



LSC TRANSPORTATION CONSULTANTS, INC.
545 East Pikes Peak Avenue, Suite 210
Colorado Springs, CO 80903
(719) 633-2868
FAX (719) 633-5430
E-mail: lsc@lsctrans.com
Website: <http://www.lsctrans.com>

September 13, 2018

Mr. Raul Guzman
Tech Contractors
P.O. Box 80036
San Diego, California 92138

RE: WindingWalk at Meridian Ranch
Filing 1 **Phases 1A and 1B**
El Paso County, Colorado
ESAL Calculation Memo
LSC #174750

Dear Mr. Guzman:

In response to your request, LSC Transportation Consultants, Inc. has prepared this transportation memorandum for WindingWalk at Meridian Ranch Filing 1 Phases 1A and 1B in El Paso County, Colorado. The site is located north of Stapleton Drive and west of Eastonville Drive in El Paso County, Colorado. LSC completed a traffic impact analysis for this development dated May 10, 2018. This memorandum contains the projected buildout weekday traffic volumes and segment-specific equivalent single axle load (ESAL) values for use in pavement design for the interior streets. This memorandum accompanies a County-standard Deviation Request and Decision Form.

APPLICANT'S INTENT

The intent is to try to pave as many streets as possible this year, so the project is divided into two phases in area east of Lambert as shown on the Figure 1 (and the attached phasing exhibit). Construction has been focused in the area between Lambert, Stapleton, and the Vistas Filing 1 in order to have a complete functional area ready for home building and sales during the winter months. We expect to pave Phase 1A, the pavement recommendation area and report that has been submitted, for sure this year and hopeful to pave Phase 1B as well. We will submit the pavement recommendation for Phase 1B as soon as we can do the borings and prepare the report. The proposed pavement phasing for WindingWalk Filing 1 has been discussed with County Inspection Staff. The timing of the phasing is strictly based on construction scheduling and seasons. Phase 2 is anticipated to be paved after utility construction this winter and set to begin in the Spring of 2019.

SUBDIVISION STREET PHASING

As explained in the "Applicant's Intent" section above, Figure 1 shows the proposed subdivision street phasing for the streets within WindingWalk at Meridian Ranch Filing 1. Figure 2 shows the proposed subdivision street names. As shown on Figure 1 Lambert Road will be constructed north from Stapleton

Drive to Rainbow Bridge Drive as part of Phase 1A. Rainbow Bridge Drive is not planned to be constructed until Phase 2.

AVERAGE WEEKDAY TRAFFIC

Figure 3 shows the projected buildout average weekday traffic volumes on the street segments proposed as part of Phases 1A and 1B.

Figure 4 shows the projected average daily traffic volumes (at buildout of the Meridian Ranch development) projected for the segment of Lambert Road to be paved with Phase 1A.

These volumes are based on the trip generation estimates and long-term directional distribution estimates shown in the May 2018 traffic impact study and on detailed estimates of trip routing on the subdivision street network.

ESAL CALCULATIONS

LSC has calculated street-segment-specific equivalent single axle load (ESAL) values based on the projected ADTs. These calculated ESALs and other factors have been used to develop **recommended design ESALs** for use in the pavement design of the planned streets within WindingWalk at Meridian Ranch Filing 1 Phases 1A and 1B.

Segments have been identified as Urban Local (Low Volume) or Urban Local (Pavement Only). For purposes of this ESAL calculation report, the Urban Local (Pavement Only) category has been divided into ADT (average daily traffic) ranges. By determining design ESALs using this procedure, the geotechnical engineer may be able to determine a suitable pavement section requiring, in some cases, slightly less base course depth, thereby saving on material costs while at the same time providing an appropriate design. The average daily traffic volumes for Urban Local street were broken into two ranges as shown in the attached Table 1. As presented in the table, these ranges are from 300-1,120 and 1,120-3,000 vehicles per day. The purpose of grouping the traffic volumes in this way was to provide a means of comparing the calculated and proposed design ESAL values for each street segment to the minimum design ESAL values listed in Table D-2 of the *El Paso County Engineering Criteria Manual (ECM)* (attached for reference).

The ECM outlines procedures for calculating ESAL values and determining the corresponding depth of asphalt pavement required based on the street classification. For Urban Local (Low Volume) streets (up to 300 ADT), the ECM requires a truck percentage of three percent to be used. For Urban Local streets (300 to 3,000 ADT), the ECM requires a truck percentage of four percent to be used. The ECM does not specify the vehicle mix of multi-unit and single-unit trucks. The ECM only indicates the total truck percentage. On Local (Low Volume) streets, a vehicle mix of two percent single-unit trucks, one percent multi-unit trucks, and 97 percent cars/pickups was assumed for a total truck percentage of three percent. On Urban Local streets, a vehicle mix of 2.33 percent single-unit trucks, 1.67 percent multi-unit trucks, and 96 percent cars/pickups was assumed for a total truck percentage of four percent.

Table 2 shows the ESAL calculations for each street segment based the buildout total average weekday traffic volumes. Figure 3 shows the recommended classification and design ESAL for each segment.

Figure 4 shows the design ESALs for the two segments of Lambert Road to be paved with Filing 1 Phases 1A and 1B. Lambert Road is classified as an Urban Non-Residential Collector. The ESAL calculation is based on the ECM-standard fifteen percent trucks for Non-Residential Collector streets.

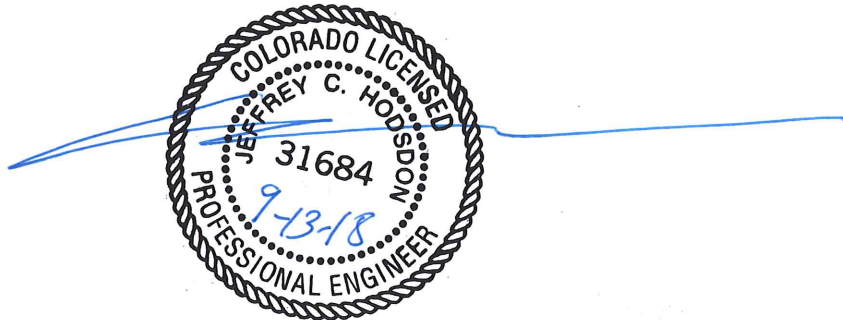
ESALs for Rainbow Bridge Drive north of WindingWalk Drive will be determined with Filing 1 Phase 2 and an ESAL report will be submitted for Phase 2.

* * * * *

Please contact me if you have any questions.

Respectfully submitted,

LSC TRANSPORTATION CONSULTANTS, INC.



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

Enclosures: Tables 1-2
Figures 1-4
Table D-2 of the ECM
Phasing Exhibit

**Table 1
WindingWalk at Meridian Ranch Filing No. 1
Street Classifications (for pavement design) with ADT Ranges and ESAL Values**






Segment Identifier (from Figure 3)	Urban Street Functional Classification (from ECM Table D-2)	ADT Volume Range	ECM ESAL (from ECM Table D-2) Version prior to 2011	LSC Proposed Design ESAL
	Local (low volume)	0-300	36,500	36,500
	Local (pavement only)	>300-1,120 ⁽¹⁾	109,500	109,500
	Local	>1,120-3,000	292,000	292,000
	Residential Collector	<10,000	821,000	TBD w/ Phase 2
	Non-Residential Collector	<20,000	821,000	See Figure 4
<p>Notes: (1) 1,120 ADT not specifically quoted in ECM for Local (pavement only) streets, but resulting ESAL matches Table D-2 of the ECM when assuming 4% trucks. The 2011 ECM has been revised to remove the Local (pavement only) line in the table. This was due to confusion over its use rather than removal because of inaccuracy).</p>				
<p>Source: LSC Transportation Consultants, Inc.</p>				<p>9/12/2018</p>

Table 2
WindingWalk at Meridian Ranch Filing No. 1
ESAL Calculation Table

Segment	Classification	Vehicle Type	Total Percent of One-Way ADT	Design Lane Percent of One-Way ADT	Buildout					Calculated 20-Year 18-Kip ESAL	Recommended Design ESAL
					ADT (Vehicles Per Day)	Directional ADT (Vehicles Per Day)	Vehicles in Single Lane	CDOT Factor	EDLA		
Lambert Road between Stapleton Dr. and Windingpark Ln.	Non-Residential Collector*	Multi-Unit Trucks	5.00%	5.00%	14,190	7,095	355	1.087	385.61	4,236,708	4,236,800
		Single-Unit Trucks	10.00%	10.00%			710	0.249	176.67		
		Passenger Cars/Pickup Trucks	85.00%	85.00%			6,031	0.003	18.09		
		Total							580.37		
Lambert Road between Windingpark Ln. and Rainbow Bridge Dr.	Non-Residential Collector*	Multi-Unit Trucks	5.00%	5.00%	11,970	5,985	299	1.087	325.28	3,573,883	3,573,900
		Single-Unit Trucks	10.00%	10.00%			599	0.249	149.03		
		Passenger Cars/Pickup Trucks	85.00%	85.00%			5,087	0.003	15.26		
		Total							489.57		
Rainbow Bridge Dr. north of Lambert Rd to Windingwalk Dr.**	Residential Collector	Multi-Unit Trucks	2.00%	2.00%	6,230	3,115	62	1.087	67.72	729,028	729,100
		Single-Unit Trucks	3.00%	3.00%			93	0.249	23.27		
		Passenger Cars/Pickup Trucks	95.00%	95.00%			2,959	0.003	8.88		
		Total							99.87		
Windingwalk Dr.	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	725	363	6	1.087	6.58	71,011	109,500
		Single-Unit Trucks	2.33%	2.33%			8	0.249	2.10		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			348	0.003	1.04		
		Total							9.73		
Fairview Glen Cir. North of Windingwalk Dr.	Urban Local (Low Volume)	Multi-Unit Trucks	1.00%	1.00%	150	75	1	1.087	0.82	10,271	36,500
		Single-Unit Trucks	2.00%	2.00%			2	0.249	0.37		
		Passenger Cars/Pickup Trucks	97.00%	97.00%			73	0.003	0.22		
		Total							1.41		
Fairview Glen Cir. South of Hidden Valley Way	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	515	258	4	1.087	4.67	50,442	109,500
		Single-Unit Trucks	2.33%	2.33%			6	0.249	1.49		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			247	0.003	0.74		
		Total							6.91		
Porch Swing Ln.	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	180	90	2	1.087	1.63	17,630	109,500
		Single-Unit Trucks	2.33%	2.33%			2	0.249	0.52		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			86	0.003	0.26		
		Total							2.42		
Arbor Walk Ln.	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	395	198	3	1.087	3.59	38,689	109,500
		Single-Unit Trucks	2.33%	2.33%			5	0.249	1.15		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			190	0.003	0.57		
		Total							5.30		
Hidden Walk Way	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	745	373	6	1.087	6.76	72,970	109,500
		Single-Unit Trucks	2.33%	2.33%			9	0.249	2.16		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			358	0.003	1.07		
		Total							10.00		
Winding Glen Ln.	Urban Local (Low Volume)	Multi-Unit Trucks	1.00%	1.00%	285	143	1	1.087	1.55	19,515	36,500
		Single-Unit Trucks	2.00%	2.00%			3	0.249	0.71		
		Passenger Cars/Pickup Trucks	97.00%	97.00%			138	0.003	0.41		
		Total							2.67		
Windingpark Ln. North of Lambert Rd.	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	1,500	750	13	1.087	13.61	146,919	292,000
		Single-Unit Trucks	2.33%	2.33%			17	0.249	4.35		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			720	0.003	2.16		
		Total							20.13		
Windingpark Ln. South of Lambert Rd.	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	430	215	4	1.087	3.90	42,117	109,500
		Single-Unit Trucks	2.33%	2.33%			5	0.249	1.25		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			206	0.003	0.62		
		Total							5.77		
Rainbow Bridge Dr. South of Lambert Rd.	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	760	380	6	1.087	6.90	74,439	109,500
		Single-Unit Trucks	2.33%	2.33%			9	0.249	2.20		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			365	0.003	1.09		
		Total							10.20		
Scenic Walk Tr.	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	365	183	3	1.087	3.31	35,750	109,500
		Single-Unit Trucks	2.33%	2.33%			4	0.249	1.06		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			175	0.003	0.53		
		Total							4.90		
Morning Breeze Way	Urban Local (Pavement Only)	Multi-Unit Trucks	1.67%	1.67%	280	140	2	1.087	2.54	27,425	109,500
		Single-Unit Trucks	2.33%	2.33%			3	0.249	0.81		
		Passenger Cars/Pickup Trucks	96.00%	96.00%			134	0.003	0.40		
		Total							3.76		
Summer Sky Ln.	Urban Local (Low Volume)	Multi-Unit Trucks	1.00%	1.00%	130	65	1	1.087	0.71	8,902	36,500
		Single-Unit Trucks	2.00%	2.00%			1	0.249	0.32		
		Passenger Cars/Pickup Trucks	97.00%	97.00%			63	0.003	0.19		
		Total							1.22		

Notes:

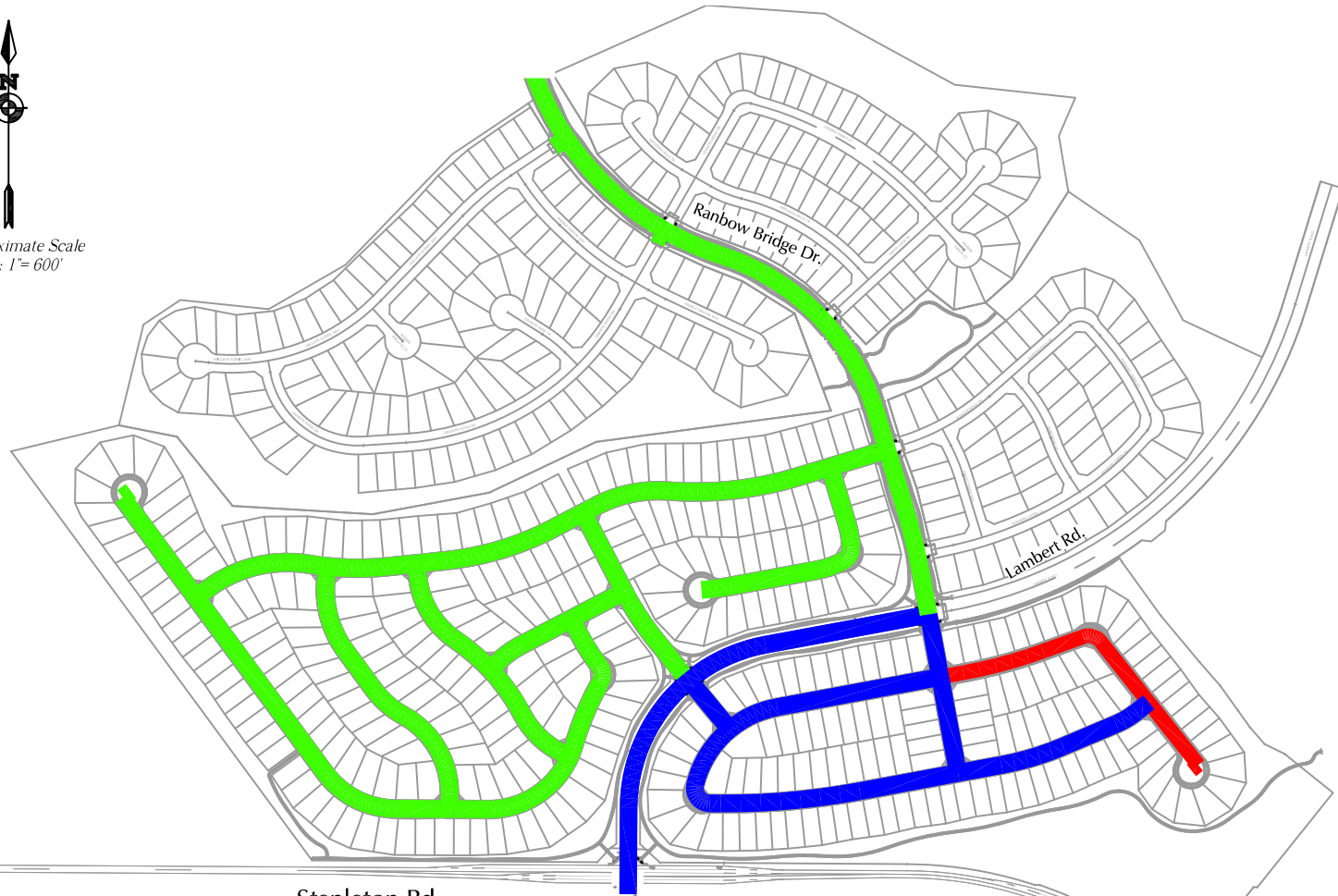
*Note: This truck percentage is the ECM-standard for an Urban Residential Collector. The classification of Lambert is Urban Non Residential Collector. Please refer to the deviation form for details.

** ESALs for Filing 1 north of WindingWalk Dr. will be determined with Filing 1 Phase 2.

Source: LSC Transportation Consultants, Inc.



Approximate Scale
Scale: 1" = 600'



LEGEND:




-  = Phase 1A
-  = Phase 1B
-  = Phase 2

Figure 1

Subdivision Street Phasing Plan

WindingWalk at Meridian Ranch and The Enclave at Stonebridge at Meridian Ranch (LSC #174750)



Approximate Scale
Scale: 1" = 600'



Figure 2

Subdivision Street Names

WindingWalk at Meridian Ranch and The Enclave at Stonebridge at Meridian Ranch (LSC #174750)

