



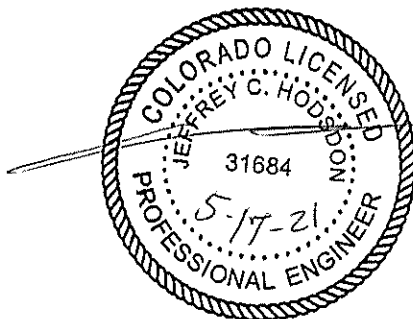
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Bent Grass East Commercial
Filing No. 3
Updated Traffic Impact Analysis
PCD File No. SP2010
(LSC #204660)
May 17, 2021

If you have questions please
reach out for a meeting to
discuss the comments
provided.

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.


5/18/21
Date

LSC Responses to EPC TIS Redline Comments

Page: 1

 Number: 1 Author: Daniel Torres Subject: Text Box Date: 6/29/2021 9:54:21 AM

[If you have questions please reach out for a meeting to discuss the comments provided.](#)

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:22:56 PM

LSC Response: Meetings have taken place and the TIS report has been updated, based on the outcomes of those meetings.

BACKGROUND TRAFFIC

Background traffic is the traffic estimated to be on the roadways without the Bent Grass West traffic. The short-term (Year 2021) background traffic volumes are shown in Figure 6. The background traffic volumes are based on the existing traffic volumes shown in Figure 5, with a portion of the volumes assumed to be rerouted as the counts were conducted prior to the completion of Bent Grass Meadows Drive (between the sections located north of the Woodmen frontage road and west of Meridian Road) and the closure of the 7-Eleven access to Bent Grass Meadows Drive. All 7-Eleven traffic was assumed to use the south access to Meridian Park Drive that will align with the proposed access for Bent Grass East Commercial Filing No. 3.

The short-term background traffic volumes also include additional traffic projected to be generated by buildout of Bent Grass Residential Filing No. 2, buildout of Falcon Meadows at Bent Grass, buildout of the initial phase of Banning Lewis Ranch North, and **buildout of Falcon Marketplace** located northwest of the intersection of Woodmen Road/Meridian Road. As buildout of these projects has been assumed, these short-term volumes may be conservative if commercial buildout takes several years to occur. The short-term background traffic volumes also assume a right-in-only access to Woodmen Road just west of Meridian Road. Through traffic on Meridian Road was assumed to have a 2 percent growth rate per year.

Figure 7 shows the projected 2040 background traffic volumes. These volumes were estimated by LSC, based on previous work completed in the area by LSC, including other Bent Grass Meadows developments, the Falcon Marketplace, and *the Banning Lewis Ranch North - Traffic Impact Study* prepared by SM Rocha, LLC, dated August 2019. The 2040 background traffic volumes assume buildout of the area north of Woodmen Road and west of Meridian Road. Appendix Table 1 shows the trip generation estimates for all existing and future land uses assumed to be built out in this area by 2040. Appendix Figure 1 shows the location of each traffic analysis zone referenced in the appendix tables.


A significant portion of the background traffic shown on Meridian Park Drive is due to Owl Lane redevelopment trip estimates from 10-15 years ago. Commercial development of the size and configuration that was common at that time likely no longer applies today for the Owl Lane area, and any commercial development would likely be significantly smaller and generate significantly fewer trips.

TRIP GENERATION

Estimates of the vehicle trips generated by Bent Grass East Commercial Filing No. 3 have been made using the nationally published trip generation rates found in *Trip Generation, 10th Edition* by the Institute of Transportation Engineers (ITE). The results of the trip generation estimate are shown in Table 2.

Page: Bent Grass Commercial Update TIA REPORT MAY 2021 (combined) 10

 Number: 1 Author: Daniel Torres Subject: Highlight Date: 6/27/2021 5:05:11 PM

 Number: 2 Author: Daniel Torres Subject: Highlight Date: 6/27/2021 5:05:08 PM

¹ May 17, 2021
Traffic Impact Analysis
Please use County nomenclature as the ECM does not differentiate between residential and non-residential local roadways

ROADWAY CLASSIFICATIONS & CROSS SECTIONS

Private Roadway

LSC suggests a classification of “Commercial Local [private]” for the private road. This roadway should be classified as a “Local” Roadway – not a “residential local” roadway with individual residential lot access, on street parking, etc., rather a “commercial local” roadway, where access to adjacent parcels is the predominant function. The proposed roadway cross section is 24-feet wide. As a commercial street, higher traffic activity is expected and tolerated, compared to a residential street with a similar width.

Each individual lot to be developed is intended to be accessed via a private driveway that will be located on the private roadway. Comments have been provided in the turn movement exhibit as the design vehicle encroaches into the opposing lane at the radii proposed at the intersection of the private roadway and Meridian Park Drive. ²

This street is intended to be a relatively short, local commercial street serving a minimal number of commercial lots, a center two-way left-turn lane would not be necessary to separate left-turning traffic from through traffic at each of the internal lot driveway access points. The roadway has a short length and, as such, trip lengths will be short. The narrower width combined with the short length will geometrically limit higher speeds. A 24 ft. cross section is not sufficient for the traffic volume/impacts of this development. Based on the proposed uses, turn lanes may be required along this private roadway and a 24ft section would not provide the required width to add any future turn lanes. These comments have also been provided in the submitted deviation request for this private roadway.

As this will be a relatively short, local commercial street serving a minimal number of commercial lots, a center two-way left-turn lane would not be necessary to separate left-turning traffic from through traffic at each of the internal lot driveway access points. The roadway has a short length and, as such, trip lengths will be short. The narrower width combined with the short length will geometrically limit higher speeds.

The site development plan for each individual lot will address lot access design and site circulation to accommodate the anticipated design vehicle – either single unit or multi-unit trucks. The radii at the intersections of the private road/Meridian Park Drive and the intersection of the private road/Bent Grass Meadows Boulevard can be adjusted to accommodate the design vehicle.

Meridian Park Drive

Meridian Park Dr is not identified on the 2016 El Paso County Major Transportation Corridors Plan (MTCP). This roadway was approved and constructed as a Local with the development of the Bent Grass Commercial PUD. The land use currently proposed is consistent with the land use shown at the time the PUD was approved.


Meridian Park Drive should be classified as a “Local” street – not a “residential local” street (with individual residential lot access, on street parking, etc.) - rather a “commercial local” street, where access to adjacent parcels is the predominant function. Meridian Park drive was constructed with sufficient width to stripe a two-way, center left-turn lane if ever needed. Note: this project is proposing to consolidate lot access into one Meridian Park Drive location (plus one on Bent Grass Meadows Drive) via the proposed private road.

³
Use County nomenclature such as urban local roadway.

Page: Bent Grass Commercial Update TIA REPORT MAY 2021 (combined) 15

 Number: 1 Author: Daniel Torres Subject: Callout Date: 6/28/2021 10:54:08 AM


Please use County nomenclature as the ECM does not differentiate between residential and non-residential local roadways

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:21:46 PM

LSC Response: The TIS report has been updated to address this comment.

 Number: 2 Author: Daniel Torres Subject: Callout Date: 6/29/2021 11:05:30 AM

Comments have been provided in the turn movement exhibit as the design vehicle encroaches into the opposing lane at the radii proposed. A 24 ft. cross section is not sufficient for the traffic volume/impacts of this development. Based on the proposed uses, turn lanes may be required along this private roadway and a 24ft section would not provide the required width to add any future turn lanes. These comments have also been provided in the submitted deviation request for this private roadway.

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:22:48 PM

LSC Response: This comment was discussed in the meetings with Staff and the TIS report has been updated, based on the outcomes of those meetings. The private roadway is now shown as an Urban Local and the Autoturn exhibits have been revised by Classic Consulting.

 Number: 3 Author: Daniel Torres Subject: Callout Date: 6/28/2021 10:56:20 AM

Use County nomenclature such as urban local roadway.

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:23:16 PM

LSC Response: The TIS report has been updated to address this comment.

ECM criteria in 2.3.7 does not specify that thresholds do not apply to local roadways. The criteria indicates Minor arterials and lower classifications which would include local roadways. Please revise and provide the required auxiliary turn lanes on Meridian Park Drive and the proposed private roadway.

Meridian Park Drive commercial development associated with the Owl Place area. Meridian Park Drive was required by EPC to extend to the south property line to allow for possible future access to the Owl Lane area and potentially a connection between [now] Falcon Marketplace and the south end of Meridian Park Drive. This was required to ensure access management on Meridian Road, as no full movement would be allowed between Eastonville and Bent Grass Meadows Drive. This connection was basically intended as a commercial "local frontage road" for the relatively short distance between Eastonville and Bent Grass Meadows Drive.

A significant portion of the ADT is due to Owl Lane redevelopment trip estimates from 10-15 years ago. Commercial development of the size and configuration that was common at that time likely no longer applies today for the Owl Lane area, and any commercial development would likely be significantly smaller and generate significantly fewer trips.

AUXILIARY TURN LANE ANALYSIS

Meridian Park Drive/Private Road -Northbound and Southbound Approaches

Applying auxiliary lanes thresholds is not required on roadways classified as "Local." Even if the street were considered subject to the turn-lane thresholds, the southbound projected through traffic at this access is low, even with the potential future Owl Lane redevelopment. As Meridian Park Drive/Bent Grass Meadows Drive is a T intersection, southbound traffic upstream of this access will have just turned from Bent Grass Meadows Drive – beginning travel southbound at a significantly lower speed than a 35 or 40 mph design speed.

Meridian Park drive was constructed with sufficient width to stripe a two-way, center left-turn lane if ever needed – for purposes of left-turn storage to avoid blockage of through traffic by left-turning traffic waiting for an acceptable gap in opposing traffic.

Private Street – Exiting Traffic Laneage


This subsection discusses the eastbound approach to Meridian Park Drive and Northbound Approach to Bent Grass Meadows Drive

Section 2.3.7.D describes the warrants for turn lanes generally in this manner: [...] lane is required for any access with a projected peak-hour right [or left] ingress turning volume of [...]. The word "ingress" refers to traffic turning from the major street (in this case, Bent Grass Meadows Drive or Meridian Park Drive) onto the minor street (in this case, the private road) or access.

We have evaluated this intersection for eastbound approach need for auxiliary speed change lanes for this site-specific case, considering the intent of the *ECM* criteria.

 Number: 1 Author: Daniel Torres Subject: Callout Date: 6/28/2021 12:19:18 PM

ECM criteria in 2.3.7 does not specify that thresholds do not apply to local roadways. The criteria indicates Minor arterials and lower classifications which would include local roadways. Please revise and provide the required auxiliary turn lanes on Meridian Park Drive and the proposed private roadway.

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:23:42 PM

LSC Response: This comment was discussed in the meetings with Staff and the TIS report has been updated, based on the outcomes of those meetings.

Mr. Ron Waldthausen
Bent Grass East Commercial

Per our previous discussion on other projects Red Rock acres and Rock Creek Mesa, the intent of this criteria is that if the threshold is met then turn lanes are required regardless if it is stop sign controlled. Please revise accordingly.

2 Although the projected left-turn volume on the private road eastbound at Meridian Park Drive exceeds 25 vph, separate turn lanes would not be needed as "speed change lanes" eastbound on the private road at Meridian Park Drive or northbound on the private road at Bent Grass Meadows Drive, as these access points will remain stop-sign controlled. There will be no significant speed differential between turning traffic and through traffic. As all traffic stops at the stop sign, there will be no need for auxiliary "speed change lane(s)" to mitigate speed differential. Even given the remote chance these access points might be signalized in the future, with very low straight through traffic across the intersecting "major" street, almost all traffic will turn left or right.

As the "speed differential" reason for a separate turn lane does not exist in this situation, the intent of the *ECM* with respect to the prescribed thresholds is not met. However, there would be a few situations where a separate left- and right-turn "bays" would potentially be beneficial or necessary: 1) for "Convenience" for right turning vehicles, not having to wait behind left-turning vehicles 2) to maintain satisfactory LOS (i.e., if a single lane approach has a low level of service which does not meet *ECM* criteria, and separate right- and left-turn lanes improves the LOS or 3) to reduce stop-sign approach queue length, if necessary, in the shared approach lane. The LOS is projected to be LOS D or better with the shared approach lane.

The 95th percentile approach queues for 2040 afternoon peak hour for the single-lane minor-street approaches on the private road are projected to be 90 feet (about 4 vehicles) for the eastbound approach to Meridian Park Drive and 54 feet (about 2-3 vehicles) for the northbound approach to Bent Grass Meadows Drive. LSC recommends these queue lengths be considered when placing the individual lot access points to the private road. Queue length estimates may need to be updated with each site development plan.

TRUCK ACCOMMODATION

Please refer to the Autoturn exhibit prepared by Classic Consulting for truck turns into/out of the private road and passage through the site on the private road. The site development plan for each individual lot will address lot access design and site circulation to accommodate the anticipated design vehicle – either single unit or multi-unit trucks. The radii at the intersections of the private road/Meridian Park Drive and the intersection of the private road/Bent Grass Meadows Boulevard can be adjusted to accommodate the design vehicle.

APPROVED CORRIDOR STUDIES

The *El Paso County 2016 Major Transportation Corridors Plan Update* does not identify any 2040 roadway improvements projects in the vicinity of the site and there are no other known approved corridor studies in the area.


Comments have been provided in the submitted turning exhibit. Please include the exhibit in the report.

Page: Bent Grass Commercial Update TIA REPORT MAY 2021 (combined)


17

 Number: 1 Author: Daniel Torres Subject: Callout Date: 6/29/2021 11:04:57 AM

Per our previous discussion on other projects Red Rock acres and Rock Creek Mesa, the intent of this criteria is that if the threshold is met then turn lanes are required regardless if it is stop sign controlled. Please revise accordingly.

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:24:17 PM

LSC Response: This comment was discussed in the meetings with Staff and the TIS report has been updated, based on the outcomes of those meetings. Two-lane approaches are now shown on the plans and in the TIS.

 Number: 2 Author: Daniel Torres Subject: Highlight Date: 6/27/2021 6:39:45 PM

Although the projected left-turn volume on the private road eastbound at Meridian Park Drive exceeds 25 vph, separa

 Number: 3 Author: Daniel Torres Subject: Highlight Date: 6/27/2021 6:39:43 PM

exceeds 25 vph, separate turn lanes would not be needed as "speed change lanes" eastbound on the private road at Meridian Park Drive or northbound on the private road at Bent Grass Meadows Drive, as these access points will remain stop-sign controlled

 Number: 4 Author: Daniel Torres Subject: Callout Date: 6/27/2021 9:12:01 PM

Comments have been provided in the submitted turning exhibit. Please include the exhibit in the report.

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:25:31 PM

LSC Response: The Autoturn exhibits have been revised by Classic Consulting. These exhibits have been attached to the updated TIS report, as requested.

sign-controlled intersection, based on the projected short-term and 2040 total traffic volumes.

- The shared southbound right-turn and through lane at the intersection of Woodmen/Golden Sage is projected to operate at LOS E during the afternoon peak hour, based on the projected short-term total traffic volumes. These movements are projected to operate at LOS D or better, once a separate southbound right-turn lane is constructed. This analysis has been included, although the traffic impact from this project is less than five percent during the morning peak hour, as this and other TIS reports for projects in this Bent Grass/Latigo/Falcon Marketplace “sub area” have called out cost sharing for these improvements. The improvements table includes a recommendation for a fair-share contribution to this improvement. All other movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.

Roadway Improvements

- Auxiliary Turn Lanes

- The existing section of Bent Grass Meadows Drive between Meridian Road and Meridian Park Drive has recently been widened to allow for a three-lane eastbound approach at Meridian/Bent Grass Meadows. As part of this improvement, Bent Grass Meadows has been restriped to remove the existing westbound left-turn lane for the 7-Eleven access, which has been closed, and lengthen the existing westbound left-turn bay approaching Meridian Park Drive. The restriped lane will be about 195 feet long plus an 85-foot taper. Based on the queueing analysis discussed above, the proposed 195-foot lane will provide adequate storage for the projected queues.


- A westbound left-turn lane already exists on Bent Grass Meadows Drive approaching the west site access. The roadway was originally striped with a 110-foot-long westbound left-turn lane approaching the access location. Based on the criteria contained in the *ECM* and a design speed of 40 miles per hour, this left-turn lane should be 215 feet long plus a 160-foot taper. The existing lane should be restriped to meet the *ECM* criteria with this project. Once the parcels north of Bent Grass Meadows Drive develop and a north leg is constructed at the Bent Grass Meadows/Meridian Park intersection, it will not be possible to provide back-to-back left-turn lanes that meet the *ECM* criteria in both directions. A deviation to the criteria contained in the *ECM* may be required with that future development. The maximum westbound left-turn queue on Bent Grass Meadows Drive is about 46 feet approaching the proposed full-movement site access. This

Please indicate the length of the existing eastbound left turn lane. Are the current back to back left turns equal in length? Is it appropriate for the roadway to be widened at this intersection to allow for both left turn lanes to be accommodated?

Page: Bent Grass Commercial Update TIA REPORT MAY 2021 (combined) 19

 Number: 1 Author: Daniel Torres Subject: Callout Date: 6/29/2021 12:35:17 PM

Please indicate the length of the existing eastbound left turn lane. Are the current back to back left turns equal in length?
Is it appropriate for the roadway to be widened at this intersection to allow for both left turn lanes to be accommodated?

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:26:29 PM

LSC Response: This comment was discussed in the meetings with Staff and the TIS report has been updated, based on the outcomes of those meetings. The updated TIS report includes an exhibit showing the recommended turn-lane configuration.

- Based on the classification of Local, no auxiliary lanes are recommended on Meridian Park Drive approaching the proposed private roadway. Please refer to the Auxiliary Turn Lanes section of the report for additional details/discussion.
- Private roadway:
 - A deviation has been submitted for the private road cross section.
 - Based on the proposed cross section of the private roadway, no on-site auxiliary lanes are shown approaching either Bent Grass Meadows Drive or Meridian Park Drive. These intersection approaches are projected to operate at LOS D or better for all movements with single-lane approaches.
 - The queuing analysis projects 95th percentile approach queues for 2040 afternoon peak hour for the single-lane minor street approaches on the private road to be 90 feet (about 4 vehicles) for the eastbound approach to Meridian Park Drive and 54 feet (about 2-3 vehicles) for the northbound approach to Bent Grass Meadows Drive. LSC recommends these queue lengths be considered when placing the individual lot access points to the private road. . Queue length estimates may need to be updated with each site development plan as lot users become known and to verify projections of area traffic conditions.
 - The site development plan for each individual lot will address lot access design and site circulation to accommodate the anticipated design vehicle – either single-unit or multi-unit trucks.
 - The radii at the intersections of the private road/Meridian Park Drive and the intersection of the private road/Bent Grass Meadows Boulevard can be adjusted to accommodate the design vehicle.
- Table 4 identifies the future roadway improvements that will be needed in the vicinity of the site. Table 4 also gives a recommended trigger for when each improvement will be needed.
- Table 5 shows the percentage of the projected 2040 total traffic due to Bent Grass East Commercial Filing No. 3. These percentages could be used to determine the pro-rata share of the cost of intersection improvements.


Deviations

- A deviation for the internal-street cross section of the private roadway through the site is being included with this resubmittal.

Page: Bent Grass Commercial Update TIA REPORT MAY 2021 (combined) 20

 Number: 1 Author: Daniel Torres Subject: Callout Date: 6/29/2021 12:36:23 PM

[Use County nomenclature i.e. urban local](#)

 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 12:26:51 PM
LSC Response: The TIS report has been updated to address this comment.

FYI: Prorata share contribution may be required toward final construction, paving and associated repairs to Bent Grass Meadows Drive southwest of the site, including design and construction of an eastbound left turn lane on Woodmen Frontage Road at Bent Grass Meadows Drive at the final plat stage should these improvements not be financially guaranteed or constructed by others. Conditions of approval are being drafted to that effect.

These improvements not be financially guaranteed or constructed by others. Conditions of approval are being drafted to that effect.

Table 3
Prorata Share Contribution Calculations

1

Bent Grass East Commercial Filing No. 3							
Item	Improvement Description and Estimated Cost			AM	PM	AM + PM	
J	Add protected/permitted phasing at Woodmen/Golden Sage			Site-Generated Traffic ⁽¹⁾ (vehicles per hour)	5	4	9
				2040 Total Traffic ⁽¹⁾ (vehicles per hour)	325	451	776
				%	1.54%	0.89%	1.16%
	Estimated Improvement Cost:		\$ 33,750	Estimated Fair-Share Portion for this project based on calculated AM + PM percentage:		\$ 391	
K	Lengthening of the current eastbound single left-turn deceleration lane on Woodmen approaching Golden Sage Road			Site-Generated Traffic ⁽¹⁾ (vehicles per hour)	5	4	9
				2040 Total Traffic ⁽¹⁾ (vehicles per hour)	325	451	776
				%	1.54%	0.89%	1.16%
	Estimated Improvement Cost:		\$ 200,000	Estimated Fair-Share Portion for this project based on calculated AM + PM percentage:		\$ 2,320	
L	Southbound exclusive right-turn lane on Golden Sage Road approaching Woodmen Road			Site-Generated Traffic ⁽²⁾ (vehicles per hour)	4	6	10
				2040 Total Traffic ⁽²⁾ (vehicles per hour)	395	393	788
				%	1.01%	1.53%	1.27%
	Estimated Improvement Cost:		\$ 100,000	Estimated Fair-Share Portion for this project based on calculated AM + PM percentage:		\$ 1,269	
M	Signalization of Golden Sage Road/Woodmen Frontage Road or reconstruction as a modern roundabout; Future additional laneage may be necessary at this intersection to accommodate vehicle queues and for traffic operations.			Site-Generated Traffic ⁽³⁾ (vehicles per hour)	13	14	27
				2040 Total Traffic ⁽³⁾ (vehicles per hour)	984	1188	2172
				%	1.32%	1.18%	1.24%
	Estimated Improvement Cost:		\$ 350,000	Estimated Fair-Share Portion for this project based on calculated AM + PM percentage:		\$ 4,351	

Notes:
(1) Eastbound left-turn volume at the intersection of Woodmen/Golden Sage
(2) Southbound right-turn volume at the intersection of Woodmen/Golden Sage
(3) Sum of all traffic volumes at the intersection of Golden Sage/Woodmen frontage road


Source: LSC Transportation Consultants, Inc.

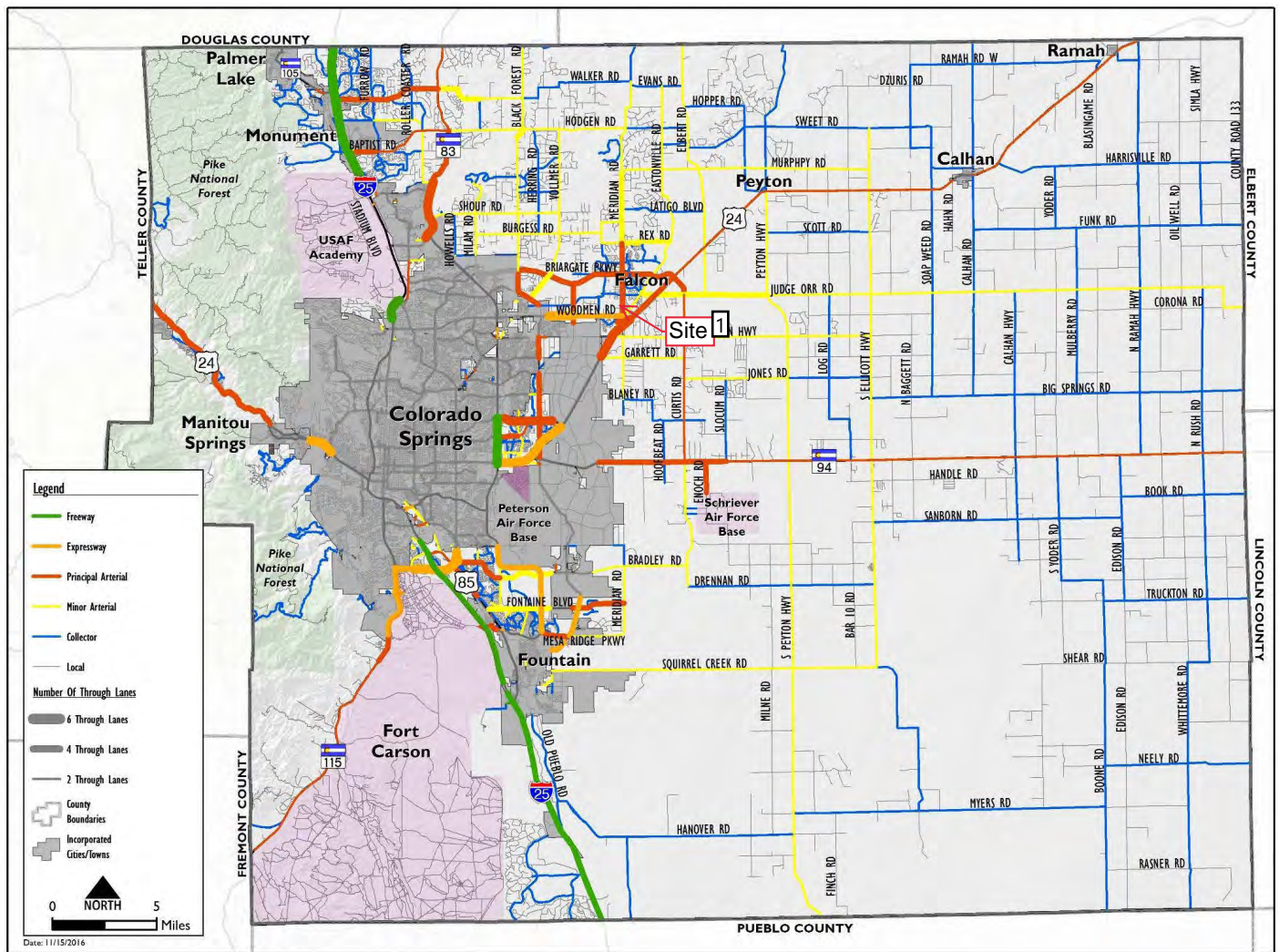
November 2020

Page: Bent Grass Commercial Update TIA REPORT MAY 2021 (combined) 26


 Number: 1 Author: Daniel Torres Subject: Text Box Date: 6/29/2021 12:21:57 PM

FYI: Prorata share contribution may be required toward final construction, paving and associated repairs to Bent Grass Meadows Drive southwest of the site, including design and construction of an eastbound left turn lane on Woodmen Frontage Road at Bent Grass Meadows Drive at the final plat stage should these improvements not be financially guaranteed or constructed by others. Conditions of approval are being drafted to that effect.

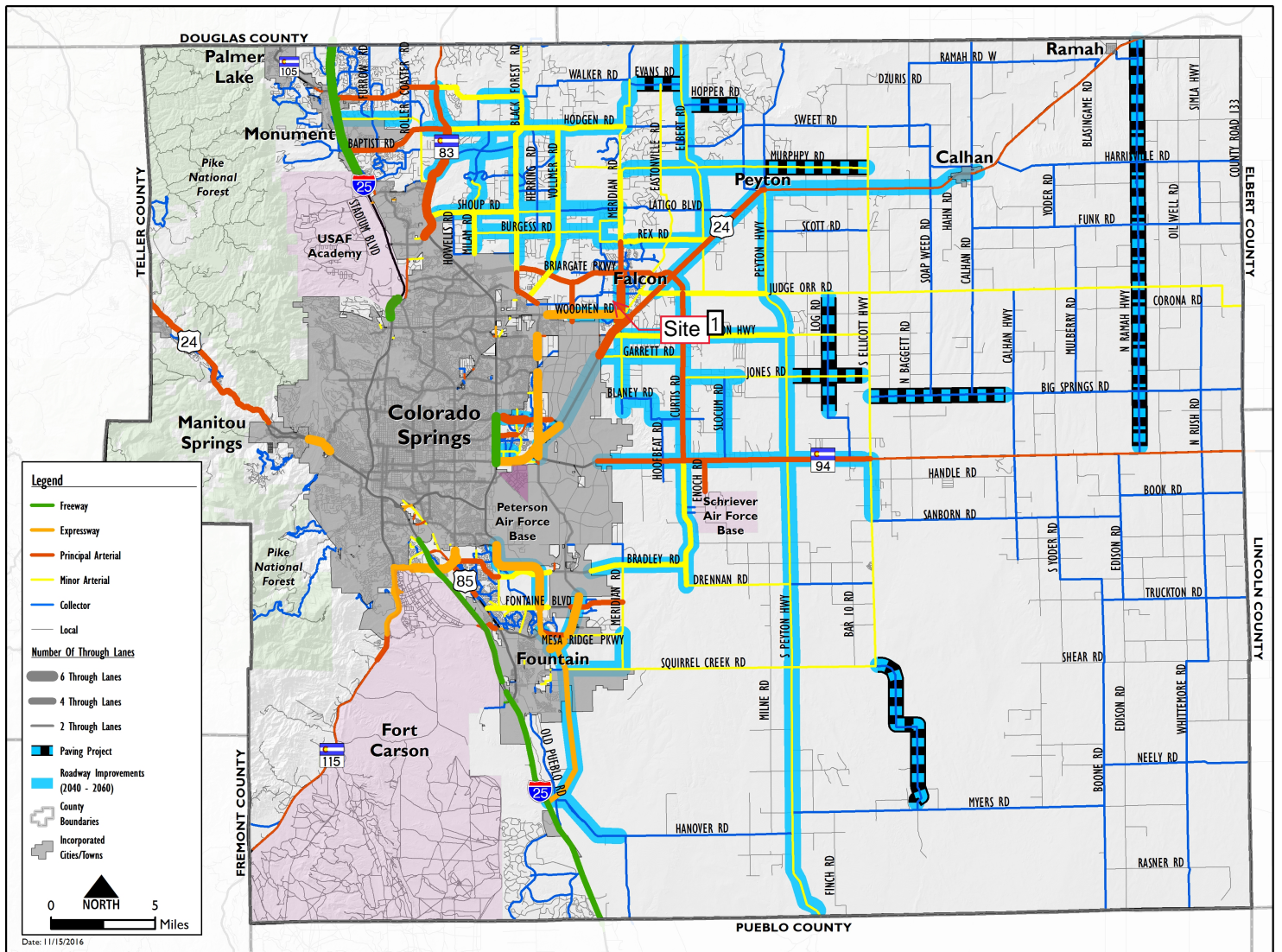
 Author: jchodsdon Subject: Sticky Note Date: 8/19/2021 11:34:25 AM
LSC Response: Comment Noted.




Map 14: 2040 Roadway Plan (Classification and Lanes)

 Number: 1 Author: Kirstin Subject: Callout Date: 10/5/2020 5:32:09 PM
Site

Map 17: 2060 Corridor Preservation



 Number: 1 Author: Kirstin Subject: Callout Date: 10/5/2020 5:32:51 PM
Site
