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Engineering Review
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dsdnijkamp
EPC Planning & Community
Development Department

June 11, 2021

Karen Levitt Ortiz
Development Manager
Evergreen
2390 East Camelback Road, Suite 410
Phoenix, Arizona 85016

RE: Falcon Marketplace
El Paso County, Colorado
ESAL Calculation Memorandum
LSC #164351
PCD File No. SF-191

Dear Ms. Ortiz:

In response to your request, LSC Transportation Consultants, Inc. has prepared this ESAL Calculation Memorandum for The Falcon Marketplace development in El Paso County, Colorado. The site is located northwest of the intersection of Woodmen Road and Meridian Road in El Paso County, Colorado. LSC completed a traffic impact analysis (TIS) for The Falcon Marketplace dated September 5, 2018. This memorandum contains site-specific estimated Equivalent Single Axle Load (ESAL) values and recommended values for use in the pavement design of some turn lanes along Meridian Road and at the Eastonville/Meridian intersection.

This memorandum contains the projected buildout weekday traffic volumes, calculated auxiliary-turn-lane-specific Equivalent Single Axle Load (ESAL) values, and recommended ESAL values for use in pavement design for the following:

- The proposed southbound right-turn deceleration and acceleration lanes on Meridian Road (an Urban 4-lane Principal Arterial) approaching Eastonville Road and for the approved right-in/right-out only access to Meridian Road.
- The proposed westbound right-turn deceleration lane on Eastonville Road (an Urban Minor Arterial) approaching Meridian Road.

LANE TRAFFIC VOLUME PROJECTIONS

The volumes calculated for use in the ESAL calculations are shown in Table 1. These volumes are for the traffic projected to use the auxiliary lanes only and do not include through traffic on Meridian Road or through traffic on Eastonville Road. The projected volumes are based on the trip generation, trip distribution, and 2040 background traffic volumes shown in the *Falcon Marketplace Traffic Impact Analysis* by LSC, dated September 5, 2018.

ESAL CALCULATIONS & RECOMMENDED DESIGN ESAL VALUES

LSC has calculated auxiliary-turn-lane-specific Equivalent Single Axle Load (ESAL) values based on the projected ADTs. The results of the analysis are shown in Table 1.

The *El Paso County Engineering Criteria Manual (ECM)* outlines procedures for calculating ESAL values and determining the corresponding depth of asphalt pavement required, based on the street classification. The *ECM* requires a truck percentage of six percent to be used for Urban Minor Arterials and eight percent to be used for Urban Principal Arterials. The *ECM* does not specify the vehicle mix of multi-unit and single-unit trucks. The *ECM* only indicates the total truck percentage. For Urban Minor Arterial a vehicle mix of four percent single-unit trucks, two percent multi-unit trucks, and 94 percent cars/pickups was assumed for a total truck percentage of six percent. For Principal Arterials, a vehicle mix of six percent single-unit trucks, two percent multi-unit trucks, and 92 percent cars/pickups was assumed for a total truck percentage of eight percent.

Meridian Road – Southbound Right Turn Lanes

LSC recommends a design ESAL of 5,256,000 be used for the southbound deceleration lane on Meridian Road approaching Eastonville Road, the southbound acceleration/deceleration lane on Meridian Road between Eastonville Road and the approved right-in/right-out Falcon Marketplace access point and the new tapered portion of the southbound right turn accel/decel lane just south of the right-in/right-out. This is shown on the attached exhibit. This recommended ESAL value exceeds the calculated ESAL values for these turn lane segments. Note: the calculated value for the segment on Meridian Road between Eastonville Road and the right-in/right-out access point represents the combination of the acceleration and deceleration traffic loading.

Eastonville at Meridian Road – Westbound Right Turn Lane

LSC recommends a design ESAL of 1,971,000 for the westbound right-turn deceleration lane on Eastonville Road approaching Meridian Road. This value is based on the recommended minimum design ESAL value given in Table D-2 Minimum Pavement Sections from the *ECM* for the Minor Arterial classification. This recommended ESAL value exceeds the calculated ESAL value for this turn lane.

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Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.



By: Jeffrey C. Hodsdon, P.E.
Principal

JCH:KDF:jas

Enclosures: Table 1
Exhibit

Tables



**Table 1
Falcon Marketplace
ESAL Calculation Table**

Lane	Segment	Classification	Vehicle Type (From Table D-1 of the ECM)	Total Percent of One-Way ADT	Design Lane Percent of One-Way ADT	Max ADT (Vehicles Per Day) ⁽¹⁾	Directional ADT (Vehicles Per Day)	Vehicles in Single Lane	CDOT Factor	EDLA	Calculated 20-Year 18-Kip ESAL	Recommended 20-Year 18-Kip ESAL ⁽²⁾
Southbound Right-Turn Decel Lane on Meridian Road approaching Eastonville Road	Decel	Urban Principal Arterial, 4-lane	Multi-Unit Trucks	2.00%	2.00%	1,600	1,600	32	1.087	34.78	460,659	5,256,000
			Single-Unit Trucks	6.00%	6.00%			96	0.249	23.90		
			Passenger Cars/Pickup Trucks	92.00%	92.00%			1,472	0.003	4.42		
			Total							63.10		
Southbound Right-Turn Accel/Decel Lane on Meridian Road between Eastonville Road and the Right-in/Right-out Access	Accel	Urban Principal Arterial, 4-lane	Multi-Unit Trucks	2.00%	2.00%	3,000	3,000	60	1.087	65.22	1,180,439	5,256,000
			Single-Unit Trucks	6.00%	6.00%			180	0.249	44.82		
			Passenger Cars/Pickup Trucks	92.00%	92.00%			2,760	0.003	8.28		
	Decel	Urban Principal Arterial, 4-lane	Multi-Unit Trucks	2.00%	2.00%	1,100	1,100	22	1.087	23.91		
			Single-Unit Trucks	6.00%	6.00%			66	0.249	16.43		
			Passenger Cars/Pickup Trucks	92.00%	92.00%			1,012	0.003	3.04		
Total					4,100	4,100			161.70			
New tapered section of the southbound Right-Turn Accel/Decel Lane on Meridian Road between the Right-in/Right-out Access and Woodmen Road	Accel	Urban Principal Arterial, 4-lane	Multi-Unit Trucks	2.00%	2.00%	3,000	3,000	60	1.087	65.22	863,736	5,256,000
			Single-Unit Trucks	6.00%	6.00%			180	0.249	44.82		
			Passenger Cars/Pickup Trucks	92.00%	92.00%			2,760	0.003	8.28		
			Total							118.32		
Westbound Right-Turn Decel on Eastonville Road approaching Meridian Road	Decel	Urban Minor Arterial	Multi-Unit Trucks	2.00%	2.00%	2,250	2,250	45	1.087	48.92	566,991	1,971,000
			Single-Unit Trucks	4.00%	4.00%			90	0.249	22.41		
			Passenger Cars/Pickup Trucks	94.00%	94.00%			2,115	0.003	6.35		
			Total							77.67		

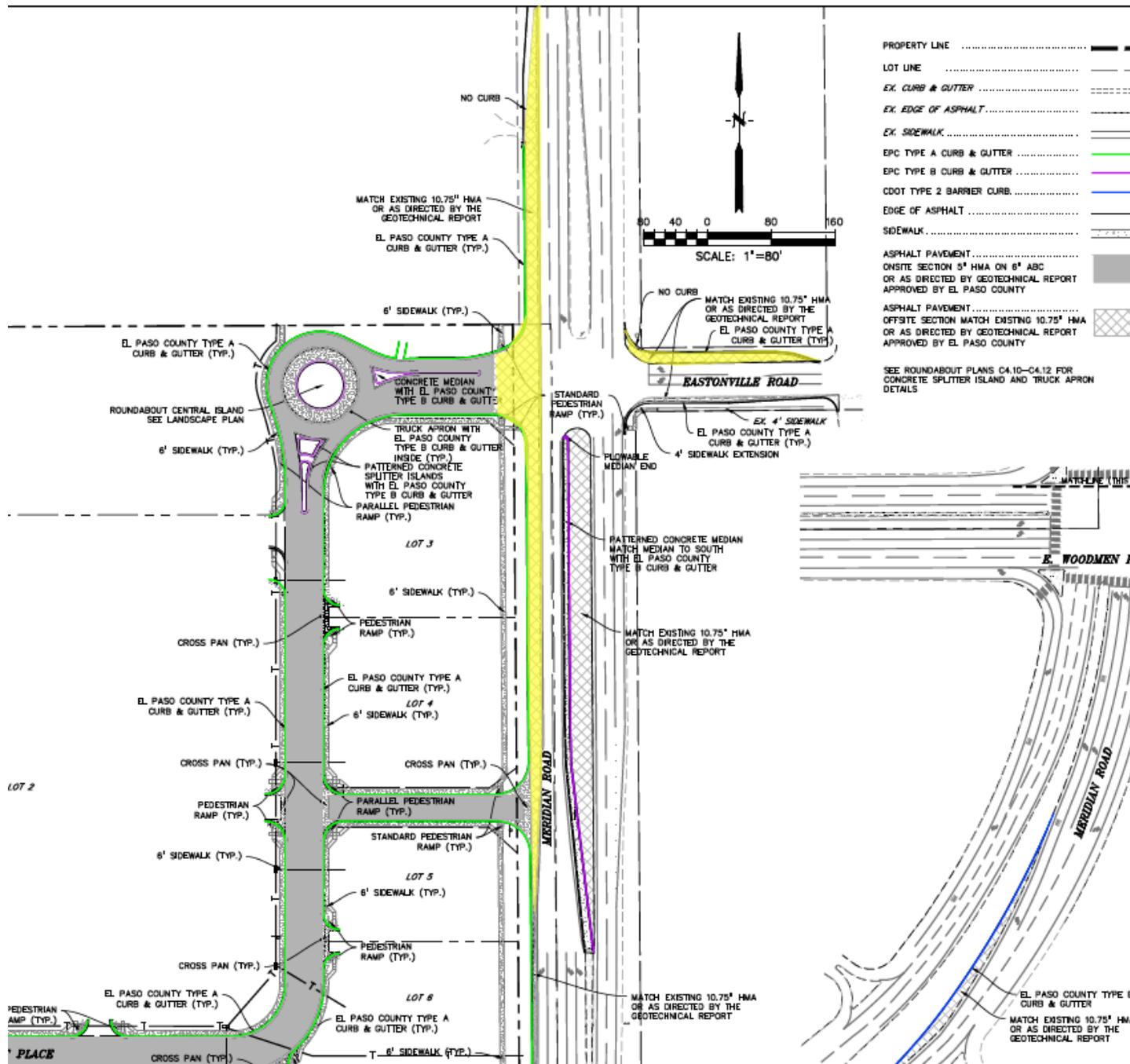
Notes:

(1) Source: *Falcon Marketplace Traffic Impact Analysis* September 5, 2018 Revision (SP-17-001/CDR-16-007)

(2) The recommended 20-Year 18-Kip ESAL values are based on the minimum ESAL value from Table D-2 Minimum Pavement Sections from the El Paso County Engineering Criteria Manual.

Exhibit





- PROPERTY LINE
- LOT LINE
- EX. CURB & GUTTER
- EX. EDGE OF ASPHALT
- EX. SIDEWALK
- EPC TYPE A CURB & GUTTER
- EPC TYPE B CURB & GUTTER
- CDOT TYPE 2 BARRIER CURB
- EDGE OF ASPHALT
- SIDEWALK
- ASPHALT PAVEMENT
- ON-SITE SECTION 5\"/>

