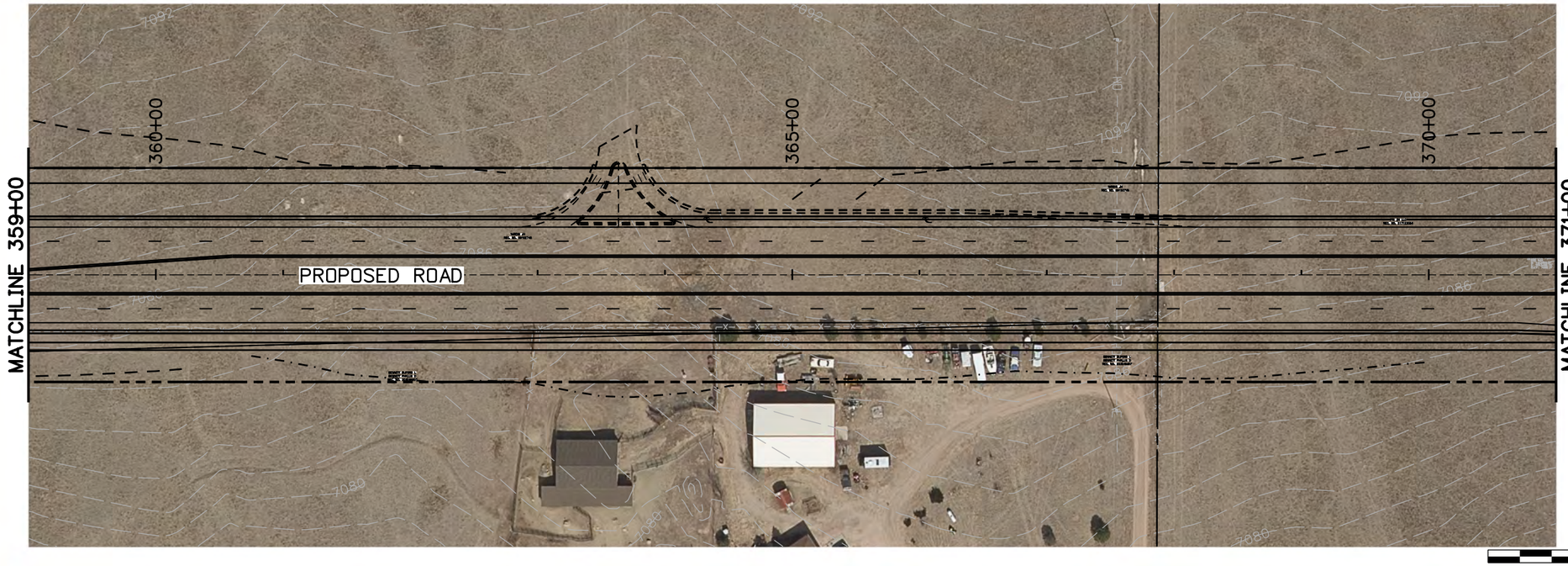

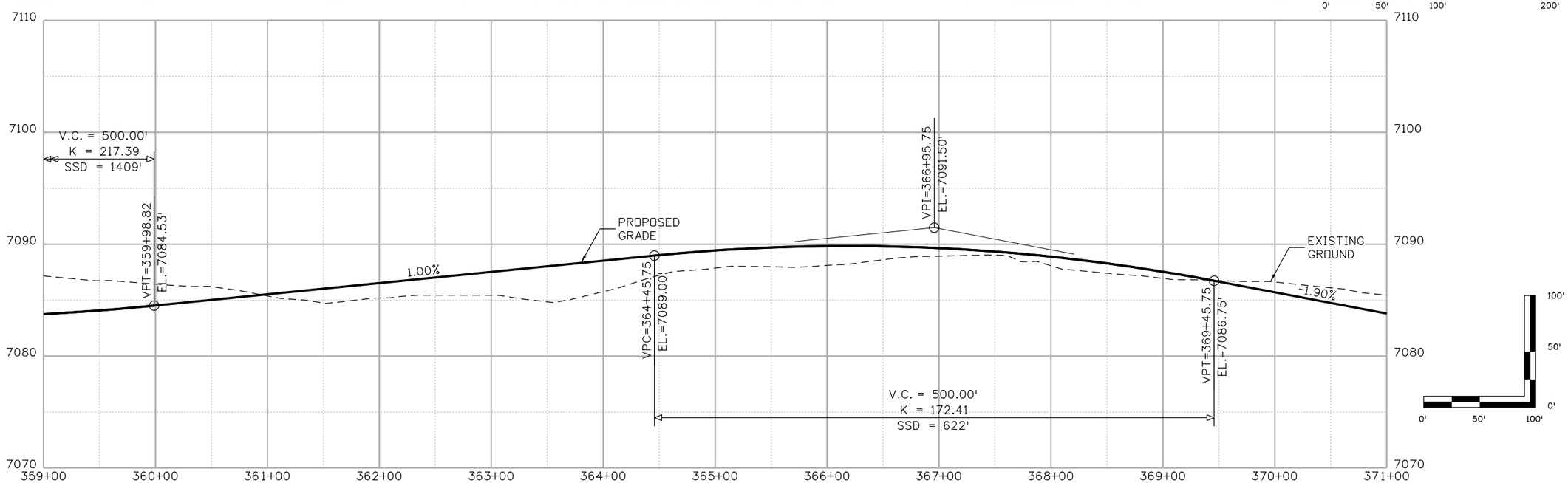

PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_16.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Date:	Comments	Init.

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ROADWAY PLAN & PROFILE STA 359+00 TO STA 371+00

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 16 of 28	

Project No./Code

Sheet Number

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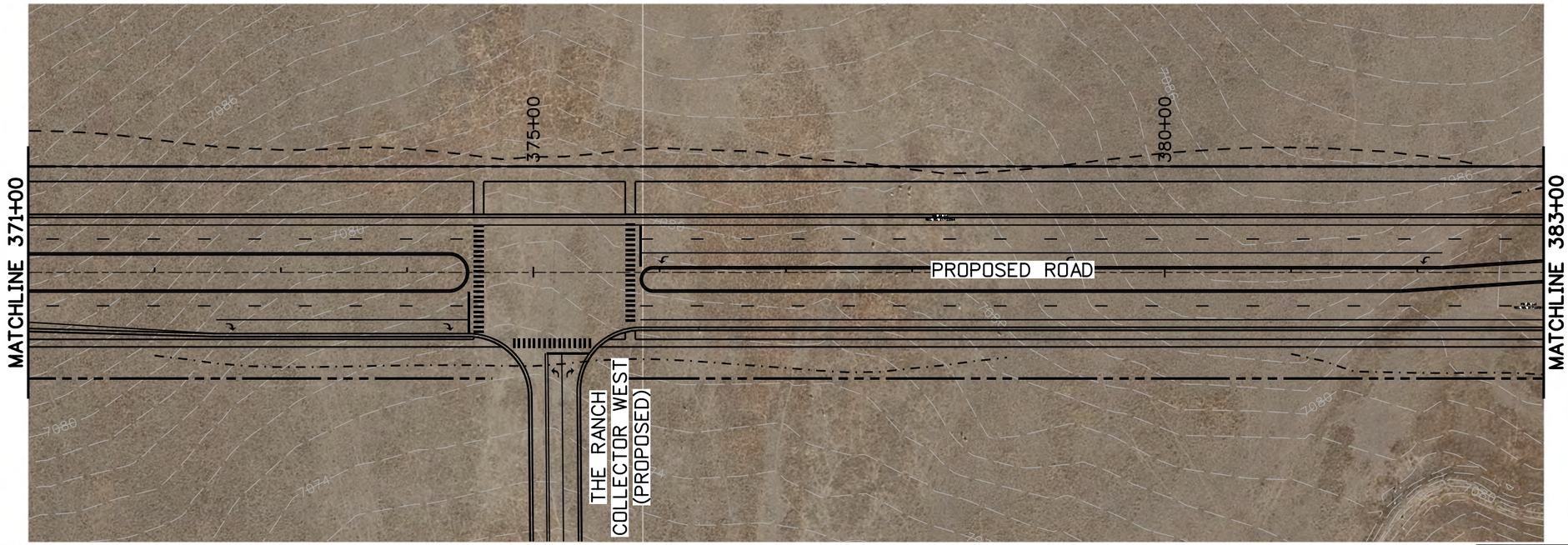
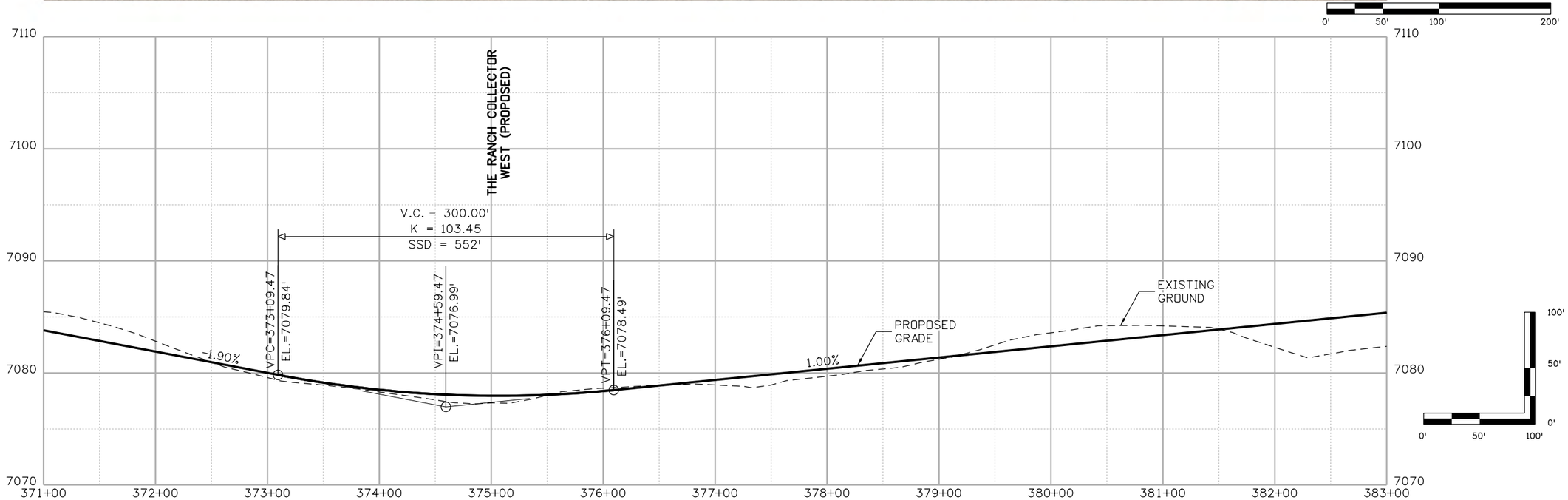
Know what's **below.** **Call** before you dig.





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Print Date: 11/2/2021			
File Name: 00600DES_PnP_17.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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Date:	Comments	Init.

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Revised:	
Void:	

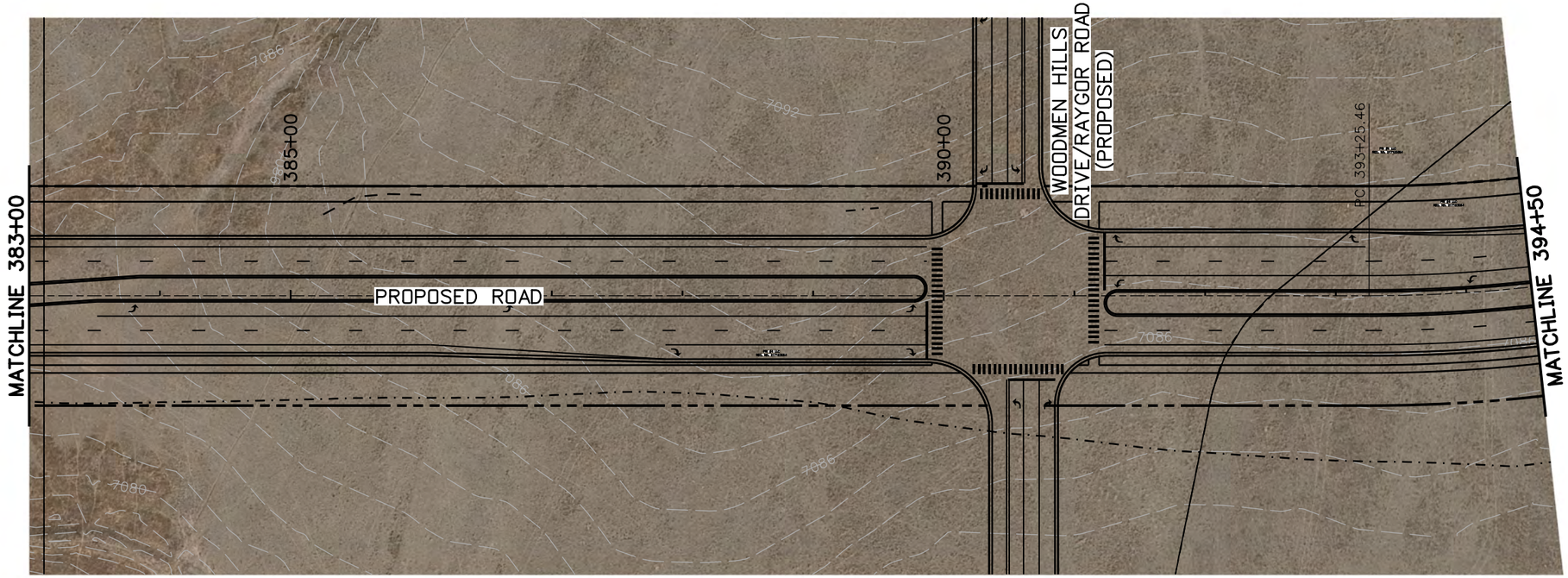
ROADWAY PLAN & PROFILE STA 371+00 TO STA 383+00

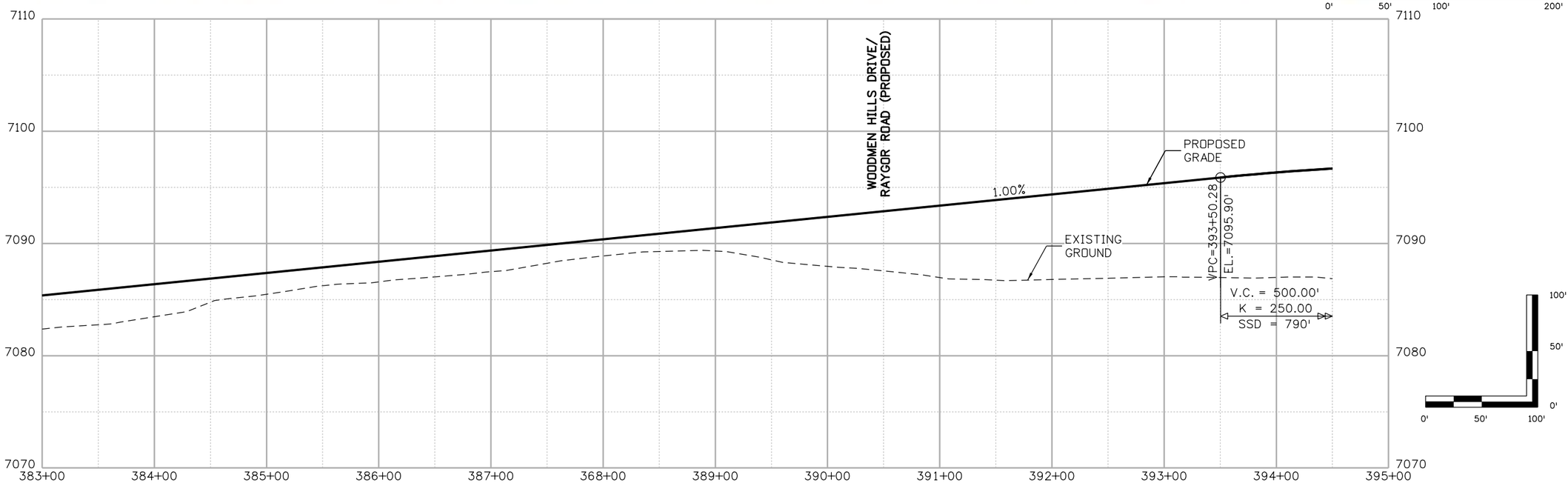
Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 17 of 28	

Project No./Code

Sheet Number

Know what's below. Call before you dig.





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Print Date: 11/2/2021		Sheet Revisions			EL PASO COUNTY COLORADO EST. 1861	WILSON & COMPANY	ROADWAY PLAN & PROFILE STA 383+00 TO STA 394+50	Project No./Code
File Name: 00600DES_PnP_18.dgn		Date:	Comments	Init.		5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108		
Horiz. Scale: 1:100	Vert. Scale:							
Unit Information	Unit Leader					No Revisions:		
						Revised:	Designer: JAF / Structure Numbers	
						Void:	Detailer: TAH	
							Sheet Subset: PnP / Subset Sheets: 18 of 28	Sheet Number

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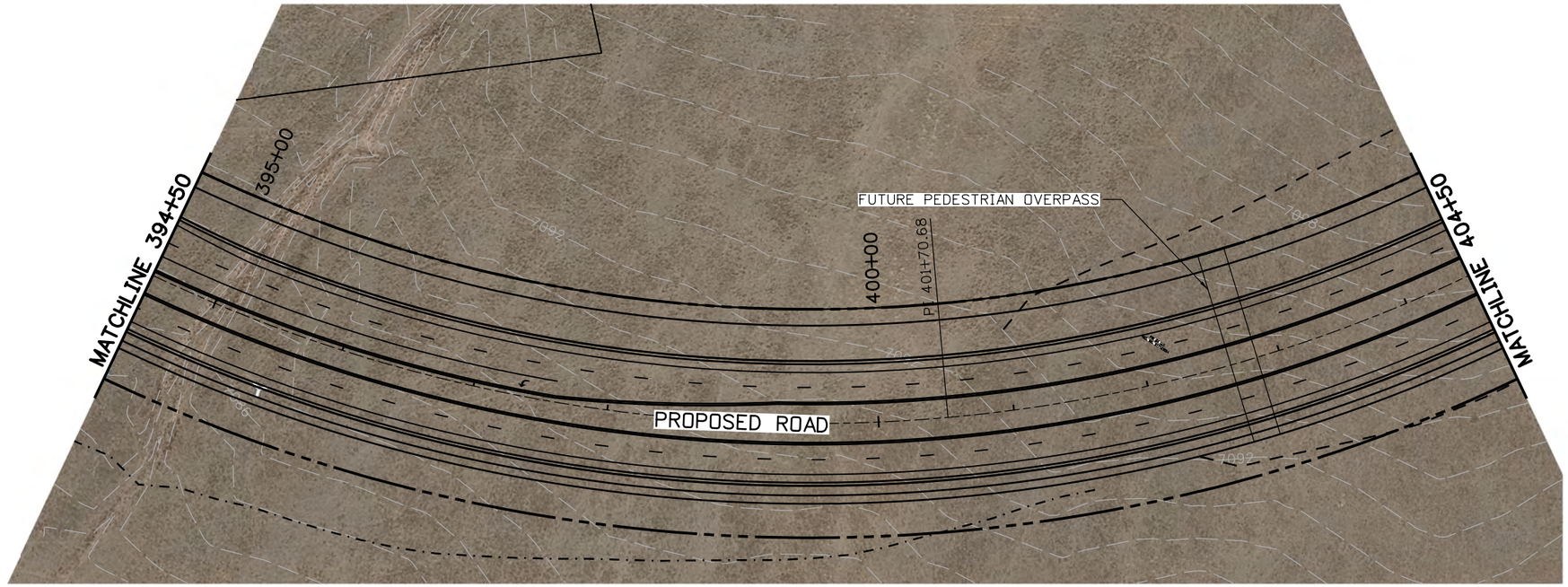

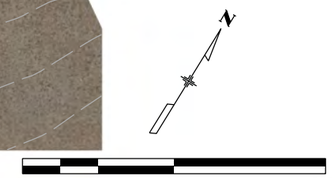

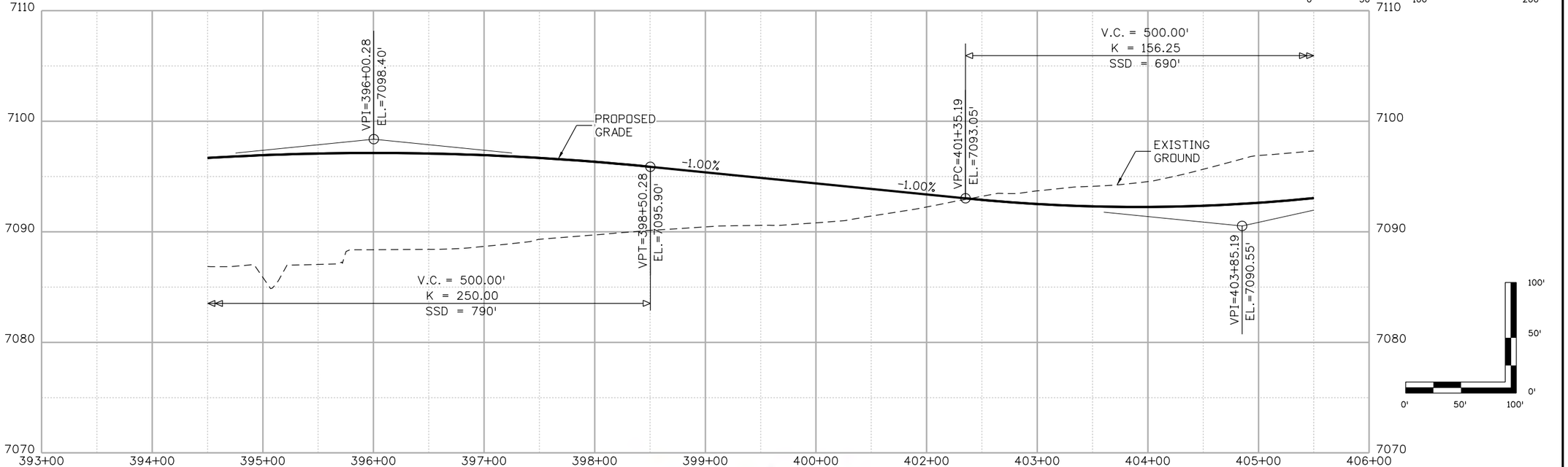

PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_19.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
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ROADWAY PLAN & PROFILE STA 394+50 TO STA 404+50

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Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 19 of 28	

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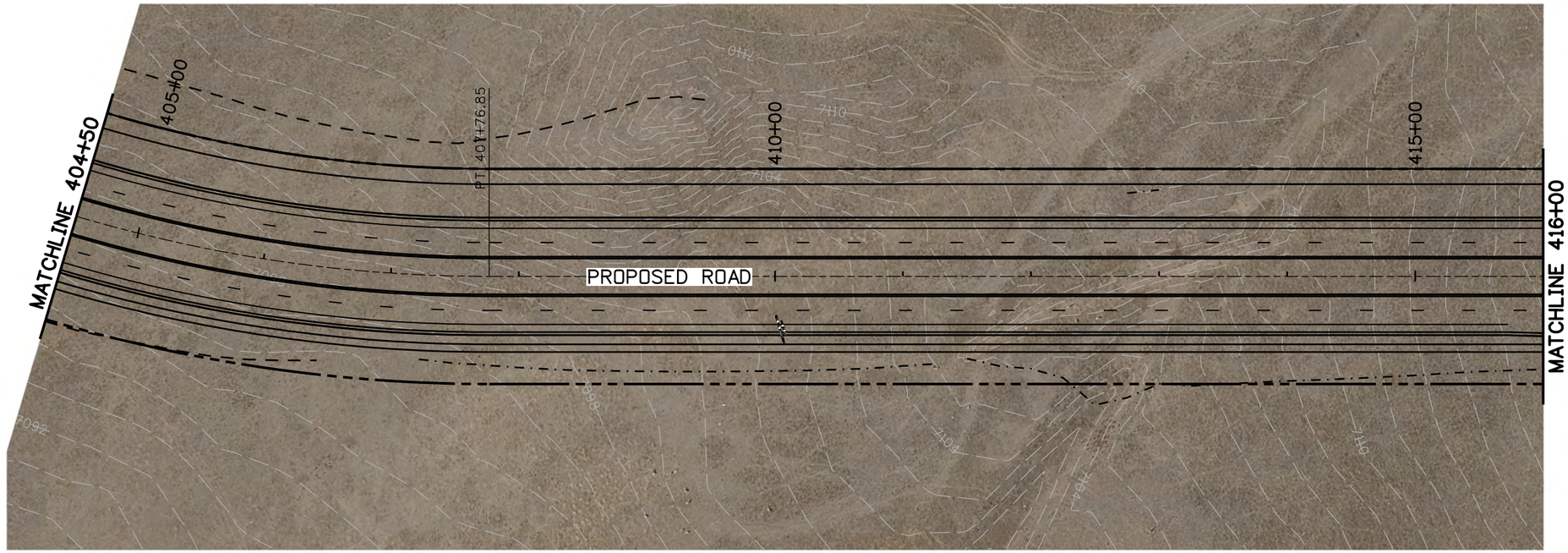

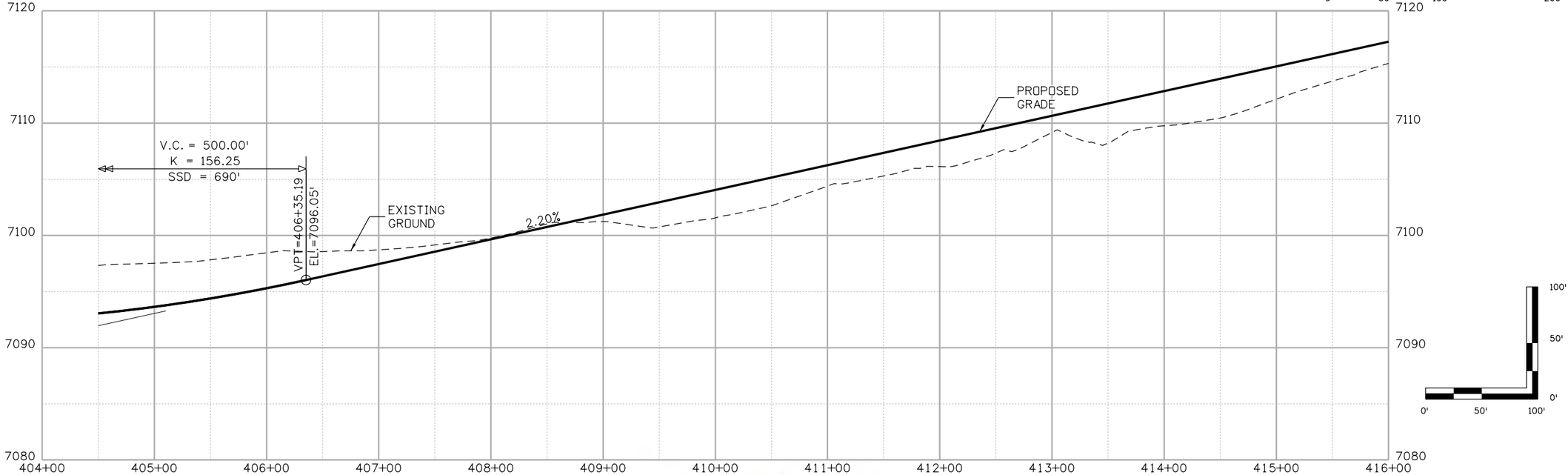

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Print Date: 11/2/2021		Sheet Revisions			EL PASO COUNTY COLORADO EST. 1861	WILSON & COMPANY	ROADWAY PLAN & PROFILE STA 404+50 TO STA 416+00	Project No./Code
File Name: 00600DES_PnP_20.dgn		Date:	Comments	Init.		5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108		
Horiz. Scale: 1:100	Vert. Scale:							
Unit Information	Unit Leader					No Revisions:		
						Revised:	Designer: JAF	Structure Numbers
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							Sheet Subset: PnP	Subset Sheets: 20 of 28
								Sheet Number

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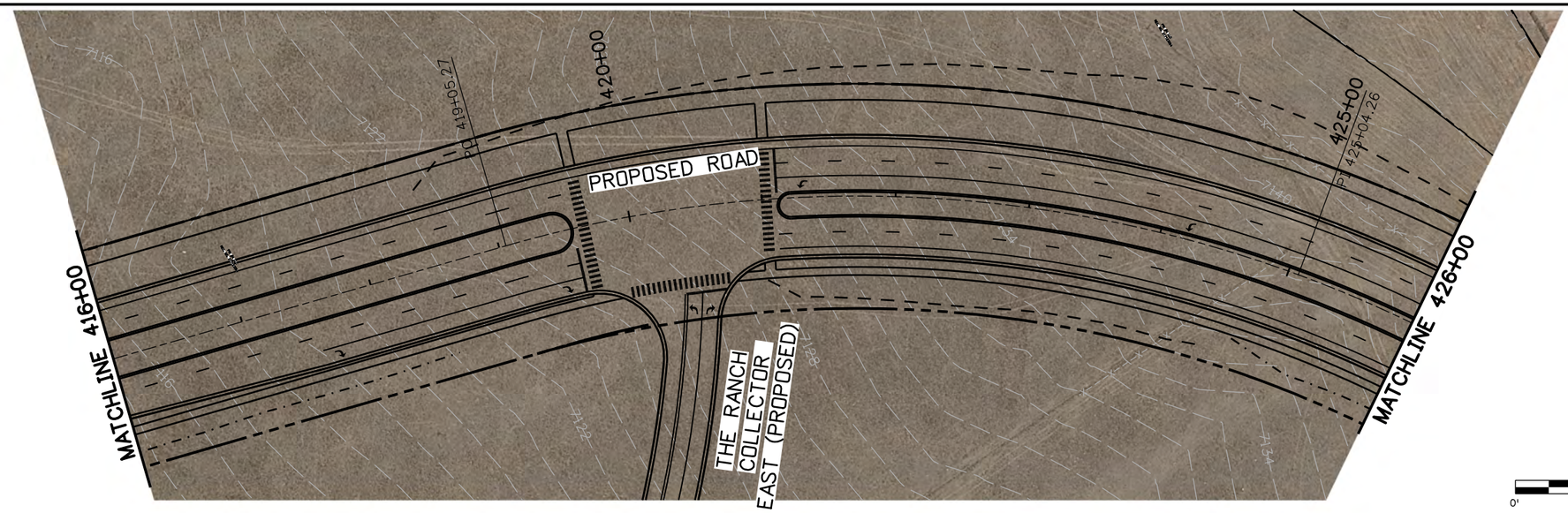

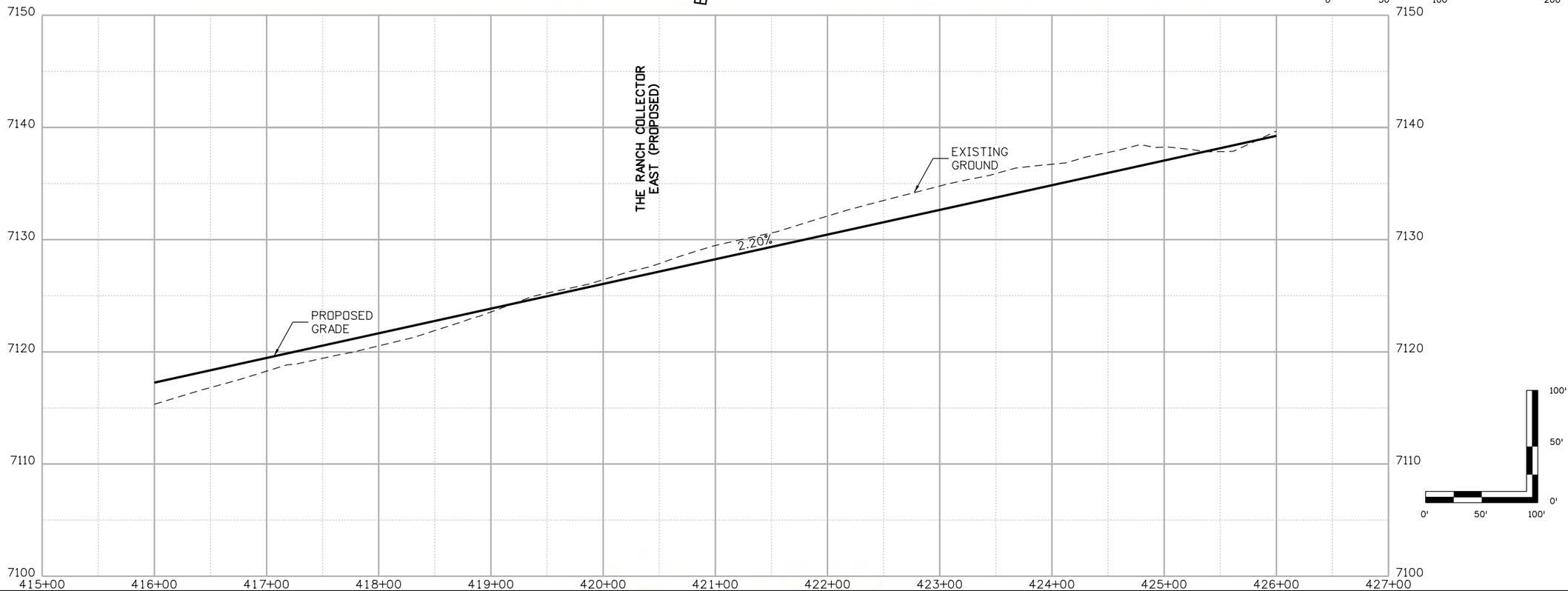

PRELIMINARY - NOT FOR CONSTRUCTION

Print Date: 11/2/2021			
File Name: 00600DES_PnP_21.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

Sheet Revisions

Date:	Comments	Init.

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ROADWAY PLAN & PROFILE STA 416+00 TO STA 426+00

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 21 of 28	

Project No./Code

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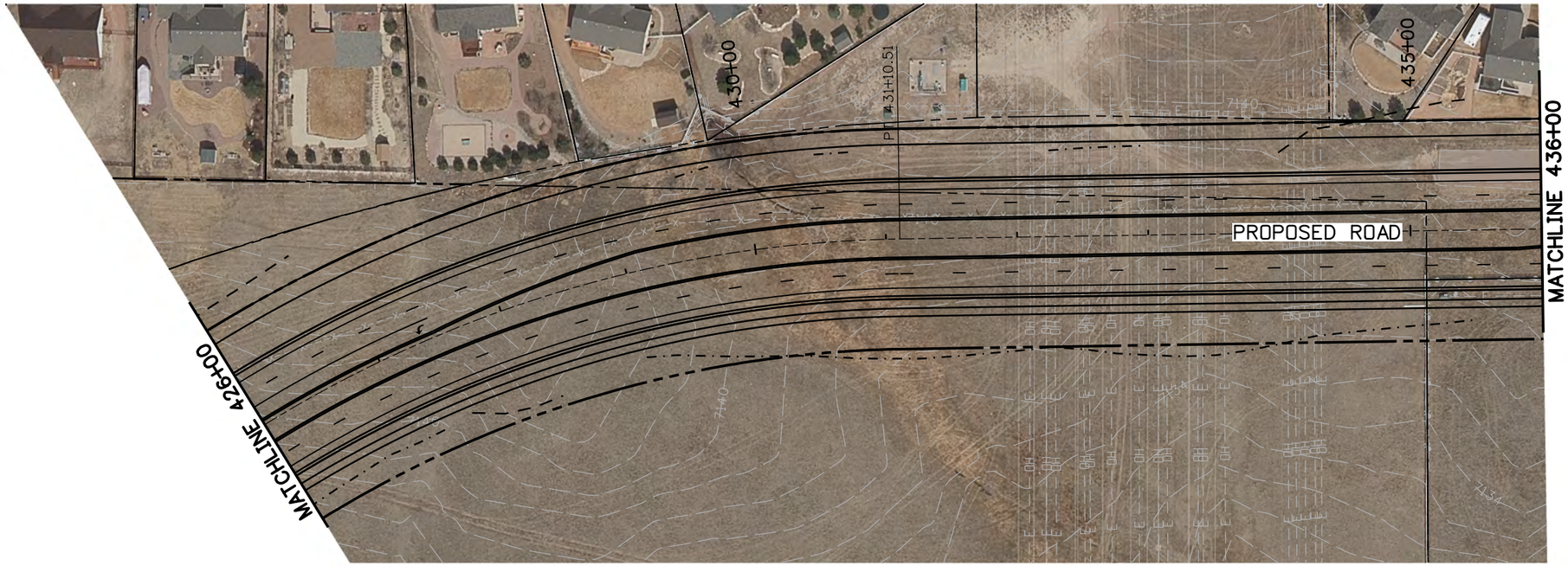

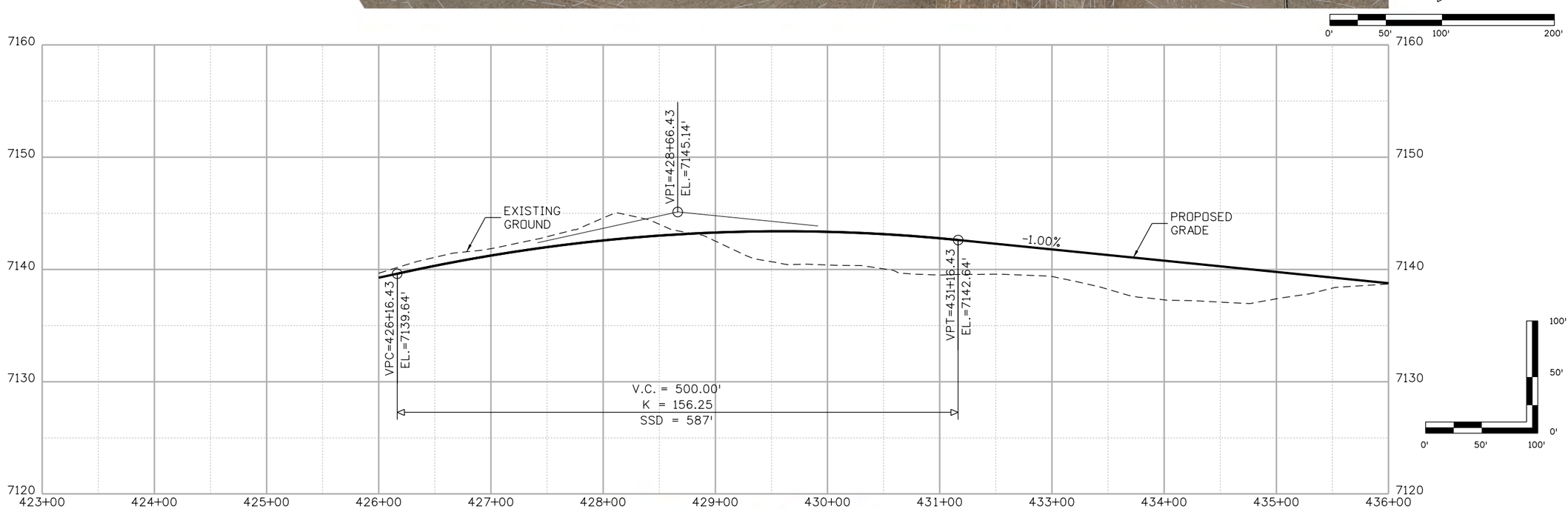

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Print Date: 11/2/2021		Sheet Revisions			EL PASO COUNTY COLORADO EST. 1861	WILSON & COMPANY	ROADWAY PLAN & PROFILE STA 426+00 TO STA 436+00	Project No./Code
File Name: 00600DES_PnP_22.dgn		Date:	Comments	Init.		5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108		
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Unit Information	Unit Leader					No Revisions:		
						Revised:	Designer: JAF / Detailer: TAH / Sheet Subset: PnP	Structure Numbers
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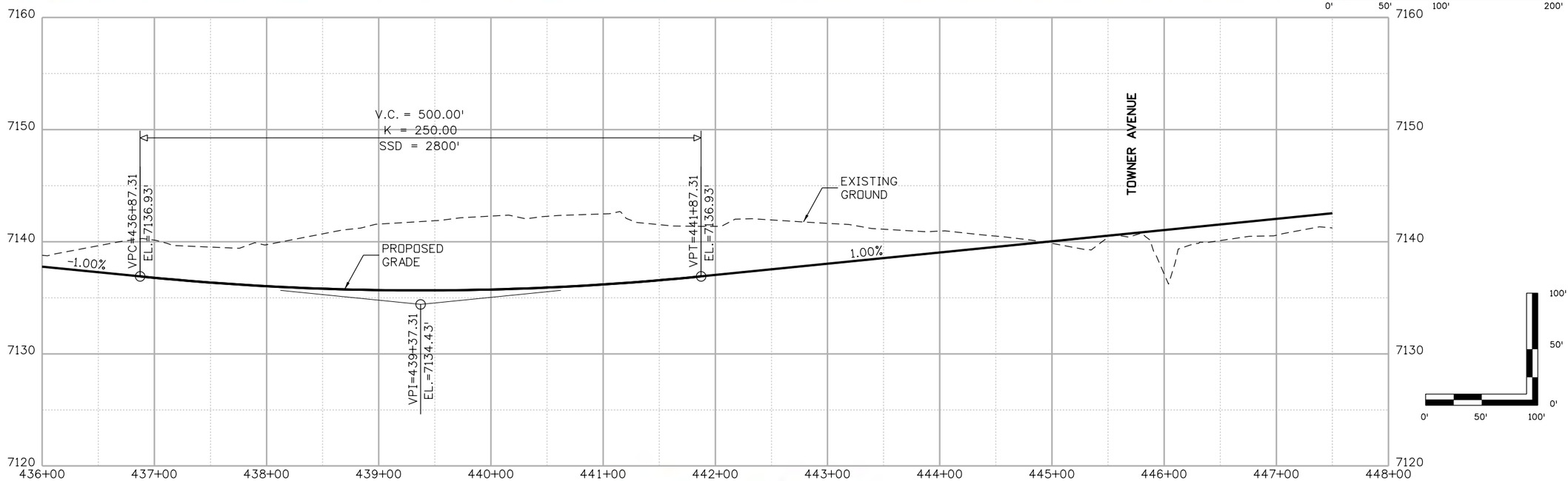

Print Date: 11/2/2021		Sheet Revisions			
File Name: 00600DES_PnP_23.dgn		Date:	Comments	Init.	
Horiz. Scale: 1:100	Vert. Scale:				
Unit Information	Unit Leader				

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ROADWAY PLAN & PROFILE STA 436+00 TO STA 447+50

Designer: JAF
Detailer: TAH
Sheet Subset: PnP
Structure Numbers:
Subset Sheets: 23 of 28

Project No./Code

Sheet Number

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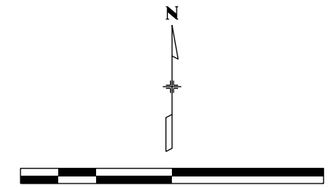

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Print Date: 11/2/2021			
File Name: 00600DES_PnP_24.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
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Sheet Revisions		
Date:	Comments	Init.

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ROADWAY PLAN & PROFILE
STA 447+50 TO STA 457+50

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 24 of 28	

Project No./Code

Sheet Number

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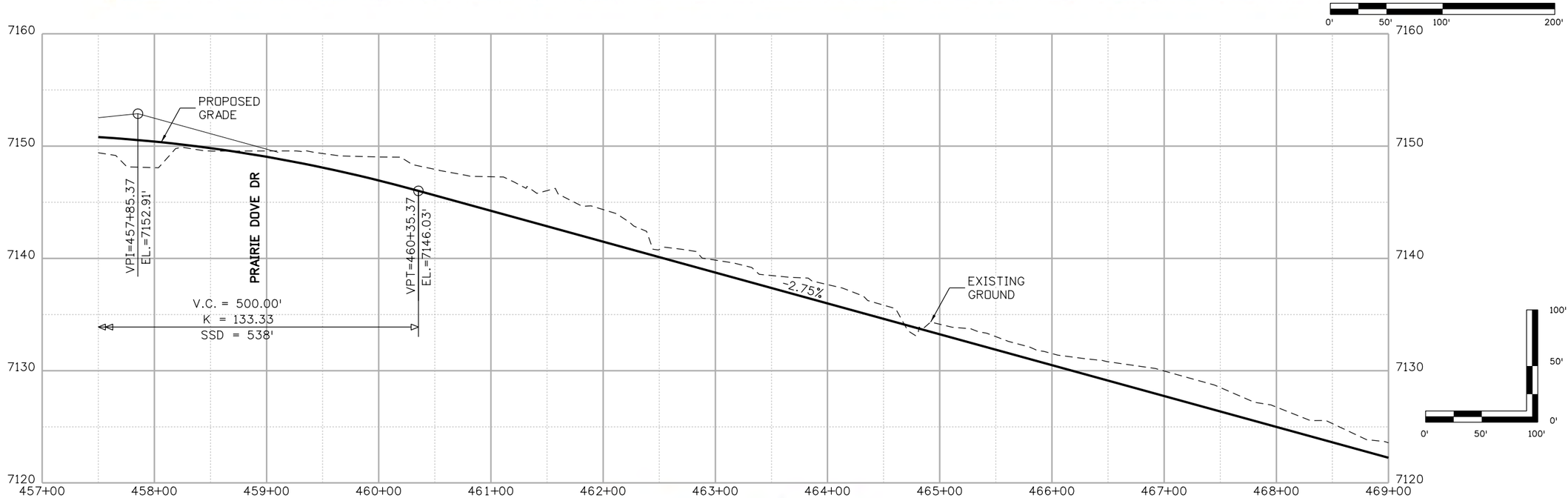

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Print Date: 11/2/2021		Sheet Revisions			WILSON & COMPANY		ROADWAY PLAN & PROFILE STA 457+50 TO STA 469+00	Project No./Code
File Name: 00600DES_PnP_25.dgn		Date:	Comments	Init.	5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108	No Revisions:		
Horiz. Scale: 1:100	Vert. Scale:					Revised:	Designer: JAF / Structure Numbers	
Unit Information	Unit Leader					Void:	Detailer: TAH	
							Sheet Subset: PnP	Subset Sheets: 25 of 28
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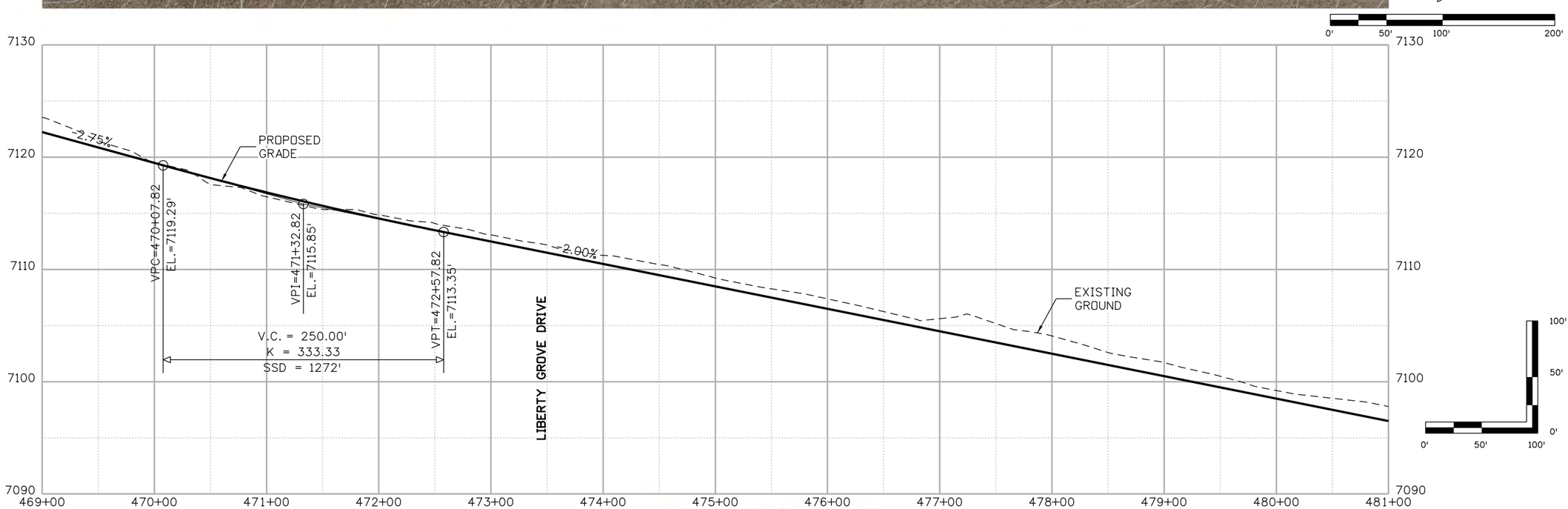

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File Name: 00600DES_PnP_26.dgn		Date:	Comments	Init.	5755 Mark Dabling Blvd. Suite 220 Colorado Springs, CO 80919 Phone: 719-520-5800 FAX: 719-520-0108	No Revisions:		
Horiz. Scale: 1:100	Vert. Scale:					Revised:	Designer: JAF / Structure Numbers	
Unit Information	Unit Leader					Void:	Detailer: TAH	
							Sheet Subset: PnP / Subset Sheets: 26 of 28	Sheet Number

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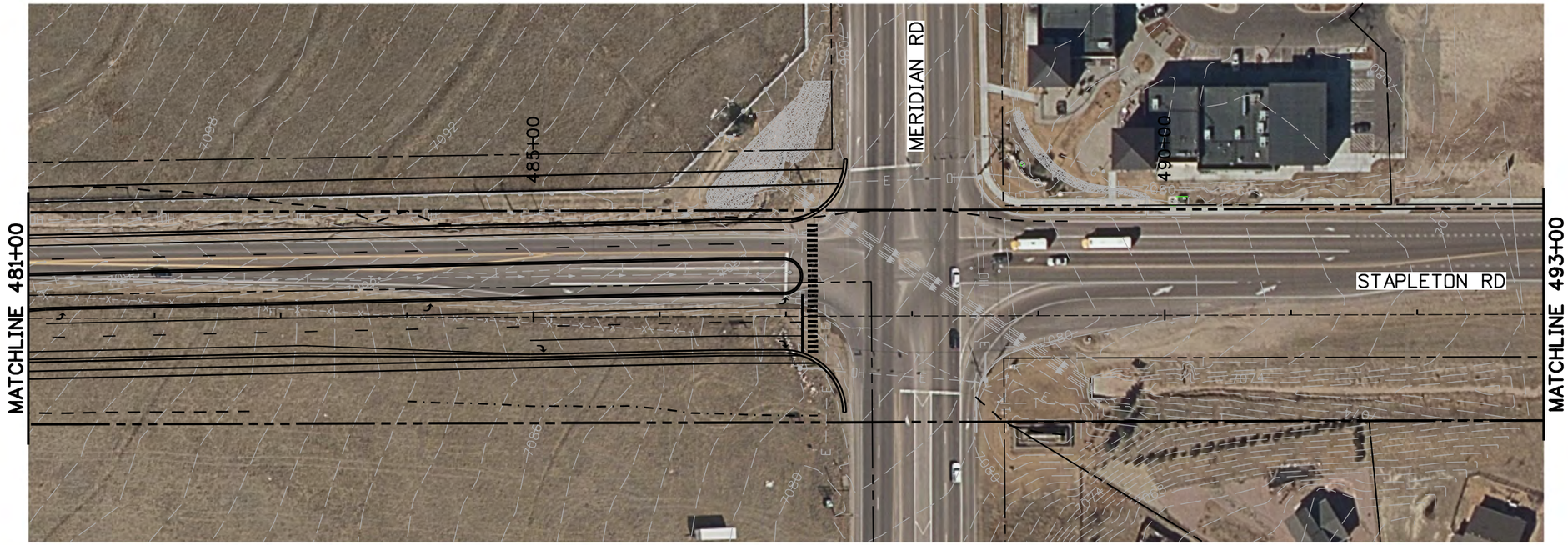

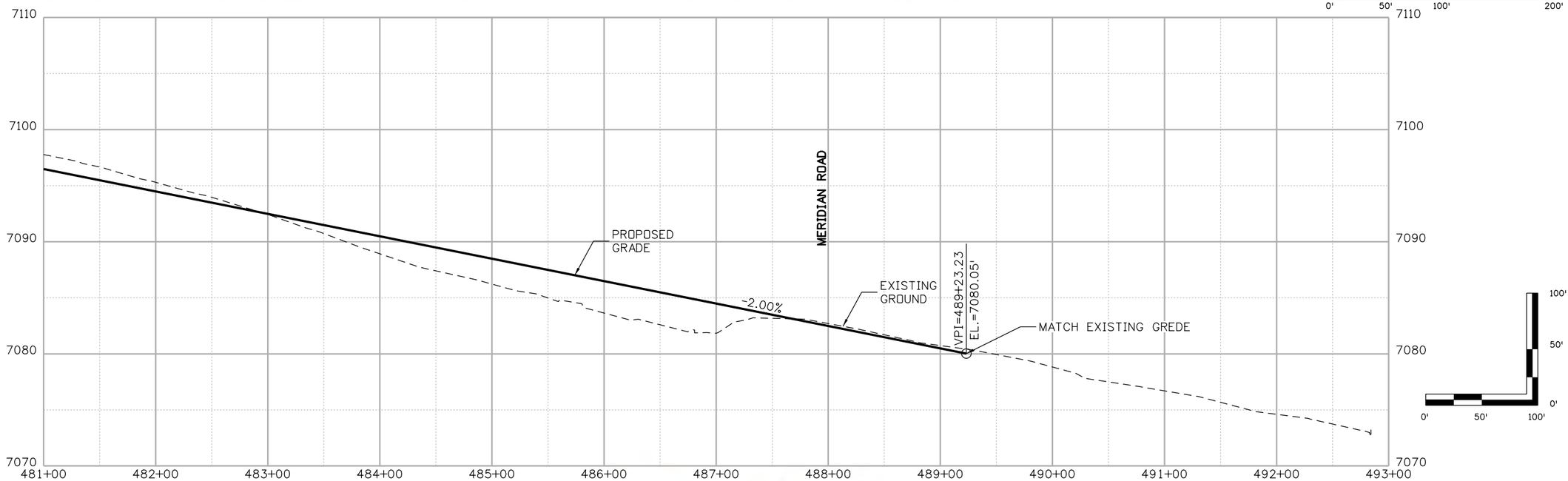

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Print Date: 11/2/2021			
File Name: 00600DES_PnP_27.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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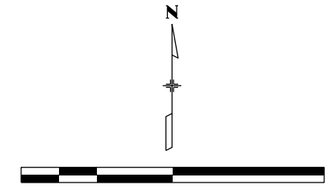
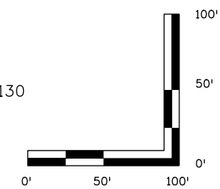
ROADWAY PLAN & PROFILE STA 481+00 TO STA 493+00

Designer:	JAF	Structure Numbers	
Detailer:	TAH		
Sheet Subset:	PnP	Subset Sheets: 27 of 28	

Project No./Code

Sheet Number





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Print Date: 11/2/2021			
File Name: 00600DES_PnP_28.dgn			
Horiz. Scale: 1:100	Vert. Scale:		
Unit Information	Unit Leader		

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STA 493+00 TO STA 500+92

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