

Emigration Canyon Transportation Study

February 2016

Prepared for:



Prepared by:

LOCHNER

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I. INTRODUCTION

Emigration Canyon, located 10 minutes from the Salt Lake City downtown metro center, is a unique environment with a mild grade, beautiful surroundings, a residential and commercial community, and accessibility to downtown. This unique context attracts various users—cyclists of differing skill levels; commuting motorists who are familiar with the corridor; school buses; visitors who are unfamiliar with the corridor; and pedestrians, runners, and in-line skaters. This variety of motorists and active transportation users results in myriad opinions on how the corridor should be used, what problems or needs exist, and how best to address such issues.

In February 2014, Salt Lake County formed the Emigration Canyon Roadway Improvement Committee (ECRIC), a group whose fundamental purpose was to assess bicyclist- and motorist-related concerns in Emigration Canyon through a facilitated collaborative process. Safety within a mixed-use corridor was the overarching consideration. The result of this committee was the development of recommendations for immediate action, and 79 specific roadway improvements.

Salt Lake County provided funding to evaluate engineering deficiencies throughout the canyon, develop costs for solutions recommended by the ECRIC, and additional engineering analysis.

This report provides a summary of these findings.

II. EXECUTIVE SUMMARY

Existing conditions of Emigration Canyon were identified in a collaborative effort with input from the ECRIC, engineers, and the public. Nearly 200 comments were identified, as shown in Appendix A (separated by ECRIC, engineering, and public). The comments received were similar in nature, and were summarized into the following categories:

- Geometric deficiencies
- Traffic issues
- Environmental concerns

Based on input from the ECRIC and the public, the need to address geometric concerns had the highest rating of 60 percent, traffic concerns rated at 30 percent, and environmental concerns rated at 10 percent. The canyon was divided into 12 segments relative to geometric needs (narrow shoulders or lane widths); a “hazard index” was then identified where higher concentrations of needs were present on the corridor. See Appendix B.

Based on the needs identified, the project team identified solutions throughout the canyon. Cost estimates were developed for solutions along each of the 12 identified segments. The cost estimates were based on single project solutions that coincided with the identified existing condition deficiencies from the 200+ comments received. These segment estimates identified \$15 million in improvements throughout the canyon (see Figure 1).

Current Salt Lake County funding only allows for \$1 million of potential improvements to be completed during the 2016 construction season. These solutions are summarized on Figure 2. Potential improvements for the \$1 million projects have been progressed to 30% design plans (see Appendix C). These improvements will be constructed by Salt Lake County over the 2016 construction season.

The County will continue to identify additional funding to construct future improvements.

Figure 1: \$15 Million Improvements from Comments

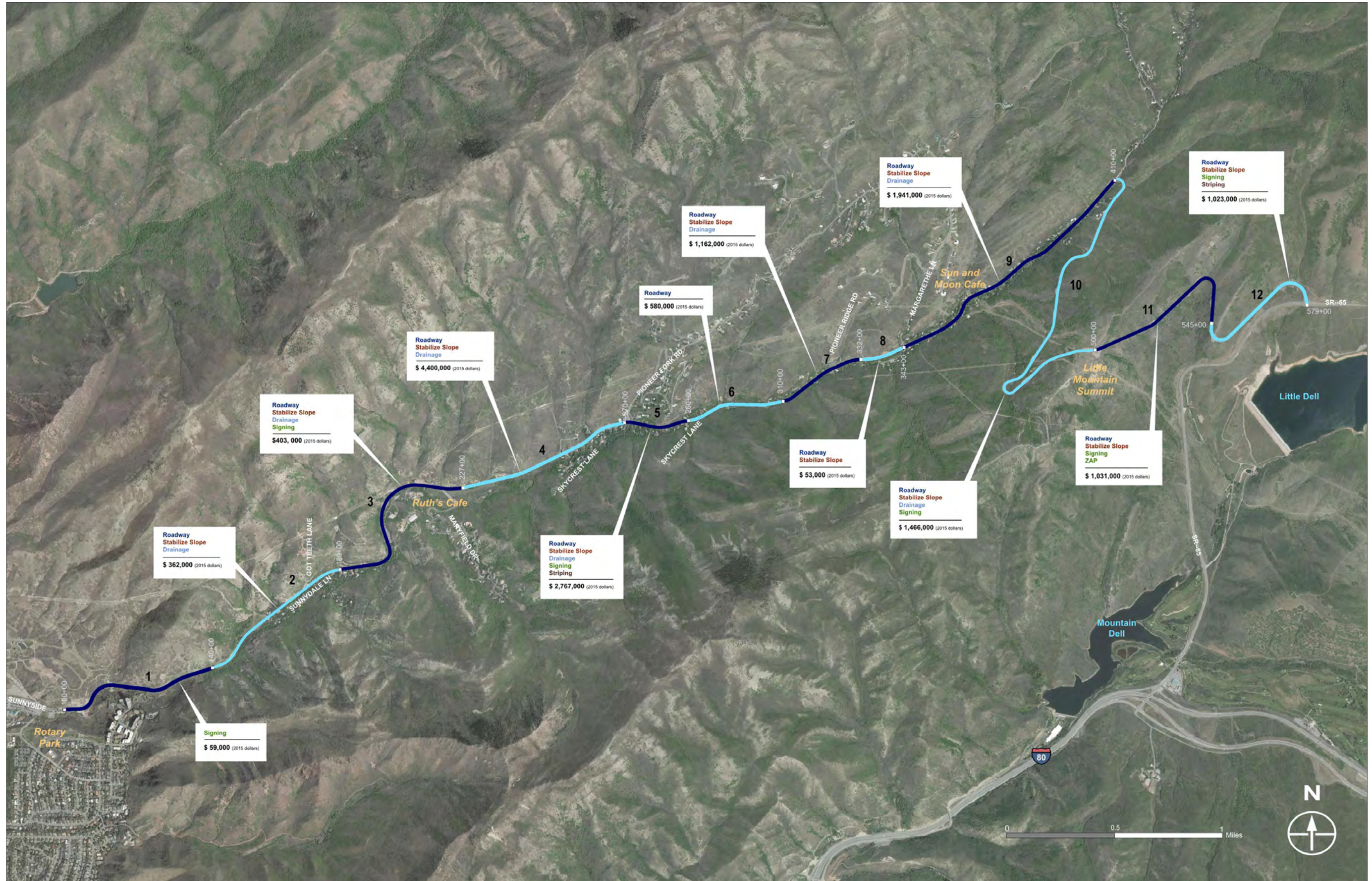
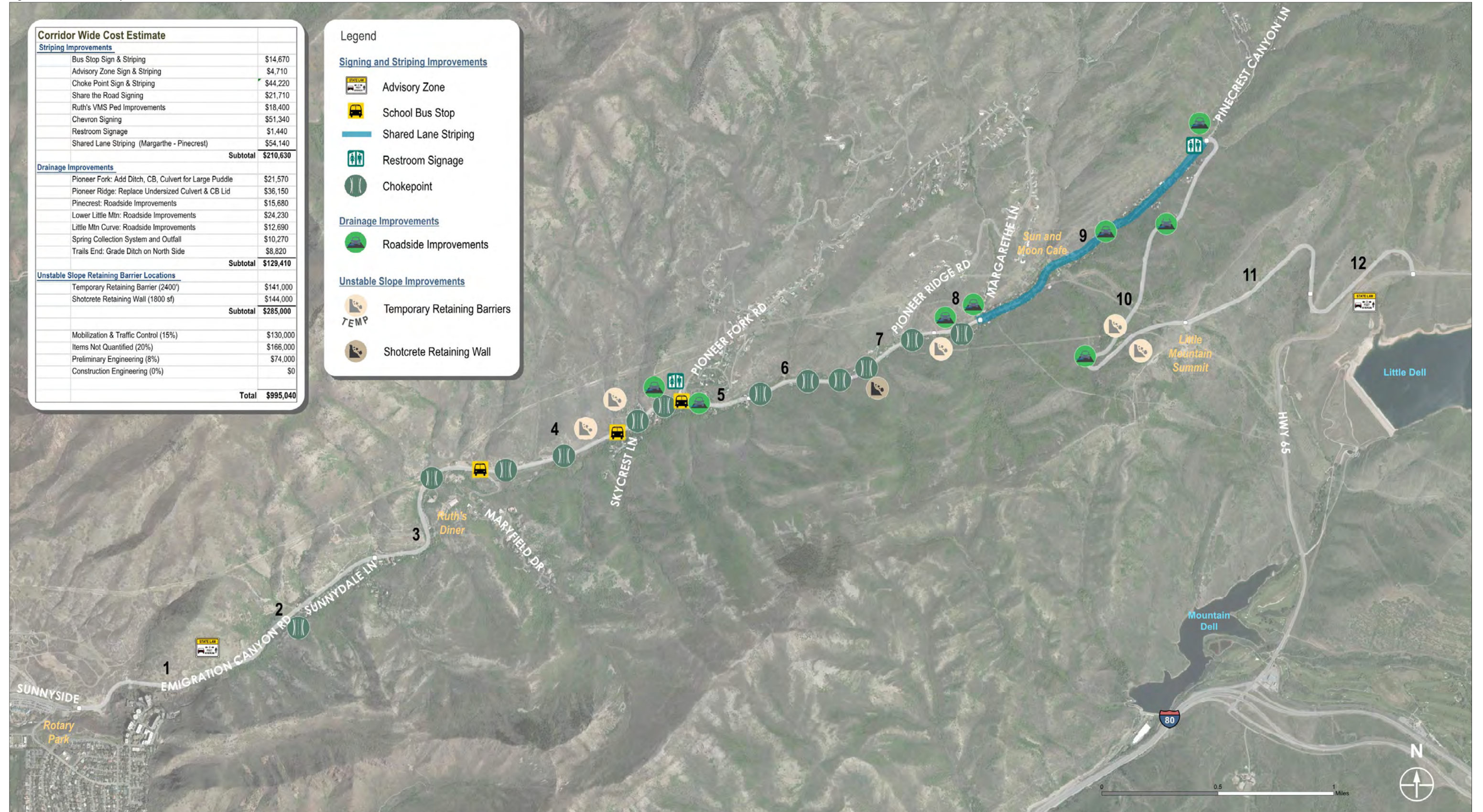


Figure 2: \$1 Million Improvements



III. EXISTING CONDITIONS

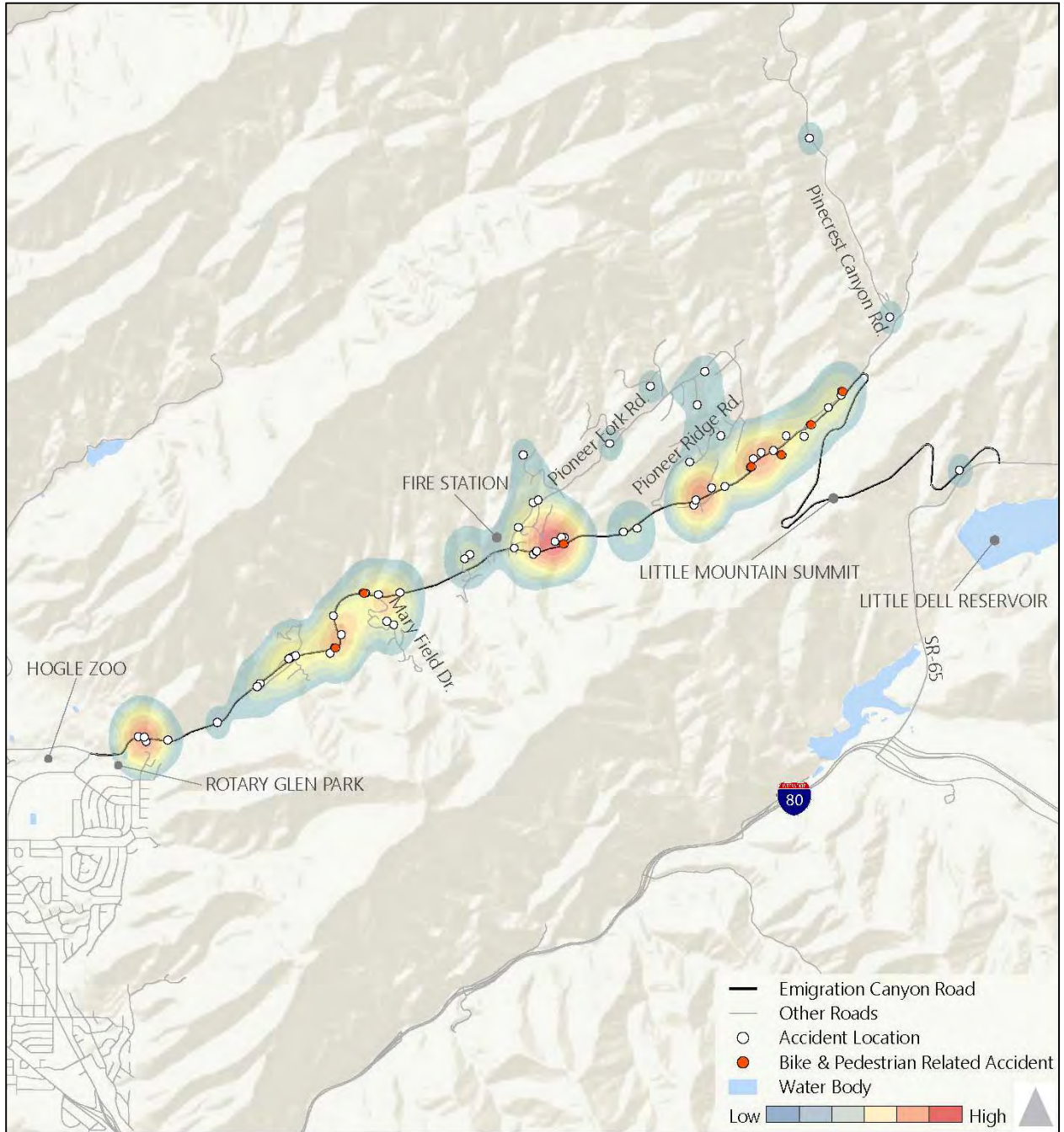
In February 2014, Salt Lake County formed the Emigration Canyon Roadway Improvement Committee (ECRIC), a group whose fundamental purpose was to assess bicyclist- and motorist-related concerns in Emigration Canyon through a facilitated collaborative process. The committee was composed of residents, special-interest users, and a professional facilitator. The group evaluated engineering, infrastructure, ecology, parking, enforcement, and sanitation needs and concerns.

Crash Locations & Roadway Deficiencies

The project team collaborated with the ECRIC's core group, provided preliminary analyses, and conducted field reviews to confirm the ECRIC's findings and identify additional needs. Safety within a mixed-use corridor was the overarching consideration. Traffic and safety analyses identified various hot spots for crash locations (see Figure 3).

Extensive field reviews were completed to identify deficient roadway conditions. These deficiencies include: limited sight distance, poor pavement, slope instability, inadequate drainage, roadside hazards, tight turns, and narrow shoulders. Over use of advance warning signs may be causing a lack of respect for the advanced warning of bus stop and bicycles on the roadway. In addition to the drainage concerns, instability of the side slopes, especially after storm events, delivers rock debris on the shoulders. The debris forces active transportation users to leave the shoulder and ride in the through traffic lanes of Emigration Canyon. See Appendix D for a summary of the identified roadway deficiencies.

Figure 3: Canyon Crash Locations



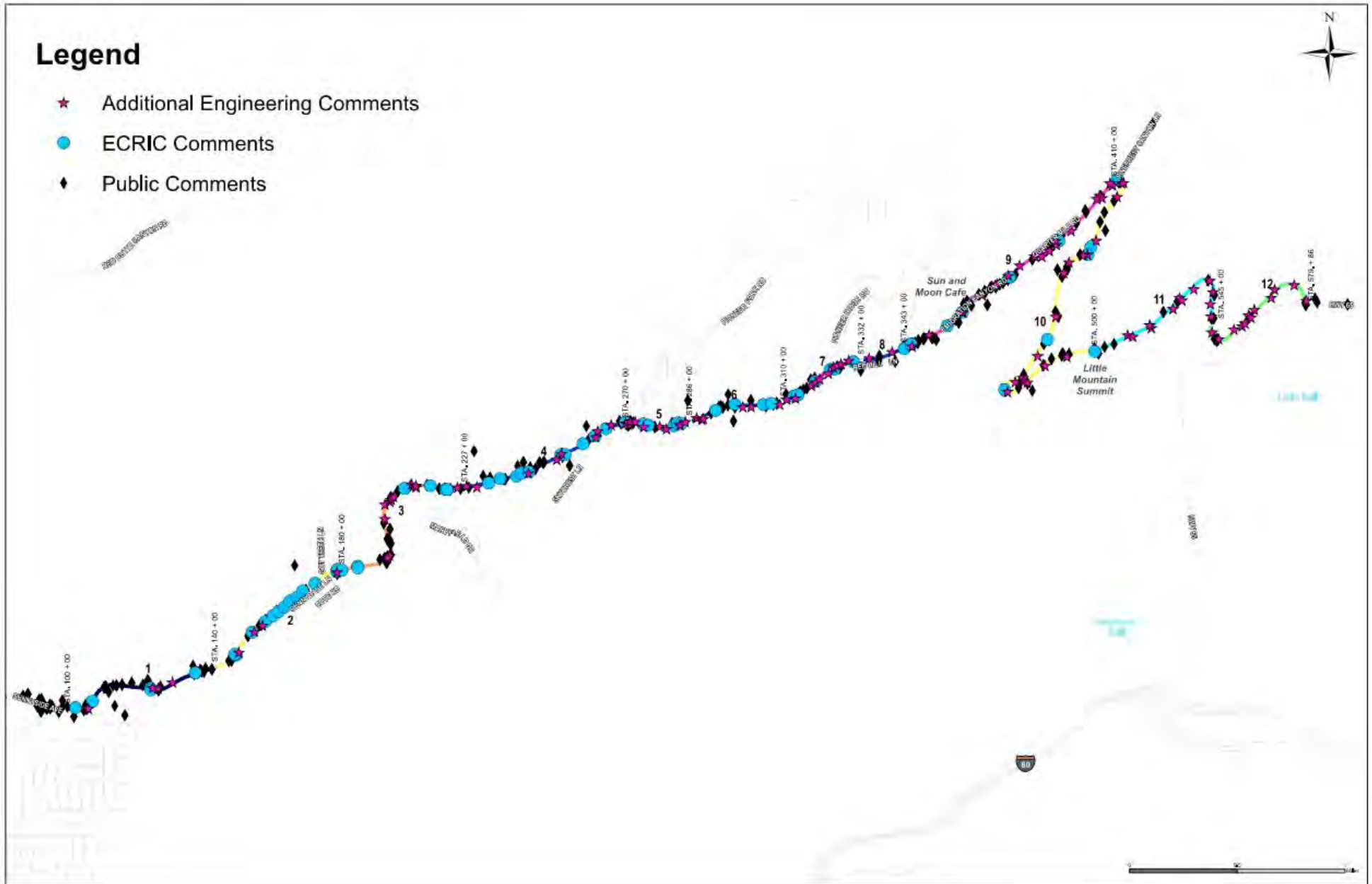
Comments Received

A public open house was held on March 25, 2015, at the fire station. Approximately 100 people attended, 76 of which live in the canyon. Comments were received via hard copy comment form and electronically. The public comments received are summarized in Figure 4. A full report can be found in Appendix E. All of the ECRIC, engineering, and public comments were compiled and summarized, as shown in Figure 5.

Figure 4: Public Open House Comment Summary

Common Comments	Number of Comments
<i>Enforce road laws for bikers/cars/motorcyclists Example: Rules applying to bicycle use should be better enforced</i>	14
<i>Reduce the speed limit Example: I would want more police, slower speeds & better road management.</i>	9
<i>Put up "Single File Only" signs for bikers Example: Also posting "Single File Riding Only" signs, there are several that say "Share the Road" but not many "Single File".</i>	9
<i>Think about residents, not bikers Example: Remember the first priority of the roadway must be motor vehicles since they have homes in the canyon and are not just out for a joyride.</i>	8
<i>Sweep road/bike lanes regularly Example: Sweep the bike path often & remove debris/rocks to keep bikers in that lane.</i>	8
<i>Don't widen the road Example: As a resident, I cannot see the value of widening the roads. Wider Roads will bring more traffic, more pollution and will not make the canyon safer.</i>	8
<i>Make bikers stay in the bike lane Example: I am a biker and I ride AND live in Emigration Canyon and it is unnerving to come up on riders in the middle of the street instead of in the bike lane.</i>	7
<i>Increase signage Example: We need more signage.</i>	7
<i>Fix rock fall hazards Example: Significant rock fall areas must be stabilized.</i>	6
<i>Repair/repave roadway Example: Pave road as soon as possible with adequate bike lanes.</i>	5
<i>Motorcycles are noisy Example: My main issue with the road is lack of noise ordinance enforcement. This mostly applies to motorcycles which are a major nuisance, particularly on weekends.</i>	5
<i>Widen the road Example: Going down is a little sketchy. Widen please.</i>	3
<i>Blind corners are scary for runners Example: Blind corners, especially at mouth of canyon & by Ruth's should be corrected. Super scary as a runner, going around those curves.</i>	3
<i>Limit number of bikes in canyon Example: If we could limit the number of bikes per day or even per hour this would help.</i>	2

Figure 5: Compiled Comments from ECRIC, Public & Engineering Team



IV. DEVELOPMENT OF ALTERNATIVES

Hazard Index & Prioritized Improvements

The ECRIC and the public were asked to prioritize the geometric needs, traffic concerns, and environmental needs on the corridor. Based on their input, geometric concerns were identified as the top priority with the highest rating of 60 percent, traffic concerns rated at 30 percent, and environmental concerns rated at 10 percent. The canyon was divided into 12 segments relative to the geometric needs (narrow shoulders or lanes widths). These segments were then rated on these geometric concerns and summarized in a "hazard index" (see Figure 6). Refer to Appendix B for more results.

The hazard index identified where higher concentration of needs were present on the corridor. Based on the needs identified, the project team identified solutions throughout the canyon. This list of solutions was then prioritized using the hazard index. The hazard index was developed through collaboration with both the ECRIC and the community at public meetings.

Based on the comments received, individual projects were identified to either solve or mitigate the identified problems. Concept cost estimates were then developed for each project and combined into their coinciding hazard index segment. Figure 7 illustrates the estimated cost for each segment with 2015 labor and material prices. The compiled comments identified a total of \$15 million in improvements throughout the canyon.

Figure 6: Hazard Index by Segment

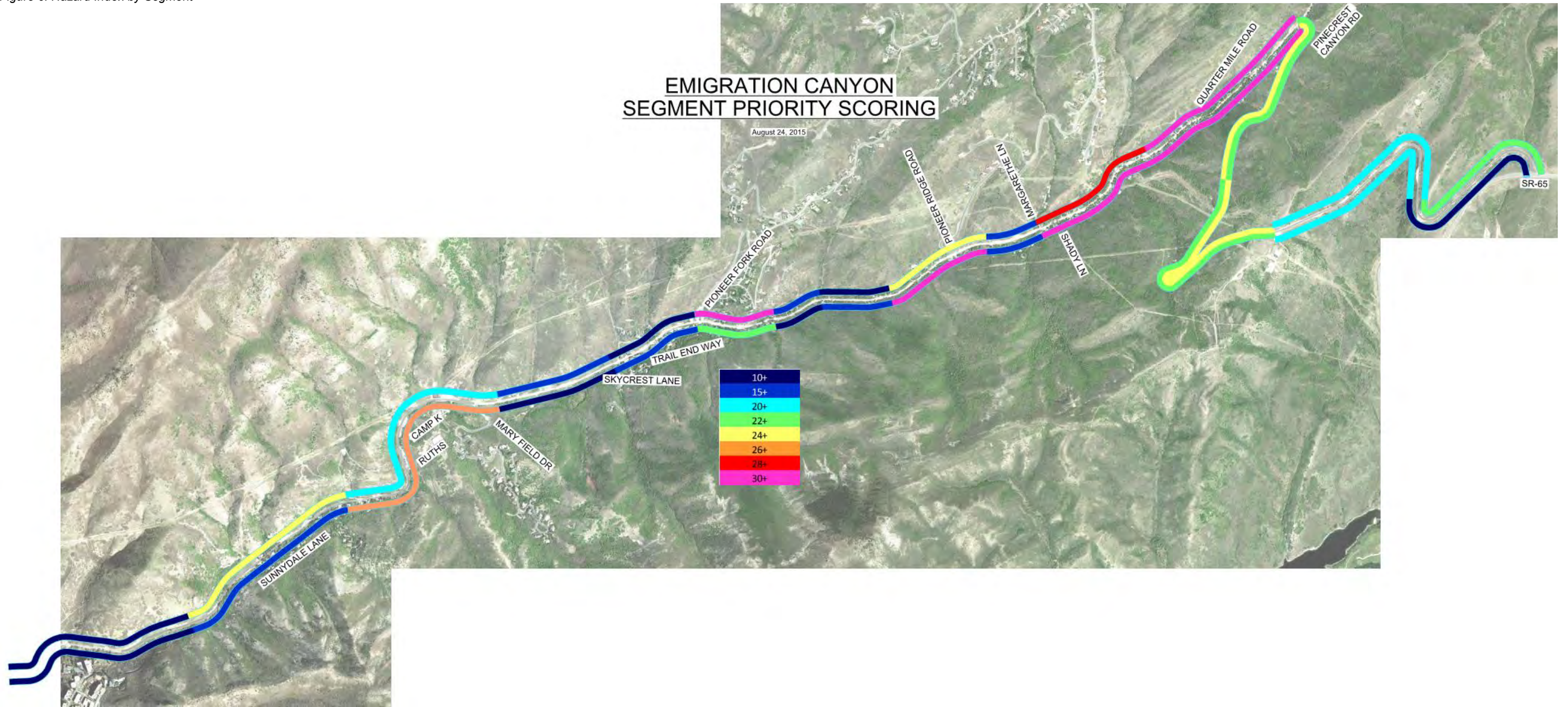
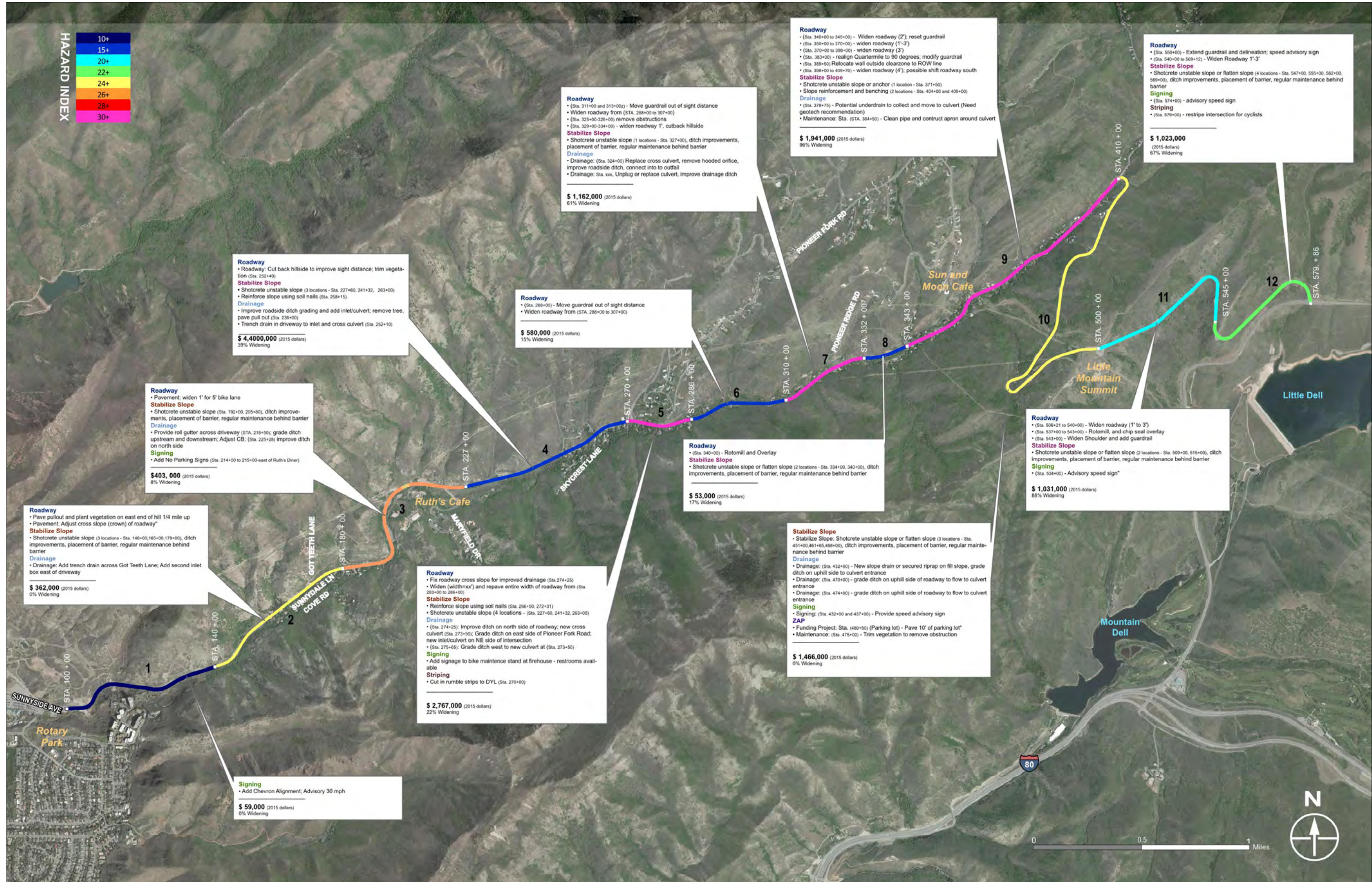


Figure 7: \$15 Million Improvements Identified from Comments



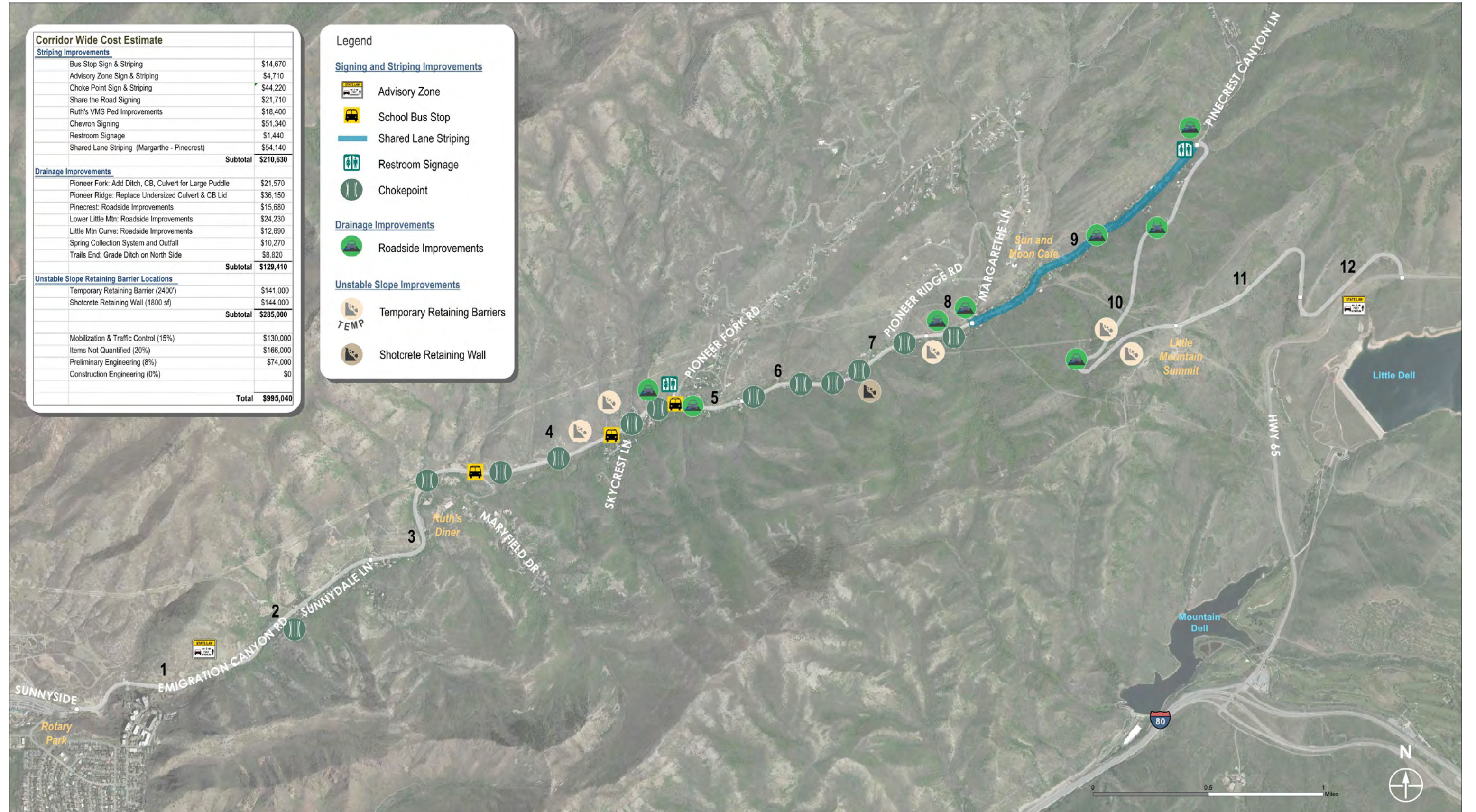
Current funding only allows for \$1 million of potential improvements to be completed during the 2016 construction season (Figure 8).

Priority was to address safety concerns in the highest hazard areas with improved signing and striping for motorists, bicyclists, and pedestrians. As inadequate funding is available to widen the narrow shoulder from Margarethe to Pinecrest, the implementation of sharrows and addition of a double yellow stripe should increase vehicle and bicycle awareness in this high-ranking hazard area. Projects at Ruth's to improve safer pedestrian crossing across the roadway was also included. Other pedestrian projects include improved bus stop signing and striping.

Another priority was to provide a mix of short-term and permanent solutions for slope stability issues in the canyon. A portion of the \$1 million funds will be to stabilize unstable slopes at an adequate offset from the roadway to allow for the future compatibility of a full travel lane and bike lane when funding to pave this additional shoulder width becomes available. Temporary solutions include adding removable precast barrier to the roadside (where adequate shoulder width allows) in several problematic slope areas that are too costly to retain at this time.

Potential improvements for the \$1 million projects have been progressed to 30% design plans. These plans are shown in Appendix C. These improvements will be constructed by Salt Lake County over the 2016 construction season. The County will continue to seek funding to meet the additional corridor needs. As funds become available, the County will identify the appropriate projects where these funds can be utilized using the hazard index and cost estimates provided in Appendix G.

Figure 8: \$1 Million Improvements



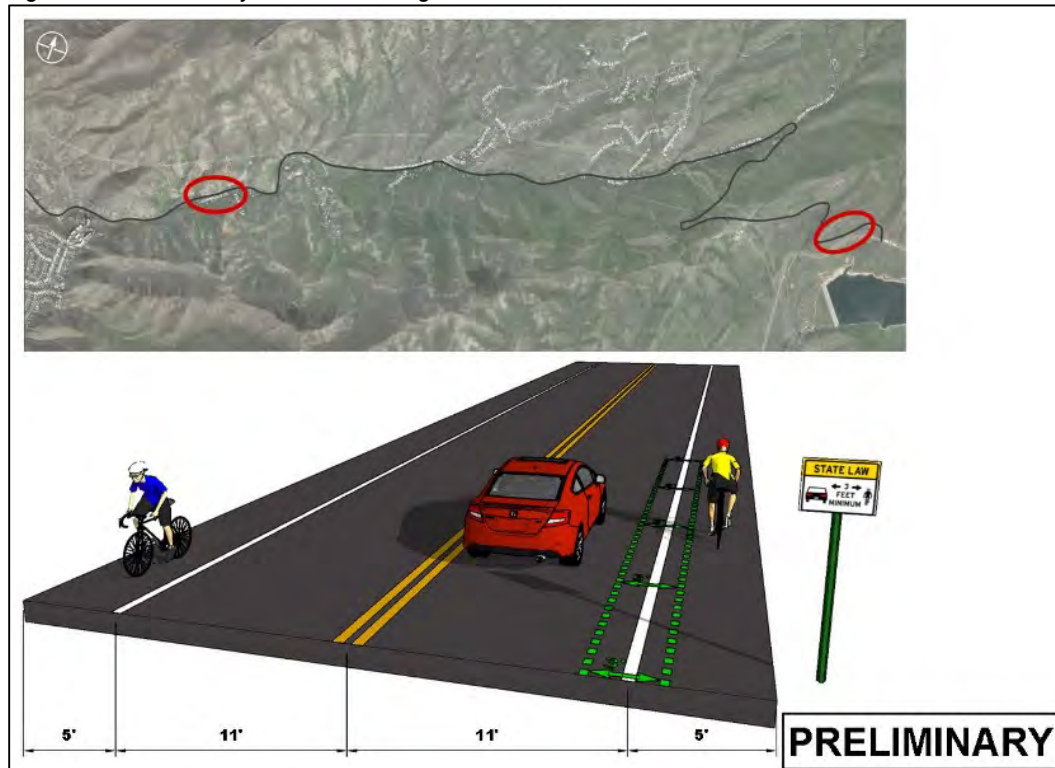
Signing, Striping & Unstable Slope Improvements

Striping, signing, and unstable slope improvements have been graphically displayed below. These options provide specific and corridor-wide improvements to address the identified needs. The following sections describe the potential improvements and locations where they are recommended or will be constructed as a part of the \$1 million or \$15 million improvements.

Bike Advisory Zones

Bike advisory zones are a combination of signing and striping that will be constructed at the beginning and end of the corridor. The purpose of this signing is to provide better visual context to inform motorists and bicyclists of the state law requiring at least a 3-foot buffer between the vehicle and the bicyclist (Figure 9). These advisory zones will be constructed in 2016.

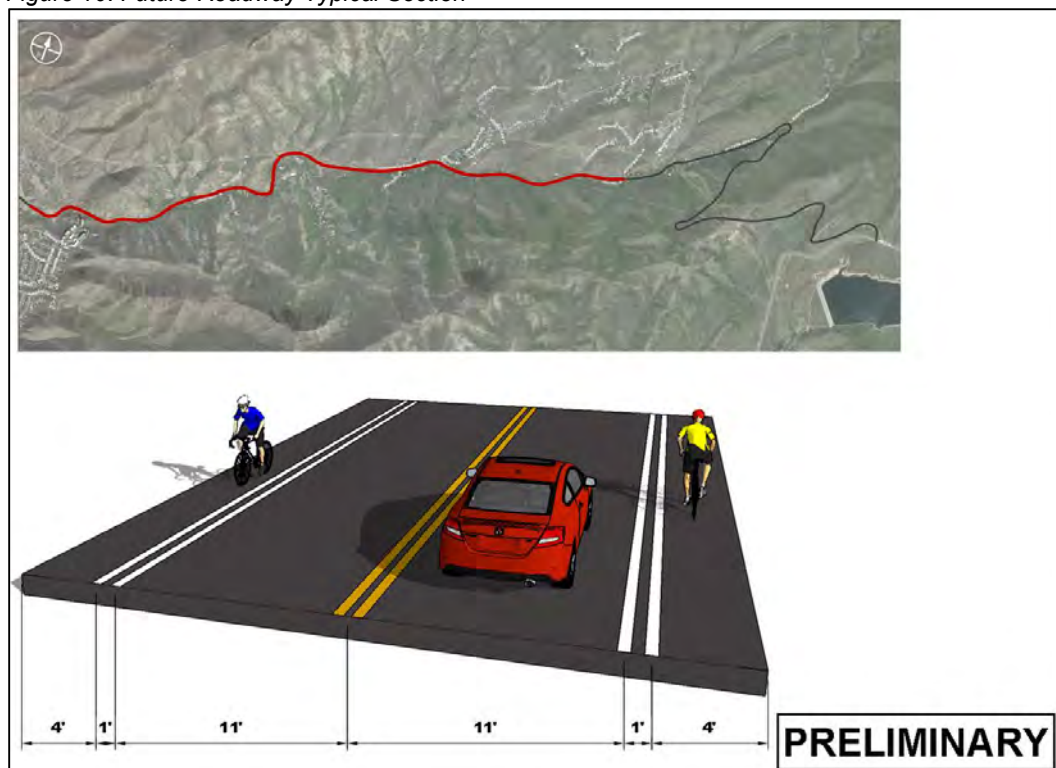
Figure 9: Bike Advisory Zone Rendering



Future Roadway Typical Section

Once adequate funding is available to widen the roadway shoulders and provide new striping, the recommended typical section includes 11-foot travel lanes with a 1-foot buffer and a 4-foot bike lane (Figure 10). This buffer, while not recommended by the National Association of City Transportation Officials (NACTO), is preferred to provide a greater shy distance between motorists and active transportation users, while still utilizing a narrow footprint to maintain the context of the canyon. This buffer encourages a wider variety of bicyclist skill levels by contributing to the perception that the buffer is safer than a standard single stripe bike lane.

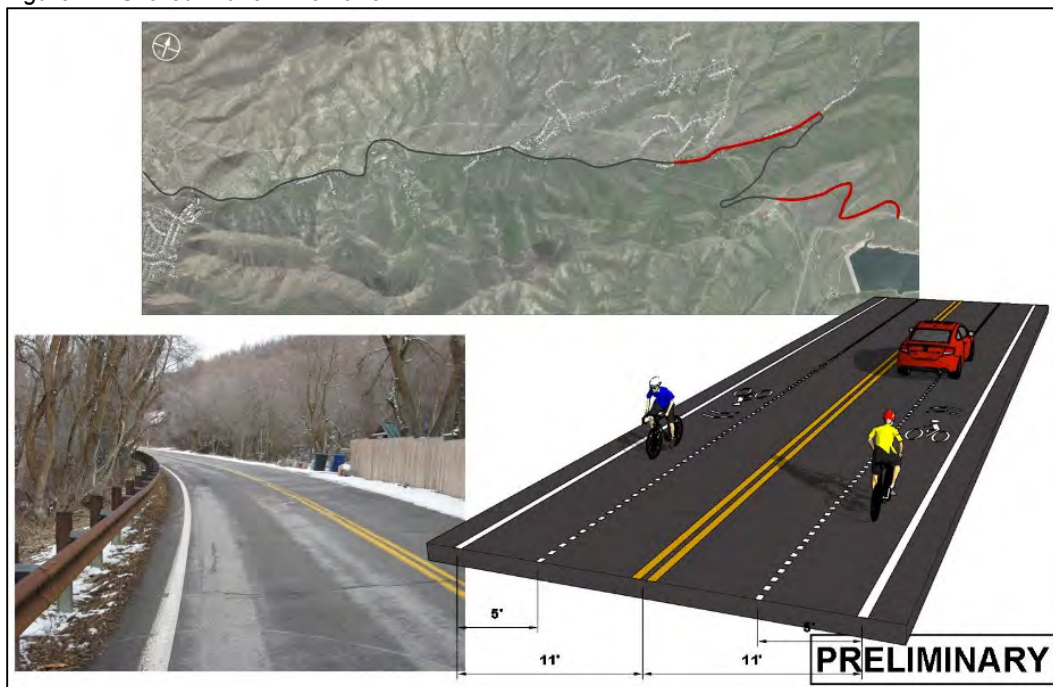
Figure 10: Future Roadway Typical Section



Shared Travel/Bike Lanes

The narrow corridor from Margarethe to Pinecrest brings many challenges with encroaching structures, unstable slopes, and mixing of pedestrians, bicyclists, and motorists into the traffic lane. To help alleviate this mix of modes in the traffic lane, sharrows will be implemented in the 30% plans (Figure 11). These sharrows will be placed every 100 feet and 4 feet from the fog line to notify motorists laterally of where they may encounter cyclists. The sharrows will also encourage cyclists of the proper bicycle positioning for safe travel and to reduce bicyclists from impeding motor vehicle traffic. It is recommended that the corridor speed limit be reduced to 30 mph on this stretch as highly advised with typical sharrow applications.

Figure 11: Shared Travel/Bike Lane



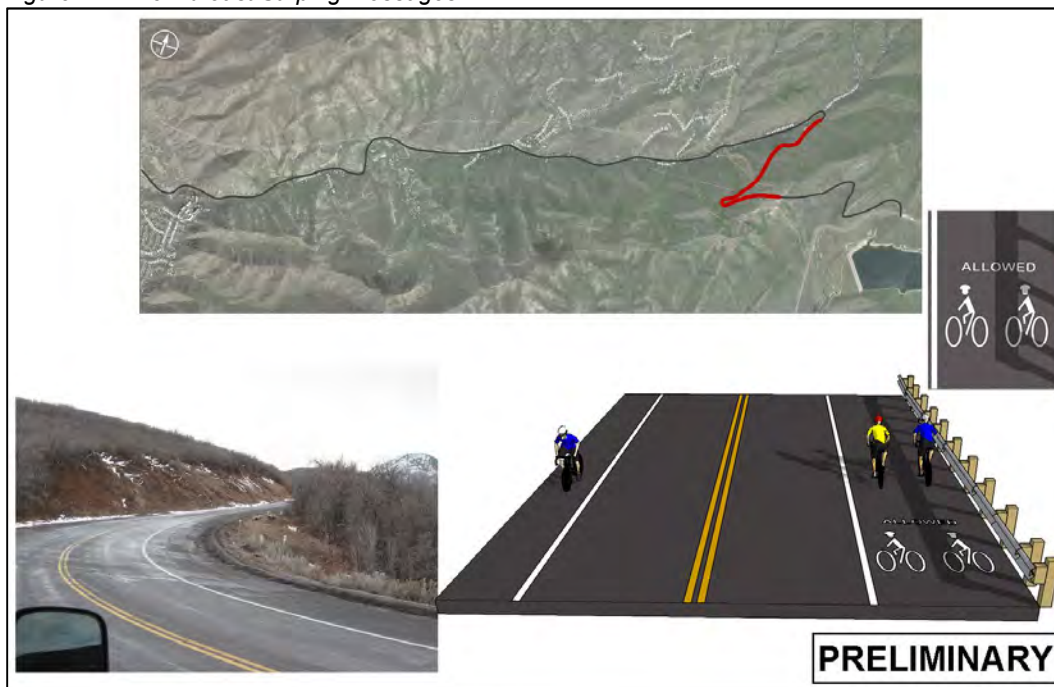
Sharrow treatments are advised on roadways with traffic volumes below 3,000 vehicles per day. Traffic counts of 2,610 vehicles per day (weekend) and 2,224 vehicles per day (weekday) were recorded for the middle of the canyon (see Appendix H). While the vehicle counts are acceptable for this sharrow application now, as the canyon inevitably gains popularity for scenic drives or as a bypass from Park City to the University of Utah this may not be acceptable as a long-term solution. Sharrows will also be added to the less traveled stretch of roadway from the Little Mountain Summit to SR-65. The

lack of shoulder, low hazard index rating, and high cost of widening the roadway benefits a sharrow treatment in this location over other alternatives.

Two Abreast Striping Messages

The two abreast treatment is intended to inform cyclists that, if desired, side-by-side riding is acceptable for areas with wide uphill shoulders like the stretch of roadway from Pinecrest to the Little Mountain Summit. This treatment was not included in the 30% plans because the striping messages were deemed not to provide significant value to the active transportation users (Figure 12). The two abreast messaging may also unintentionally endorse pack riding by cyclists.

Figure 12: Two Abreast Striping Messages



Choke-Point Signing & Striping

While separating motor vehicles and cyclists on the roadway is ideal for safe travel, engineering challenges including encroaching steep slopes, existing cast-in-place barrier/guardrail, and residential features do not allow for acceptable bike lane widths with the current funding available in some locations. To mitigate the safety concerns in these locations, signing and striping will be implemented in the 30% plan set, as detailed below in Figures 13 and 14.

Custom signage notifying motorists of their responsibility to pass with care will be installed before approaching the most dangerous choke-point areas. Choke-point areas will utilize green paint treatments similar to other recent Salt Lake City and Salt Lake County projects to maintain bicyclist expectancy. Dots placed every 100 feet in extended choke-point areas will inform cyclists to maintain single-file riding as the shoulder width is not adequate (i.e., either a minimum 4 feet, or 4 feet plus a 2-foot shy with barriers per the American Association of State Highway and Transportation Officials [AASHTO]). Striping messages, as shown in Figure 14, warn cyclists when they are entering and exiting these choke-point locations. Striping messages were preferred over signing as cyclists tend to be more aware of the upcoming pavement in front of their wheel than tall mounted roadside signs intended for cars and trucks.

Figure 13: Choke-Point Rendering

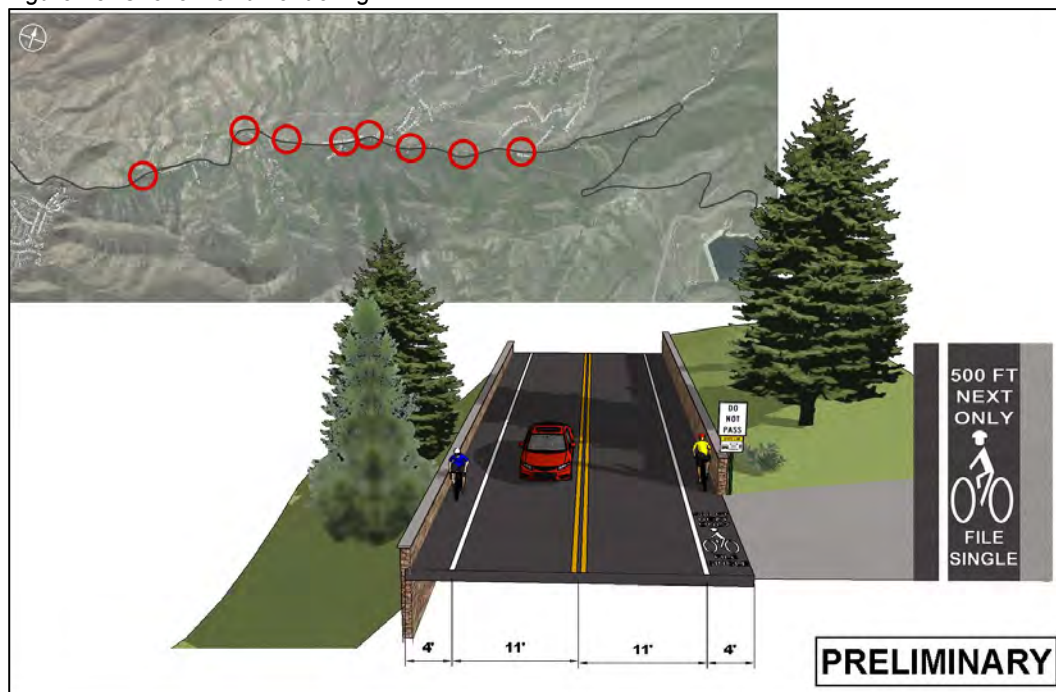
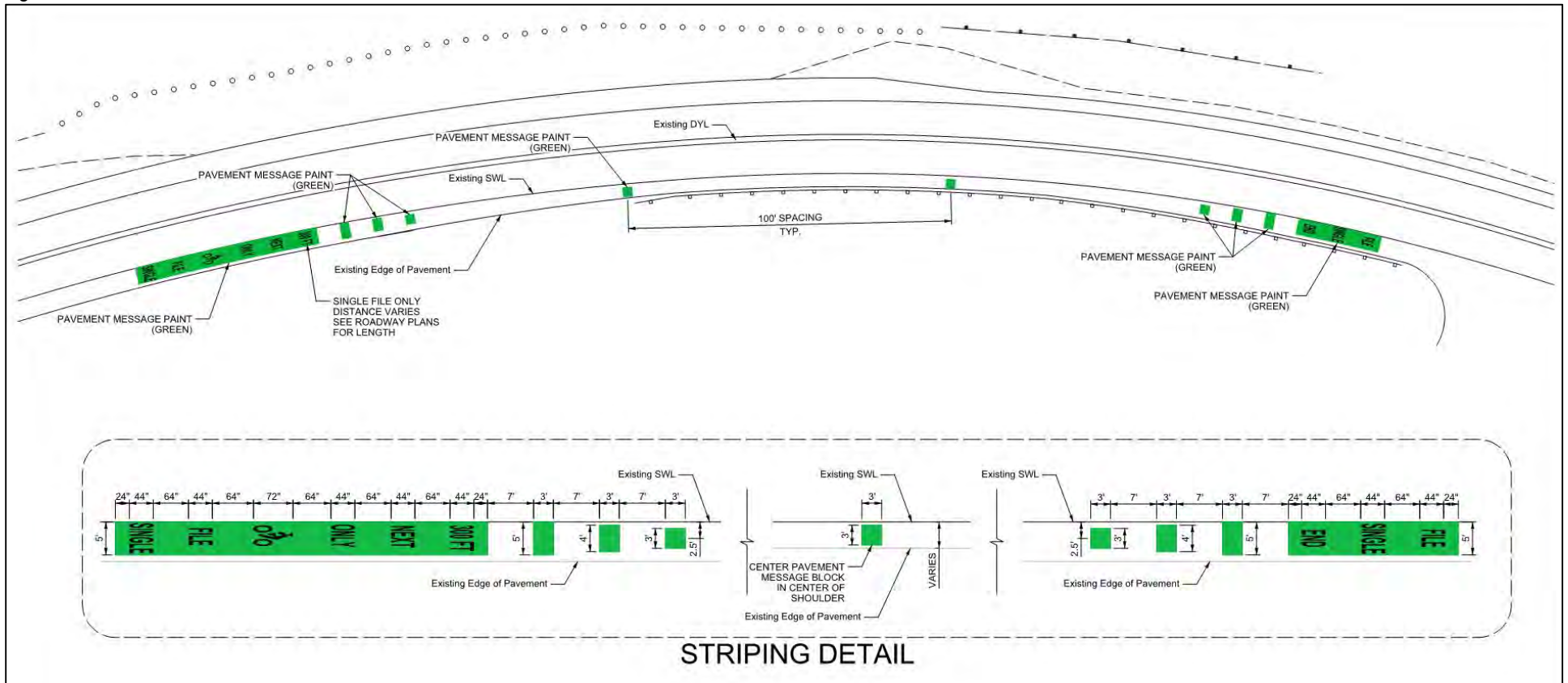


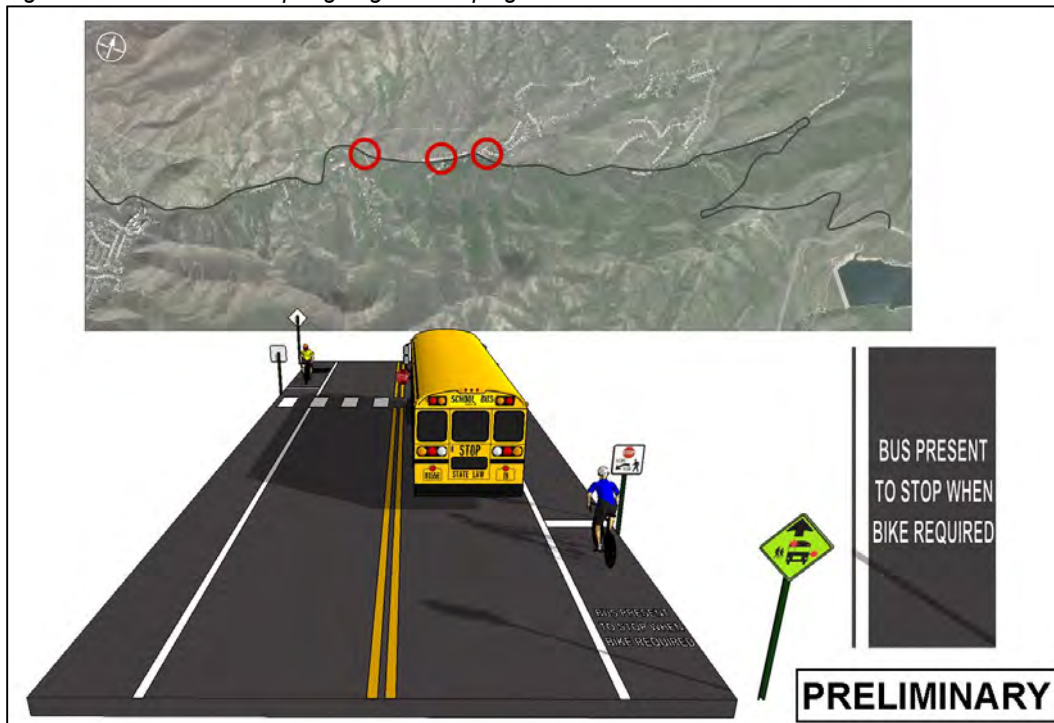
Figure 14: Choke-Point Detail



School Bus Stop Signing & Striping

Safety for children at school bus stops was an important concern to the design team. Discussions with Granite School District, Unified Police, and the ECRIC on bus stop locations and pedestrian crossing ideas took place throughout the study. The major problem has been downhill cyclists disregarding flashing school bus lights when loading and unloading school children. Signs or gates mounted to the rear of buses were suggested and may be installed in some form with a separate school district project. The abundance of advanced warning signs for bus stops throughout the canyon indicates that the signs are not respected or cyclists are traveling too fast downhill to adequately react to a stopped school bus. Included in the 30% plans are striping improvements at the most prominent school bus stops with the intention that the presence of this messaging for bicyclists will perpetuate awareness throughout corridor. See Figure 15.

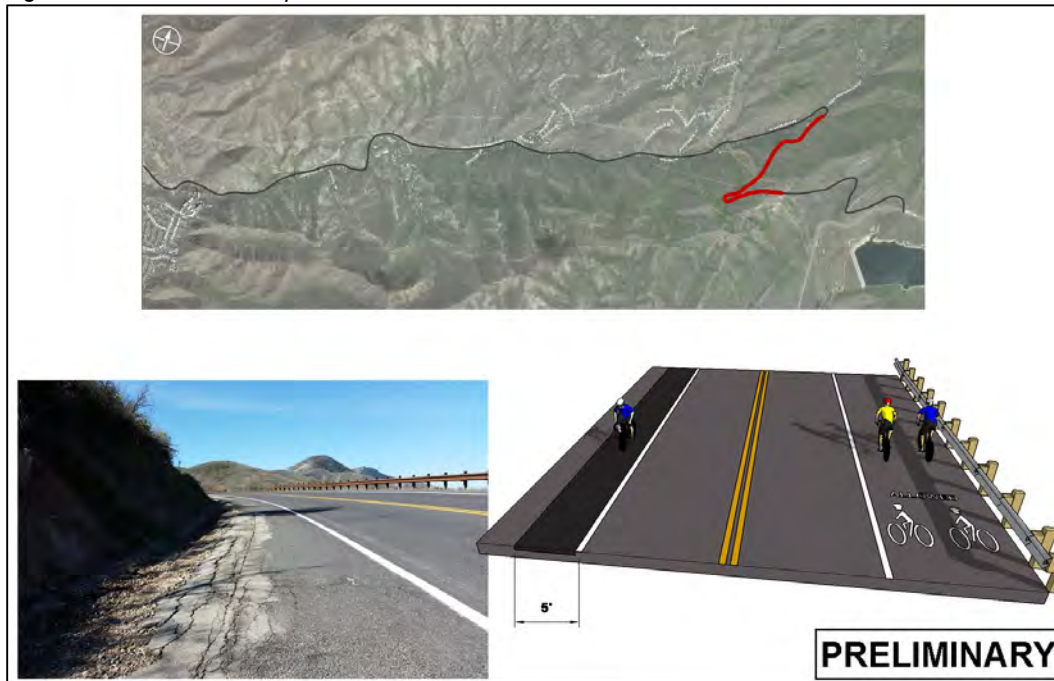
Figure 15: School Bus Stop Signing and Striping



Smoothness Improvements

The wide shoulders from Little Mountain Summit to Pinecrest are underutilized by westbound cyclists because of the poor pavement condition pushing riders into the travel lane with vehicles. Rotomilling this shoulder and repaving the shoulder is recommended (Figure 16), but was not included in the 30% plans because slope stability projects were valued above this pavement project. Appendix I includes Salt Lake County's 2015 Pavement Inspection Ratings for Emigration Canyon. The use of chip seal for pavement maintenance, similar to the area from Rotary Park to Maryfield, should be discouraged. Chip seal and open graded surface course provides a rough surface for cyclists. Slurry seal maybe an option in the traffic lanes where an adequate bike shoulder is present to discourage cyclist from hugging the solid white stripe.

Figure 16: Smoothness Improvements



Unstable Slope Improvements

Several unstable slopes that encroach onto the roadway shoulder deposit debris, particularly during storm events. The debris forces bicyclists into the traffic lane with vehicles. While recent maintenance sweeping has helped the situation, temporary infrastructure improvements like precast barrier can catch the debris before it reaches the roadway (see Figure 17). The precast barrier can be reused in other places of the canyon as these slopes are cut and stabilized with shotcrete to the full buildout location as funding becomes available. This solution can only be used in locations with a 6-foot minimum shoulder and will still need occasional maintenance to remove the collected debris behind the barrier.

Figure 17: Unstable Slope Improvements



V. FINAL RECOMMENDATIONS

Emigration Canyon has the untapped potential to be a blue-ribbon facility for all users. This canyon is the most heavily-used canyon in Utah by cyclists and pedestrians with more than 1,300 bike trips daily. The allure of sweeping views, mild canyon grades, and proximity to downtown Salt Lake City has attracted a growing number of cyclists and runners recently. These assets have also brought conflict, however, between active users, motorists, and residents. Infrastructure hazards including unstable slopes, encroaching residential structures, tight shoulders, and canyon curves bring design challenges that urban bike design guides like NACTO and AASHTO do not address. Roadway infrastructure improvements including slope stability and pilot striping concepts will be implemented to promote respect among all canyon users and hopefully lessen the severity of these obstacles.

The severity of canyon segments were rated with data collected and summarized with a hazard index. The stretch of roadway from Margarethe to Pinecrest (segment 9) was rated the highest on the hazard index. This 6,700-foot length of roadway has narrow shoulders, unstable slopes, tight curves, and a high accident history. The tight curves, reduced stopping sight distance, and presence of sharrows all strongly suggest the speed limit be reduced to 30 mph in this upper canyon stretch of roadway. To command more respect this area of reduced speed could implement solar VMS speed playback signage, flashing beacons, or high visibility flags over the reduced speed signage if desired.

Improvements related to the ECRIC, engineering study, and public comments are estimated to cost \$15 million. These improvements can be divided into drainage, unstable slope, safety, and roadway geometric solutions. Securing additional funding sources, such as the following, may help bridge this financial gap:

- Surface Transportation Program (STP)
- Transportation Alternatives Program (TAP)
- Transportation Investment Generating Economic Recovery (TIGER) grants
- Statewide Transportation Improvement Program (STIP)
- Congestion Mitigation & Air Quality (CMAQ)
- Zoo, Arts, & Parks (ZAP)

Cost sharing with third-party utilities and public-private partnerships can also provide funding for projects. Adding a bicycle counter to the lower canyon can provide valuable data that can help when applying for many of these funds.

The \$1 million funding that is available will be concentrated on safety projects that provide the most value to the canyon. While some of these improvements are temporary (e.g., precast barrier and choke-point striping), the majority of the available funding will go to lifetime projects including upgraded drainage, slope stability, and roadway signage. The 30% plans and cost estimate detail of these projects are shown in Appendix C.

APPENDIX A: EXISTING CONDITION COMMENTS

ECRIC STUDY

EMIGRATION CANYON CONCEPT PROJECT LIST

Table with columns: Station, Offset, Case, Problem, Solution. Rows include items like '162-00.00 LT', '132-00.00 LT', '122-00.00 LT', etc., detailing various road construction and safety issues and their corresponding solutions.

EMIGRATION CANYON CONCEPT PROJECT LIST

Table with columns: Station, Offset, Case, Problem, Solution. Rows include items like '375-00.00 LT', '378-75.00 LT', '382-00.00 LT', etc., detailing various road construction and safety issues and their corresponding solutions.

TRANS & RDWY IMPROV STUDY

OPNISE TRANS & RDWY IMPROV STUDY

APPENDIX B: HAZARD INDEX RESULTS

EMIGRATION CANYON
SEGMENT PRIORITY SCORING

Updated Aug 24, 2015

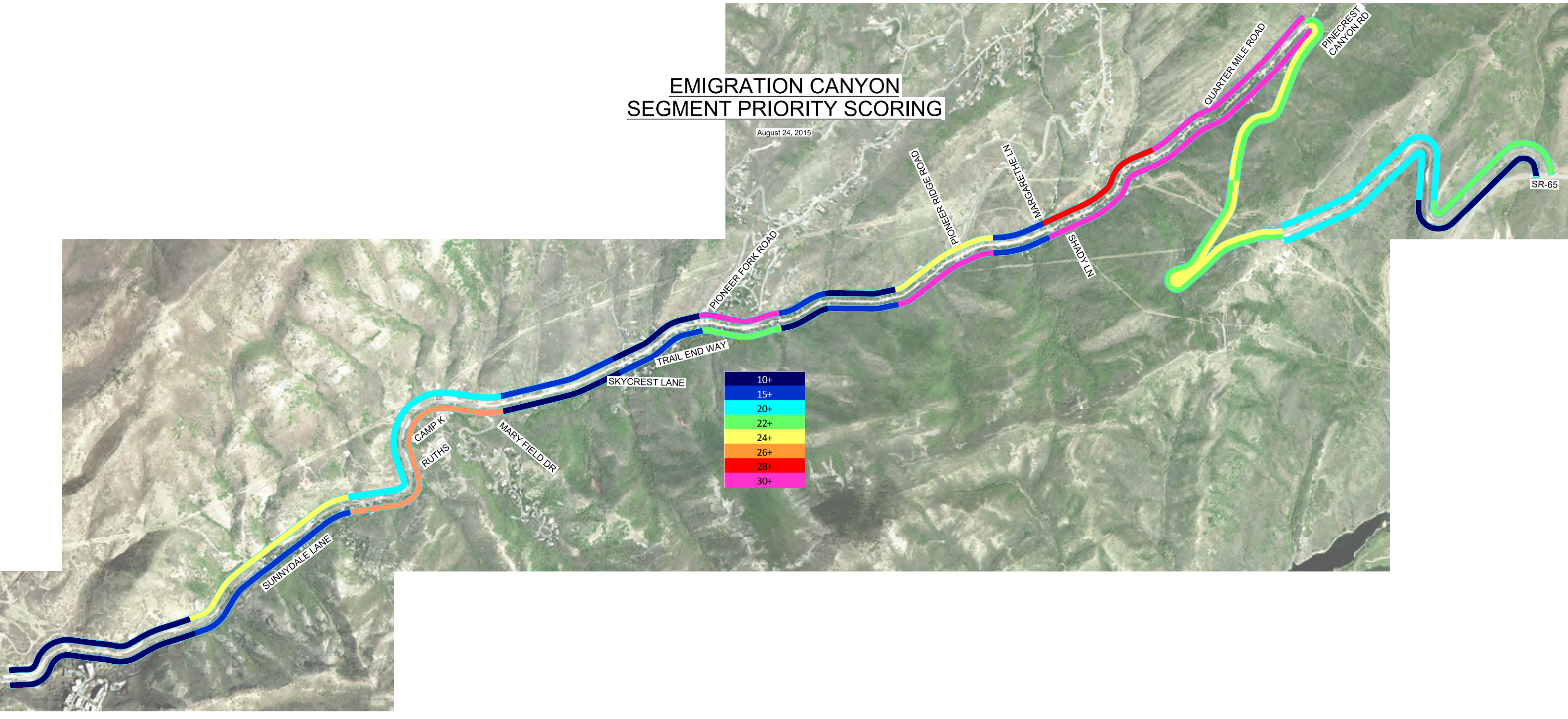
Segment	Offset	Station		Length	Widening Length	RT/LT		Segment	Environmental	Geometry		Traffic	Total	Notes
		From	To			% Widening	% Widening			10%	60%			
1	RT	100+00	140+00	4000		0%	0%		15	14	16	14.7	Rotary Pk	
1	LT	100+00	140+00	4000		0%			15	14	16	14.7	Rotary Pk	
2	RT	140+00	180+00	4000		0%			15	20	19	19.2	Sunnydale	
2	LT	140+00	180+00	4000		0%			10	30	19	24.7	Sunnydale	
3	RT	180+00	227+00	4700	542	12%	8%		10	31	27	27.7	Ruths/Camp K	
3	LT	180+00	227+00	4700	220	5%			15	21	24	21.3	Ruths/Camp K	
4	RT	227+00	251+00	4300	460	11%	39%		15	11	7	10.2		
4	LT	227+00	251+00	4300	2875	67%			15	22	7	16.8		
4	RT	251+00	270+00						15	23	14	19.5	Trails End	
4	LT	251+00	270+00						15	11	14	12.3	Trails End	
5	RT	270+00	286+00	1600	250	16%	22%		15	26	18	22.5	Firestation	
5	LT	270+00	286+00	1600	450	28%			15	38	23	31.2	Firestation	
6	RT	286+00	296+00	2400		0%	15%		5	17	12	14.3		
6	LT	286+00	296+00	2400	740	31%			18	21	13	18.3		
6	RT	296+00	310+00						15	25	7	18.6		
6	LT	296+00	310+00						15	16	7	13.2		
7	RT	310+00	332+00	2200	1600	73%	61%		8	57	9	37.7	Pioneer Ridge	
7	LT	310+00	332+00	2200	1065	48%			15	33	11	24.6	Pioneer Ridge	
8	RT	332+00	343+00	1100	365	33%	17%		15	14	17	15		
8	LT	332+00	343+00	1100		0%			10	18	17	16.9		
9	RT	343+00	370+00	6700	6420	96%	96%		15	35	31	31.8	Sun & Moon	
9	LT	343+00	370+00	6700	6420	96%			15	32	31	30	Sun & Moon	
9	RT	370+00	410+00						15	44	30	36.9	Quarter Mile	
9	LT	370+00	410+00						15	46	29	37.8	Quarter Mile	
10	RT	410+00	449+00	9000		0%	0%		15	32	12	24.3	Pinecrest Up	
10	LT	410+00	449+00	9000		0%			15	31	12	23.7	Pinecrest Up	
10	RT	449+00	500+00						15	31	12	23.7	Summit Down	
10	LT	449+00	500+00						15	33	12	24.9	Summit Down	
11	RT	500+00	545+00	4500	4000	89%	88%		15	28	7	20.4		
11	LT	500+00	545+00	4500	3880	86%			15	30	7	21.6		
12	RT	545+00	579+86	3486	2265	65%	67%		15	22	8	17.1	Deadmans	
12	LT	545+00	579+86	3486	2410	69%			15	32	8	23.1	Deadmans	

Segment	Segment % Widening
1	0%
2	0%
3	8%
4	39%
5	22%
6	15%
7	61%
8	17%
9	96%
10	0%
11	88%
12	67%



EMIGRATION CANYON SEGMENT PRIORITY SCORING

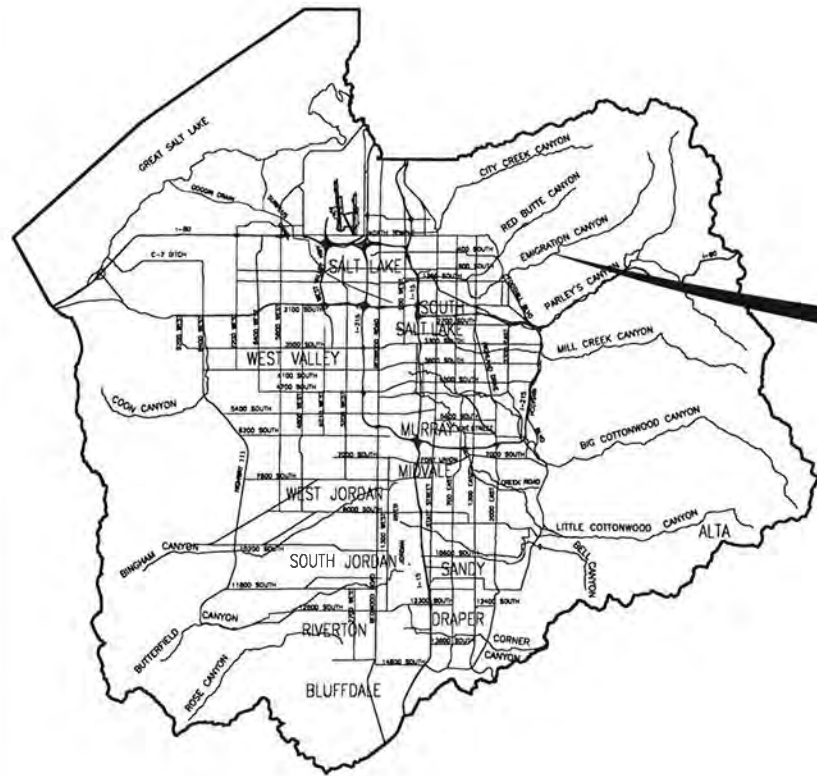
August 24, 2015



APPENDIX C: 30% PLAN SET

SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

PHONE 468-2711

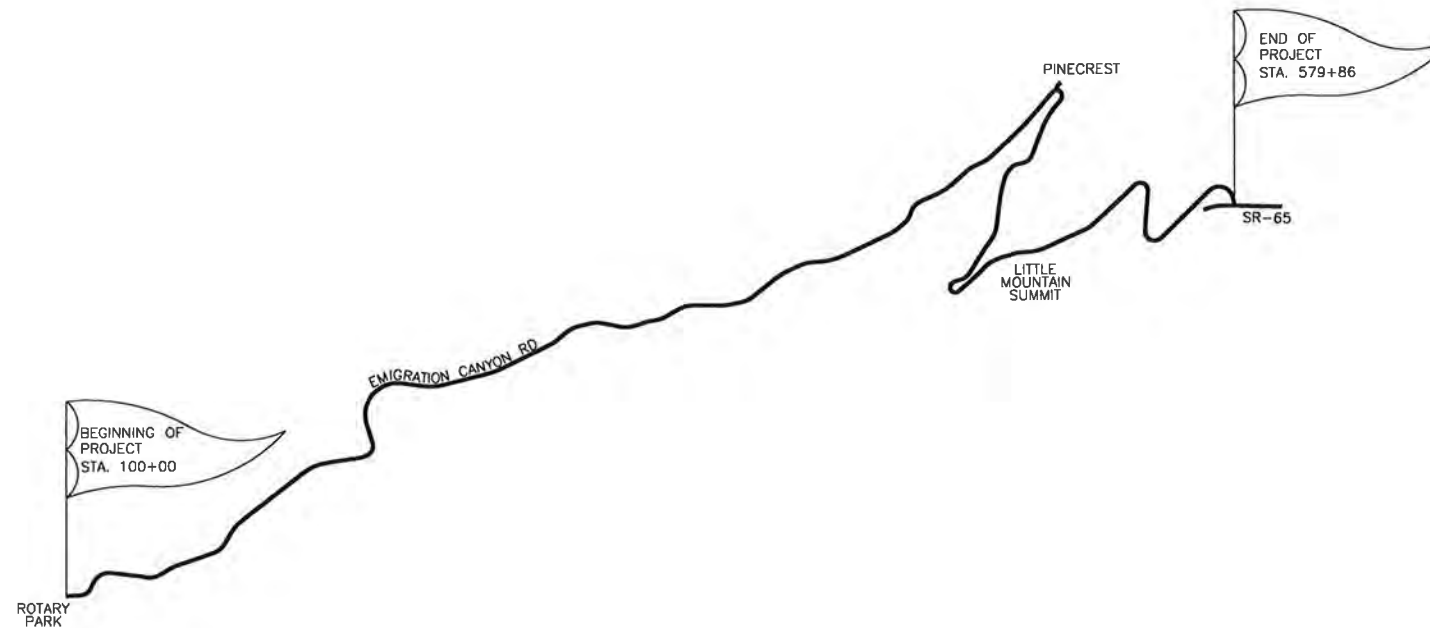


**EMIGRATION CANYON TRANSPORTATION &
ROADWAY IMPROVEMENT STUDY
ROTARY PARK TO SR-65**


DRAWING INDEX	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SHEET KEY
3-7	DETAIL
8-27	ROADWAY PLAN

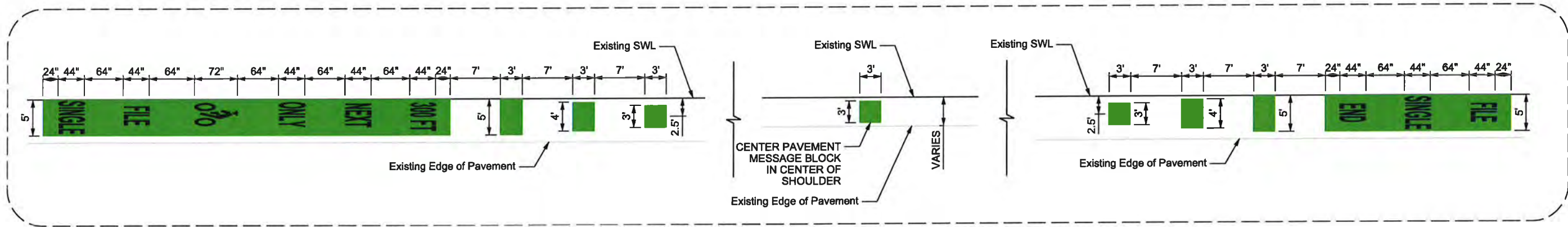
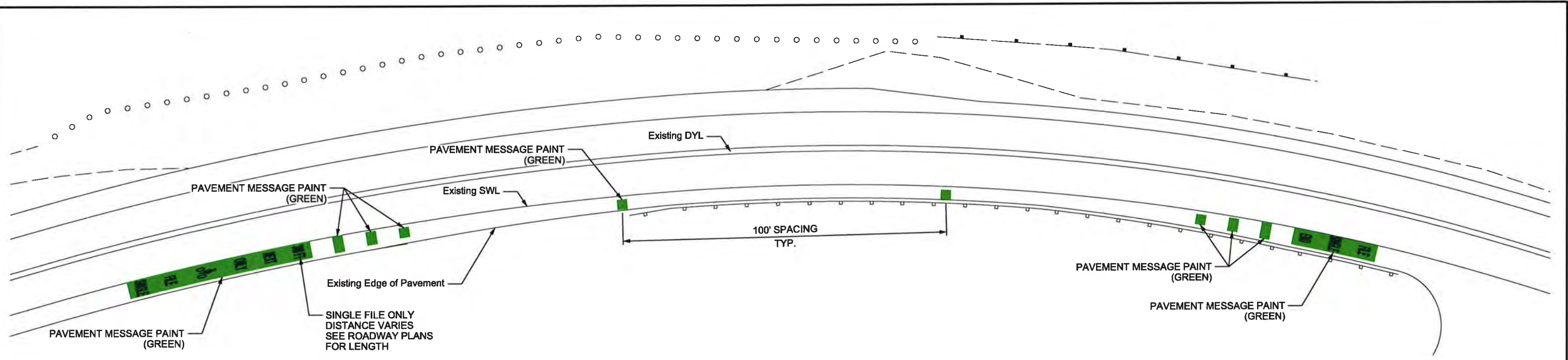
SALT LAKE COUNTY ENGINEERING DIVISION RECOMMENDED FOR APPROVAL	
DIRECTOR _____	DATE _____
SALT LAKE COUNTY PUBLIC WORKS DEPARTMENT RECOMMENDED FOR APPROVAL	
DIRECTOR _____	DATE _____
SALT LAKE COUNTY MAYOR APPROVED	
MAYOR OR DESIGNEE _____	DATE _____

30% PLANS
PRELIMINARY
NOT FOR CONSTRUCTION

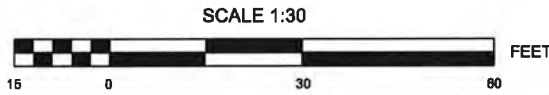


VICINITY MAP

 SALT LAKE COUNTY	SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 2001 SOUTH STATE STREET SALT LAKE CITY, UTAH 84190-4600
	REVIEWED AND APPROVAL RECOMMENDED: _____ CONSTRUCTION MANAGER _____ DATE _____ _____ PROJECT MANAGER _____ DATE _____
RECOMMENDED FOR APPROVAL	EMIGRATION CANYON TRANSPORTATION & ROADWAY IMPROVEMENT STUDY TITLE SHEET
PROJECT ENGINEER _____ DATE _____	DESIGNED BY: BJK _____ PROJECT NUMBER: XXXXXXXX DRAWN BY: BJK _____ FILE NUMBER: XXXXX CHECKED BY: HGK _____ SHEET NUMBER: 1 OF 27 DATE CHECKED: 04/2016 _____



STRIPING DETAIL



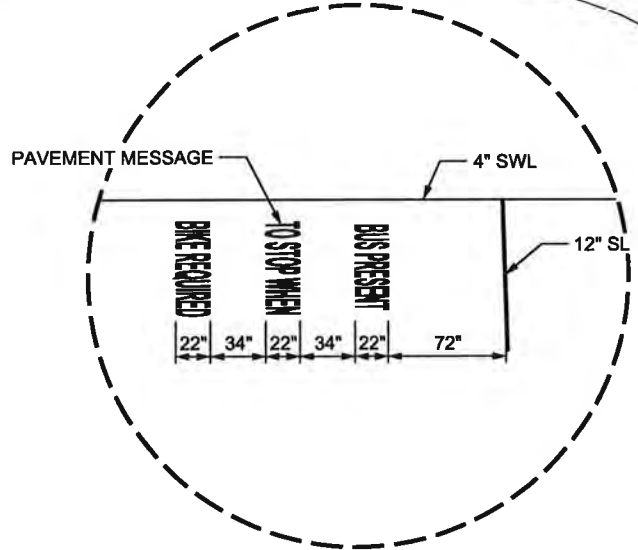
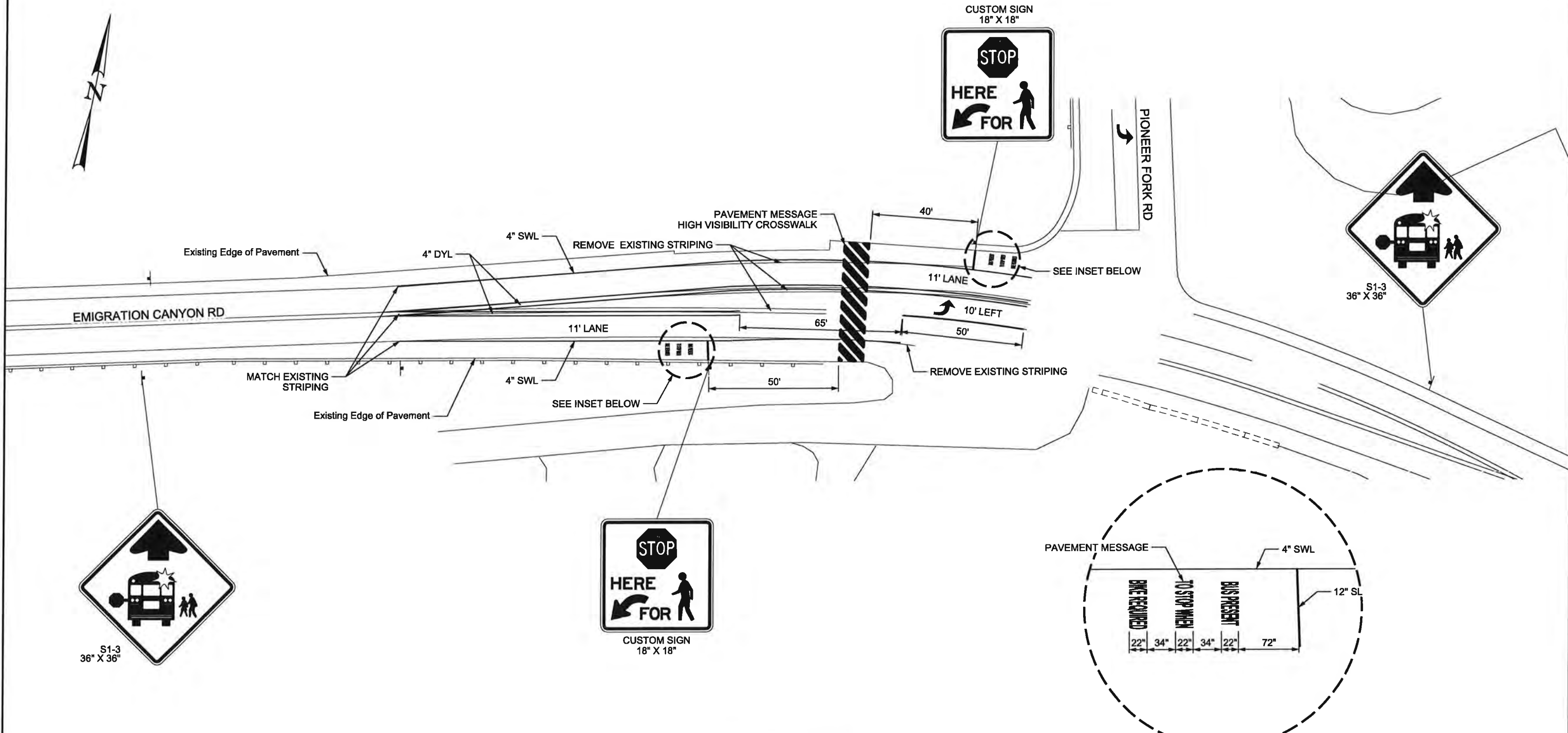
30% PLANS
PRELIMINARY
 NOT FOR CONSTRUCTION

**BIKE ADVISORY ZONE
 STRIPING LAYOUT**

- 144+65.00 RT - 147+24.00 RT
- 210+46.00 RT - 214+34.00 RT
- 226+34.00 RT - 268+04.00 RT
- 279+36.00 RT - 286+15.00 RT
- 309+30.00 RT - 333+35.00 RT
- 341+50.00 RT - 410+19.00 RT
- 212+60.00 LT - 215+92.00 LT
- 281+00.00 LT - 285+65.00 LT
- 296+24.00 LT - 318+20.00 LT
- 342+44.00 LT - 411+64.00 LT

- STRIPING KEY:**
- SWL - SOLID WHITE LINE
 - SYL - SOLID YELLOW LINE
 - DYL - DOUBLE YELLOW LINE
 - BWL - BROKEN WHITE LINE
 - DWL - DOTTED WHITE LINE
 - DGL - DOTTED GREEN LINE
 - LDL - LANE DROP LINE
 - S&BYL - SOLID AND BROKEN YELLOW LINE
 - SL - STOP LINE

1245 East Brickyard Rd Salt Lake City, Utah 84106 Phone: 801.415.5800 Fax: 801.415.5850 www.hwlochner.com	NO. AUTHORIZED BY REVISION MADE BY DATE	DESIGNED BY: BJK DRAWN BY: BJK CHECKED BY: HGK DATE CHECKED: APR 2016	SALT LAKE COUNTY SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 2001 SOUTH STATE STREET SALT LAKE CITY, UTAH 84190-4800	DETAIL	EMIGRATION CANYON BIKE STUDY	PROJECT NUMBER: FILE NUMBER: SHEET NUMBER:
						- 10301 4 OF 27



**TYPICAL
SCHOOL BUS STOP
STRIPING LAYOUT**

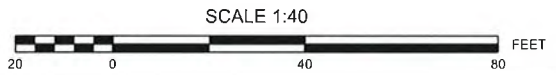
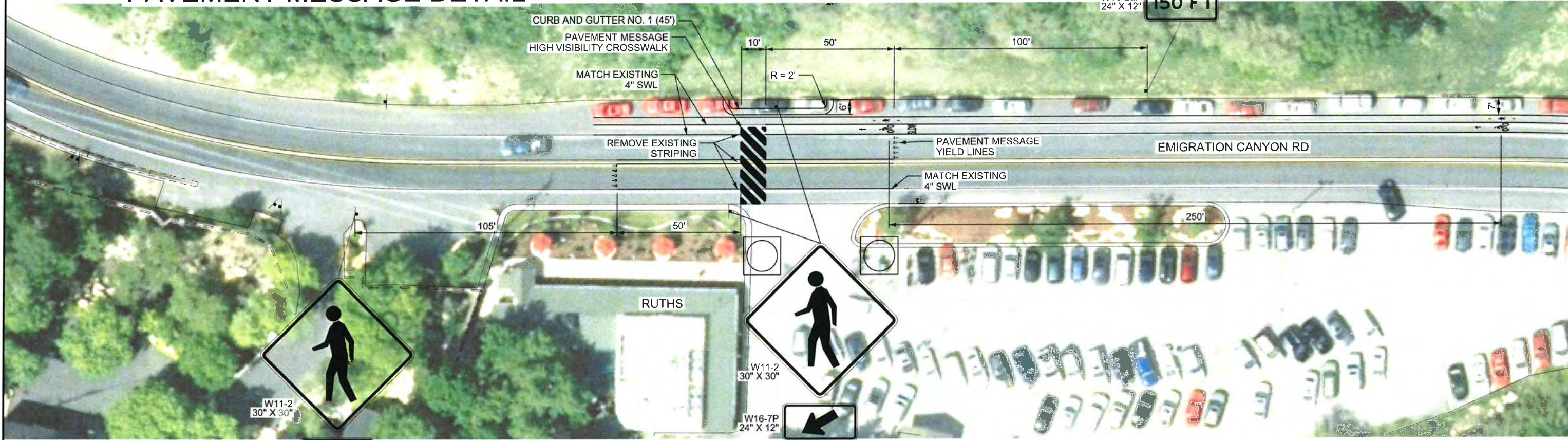
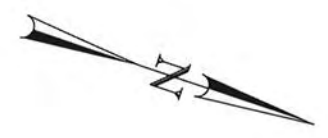
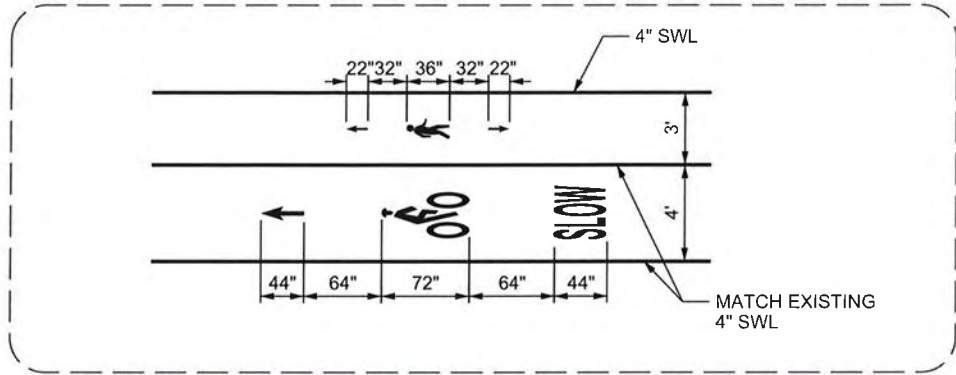
220+85.00 - 222+81.00
268+30.00 - 270+85.00

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SCALE 1:40

30% PLANS
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						CHECKED BY: HGK				FILE NUMBER: 10301
						DATE CHECKED: APR 2016				SHEET NUMBER: 5 OF 27



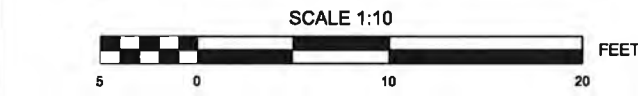
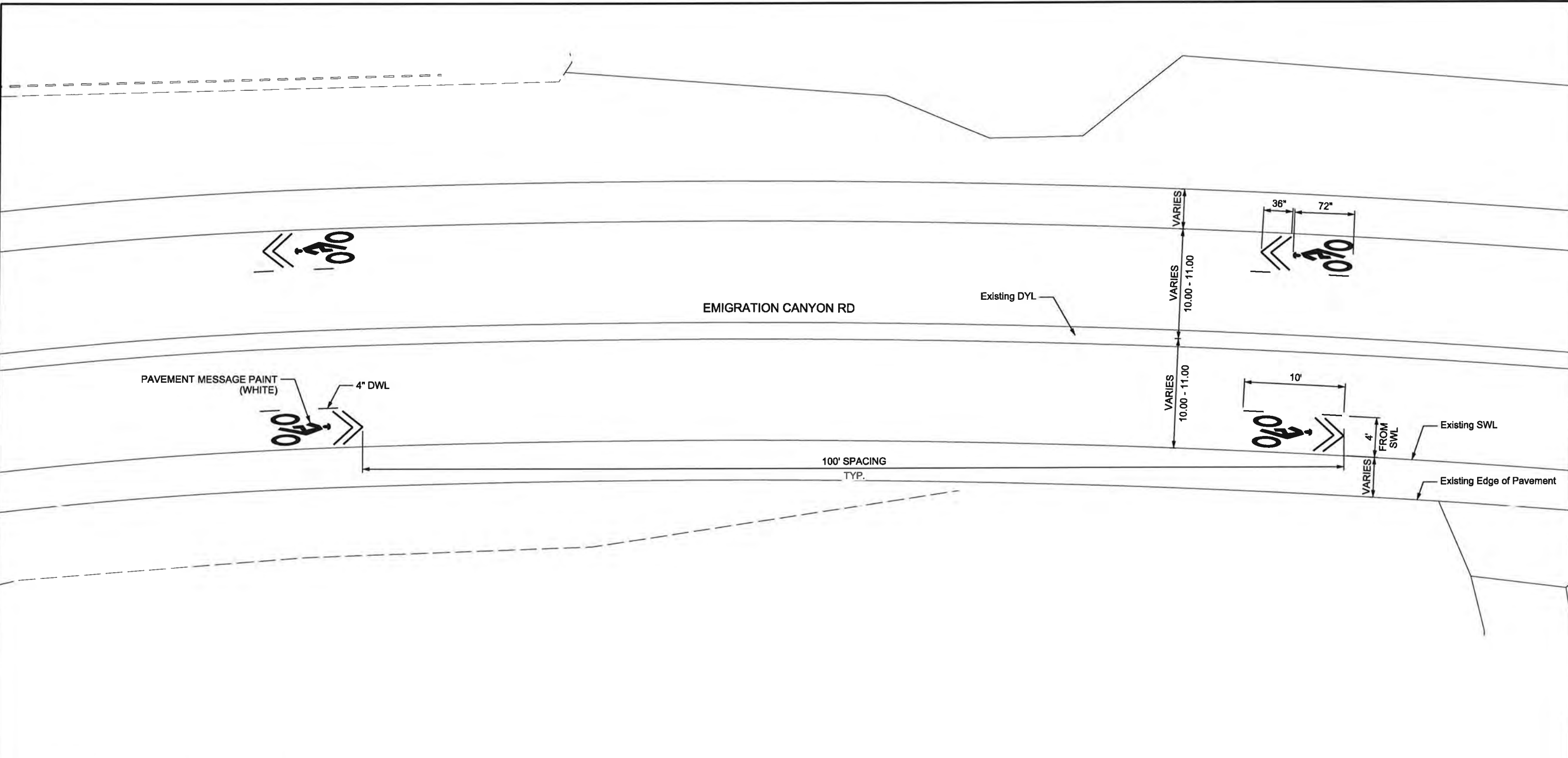
30% PLANS
PRELIMINARY
NOT FOR CONSTRUCTION

**TYPICAL
RUTHS CROSSWALK
STRIPING LAYOUT**

195+95.00 - 197+07.00

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						CHECKED BY: HGK				DATE CHECKED: APR 2016

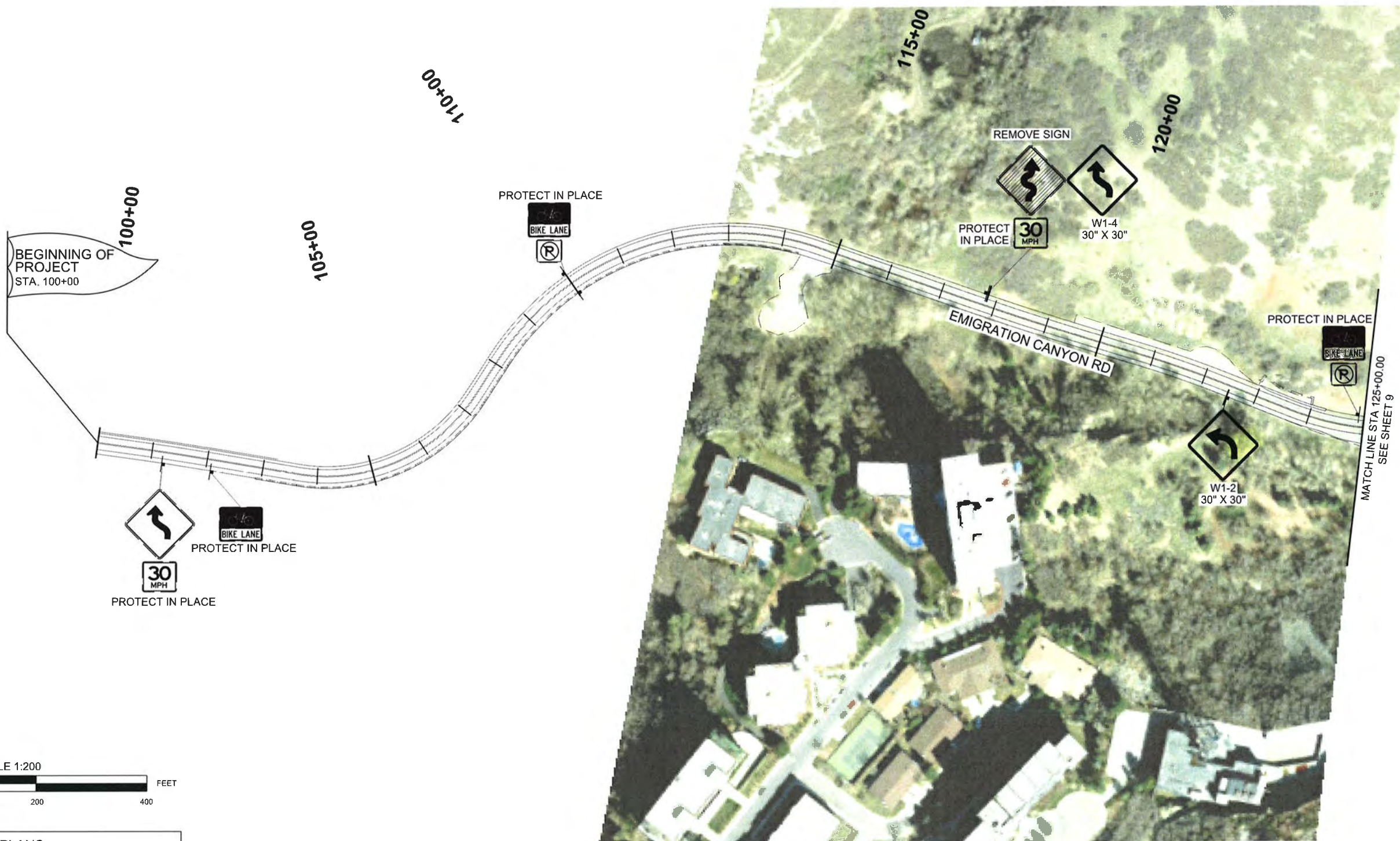


30% PLANS
PRELIMINARY
 NOT FOR CONSTRUCTION

TYPICAL SHARROW PAVEMENT MESSAGE LAYOUT
 344+00.00 - 409+80.00

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						CHECKED BY: HGK				FILE NUMBER: 10301
						DATE CHECKED: APR 2016				SHEET NUMBER: 7 OF 27



30% PLANS
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DESIGNED BY: BJK
 DRAWN BY: BJK
 CHECKED BY: HGK
 DATE CHECKED: APR 2016

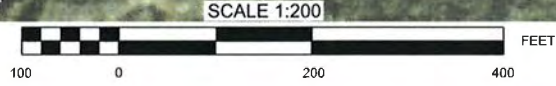
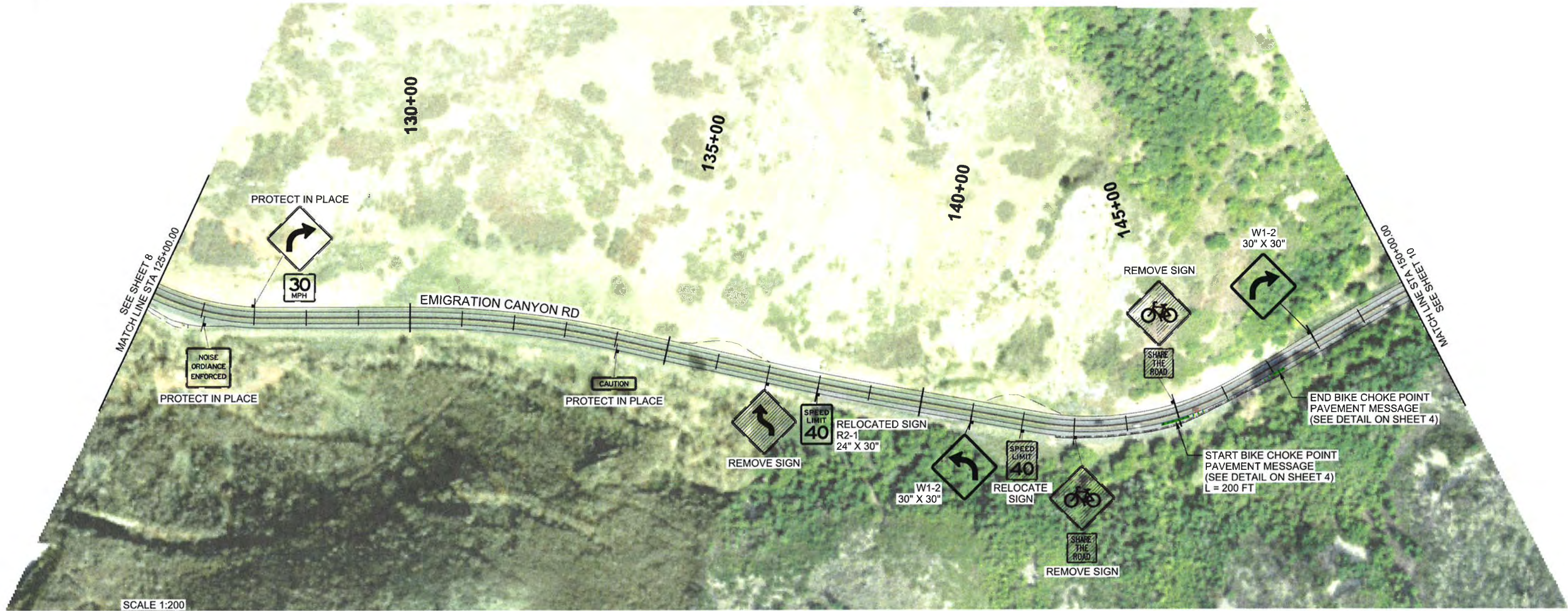


SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	S OF 27



30% PLANS
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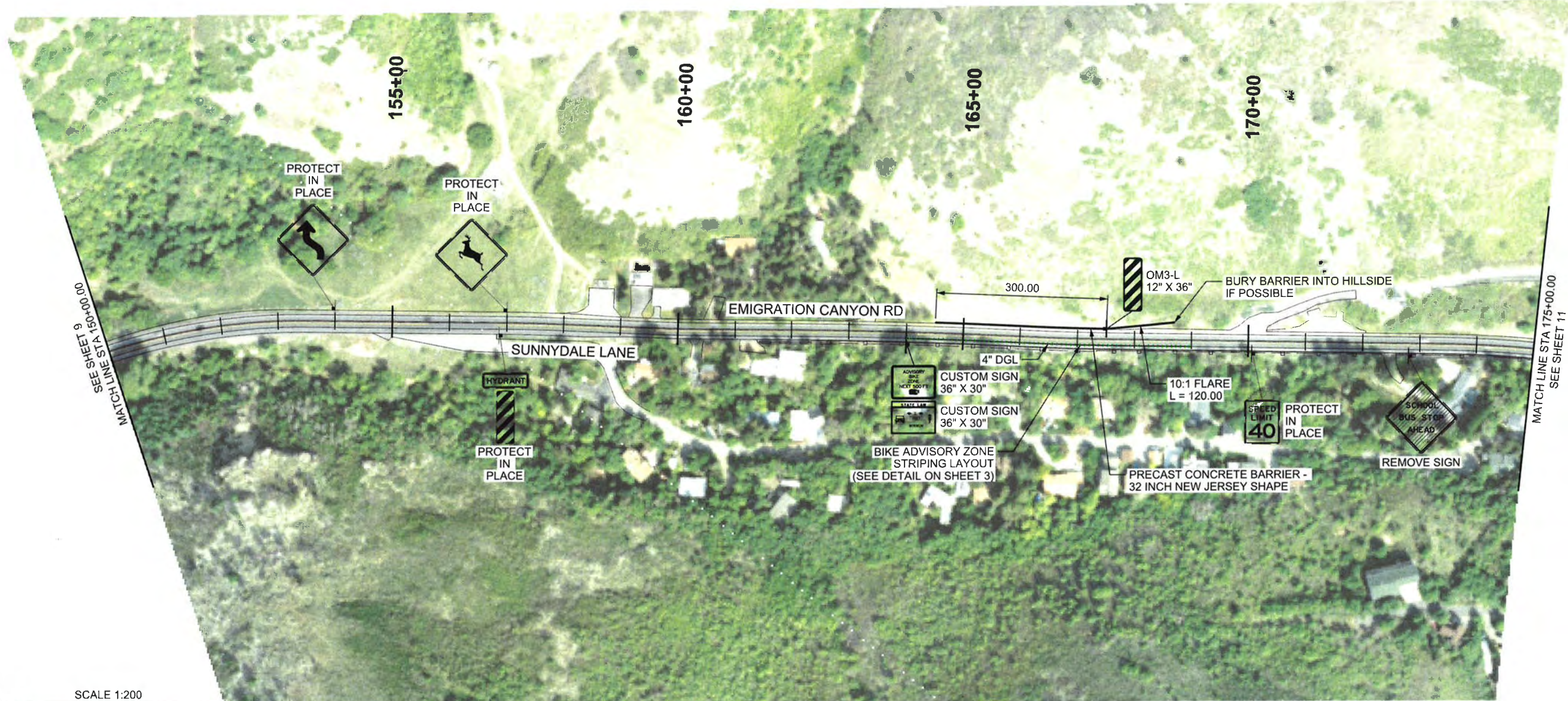


SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	9 OF 27



SCALE 1:200



30% PLANS
PRELIMINARY
 NOT FOR CONSTRUCTION

NOTE:

1. PLACE PRECAST CONCRETE BARRIER NEW JERSEY SHAPE ON COMPACTED SUBGRADE OR EXTENDED PAVEMENT SECTION. BARRIER MUST BE PLACED A MINIMUM OF 6 FT FROM EDGE OF TRAVELED WAY TO FACE OF BARRIER.

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DATE CHECKED:	APP 2016



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 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	10 OF 27




30% PLANS
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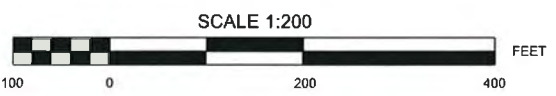
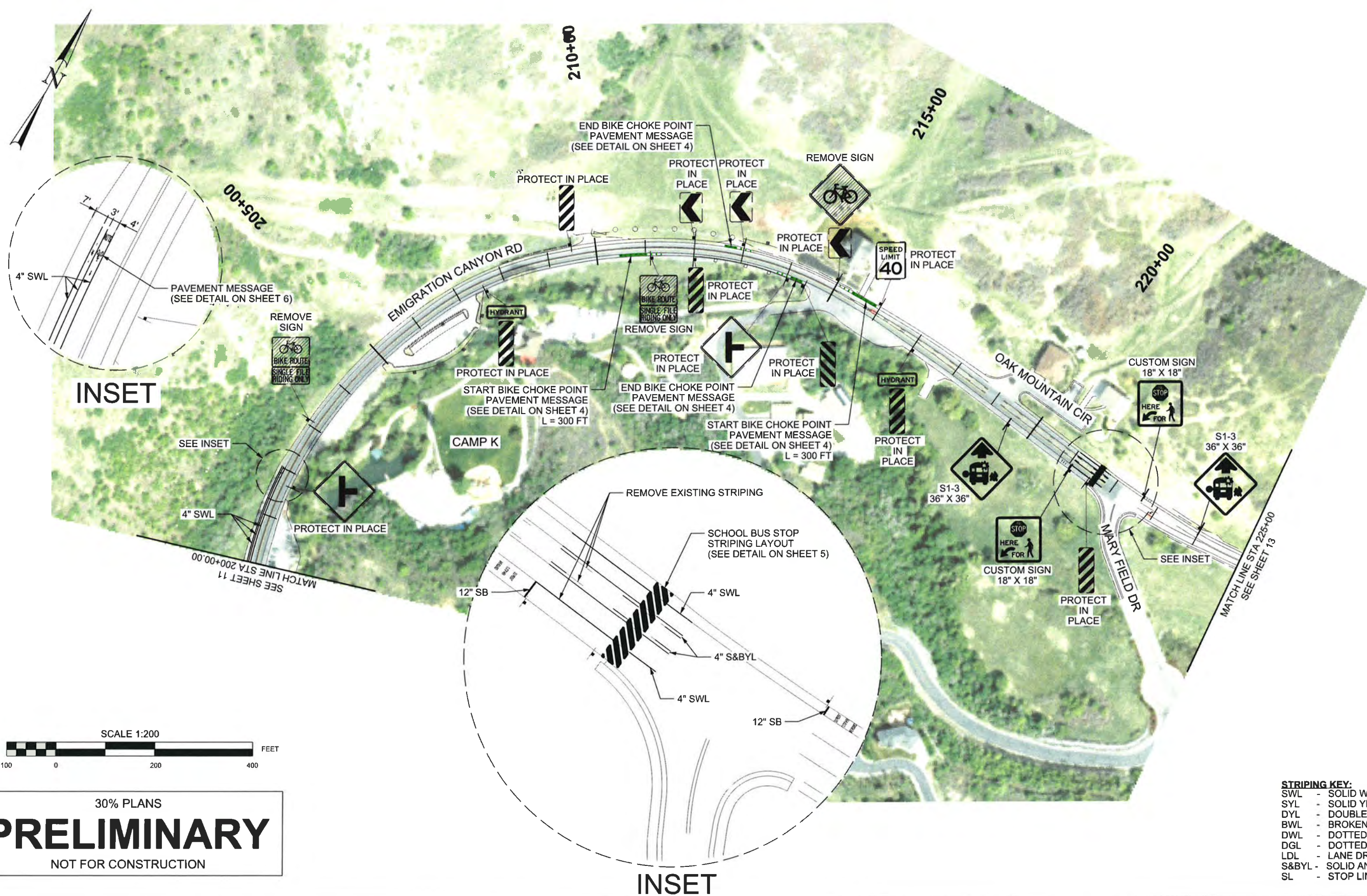
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SALT LAKE COUNTY
 SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

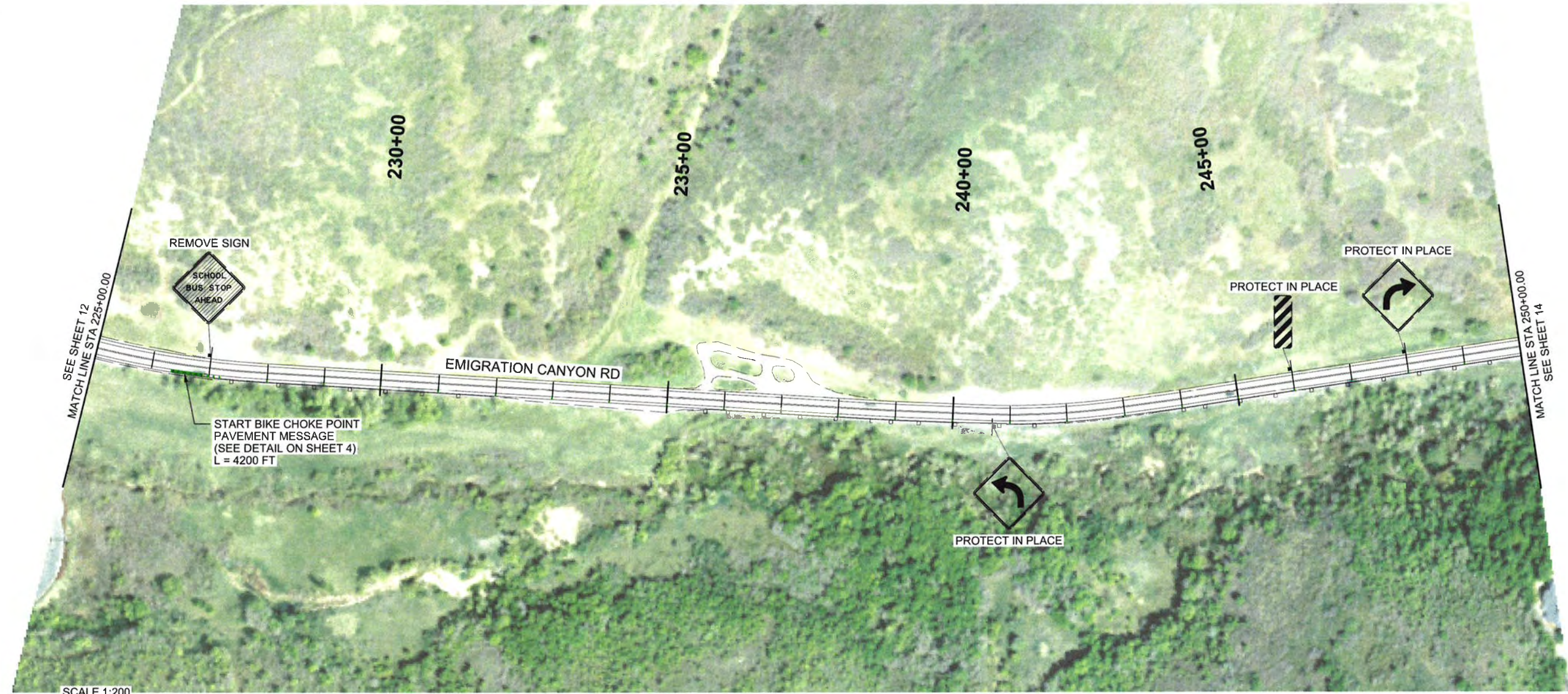
PROJECT NUMBER	
FILE NUMBER	10301
SHEET NUMBER	11 OF 27



30% PLANS
PRELIMINARY
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LOCHNER 1245 East Brickyard Rd Salt Lake City, Utah 84106 Phone: 801.415.5800 Fax: 801.415.5850 www.hwlochner.com	NO.	AUTHORIZED BY	REVISION	MADE BY	DATE	DESIGNED BY: BJK	SALT LAKE COUNTY SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION 2001 SOUTH STATE STREET SALT LAKE CITY, UTAH 84190-4600	ROADWAY PLAN	EMIGRATION CANYON BIKE STUDY	PROJECT NUMBER	
						DRAWN BY: BJK				FILE NUMBER:	10301
						CHECKED BY: HGK				SHEET NUMBER:	12 OF 27
						DATE CHECKED: APR 2016					



SCALE 1:200



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DATE CHECKED:	APR 2016

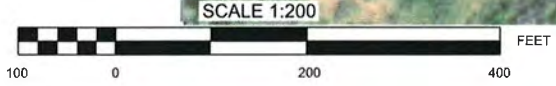
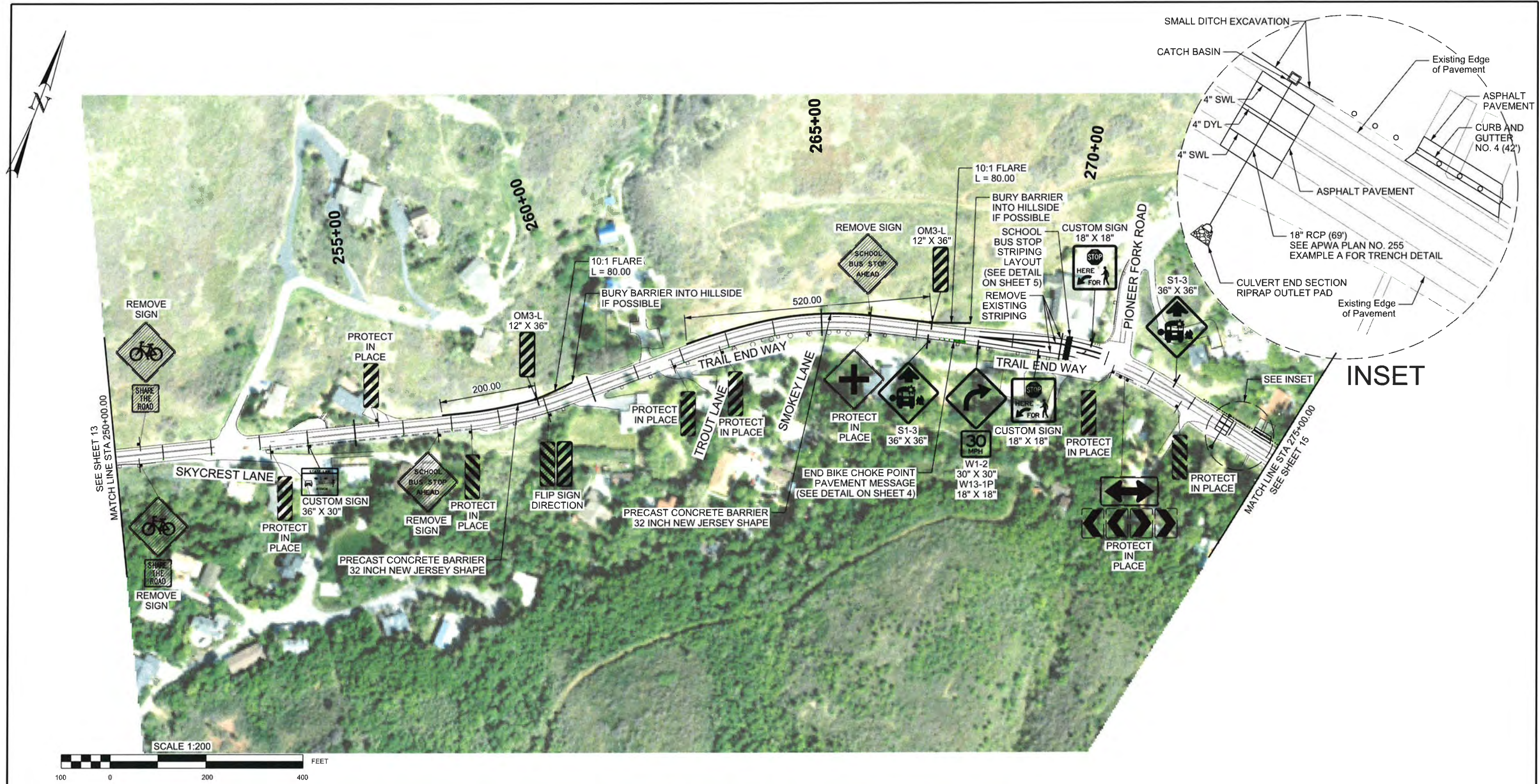


SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	13 OF 27



30% PLANS
PRELIMINARY
 NOT FOR CONSTRUCTION

- NOTE:**
1. PLACE PRECAST CONCRETE BARRIER NEW JERSEY SHAPE ON COMPACTED SUBGRADE OR EXTENDED PAVEMENT SECTION. BARRIER MUST BE PLACED A MINIMUM OF 6 FT FROM EDGE OF TRAVELED WAY TO FACE OF BARRIER.

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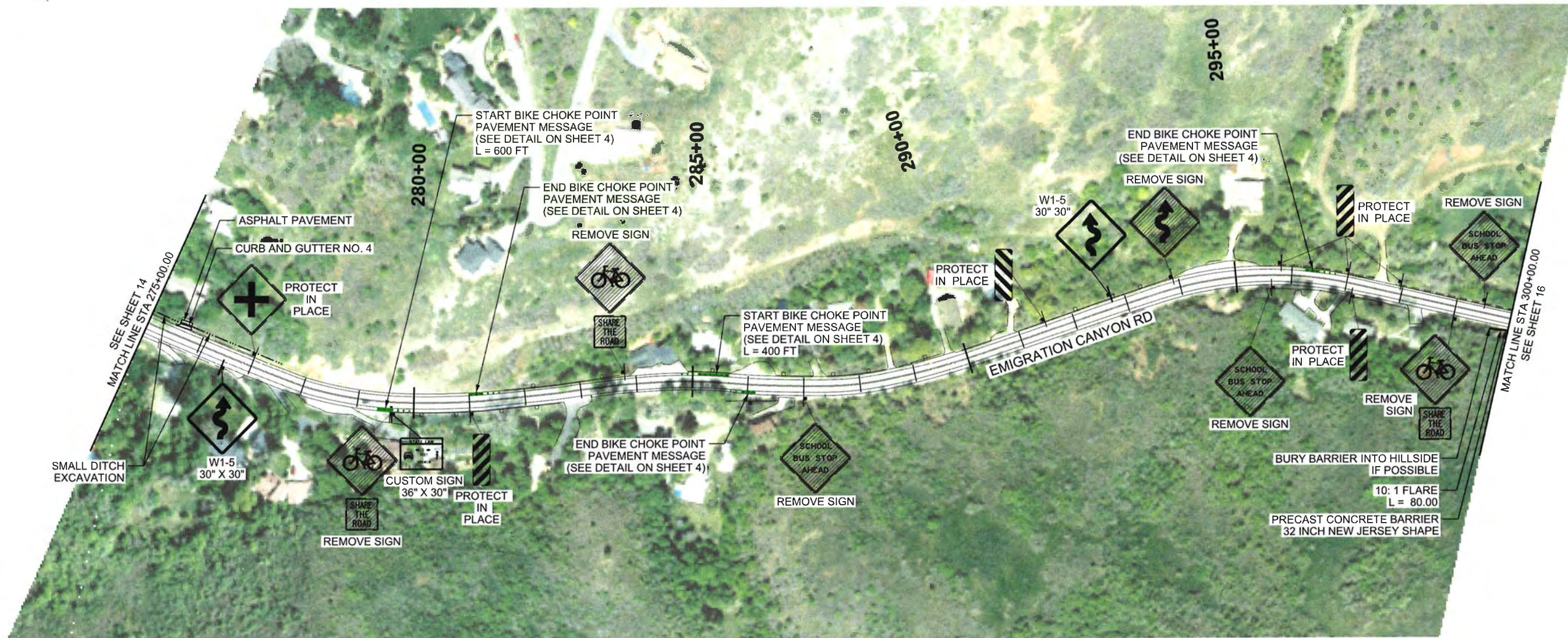
DESIGNED BY: BJK
 DRAWN BY: BJK
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SALT LAKE COUNTY
 SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	14 OF 27



30% PLANS
PRELIMINARY
 NOT FOR CONSTRUCTION

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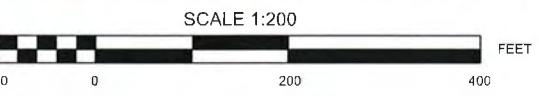
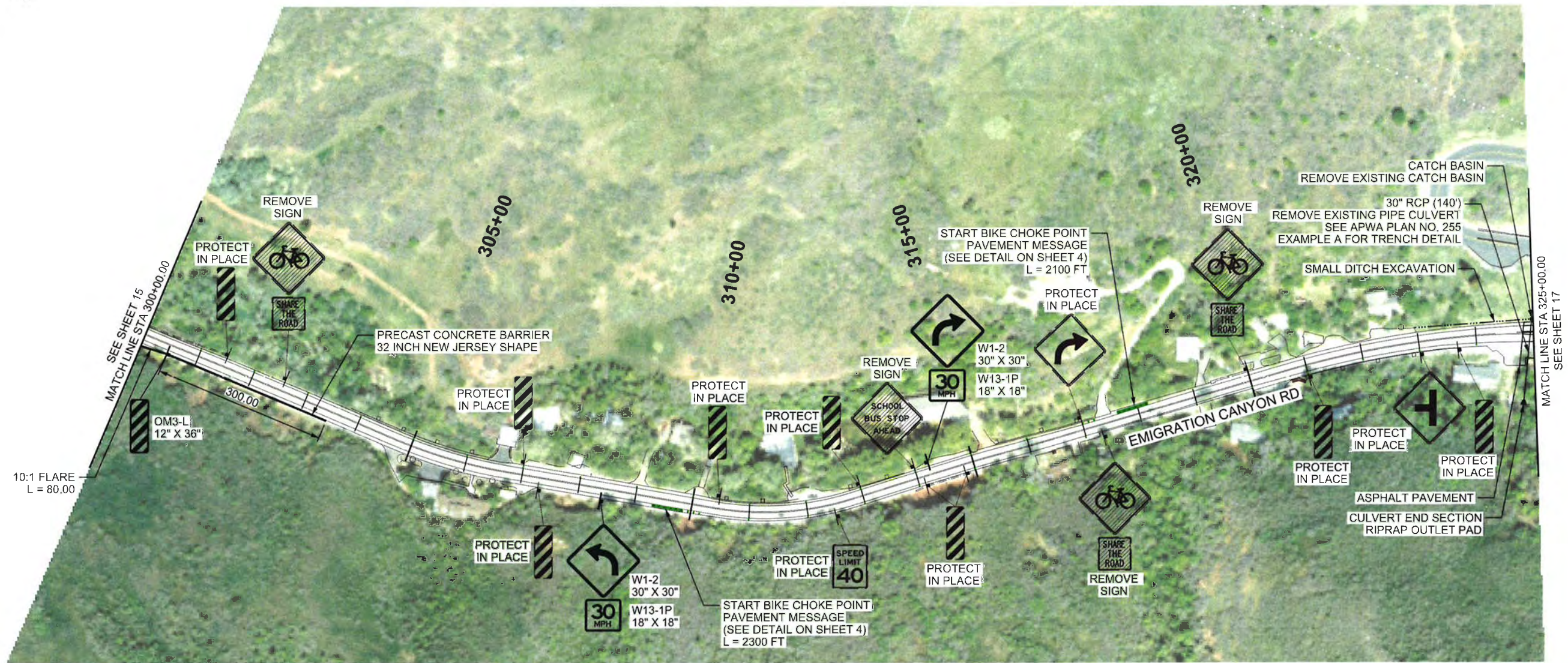


SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	15 OF 27



30% PLANS
PRELIMINARY
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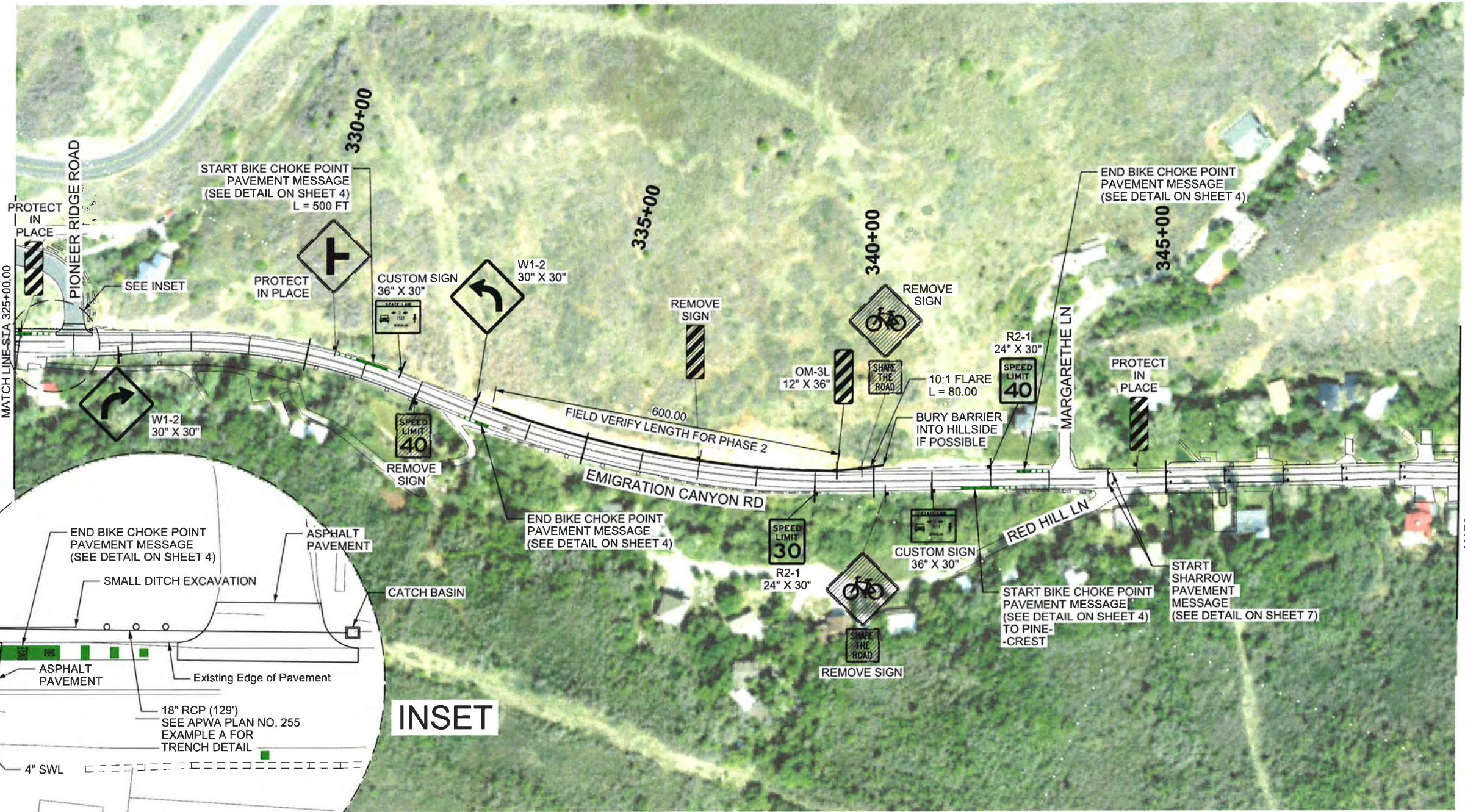
DESIGNED BY: BJK
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 ENGINEERING DIVISION
 2001 SOUTH STATE STREET
 SALT LAKE CITY, UTAH 84190-4600

ROADWAY PLAN

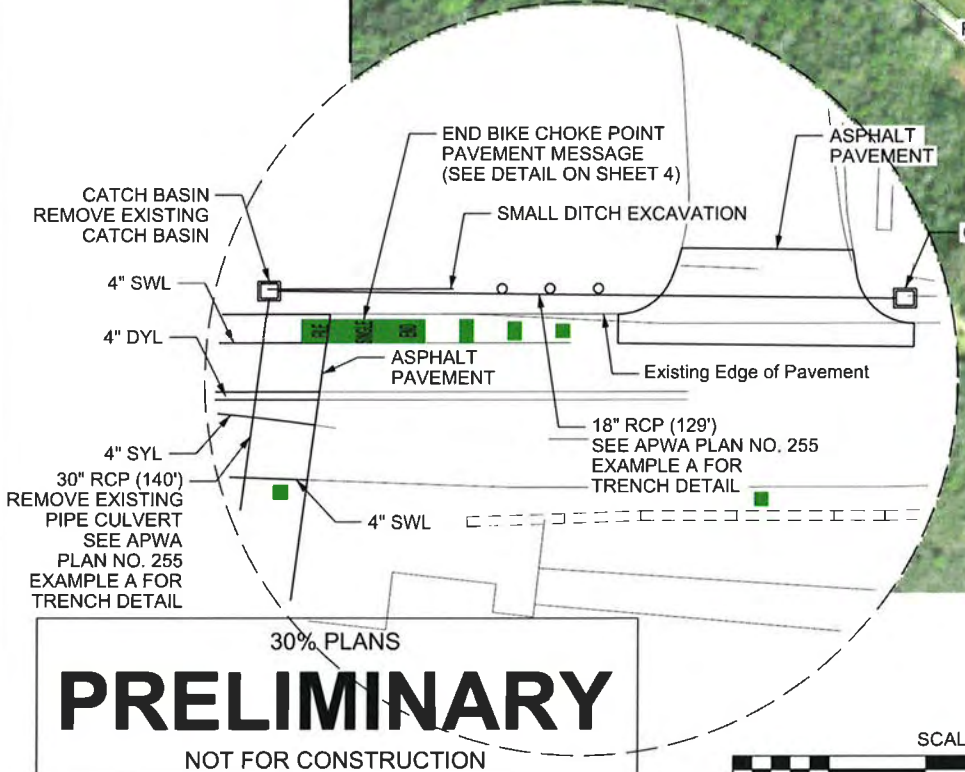
EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	16 OF 27



SEE SHEET 16
MATCH LINE STA 325+00.00

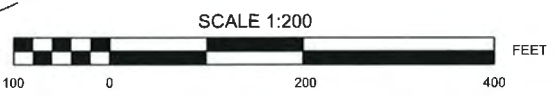
MATCH LINE STA 350+00.00
SEE SHEET 18



INSET

PRELIMINARY

NOT FOR CONSTRUCTION



- STRIPING KEY:**
- SWL - SOLID WHITE LINE
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SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
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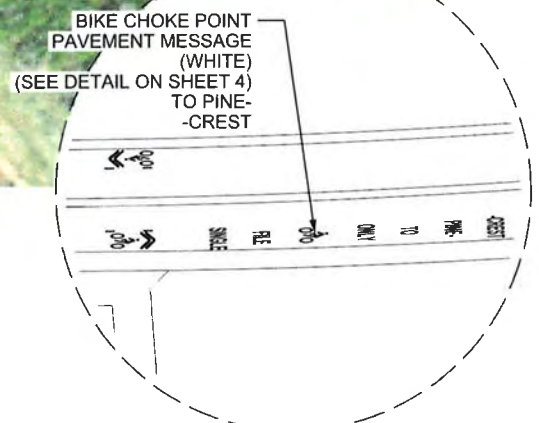
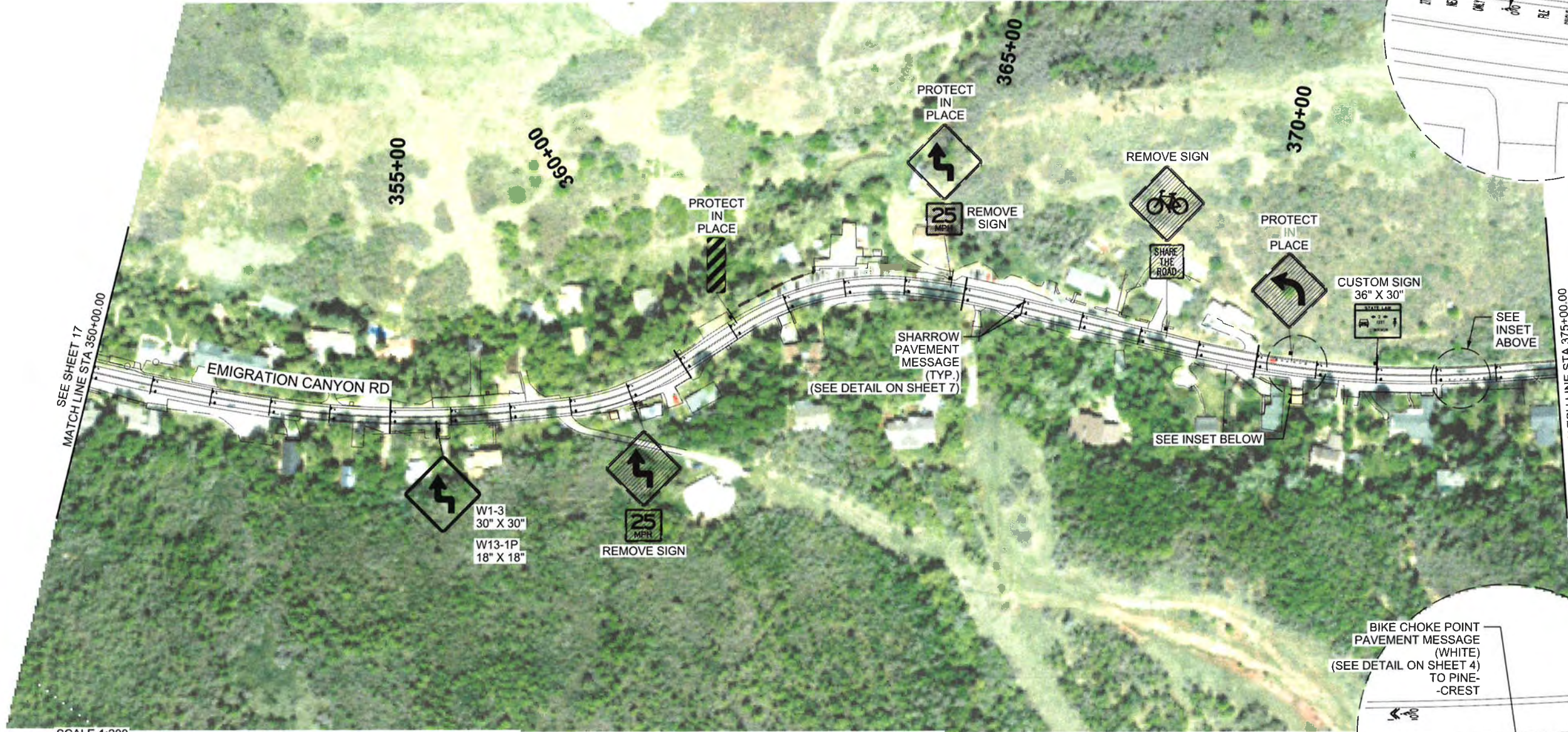
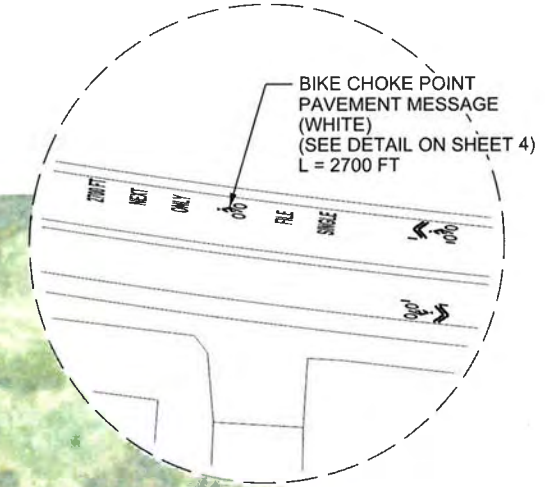
ROADWAY PLAN

EMIGRATION CANYON
BIKE STUDY

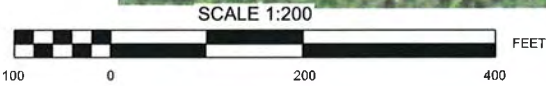
PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	17 OF 27



INSET



INSET



30% PLANS
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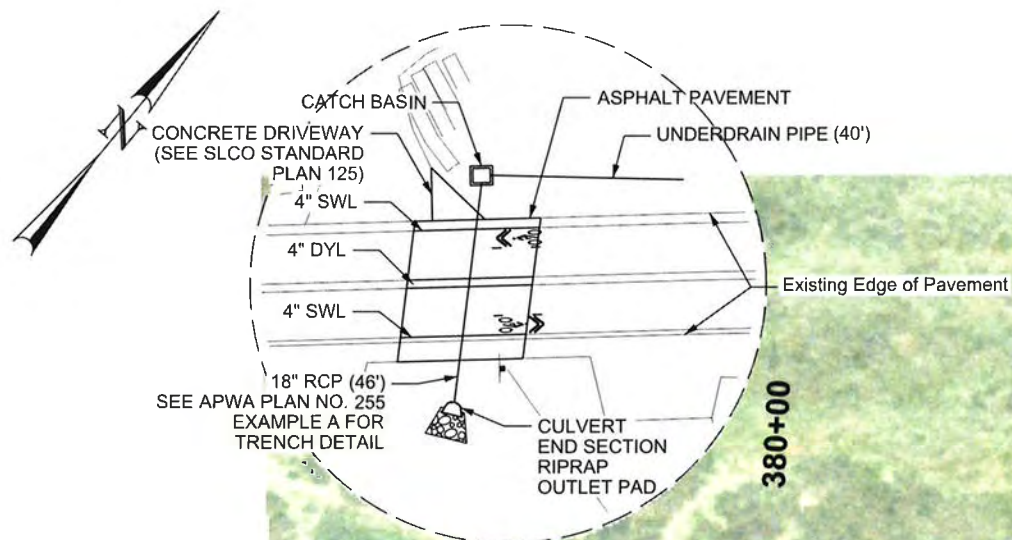


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 SALT LAKE CITY, UTAH 84190-4600

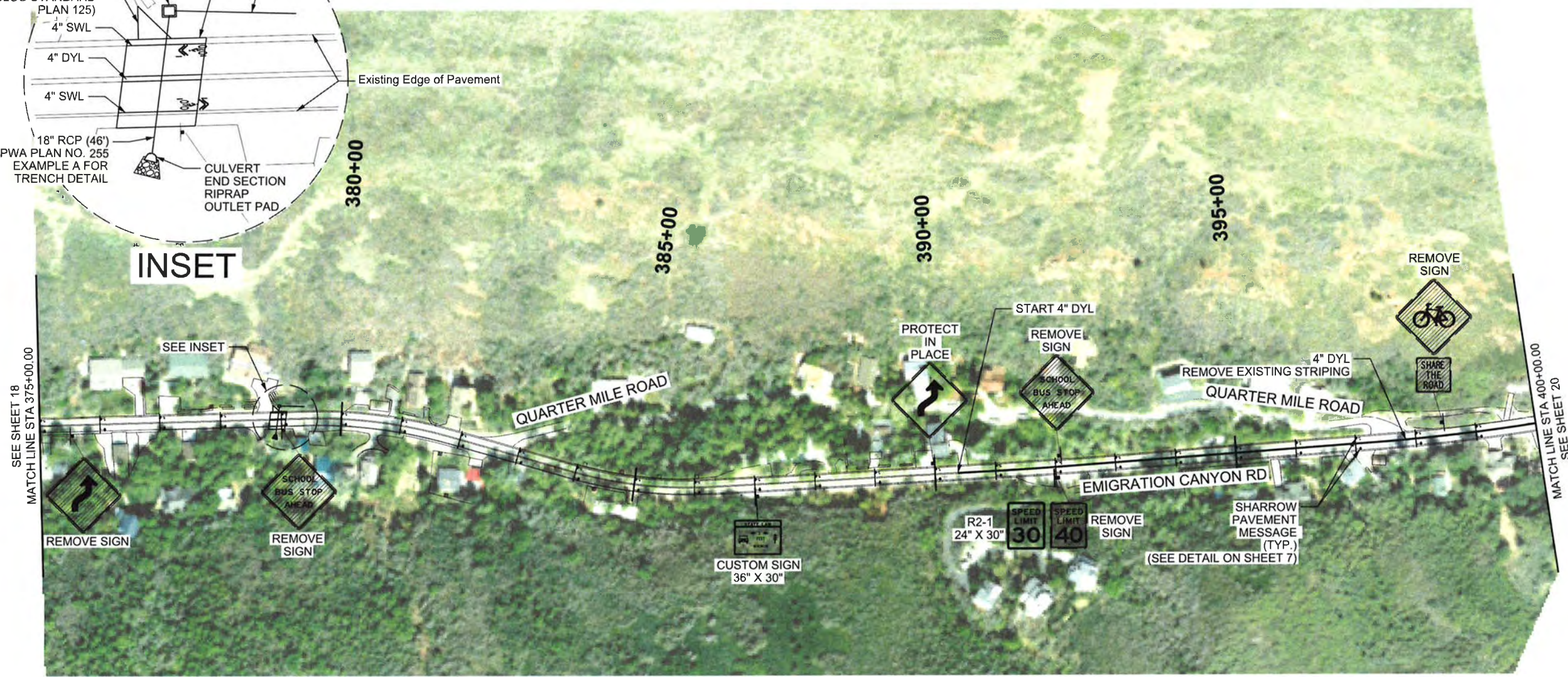
ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	18 OF 27



INSET



30% PLANS
PRELIMINARY
NOT FOR CONSTRUCTION

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 SWL - SOLID WHITE LINE
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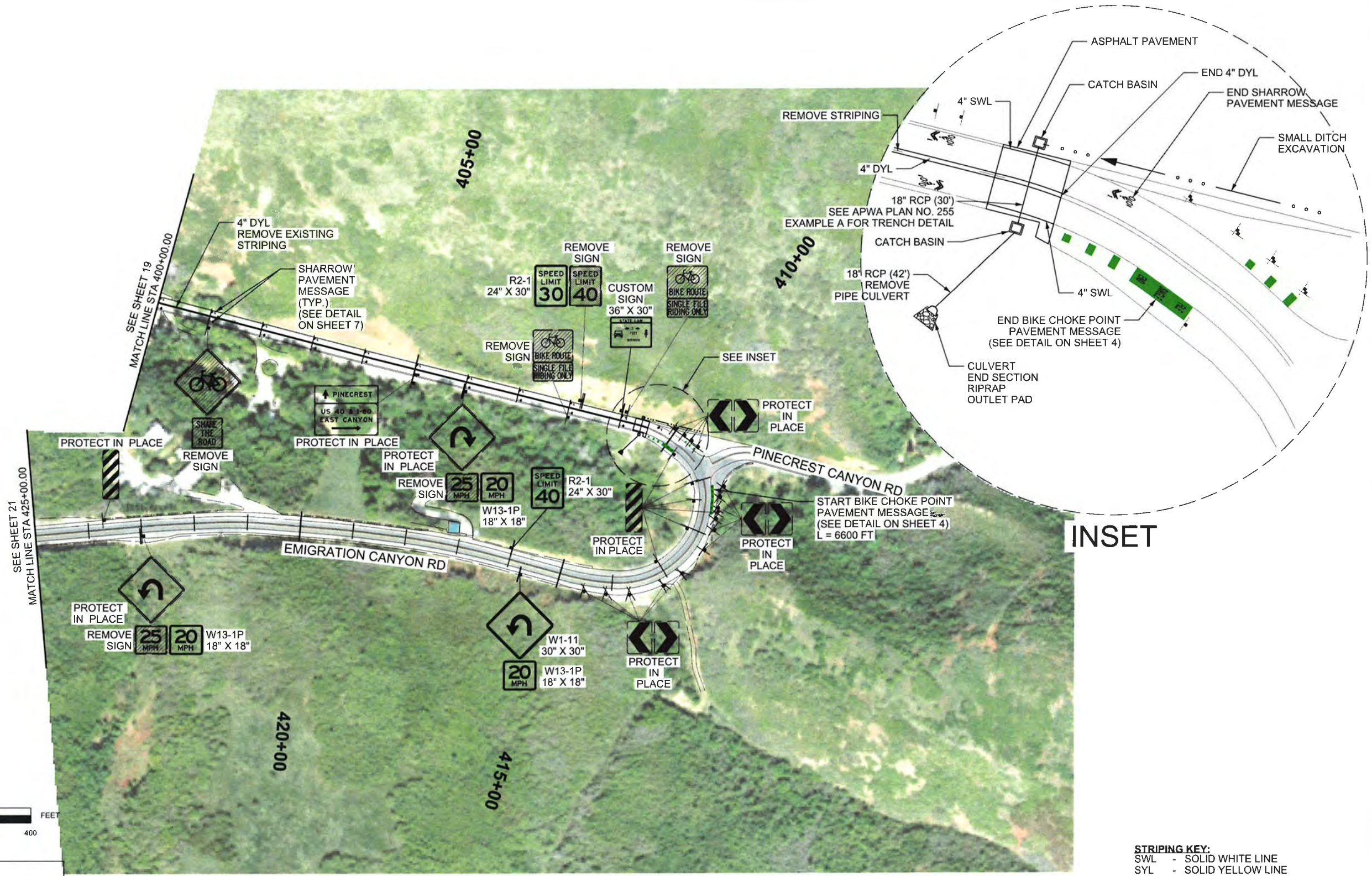


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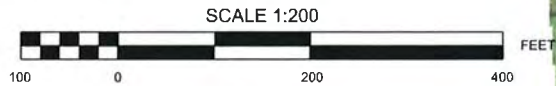
ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	19 OF 27



INSET



30% PLANS
PRELIMINARY
 NOT FOR CONSTRUCTION

- STRIPING KEY:**
- SWL - SOLID WHITE LINE
 - SYL - SOLID YELLOW LINE
 - DYL - DOUBLE YELLOW LINE
 - BWL - BROKEN WHITE LINE
 - DWL - DOTTED WHITE LINE
 - DGL - DOTTED GREEN LINE
 - LDL - LANE DROP LINE
 - S&BYL - SOLID AND BROKEN YELLOW LINE
 - SL - STOP LINE

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DESIGNED BY:	BJK
DRAWN BY:	BJK
CHECKED BY:	HCK
DATE CHECKED:	APR 2016

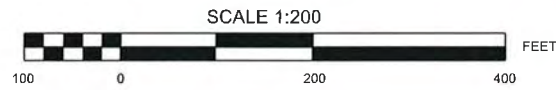
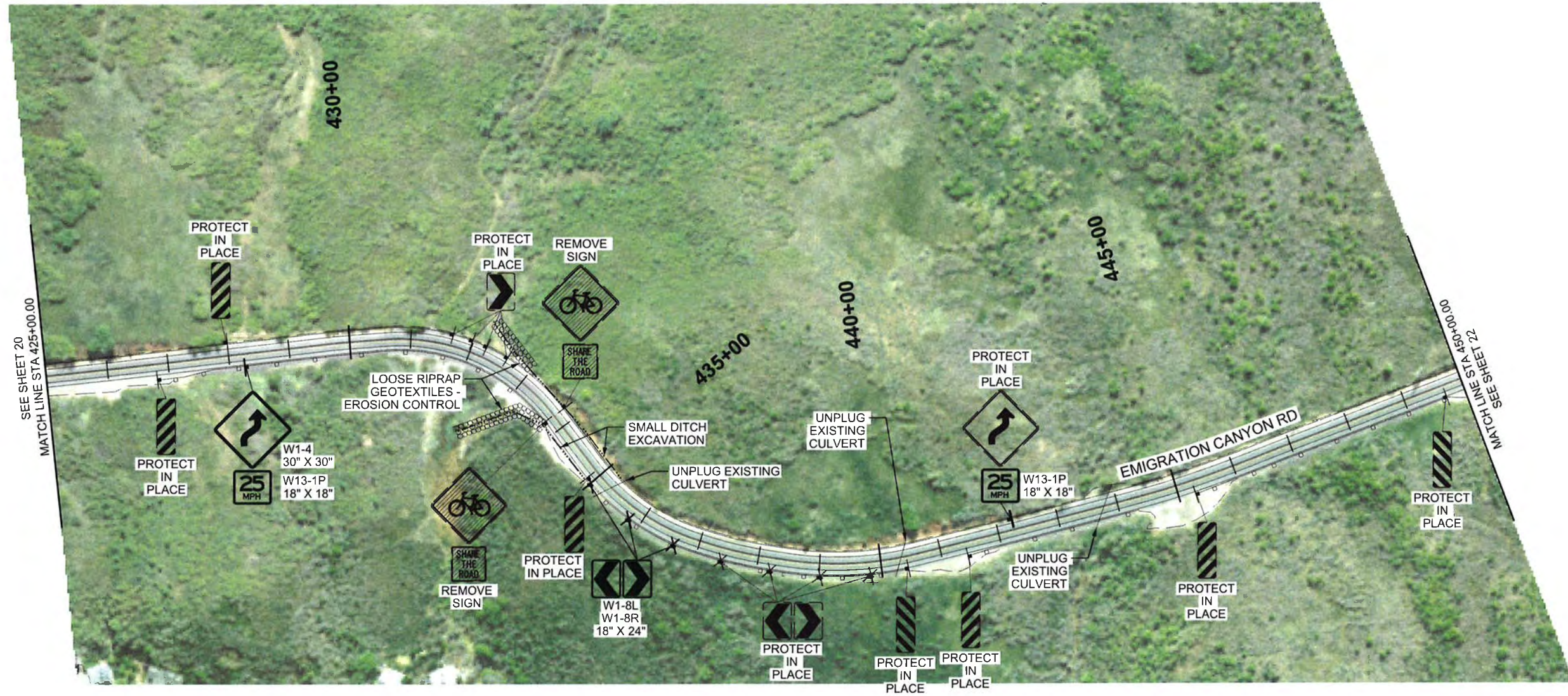


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 ENGINEERING DIVISION
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 SALT LAKE CITY, UTAH 84190-1600

ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	20 OF 27




30% PLANS
PRELIMINARY
 NOT FOR CONSTRUCTION

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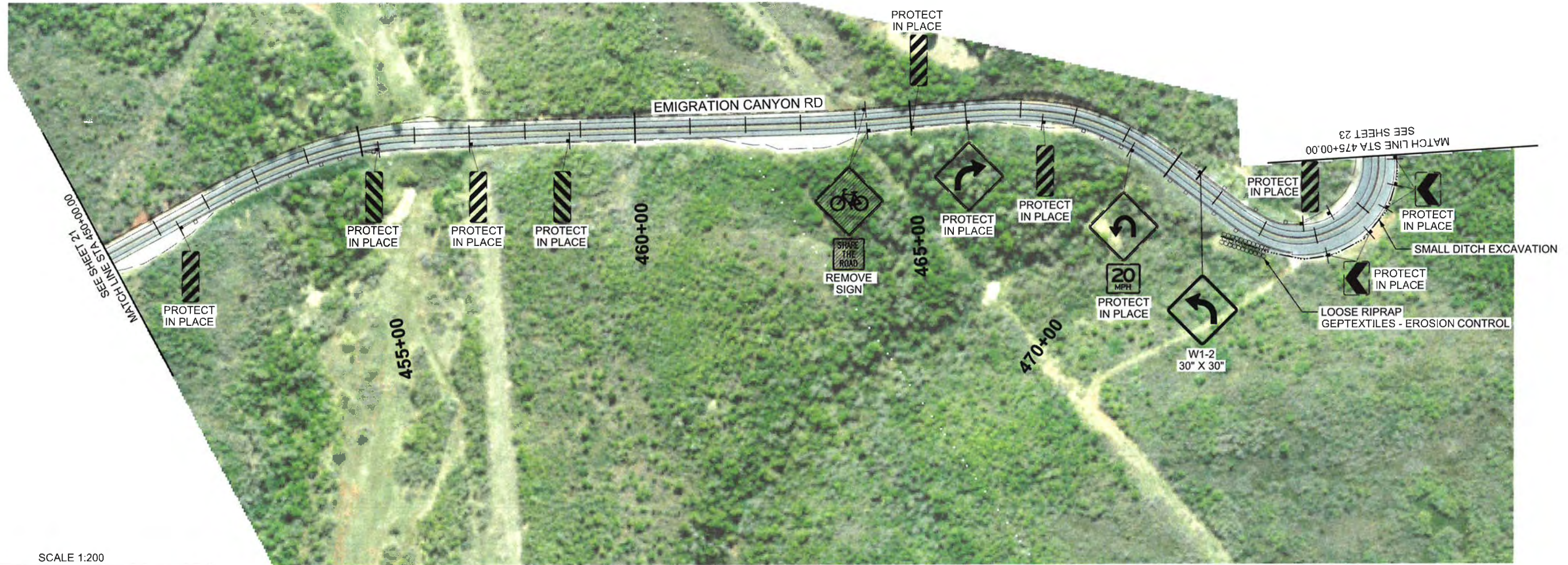
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DATE CHECKED:	APR 2016


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 ENGINEERING DIVISION
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ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	21 OF 27



30% PLANS
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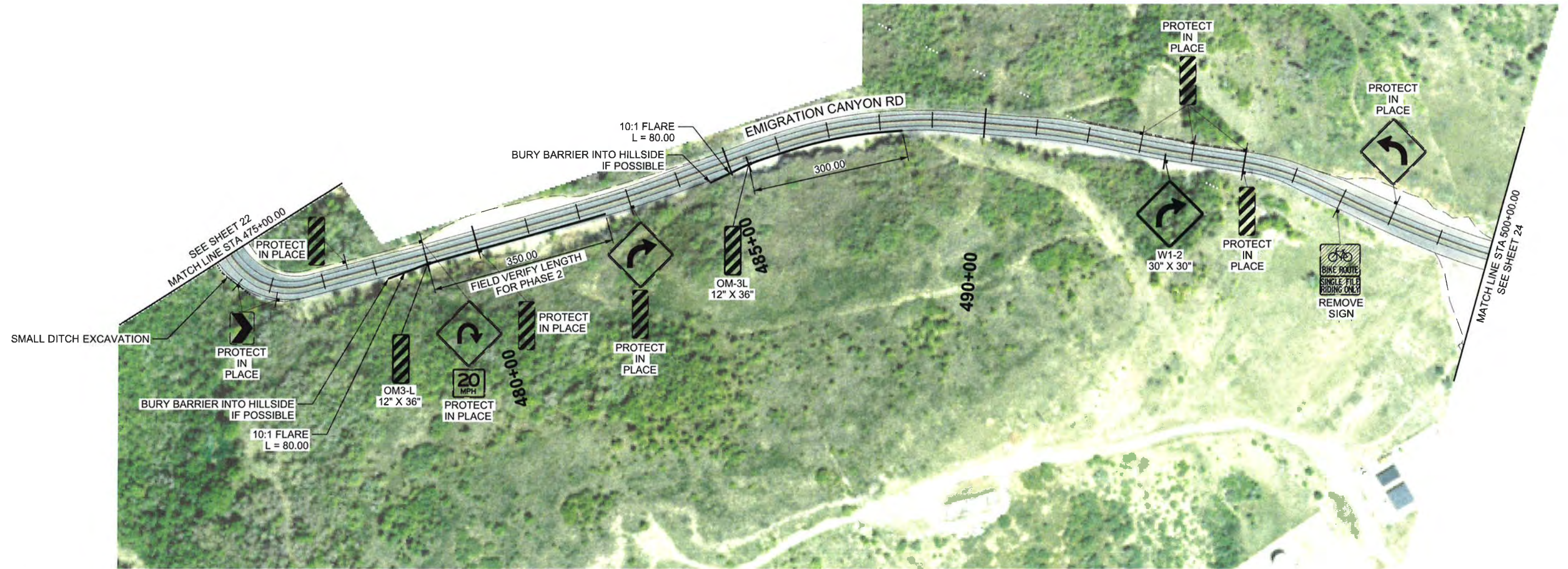


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ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	22 OF 27



30% PLANS
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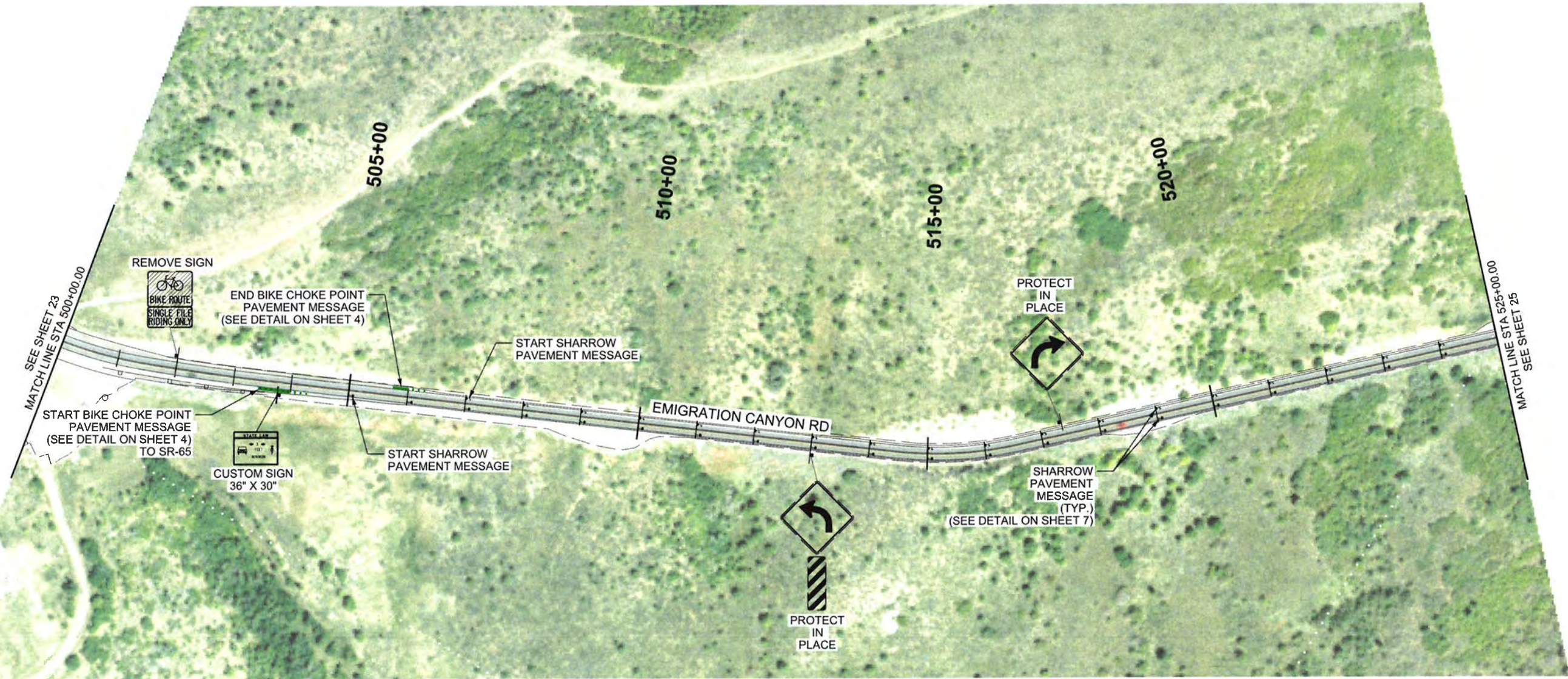


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ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	23 OF 27



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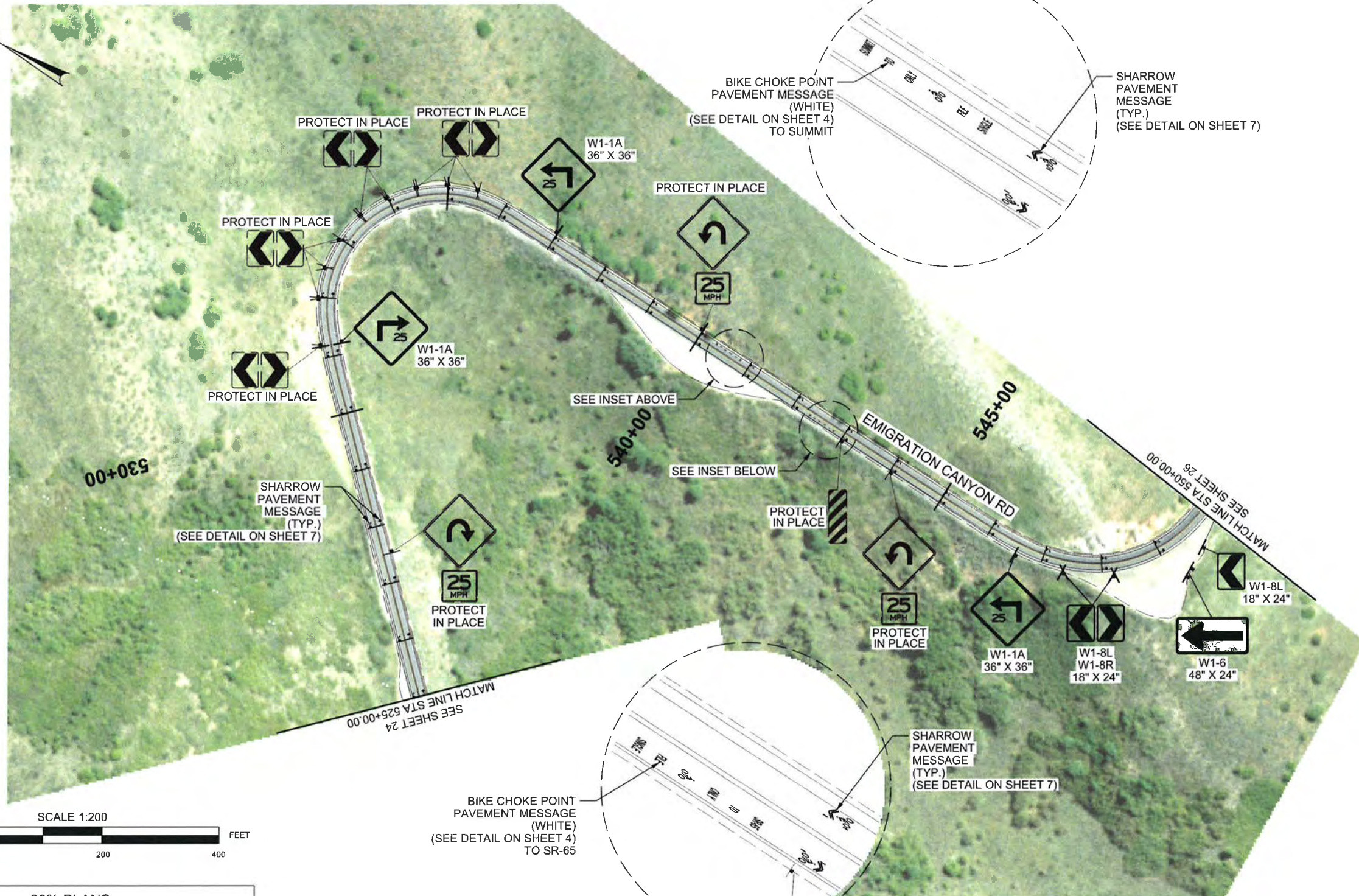
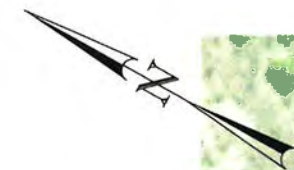


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ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	
FILE NUMBER:	10301
SHEET NUMBER:	24 OF 27



30% PLANS
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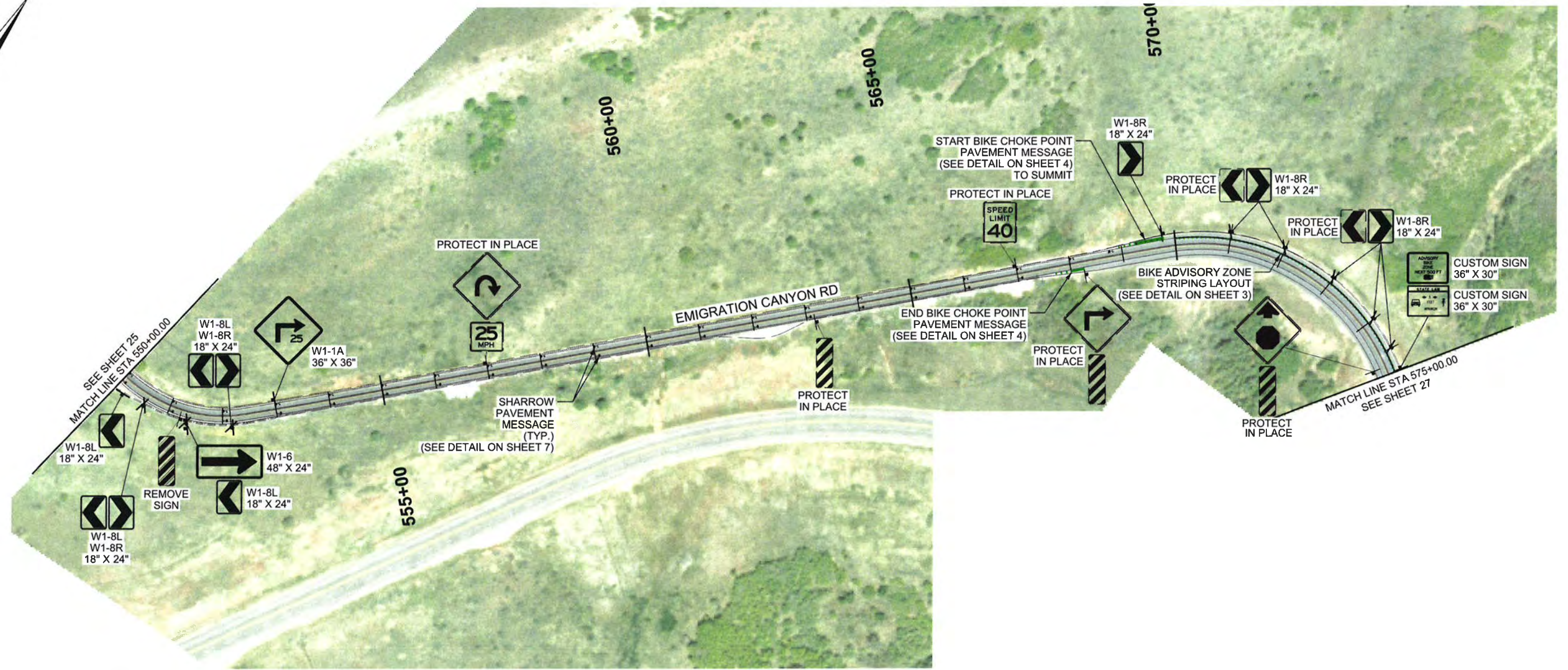


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ROADWAY PLAN

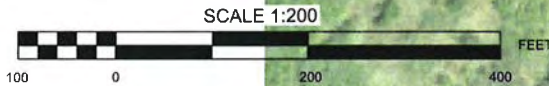
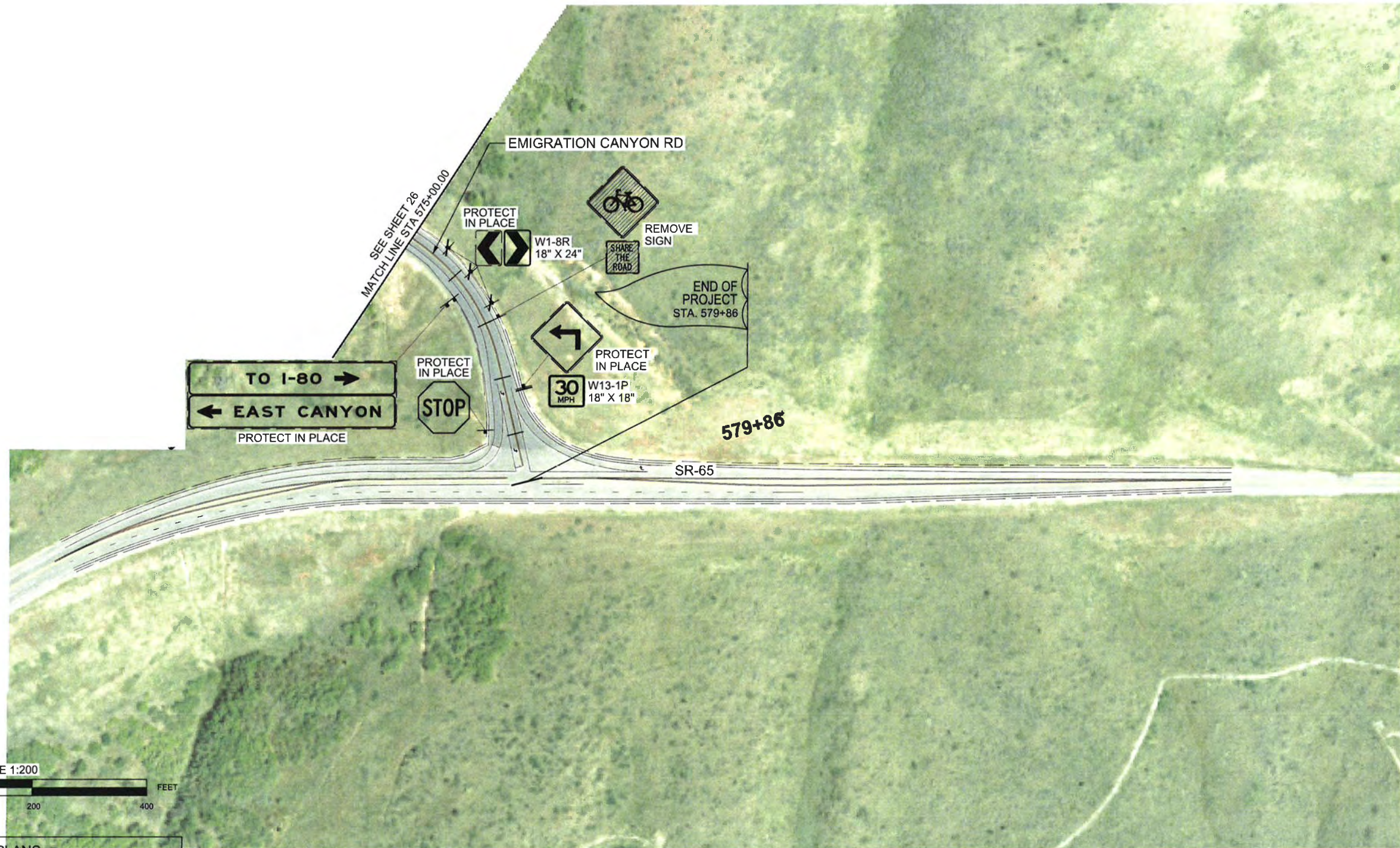
EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER:	-
FILE NUMBER:	10301
SHEET NUMBER:	25 OF 27



30% PLANS
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										FILE NUMBER:	10301
										SHEET NUMBER:	26 OF 27



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SALT LAKE COUNTY DEPARTMENT OF PUBLIC WORKS
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ROADWAY PLAN

EMIGRATION CANYON
 BIKE STUDY

PROJECT NUMBER	
FILE NUMBER	10301
SHEET NUMBER	27 OF 27

Emigration Cost Estimate

30% PLANS

Item #	Item	Quantity	Units	Price	Cost	Remarks	
Roadway							
	Remove Existing Pipe Culvert	182	ft	\$15.00	\$2,730.00		
	Remove Existing Catch Basin	1	Each	\$500.00	\$500.00		
	Precast Concrete Barrier - 32 Inch New Jersey Shape	3,400	ft	\$48.00	\$163,200.00		
	Concrete Driveway	65	sq ft	\$5.00	\$325.00		
	Asphalt Pavement	5,693	sq ft	\$9.00	\$51,237.00	Includes Pavement Section and Excavation	
	Curb and Gutter No. 1	45	ft	\$20.00	\$900.00		
	Curb and Gutter No. 4	62	ft	\$20.00	\$1,240.00		
	Roadway Subtotal				\$220,132		
Drainage							
	Unplug Existing Culvert	196	ft	\$22.00	\$4,312.00		
	Loose Riprap	311	cu yd	\$50.00	\$15,550.00		
	Riprap Outlet Pad	4	Each	\$500.00	\$2,000.00		
	Small Ditch Excavation	1,913	ft	\$10.00	\$19,130.00		
	Culvert End Section	4	Each	\$500.00	\$2,000.00		
	Geotextiles - Erosion Control	467	sq yd	\$3.00	\$1,401.00		
	Underdrain Pipe	40	ft	\$50.00	\$2,000.00		
	18" RCP	316	ft	\$50.00	\$15,800.00	Includes Trench Backfill	
	30" RCP	140	ft	\$70.00	\$9,800.00	Includes Trench Backfill	
	Catch Basin	6	Each	\$2,600.00	\$15,600.00		
	Drainage Subtotal				\$87,593		
Traffic							
	Remove Existing Striping	4,431	ft	\$0.80	\$3,544.80		
	Pavement Marking Paint (DWL)	40	Gal	\$25.00	\$1,000.79	assume 95 ft/gal for double application	
	Pavement Marking Paint (DWL)	8	Gal	\$25.00	\$188.16	assume 380 ft/gal for double application	
	Pavement Marking Paint (DGL)	5	Gal	\$25.00	\$131.58	assume 380 ft/gal for double application	
	Pavement Marking Paint (DGL)	1	Gal	\$25.00	\$28.13	assume 32 ft/gal for double application	
	Pavement Marking Paint (SYL)	0	Gal	\$25.00	\$6.84	assume 95 ft/gal for double application	
	Pavement Marking Paint (S&BYL)	2	Gal	\$25.00	\$44.08	assume 76 ft/gal for double application	
	Pavement Marking Paint (DYL)	52	Gal	\$25.00	\$1,289.06	assume 48 ft/gal for double application	
	Pavement Marking Paint (Green Bike Lane)	229	Gal	\$35.00	\$8,019.38	assume 32 ft/gal for double application	
	Pavement Message Paint (In Bike Lane)	778	Each	\$10.00	\$7,780.00	assume each letter/symbol message	
	Pavement Message Paint (In Roadway)	821	Each	\$30.00	\$24,630.00	3e Sharrows = 3 Ea. Crosswalk, Yield Lines	
	Sign R2-1 (24" x 30")	5	Each	\$400.00	\$2,000.00	assumed \$80/sf (includes post & slipbase)	
	Sign S1-3 (36" x 36")	4	Each	\$720.00	\$2,880.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-1 (30" x 30")	1	Each	\$500.00	\$500.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-1a (36" x 36")	6	Each	\$720.00	\$4,320.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-2 (30" x 30")	10	Each	\$500.00	\$5,000.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-3 (30" x 30")	1	Each	\$500.00	\$500.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-4 (30" x 30")	2	Each	\$500.00	\$1,000.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-5 (30" x 30")	2	Each	\$500.00	\$1,000.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-6 (48" x 24")	2	Each	\$640.00	\$1,280.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-8R (30" x 30")	10	Each	\$500.00	\$5,000.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-8L (30" x 30")	9	Each	\$500.00	\$4,500.00	assumed \$80/sf (includes post & slipbase)	
	Sign W1-11 (30" x 30")	1	Each	\$500.00	\$500.00	assumed \$80/sf (includes post & slipbase)	
	Sign W11-2 (30" x 30")	4	Each	\$500.00	\$2,000.00	assumed \$80/sf (includes post & slipbase)	
	Sign W13-1P (18" x 18")	10	Each	\$180.00	\$1,800.00	assumed \$80/sf (includes post & slipbase)	
	Sign W16-2aP (24" x 12")	2	Each	\$160.00	\$320.00	assumed \$80/sf (includes post & slipbase)	
	Sign W16-7P (24" x 12")	2	Each	\$160.00	\$320.00	assumed \$80/sf (includes post & slipbase)	
	Sign OM3-R (18" x 24")	13	Each	\$240.00	\$3,120.00	assumed \$80/sf (includes post & slipbase)	
	Sign OM3-L (18" x 24")	15	Each	\$240.00	\$3,600.00	assumed \$80/sf (includes post & slipbase)	
	Sign Custom Advisory Zone (36" x 30")	2	Each	\$600.00	\$1,200.00	assumed \$80/sf (includes post & slipbase)	
	Sign Custom 3/8 State Law (36" x 30")	10	Each	\$600.00	\$6,000.00	assumed \$80/sf (includes post & slipbase)	
	Sign Custom Stop Here (18" x 18")	4	Each	\$180.00	\$720.00	assumed \$80/sf (includes post & slipbase)	
	Pip Sign Direction	1	Each	\$50.00	\$50.00		
	Light Assembly at Cross Walk	2	Each	\$6,000.00	\$12,000.00	Includes power hookup and light assembly	
	Relocate Sign	1	Each	\$400.00	\$400.00		
	Remove Sign	87	Each	\$100.00	\$8,700.00		
	Roadway Subtotal				\$115,373		
	CONSTRUCTION TOTAL					\$423,098	
	Mobilization	1	Lump	\$27,000.00	\$27,000.00	Usually 7-10% of construction	
	Traffic Control	1	Lump	\$12,000.00	\$12,000.00	Usually 3-5% of construction	
	Maintenance of Traffic	1	Lump	\$3,800.00	\$3,800.00	Usually 1% of construction	
	Items Not Quantified	1	Lump	\$115,000.00	\$115,000.00	Usually 30% of construction	
	TOTAL					\$580,900	

Back to MAIN

Emigration Cost Estimate

Contingency

Item #	Item	Quantity	Units	Price	Cost	Remarks
Rotomill Pincrest to Summit						
	1" Rotomill				\$90,000.00	
	2" HMA				\$279,000.00	
	Striping				\$10,000.00	
	Total				\$379,000.00	
Thermoplastic Messages						
	Make all pavement messages thermoplastic			Additional	\$180,000.00	
Sawcut & Widen Shoulder Margarthe to Pincrest						
	Sawcut	12,650	ft	\$0.50	\$6,325.00	
	Asphalt Pavement	63,250	sf	\$9.00	\$569,250.00	
	Pavement Marking Paint (SWL)	278	Gal	\$25.00	\$6,950.00	assume 95 ft/gal for double application
	Subtotal				\$582,525.00	
	Items Not Quantified	1	Lump	\$174,757.50	\$174,757.50	Usually 30% of construction
	Total				\$757,282.50	

APPENDIX D: EXISTING CONDITION DEFICIENCIES



SUNNYSIDE AVE
CRESTVIEW DR

Rotary Glen
Park

KENNEDY DR

DONNER WAY
DONNER CIR

EMIGRATION CANYON RD

OAKHURST DR
MILLICENT DR
CHAUCEY PL
DICKENS PL
VISTA VIEW DR
CRESTVIEW DR
AUGUSTA WAY
MERCEDES WAY
STANSBURY WAY



Limited Sight Distance



Deficient Obstruction



Poor Pavement



Tight Turn



Slope Instability



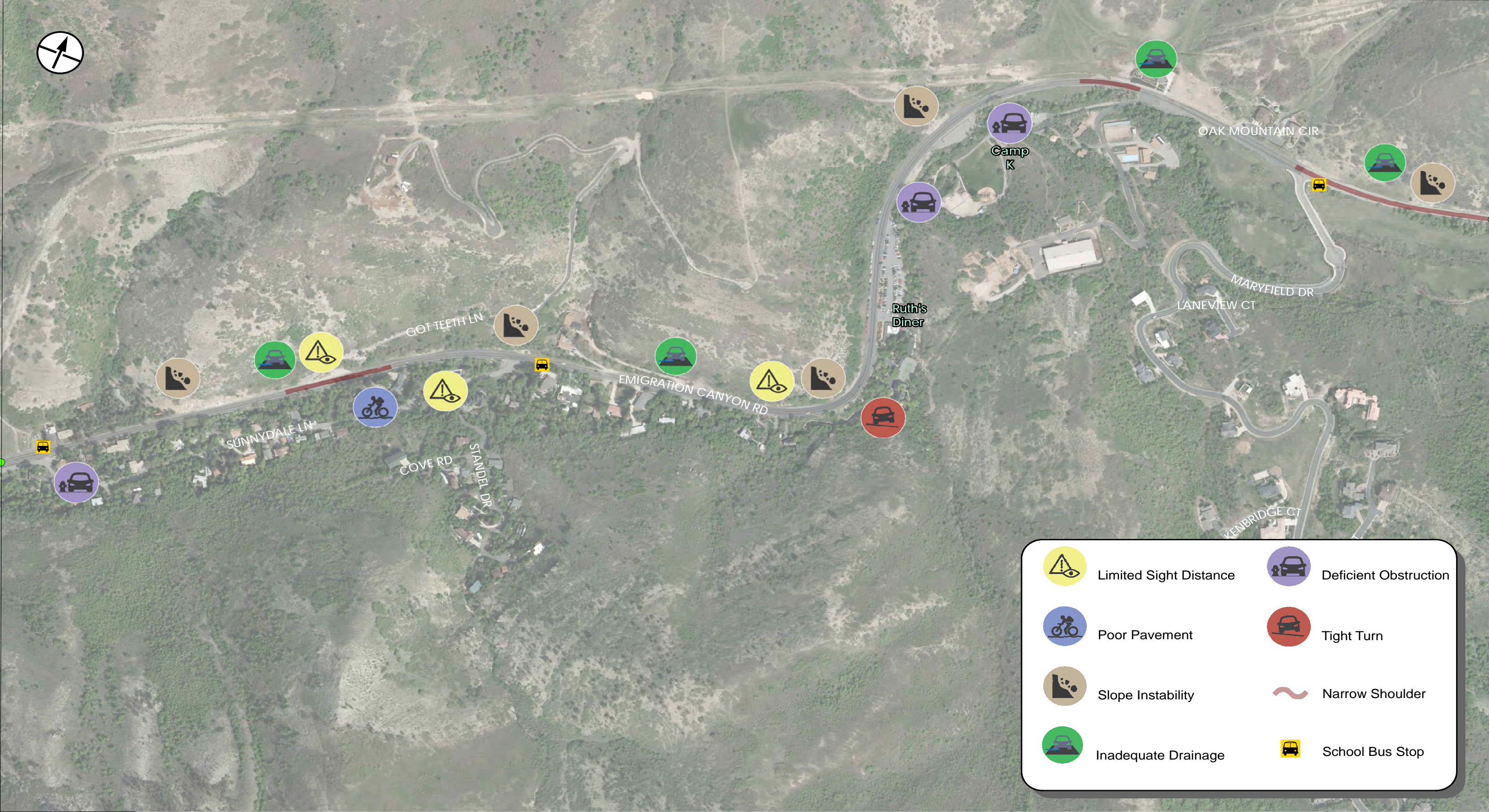
Narrow Shoulder



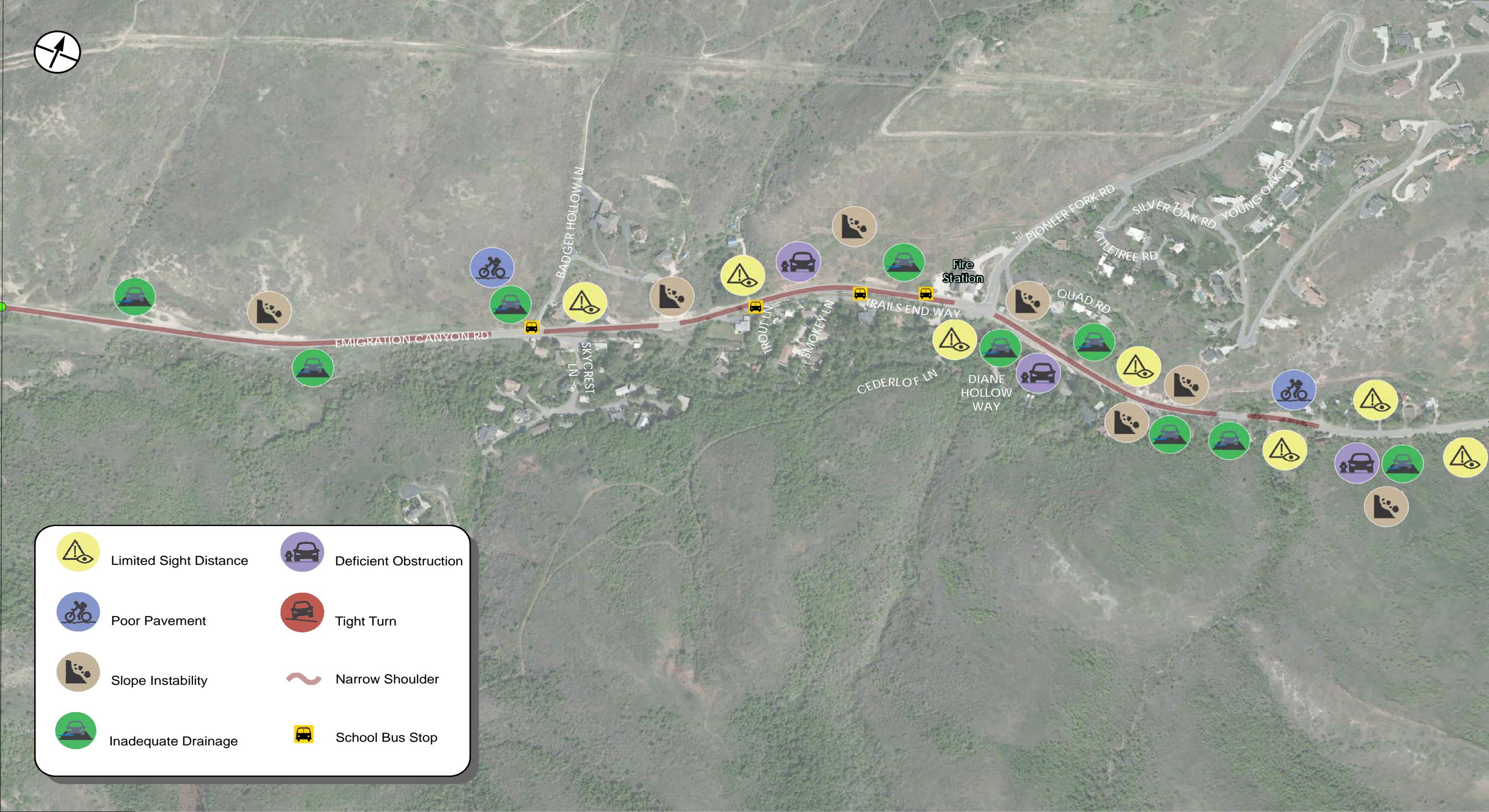
Inadequate Drainage



School Bus Stop



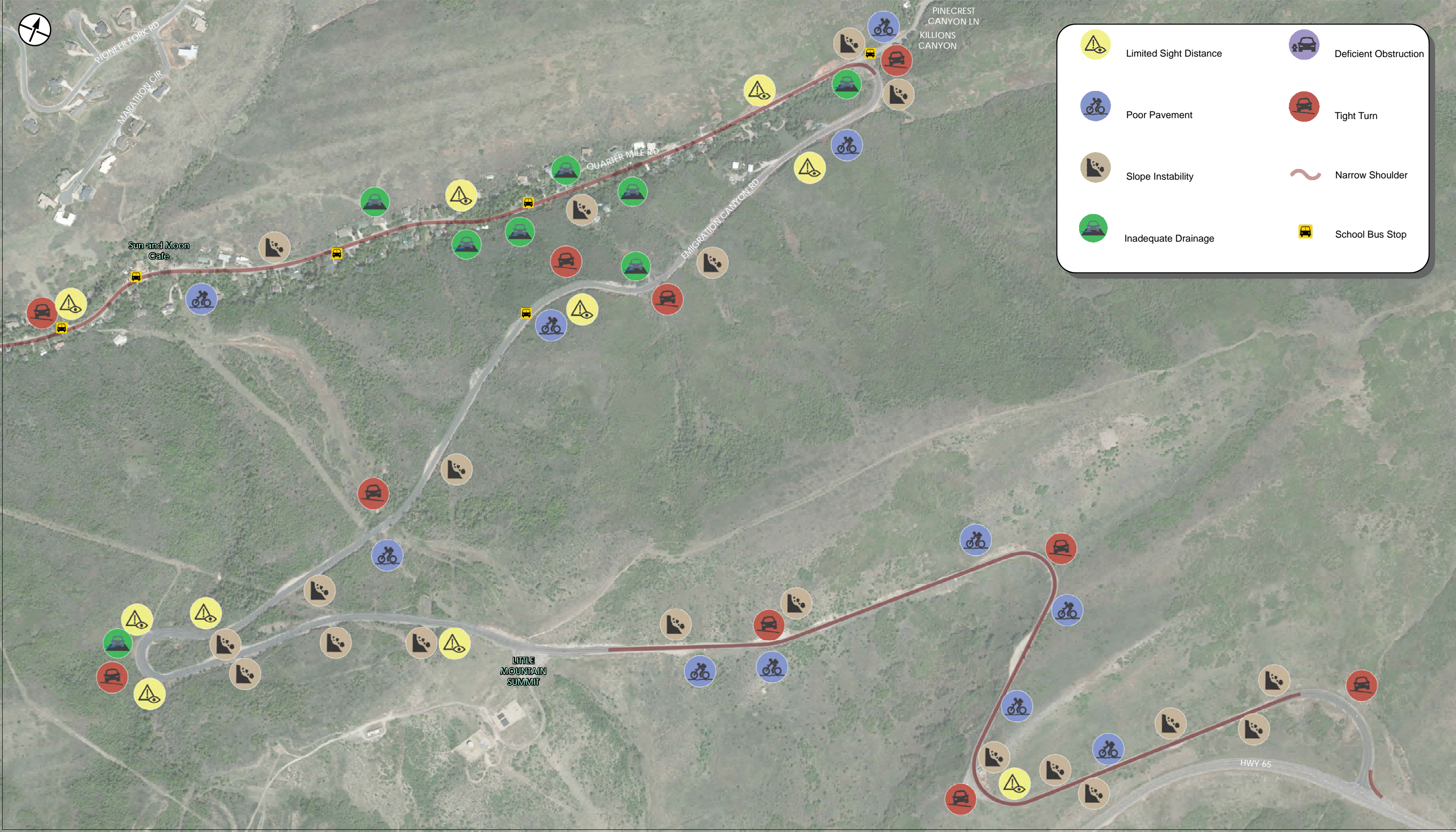
	Limited Sight Distance		Deficient Obstruction
	Poor Pavement		Tight Turn
	Slope Instability		Narrow Shoulder
	Inadequate Drainage		School Bus Stop



	Limited Sight Distance		Deficient Obstruction
	Poor Pavement		Tight Turn
	Slope Instability		Narrow Shoulder
	Inadequate Drainage		School Bus Stop



	Limited Sight Distance		Deficient Obstruction
	Poor Pavement		Tight Turn
	Slope Instability		Narrow Shoulder
	Inadequate Drainage		School Bus Stop



PIONEER FORK RD
MARATHON CIR

PINECREST CANYON LN
KILLIONS CANYON

QUARTER MILE RD

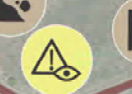
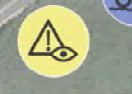
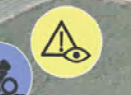
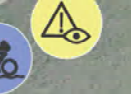
EMIGRATION CANYON RD

Sun and Moon Cafe

LITTLE MOUNTAIN SUMMIT

HWY 65

	Limited Sight Distance		Deficient Obstruction
	Poor Pavement		Tight Turn
	Slope Instability		Narrow Shoulder
	Inadequate Drainage		School Bus Stop



APPENDIX E: COMMENT SUMMARY

Emigration Canyon Transportation Study Comment Summary



Emigration Canyon Transportation Study

Open House Details:

Date: Wednesday, March 25 2015

Time: 5:00pm - 7:00pm

Location: Emigration Canyon Fire Station

Number of Attendees: 93

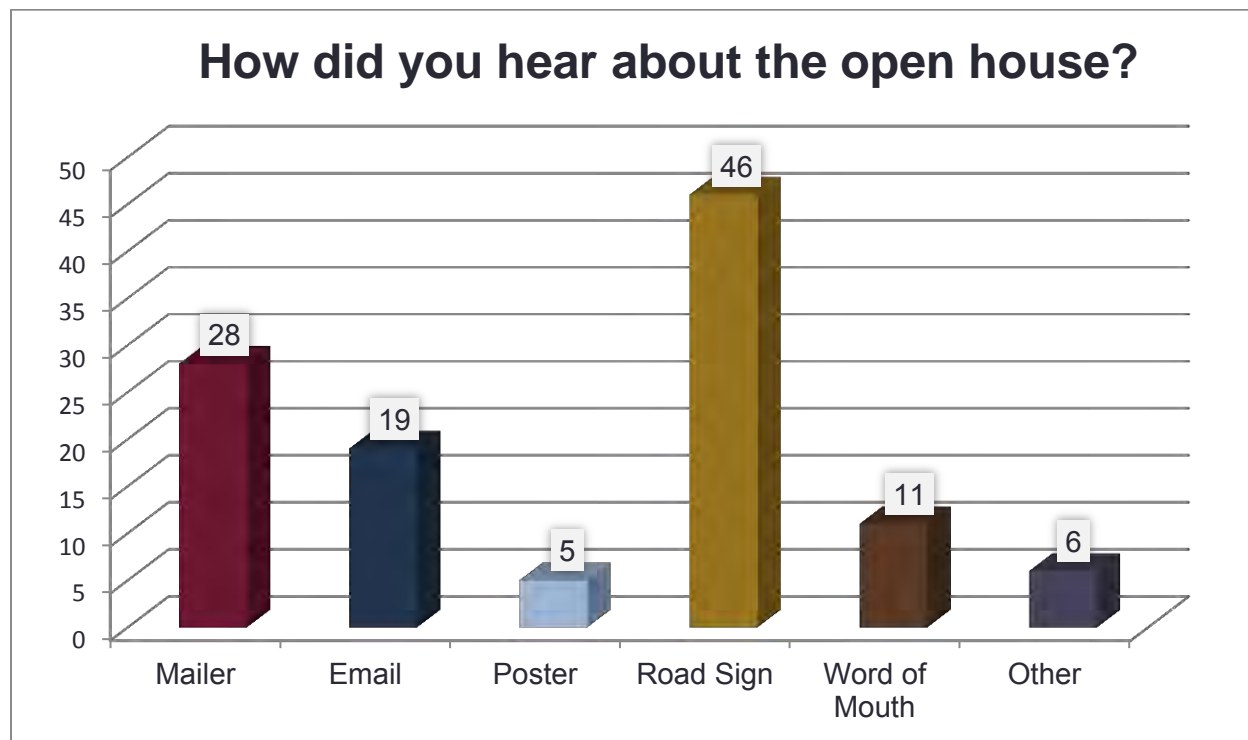
Comment Forms Received: 36

Sign-In Information:

Number of attendees who live in the canyon: 76

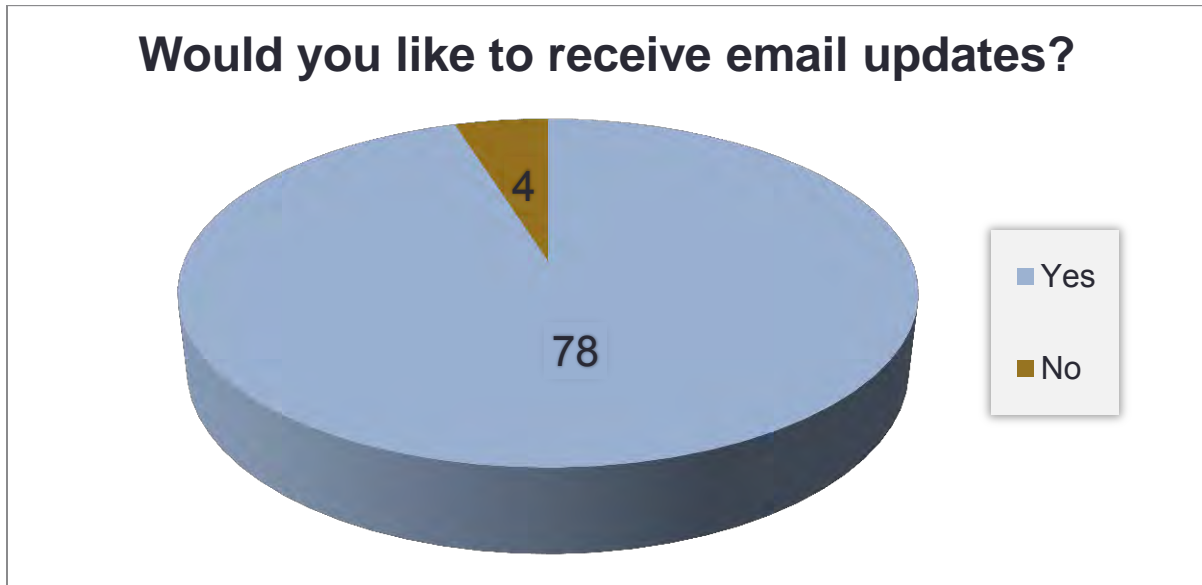
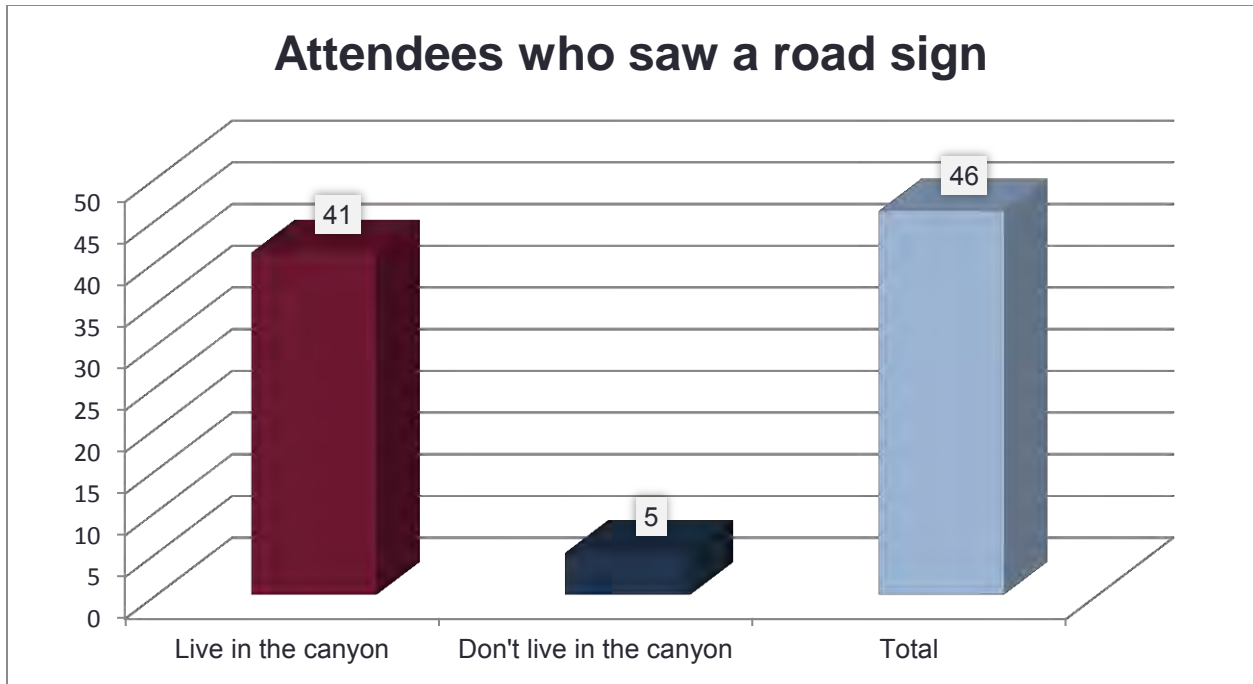
Number of attendees who don't live in the canyon: 12

No address given: 5



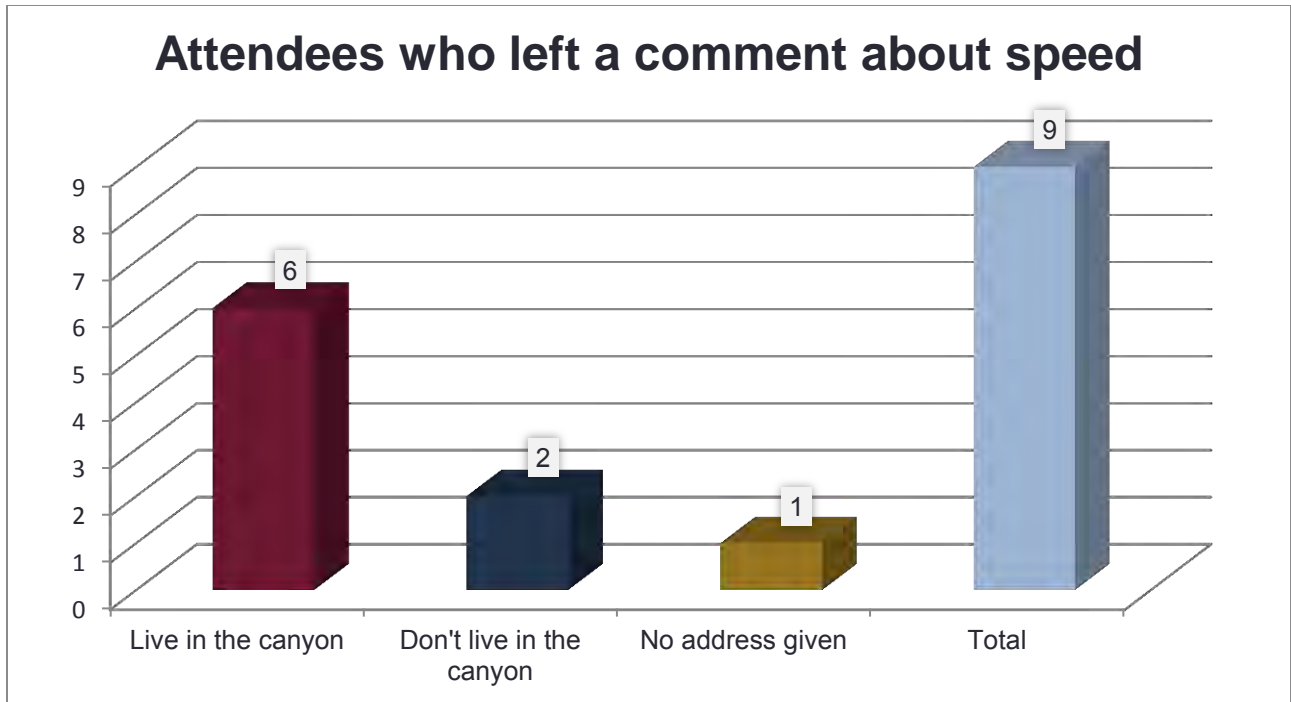
Respondents could choose more than one of the above options.

Emigration Canyon Transportation Study



Emigration Canyon Transportation Study

Comment Form Information:



Common Themes:

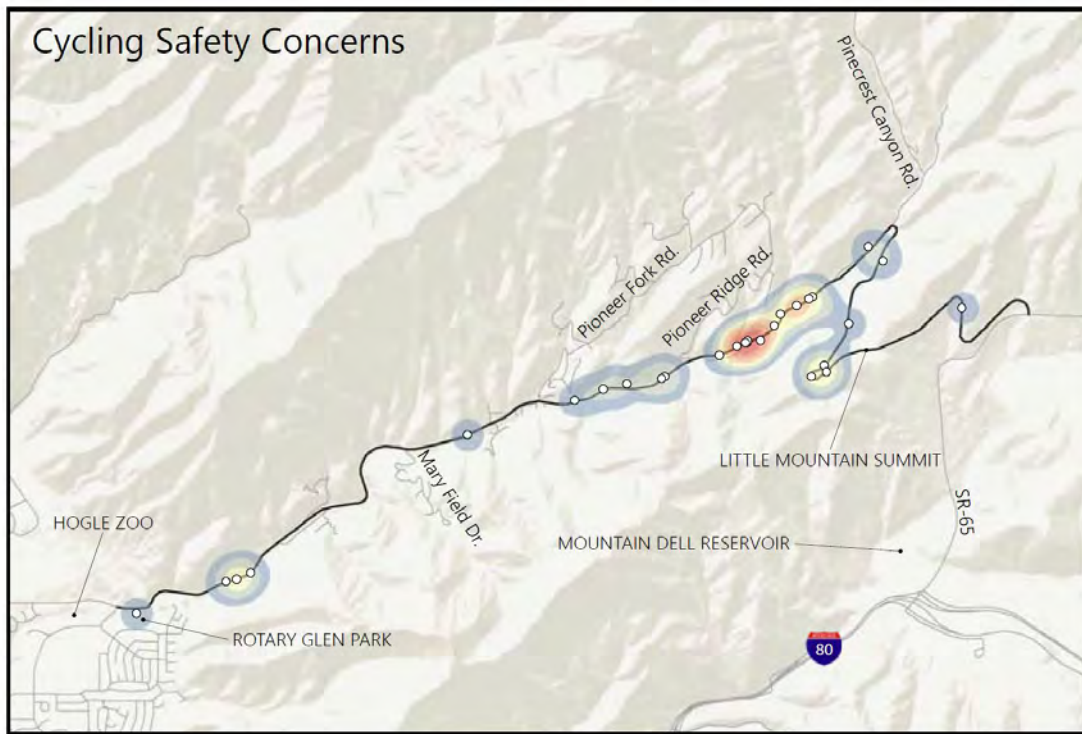
Common Comments	Number of Comments
Enforce road laws for bikers/cars/motorcyclists Example: Rules applying to bicycle use should be better enforced	14
Reduce the speed limit Example: I would want more police, slower speeds & better road management.	9
Put up "Single File Only" signs for bikers Example: Also posting "Single File Riding Only" signs, there are several that say "Share the Road" but not many "Single File".	9
Think about residents, not bikers Example: Remember the first priority of the roadway must be motor vehicles	8

Emigration Canyon Transportation Study

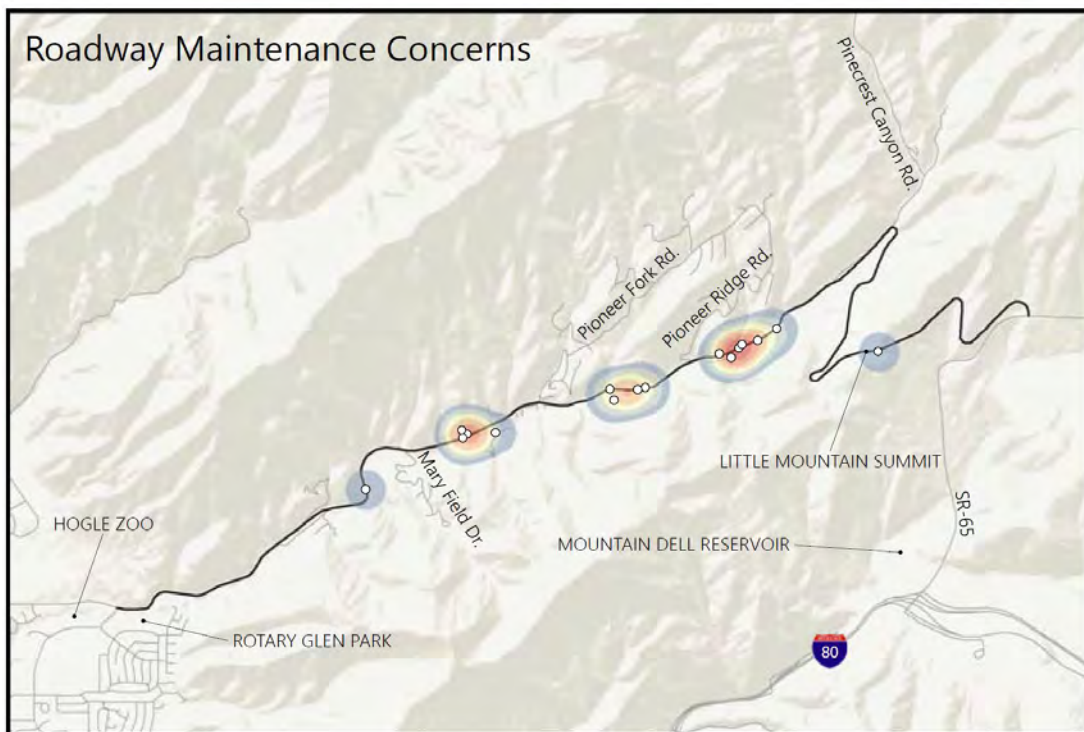
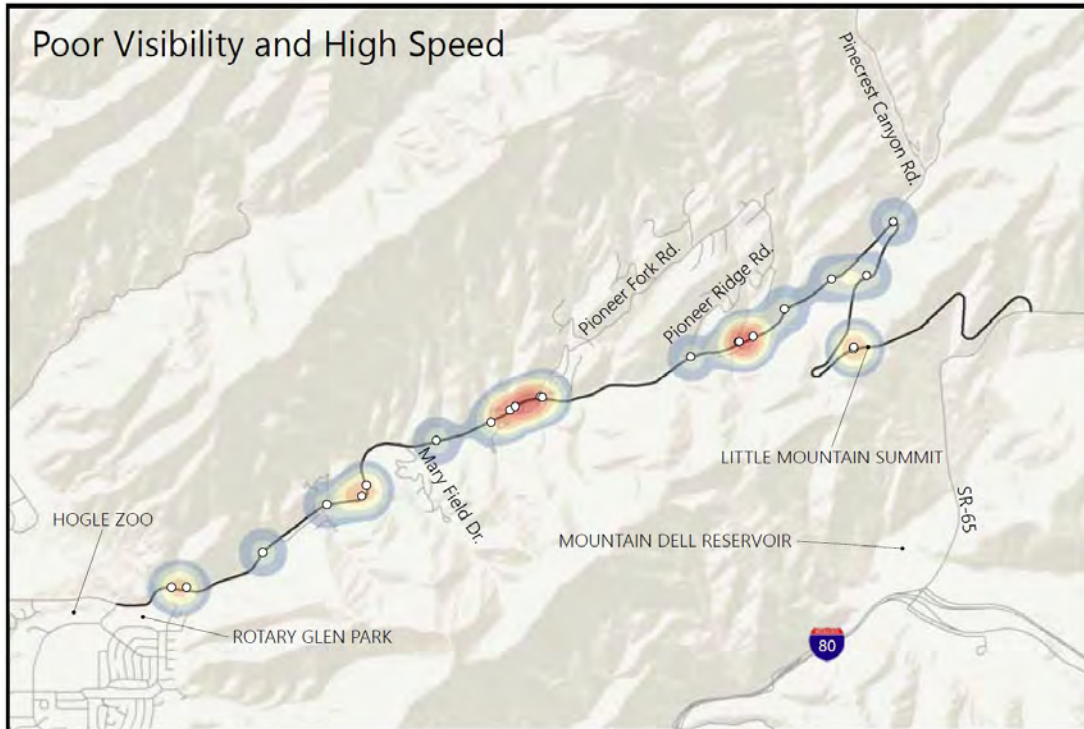
since they have homes in the canyon and are not just out for a joyride.	
Sweep road/bike lanes regularly Example: Sweep the bike path often & remove debris/rocks to keep bikers in that lane.	8
Don't widen the road Example: As a resident, I cannot see the value of widening the roads. Wider Roads will bring more traffic, more pollution and will not make the canyon safer.	8
Make bikers stay in the bike lane Example: I am a biker and I ride AND live in Emigration Canyon and it is unnerving to come up on riders in the middle of the street instead of in the bike lane.	7
Increase signage Example: We need more signage.	7
Fix rock fall hazards Example: Significant rock fall areas must be stabilized.	6
Repair/repave roadway Example: Pave road as soon as possible with adequate bike lanes.	5
Motorcycles are noisy Example: My main issue with the road is lack of noise ordinance enforcement. This mostly applies to motorcycles which are a major nuisance, particularly on weekends.	5
Widen the road Example: Going down is a little sketchy. Widen please.	3
Blind corners are scary for runners Example: Blind corners, especially at mouth of canyon & by Ruth's should be corrected. Super scary as a runner, going around those curves.	3
Limit number of bikes in canyon Example: If we could limit the number of bikes per day or even per hour this would help.	2

Emigration Canyon Transportation Study

Online Comment Map Results:



Emigration Canyon Transportation Study



Emigration Canyon Transportation Study

Comment Type	Count of Comments
Add your own idea	50
High speed travel here	11
Make it easier to cross the street here	12
Make it safer to bike here	50
Make it safer to walk here	9
Poor visibility (sight distance) here	16
Roadway maintenance needed here	26
Grand Total	174

All Comments Received:

Method Received	Please tell us about your concerns, issues or ideas for solutions on Emigration Canyon Road.
Open House Comment Form	Why not put in speed bumps & slow the traffic to improve safety in all of these plans what will you do for the residents in the Canyon? When did this become a permanent plan? I would want more police, slower speeds & better road management. Pushing for all of the needs of the cyclists is ridiculous they don't respect the canyon or residents.
Open House Comment Form	New guard rails are dangerous! CA used this style until it was voted out by public opinion.
Open House Comment Form	Appendix A of the assessment states Canyon is the "Crown Jewel" of the community. To urbanize the roads will affect the rural feel of the canyon. As a resident I feel this is mostly a reaction to a special interest group, recreational cyclists. While I respect them they often do not respect us as residents. Float a bond for the proposed work, that will really tell you how the people of SL Co feel just like other rec facilities cyclists should pay their share for improvements needed for their rec activities. I do like that people are recreating, it's important to be outdoors & cycling promotes a healthy lifestyle. As a resident I want to share the beauty of the canyon, I don't think you can install the infrastructure improvements outlined in the motorist & bicyclists safety assessment without marginalizing our "Crown Jewel"
Open House Comment Form	My concern is that this WILL NOT MAKE THE CANYON SAFER. For anyone. Bike lanes will draw MORE bikers, they will go faster. Not to mention: They do not use the wide lane when it's available!!! At the top where it is wide, the bikers are on the road OR IN THE ROAD!!! So what good will it do to spend millions putting in these wider lanes?!?!?
Open House Comment Form	~5700 East- Clay & H2O seepage & rock fall- don't think a stucco wall would hold. I visually see deer coming over top & creating some of the rock/clay fall. Loose, unstable. Push back upper 1/2? Put barrier @ road level to capture rocks. More widening if \$ allows?
Open House Comment	Problem with water coming down from Emigration Oaks and running across the road in front of our house 5110 Emigration Canyon. It is flooding our front yard.

Emigration Canyon Transportation Study

Form	
Open House Comment Form	My concern is with people who WILL NOT ride single file- I am a biker and I ride AND live in Emigration Canyon and it is unnerving to come up on riders in the middle of the street instead of in the bike lane. I don't mind slowing down either. There are only 2 lanes- many of which have blind curves. I think if tickets were given to those that don't follow that would curb it significantly- especially packs of riders who flip you off if you just let them know you're there on the road with them.
Open House Comment Form	Remember the first priority of the roadway <u>must</u> be motor vehicles since they have homes in the canyon and are not just out for a joyride. Secondly, the rules applying to bicycle use should be better enforced. I.e. single file riding. Signage should also be increased. A rule insisting a single file use <u>only</u> should be incorporated on this "skinny" canyon road. I don't endorse nor ever want extending the bike lanes.
Open House Comment Form	As a canyon resident I commute every day by bicycle to work and back (year round!) First and foremost, cyclists should ride <u>single file</u> and cars should <u>slow down!</u> I've reviewed the study's plan and am excited about the many improvements being recommended... safety education and improvements, etc. are all going to help! Most impressive is the level of detail contained in the study... perhaps the greatest contribution to safety and mutual respect will be the sum of many small details (e.g. Joe Smolka's 79-point plan!) I have great respect for the canyon resident drivers who have consistently given me a wide berth during my rides/and shown great courtesy over the last 7 years. Now it's only going to be (get) safer and better for everyone!
Open House Comment Form	The most important sign on the road is "share the road". But share the road may mean different things to different people. Maybe we should define the 10 common sense elements of share the road & write them down on a sign at the mouth of the canyon & on a wallet card that could be handed to residents and bikers.
Open House Comment Form	The idea of "road 10 tags" for road bikes is not related to safety and should not be part of this initiative. I think if the shoulder is kept free of debris and the pavement is good 90% of the cyclists will stay in the bike lane (uphill direction)
Open House Comment Form	Cycling = -wider roads so cyclists can ride 2 wide on shoulder -regular sweeping -regular pot hole repair -signage for cyclists reminding to stay inside lines
Open House Comment Form	I don't believe that road expansion will lead to any real decrease in the problems and issues mentioned in the report. I want assurance that the consultants used prior to drafting the report are actually qualified, and that none of them are currently under investigation. I would further like to know that any and all construction firms under litigation or investigation will be excluded from the bidding process. Every road expansion project in the past has been done improperly, leading to increased hazard for residents, as well as recreational visitors.

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Open House Comment Form	Our 2nd comment form: After everyone else rides off into the sunset- we- who live here are left with the mess to clean up- with our ears deaf from the motorcycles (no noise ordinances?) we wish to share- but we <u>all</u> have a stake in this Canyon- it should not all be just for bikers (we are bikers!) - we stand to loose a lot in these changes- I don't think most people who use the Canyon would welcome it if they were not considered as well where they live.
Open House Comment Form	Bikes going really fast downhill from bottom of little mt. Pincrest area- knocking you off your feet when you go to get mail- bikers riding <u>3</u> abreast, to make you go in the middle of the road- into head on traffic. Speed of 40 mph in residential area- motor cycles 20 in & now speeding in the canyon on weekends.
Open House Comment Form	<ol style="list-style-type: none">1. Pave road as soon as possible with adequate bike lanes. NO CHIP SEAL.2. Fix red cliff on south side of road at about 5670 East.3. Install signs to ask motorists to be considerate of bicyclists and bicyclists to be considerate of motorists.4. Follow the Emigration Study Recommendation that the bike lanes be swept weekly. (at least when the rocks are falling)
Open House Comment Form	Change the stop sign at the west end of Sunnydale Ln to yield. And enforce it! Put "no stopping" signs at the same end, people and deer hunters stop or park down there and it is difficult to see up canyon traffic. Better snow removal so cars can pass each other on the lane.
Open House Comment Form	<u>IDEAS</u> = sweep the bike path often & debris/rocks to keep bikers in that lane. We need rules for biking along Emigration. Bikers don't respect cars and its hard for cars to safely drive the canyon to & from the house when bikers are all over the road (2 & 3 across) riding in the car lane; then when you are trying to go around several bikers safely, you have an oncoming car doing the same thing almost causing a head on collision.
Open House Comment Form	Slope instability & rocks on the road
Open House Comment Form	We think the speed limit should be decreased to 30mph. This would benefit all users (bikes, walkers- weather walking your dog or child or just yourself) a bike lane extension would further compress us all together- decreased speed would give everyone more time to react. The existing bike lane is most often dangerous for bikers since it is full of debris- even the day after the street sweeper. The increased transit time from rotary park to our house is 3 additional minutes- depending upon traffic. This new speed limit would have to be enforced- the 40 mph is not- especially on weekends the speeding is a big issue. But since the residents of the Canyon pay extra for police enforcement already- this should not be a problem!
Open House Comment Form	Looking at your work study I see nothing that addresses the safety of the residents. I'm not really sure why the people that live in the canyon are not considered when talking about improvements. The most dangerous thing is speed and widening the ROAD will only MAKE the CANYON RD a better choice for people to make it a "main" road from PC to Down Town. Put something in place to slow people down

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Open House Comment Form	My main issue with the road is lack of noise ordinance enforcement. This mostly applies to motorcycles which are a major nuisance, particularly on weekends. These often violate existing but not enforced laws, and sometimes speed limits. Postage and enforcement of noise ordinance laws would greatly improve canyon living.
Open House Comment Form	Widening the road, digging out uphill side, removed preexisting grass that held up the hillside. You also removed the red sandstone out crop just below the fire station. Removing the aesthetic nature of the canyon. "Stupid"
Open House Comment Form	There are way too many times cyclists must go out of bike lane & drivers cross double yellow line. The amount of users has increased (^ cyclists ^ runners) bike lane must <u>exceed</u> legal minimum by a lot to accommodate amount of users, which is sure to increase as the years go by. Significant rock fall areas <u>must</u> be stabilized. Weekly sweeping just does not do the job. Just 1 rock will cause a cyclist to move out of lane. Rocks fall constantly. Blind corners, especially at mouth of canyon & by Ruth's should be corrected. Super scary as a runner, going around those curves. An idea would be to paint the bike lane stripe a double yellow where both drivers & bike lane users should not cross over due to blind spots.
Open House Comment Form	My main concern is the very loud motorcycles. We are right off the main canyon road and our weekends and sunny evenings are marred by the muffler-less packs of motorcycles roaring by. It's a public nuisance and I hope law enforcement resources can be assigned to reign them in. Even signs warning of fines might help.
Open House Comment Form	Noise levels from vehicles (namely motorcycles) equipped with loud exhaust systems (and mufflers in particular).
Open House Comment Form	If you continue to widen the road it will only cause drivers to drive faster. We need a toilet built at the midpoint. Or at the fire station for bike & runner traffic.
Open House Comment Form	I believe widening the bike lane as much as possible and enforcing the traffic laws both for cars coming over the double yellow line and for bikes riding two abreast are necessary. Also posting "Single File Riding Only" signs, there are several that say "Share the Road" but not many "Single File". Lowering the speed limit should not be a consideration. The other improvements to the Canyon Road that have been identified by the working group will help also.
Open House Comment Form	I live on Killyons Canyon Road. The upper section of this road (~1/2 mile) is unpaved and always in poor condition after winter. It should be paved, and 6/9 residents of the upper section are in favor, 2 opposed, and 1 neutral. Also, parking at the end of the road for bikers/snow shoers using the trail to Utah Open Lands needs to be provided.
Open House Comment Form	As a biker <u>and</u> resident of the canyon, I think bikes need to be registered & ticketed for violating the law (riding in middle of road is my pet peeve.) More law enforcement- especially on weekends- would be helpful.

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Open House Comment Form	My biggest issue in driving the canyon is the one-out-of-ten motorists or bicyclists who is in a hurry. These people (motorists) tend to tailgate, pass 0 in hazardous spots, cut corners, etc. & the generally create a hazard. Bicyclists who are racing (the clock) do the same. I don't know what more we can do to encourage/enforce more sane road use, but I'd be happy to participate in a focus group.
Open House Comment Form	Driveways & roads that empty onto Emigration Canyon road at <u>very</u> steep grades- in slippery conditions, these pose a hazard. People driving out of Ruth's often fail to check for oncoming- they seem to think Emigration Canyon Road is Ruth's driveway.
Open House Comment Form	Stop the speeders and drunk drivers!!! As a resident, I cannot see the value of widening the roads. Wider Roads will bring more traffic, more pollution and will not make the canyon safer!! Many accidents are caused by distracted drivers. How do you plan to resolve this problem? If you widen the roads how do you plan to ensure that the bicyclists stay in their bike lane? Right now they ride side by or more. Plus, they use my yard as a urinal! I live in the canyon & expect a safe environment. One last item, has a survey been done on where the accidents occur and what caused them?
Open House Comment Form	1. While you are debating what to do Please repair the roads/bike lane and stabilize the hills. Sweep Bike lane. DON'T WAIT A YEAR TO DO SOMETHING.
Open House Comment Form	If we could limit the number of bikes per day or even per hour this would help. TAKE a page from the National park play book, require a permit to ride in the canyon with a lottery and limit the number of bikes per day. The cyclists could carry a Transponder. Put a sign at the mouth of the canyon explaining the rules. UPP could enforce this like the car pool lane. I am not in favor of widening the road. First fix the slide areas, retain the rocks and clean the road on a regular basis <u>Sweep</u> . We would like to preserve the canyon feel and livability of the road.
Open House Comment Form	I am a resident of the canyon & a cyclist. 1. I have had only 2-3 rude car drivers, maybe that is because I try and stay in the bike lane. 2. I will ride two abreast when the bike lane allows, 3. We need more signage & "open year round RR" 4. We need to improve the areas where there is no bike lane- especially in uphill direction. 5. Hill side stabilization a must. 6. Crack and asphalt repair by professionals not the crew that recently (last year).
Emailed Comment	I attended the fire station meeting last week which was to gather input from residents and users of the Emigration Canyon transportation system (bikes and autos). I have heard from several sources that the County has set aside considerable funds (? 1 million \$) to address problems with transportation in Emigration Canyon. This is excellent, but I was surprised to see that there was little to no indication on the maps presented of any problems in Killyons. Given our extensive discussions with the County regarding issues with our road (resurfacing needs, trailhead parking problems, increased traffic due to Utah Open Lands, etc), I think this omission was inappropriate. Doesn't the County

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consider Killyons and Pinecrest roads as belonging in the "Emigration Canyon Transportation System"? Is the focus of this effort mainly to improve bike safety? Is the County considering using any of these funds for improvements in Killyons?

Emailed
Comment

I cannot attend the meeting on 3/25 in Emigration Canyon, but I would like to comment. I have lived in the canyon for 31 years continuously and for 5 years previously. I have written numerous times about the bicycle issue in the canyon. This is an unmitigated disaster. There is not room for bikes, runners and cars, especially since the bike riders (I ride a bike too, so this is not coming from an unsympathetic source) insist on riding 2, 3, 4 abreast and sometimes in groups that exceed 4. This simply cannot continue. Riders, runners and motorists are going to be injured or killed. All it will take is a very minor "move" at the wrong moment. I dread the coming of spring and the obstacle course that the canyon becomes morning, noon and night and especially on weekends. There must be definitive action taken. Half way measures won't suffice.

Emailed
Comment

Thanks for taking on this evaluation and for the progress to date. I am a resident of the canyon (Emigration Oaks), and regular bike commuter, former chair of the SLC Mayor's Bicycle Advisory Committee, former President of Rocky Mountain Cycling Club, a certified Effective Cycling instructor, member of the Bonneville Shoreline Trail Executive, and former member of the Board of the Emigration Oaks Homeowners Association. I have ridden Emigration Canyon for the past 25 years for one purpose or another and this is, by far, my most regular riding area. Based on this experience and riding on roads and bicycle facilities all around the world (I travel with a folding bike), I think the solution to most of the challenges in the Canyon is actually quite simple. We need a proper, highway standard bike lane in BOTH directions along the entire length of the Canyon. This will give all users suitable space and resolve almost all the tensions and dangers of riding the canyon. The difference in the riding and driving experience in the Canyon is dramatic between the areas that have wide bike lanes from those that do not. It is also crucial to consider improvements in hillside stabilization as the effective width of bike lanes (and the roadway) is highly dependent on the amount of debris that slips from the hills onto the road surface. This winter (2014/15) has been the worst in this regard, while it has also been the best in my memory for cycling. It is only a matter of time before falling rocks cause accidents (for cyclists or motorists) on the Canyon road. A useful adjunct will, of course, be education of all users of the Canyon Road; education through careful signage, Township Newsletters, and the press. But if there is space for all to sensibly share the road, the education effort will also be simplified. We are so lucky to have this road and the cycling facilities that are in place. We who live here value many facets of the nature, the recreation opportunities, and the friendly neighborhoods. I hope

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that the County can find its way to support the modest improvements that my experience suggests will be all we need to make the most of these opportunities and enjoy the Canyon, as residents and visitors, forever. Many thanks.

Emailed
Comment

Hello, I am writing because I understand you are seeking input on the multi use perspective of Emigration Canyon road. I drive and bicycle on the road fairly regularly. I believe any solution to conflict between users must include a continuation of easy and safe bicycle usage. No matter what is done to the road, cyclists will use it, so keeping everyone's safety in mind while designing a road for better overall flow is a logical path. Wider shoulders would give both motorists and cyclists a better experience. Speed bumps would slow traffic (excessive speed in the canyon is a problem for all users as it creates hazards). Using blacktop the road instead of pitch and seal would certainly make cycling more pleasant. I notice I need at least one gear easier after a fresh resurface. That is with 2 skinny tires. The extra fuel used by four fat tires on a car going over pitch and seal as opposed to blacktop winds up costing the motorist and polluting the canyon. Good luck with the planning

Emailed
Comment

Thank you for your efforts regarding transportation and recreation use in Emigration Canyon. As a cyclists that lives at the mouth of the Canyon, I use the Canyon quite frequently. I've had both good and bad experiences with cars, runners and other cyclists. Your task is a difficult one and I don't know the solution. I do know though that attitudes towards cyclists need to change and that begins with cyclists themselves. Just yesterday a young cyclists was riding down 1300 S blowing through stop signs and red lights and it ticked me off big time. I'm certain other drivers were just as mad as I was. THAT is why people hate us and is the root of our perception problem. I don't know how to resolve that type of behavior as there are motorists that behave that way too. All segments of society have idiots that feels rules and good behavior don't pertain to them. Maybe our elementary schools can address the younger generation and somehow make obeying stop signs and red lights "cool". :) In the Canyon it seems riding two abreast angers drivers. That needs to be addressed. My feeling is 2 abreast should be legal and that would calm drivers down somewhat. Riding and running is social and side-by-side will not stop. Just make it legal and everyone will eventually come to a level of acceptance and tempers will die down. Walking/running against traffic is a bigger concern to me needs to be addressed. Riding/walking/running against traffic is very dangerous and should be illegal. Period. It's just not safe for cyclists or motorists. On more than one occasion I have pulled out to the left of the white line to pass runners/walkers coming down canyon against traffic only to be buzzed by a motorist who refuses to cross the yellow center line. And almost

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always there is no motor traffic coming down canyon preventing the motorist from moving further to the left. I've often wanted to ask an aggressive motorist what they would do in the same situation if a 6 or 7 year old were riding their bike to the left of the white line. Would they buzz them too to "show them" and teach them a lesson? I have children and grandchildren that would be just as devastated if I were to be senselessly run down as would the parents of a child that was needlessly run down. A life is a life whether it is in Lycra or Hello Kitty garb. My solution to running/walking against traffic is get a dorky mirror for your glasses so you can see traffic behind you if that is why you go against traffic. That practice is as dangerous in the Canyon as it is on city streets and sidewalks. It makes absolutely no sense and it should be stopped immediately. Tradition & "safety" is not an good reason to continue this dangerous practice. The double yellow line also needs to be addressed too. Motorists seems to treat the yellow line as a fence, even when the downhill lane is empty for as far as the eye can see. I do believe the law has been changed to allow motorists to legally cross a double yellow, but I don't believe most motorists are aware of it. And please correct me if I am wrong. If I'm correct, the Canyon residents need to be educated that it IS legal and prudent action to take for the safety of all. Maybe signs in the canyon would work. Maybe a sign that the informs motorists that double yellow passing is okay if it is safe, and, a sign that says riding/walking/running against traffic is illegal. And another that says 2 abreast is legal but 3+ is not. And have the Canyon police enforce the rules. After a few tickets all users would understand and get on board. That seems like a simple and inexpensive solution to at least a few issues facing Emigration Canyon. As for road width and bike/running lanes, that's a tough one with no simple inexpensive solution. Good luck on that one :) I hope my input is constructive and helps in some way. And I am in no way defending bad behavior by anyone as acceptable. We are all in this together so let's find a solution and learn to get along. Just a final thought. How about a BBQ this summer at the mouth of the Canyon for bikers/runners/walker/residents to rub shoulders and get to know each other. I bet we can gather without throwing down :)

Emailed
Comment

Hi: I didn't find a way to give general input on the emigrationstudy.com website, but the site did mention submitting comments to you; are you the right contact person? If not could you forward these on? I use Emigration Canyon as an occasional motorist, but much commonly as a road cyclist. As a cyclist I find it to be a very enjoyable canyon to ride as the traffic isn't usually too heavy, and auto speeds are moderate. The quality of the road surface on the shoulders, and the often inadequate shoulders (in terms of width) are the 2 biggest problems I find. I don't witness a lot of conflict between cyclists and motorists, as I try to ride as far to the ride as possible, and to not impede traffic while

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biking with others. As a cyclist, I find Emigration to be very motorist-centric (as are all of our other roads), and would suggest that motorists would benefit from being reminded that we have a 3 foot law, and that it is the responsibility of the passing vehicle to maintain that; perhaps that message could replace the nice but overly general "share the road" signs. I believe that motorists are legally able to cross the yellow line when passing slower vehicles line farm implements and cyclists, and perhaps motorists need to be reminded of that, as I find that many motorists simply do not want to change lane position while passing. As a motorist I am sometimes frustrated with cyclists who don't seem to be very considerate of faster-moving traffic by keeping to the right as much as possible. I try to remind myself, in those situations, that cyclists are humans and, even when they are being irresponsible, that I have to respect their safety (I remind myself of that when I'm driving around irresponsible pedestrians and motorists, too). Thank you.

Emailed
Comment

Just wanted to voice my support for promoting safe, accessible, continued and expanded pedestrian and cyclist access along the Emigration Canyon roadway. A defined bike lane up the canyon will continue to enable safe access for drivers and cyclists' and runners alike. I have signed up to receive updates, etc. Thanks

Emailed
Comment

Thanks for your work to make Emigration Canyon safer for all that use it. I use the canyon to cycle as well as to run. I am writing to support efforts to continue accessibility to riders and runners as well as to promote safety. As a cyclist, especially, safety is a foremost concern. I know of too many accidents and deaths related mostly to collisions with automobiles. Aside from education, I support a safe, clean (not covered with debris) and smooth(not full of potholes and bumps) shoulder of sufficient width to make it safe even if cars decide to park there. I support signs advising motorists to use caution because of the large number of cyclists that use the canyon. Of popular rides in the SLC area, Emigration is great, because of its generally smooth surface, motorist awareness and reasonable shoulder. Recently Utah was identified as a top bike friendly state. I am not sure I agree with this but I do agree that many cyclists live and visit here and it could be a top destination. Thanks again for your continued support of persons who are interested in pursuing an active, healthy lifestyle in safe environment.

Emailed
Comment

Dear Sirs,

We live at 6720 Emigration Canyon Road. Our safety issues are these:

1) The numerous bicyclists who race down (higher than the speed limit) Emigration Canyon riding the double yellow line (yes, in the middle of the road)

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and refuse to move to the side for safer two-way vehicle traffic.

2) The motorcyclists and small vehicles who street race at very high speeds (using both lanes) up the canyon in our area around dusk during the spring/summer months.

We've reported these issues to the police numerous times, but nothing has been done to date.

We ride bicycles ourselves, but numerous bicyclists ride irresponsibly and disrespectfully...without fear of legal consequences for breaking the law (which vehicle drivers are expected to obey) or injury.

Respectfully,

The Fourts

Emailed
Comment

I am a cyclist that uses Emigration Canyon, typically 4 to 6 times per month. Mostly on weekends with the occasional weekday evening ride. I have been using the Canyon as a cycling route for 20 years. While I do not know ALL of the concerns residents of the Canyon have, I have herd through the grapevine some of their concerns.

Knock on wood, but I can only think of couple instances where I have had someone honk at me. There was one very weird instance where I had a motor cyclist yell at me, which was weird one, because I happened to be on or to the right of the white line, and two, this was a motor cyclist, so passing me was not a burden. While my adverse interactions with motorists in the canyon have been limited, I have seen quite a few instances.

A few thoughts are on my mind, that would help improve auto cyclist and auto runner interaction and safety.

1) Motorists need to slow down and drive the speed limit. Most conflicts I have seen are because a motorist is in hurry and has no patience for the other canyon users. The instances when I feel the most unsafe are when motorists go flying by above the speed limit. Emigration Canyon is not I-80. It is a scenic road and does not need to be traveled at high speeds. People need to slow down and enjoy the scenery!

2) EVERYONE; motorists, joggers, cyclists, all need to be better educated on common courtesy and proper use of the PUBLIC road. Requiring cyclists to ride single file is not always safe. Banning cyclists is not going to fly either. Motorists can be more courteous but so can cyclists. Joggers could help by filing into single file when running against traffic and they encounter cyclists.

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This would help us so we don't have to move so far out into the road to pass the joggers. Cyclists, if riding two abreast, could file into single file if they hear a motorist. This is courtesy, but should not be required.

3) A road etiquette sign could be placed at the mouth of the canyon, Little Mountain Summit, the Fire Station, and the intersection of SR65 and Emigration Canyon Road (East Canyon / Parley's). This road etiquette sign could be similar to the trail signs we see that recommend, hikers yield to bikers, bikers yield to horses, etc. This would be much less expensive than widening the road to create dedicated bike lanes.

4) Something that should be on the road etiquette sign, or even another sign... ALL CYCLISTS and RUNNERS MUST REMOVE AT LEAST the road side ear bud. I do NOT ride with any ear buds listening to music. I cannot tell you how many times I have yelled on you left or even said hi to a cyclists or runner as I passed them and gotten no response because they could not hear me due to their ear buds and music. You cannot hear the traffic around you if your ears are plugged with music.

5) Drivers need to understand when we are descending from Big Mountain and Little Mountain and traveling at speeds of 25 - 40 miles per hour, cyclists need more than a 2 foot narrow swath of road. There is often debris on the right hand side of the road that if hit at high speed can cause crashes. We also need room to maneuver around animals. One day descending the steepest part of the Canyon, there was a fox in the middle of the road that cause a number of us cyclists to swerve way out into the road. Motorists need to recognize we need some space.

6) All of the utility digs, patches are repairs are dangerous on the descent and cause cyclists to be further out in the traffic lane. There are a number of utility digs and patches in the asphalt that make the asphalt very uneven and bounce us around way to much on descent. While cost is an issue, a milling and re-asphalting of the canyon would go a long way in improving safety. A smooth road is safer for cyclists than a super rough road. The condition of the asphalt has deteriorated greatly over the last couple of years.

7) Riding two abreast is safer for cyclists... Please review this link to an article on cycling. It explains very thoroughly why riding two abreast is safe for cyclists. <http://www.bikewalknc.org/2015/04/why-cyclists-ride-two-abreast/>

The above are some thoughts I have. PLEASE forward these to the committee for review. Please feel free to email or call me if you need be to elaborate on any of the points I have tried to make.

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Emailed
Comment

Dear Ms. Adams,

I was so excited to see that I would have a chance to provide input on what it was like to be a canyon resident who traveled on Emigration Canyon road on a daily basis. I was very disappointed in the survey format. It is true that the road needs many improvements, but for most of us it is difficult to pinpoint an area of the map where a specific hazard is present. I was also disappointed that there was no interest group identified as residents who would simply like to walk on the road either with their families or their dogs. For these reasons I would like to provide my comments in this email and hope that this input is included in the overall survey results:

Those who use the canyon road for recreation in general have little regard for the traffic needs of canyon residents. Here are some examples:

Bikers ride 3 or 4 abreast and only grudgingly move out of the way. Skate-skiers who skate up the canyon push their skis into the traffic lanes so that motorists must slow down. When cars are travelling in both directions on the road while bicyclists, joggers, or skate skiers are present it is taken for granted that the motorist will adjust their driving, not the other users of the road. Skateboarders board down the canyon with a companion car following behind to prevent other motorists from running into the skateboarder.

For our family, walking a dog or pushing a stroller was so hazardous that we eventually stopped all-together. We have moved away from Emigration Canyon road. What should have been a peaceful place to live was made hazardous by those who only visit it occasionally. If Emigration Canyon road is to be designated for recreational use for the entire county, then either the road will need to be greatly modified OR there needs to be more frequent monitoring and citations issued to those recreational users who create hazardous conditions. Thank you for taking the time to review my input.

Emailed
Comment

I wash to make comments about Emigration Canyon pedestrian safety. I walk my dog twice a day in the canyon on leash and although I am very careful, I am in great danger and fear for my life because the bikes are riding irresponsibly. I am 69 years old and it is very dangerous because about 40% of the bikes use the north side of the main road as a race course. They are going so fast (30+ mph) that it is unsafe to be anywhere near them. Many do not give me the right-of-way as the law requires. If they would slow down to 20 mph this would be a much safer neighborhood as it was 20 years ago. I have been hit by speeding bikes 3 times in the last several years. I have seen a loose dog hit by a bike who was going so fast he could not stop for the dog emergency. This is NOT A RACE COURSE, IT IS A NEIGHBORHOOD THOROUGHFARE, THE

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BIKES MUST BE REQUIRED TO RIDE SAFELY AND RESPONSIBLY. A posted speed of 20 mph for bikes and adequate enforcement would make a huge safety improvement.

--

Also going up and down canyon almost all problems and unsafe conditions are caused by bikes riding tandem and out of the bike lane. The tandem bikers yell back and forth to talk and it is very unpleasant to listen to them yell. The canyon was so much nicer and safer before the yelling, out of control racing bikers overran it. Bike riding should be SINGLE FILE ONLY and should be posted and enforced by the sheriff strictly!

--

If money is needed for enforcement or bike lane improvements, a toll booth could be set up at the bottom of the canyon and charge the bikes \$1 to enter the canyon. Also verification of bikes driver licenses should be done at the toll booth so they can be held accountable for their actions in the canyon just as any vehicle is held accountable. Strict enforcement is required because so many bikers (and motorcycles) are very careless and ignore the traffic and bike laws. Use toll booth money to pay for enforcement and make them comply. Thanks

Emailed
Comment

I tried to use the “map” for comments, but couldn’t figure out how to drop a pin. so here are a few comments:

- I live in Park City, but often come down to SLC where it’s a little warmer to ride my road and mountain bike. Immigration is often my destination for a quick training ride.
- The new restroom facility at Rotary Park is great, especially having the sink outside the enclosed toilet so you don’t have to wait while someone washes their hands. Also, on my first ride after it was installed, my bike seat was loose and fell down a 100 yrs up the canyon. I had no tools and remembering the tool/stand I returned and fixed my bike and finished the ride ... otherwise it would have been a wasted trip from PC.
- Also, for years, I have ridden the every other week Emigration TT from Rotary Park to the top of Little Mt. This is a great road bike training event.
- I believe there is also a bike tool/stand at the fire station.
- Bathroom facilities at the fire station and top of Little Mt would be ideal. Often when riding a bike you have to relieve yourself shortly aft starting your ride. The Fire Station would be a perfect location for that. Once

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riding hard, your kidneys shut down and a nature break usually is't needed for hours.

- A wider bike lane, better pavement and rock erosion control is definitely needed.
- My personal 1st priority would be a connection from Emigration to the top of Summit Park. This would provide a a road bike connection from Park City to SLC without getting on I80.

Emailed Comment	The interactive map does not seem to be accepting any pins or further comments. I am concerned that the bicyclists do not follow the rules of the road and have a disregard specifically for the rules as they apply to school bus stops. On several occasions bicyclists failure to stop has caused close calls with the students entering and exiting the bus. I am appalled at the bicyclists who want to just pick and chose which rules they will follow.
Online Map	I would like to make a "comparison recommendation". Many years ago, in Colorado, this same problem came up in Glenwood Canyon, on I-70. Residents were up in arms. "Don't ruin our beautiful canyon!" The state called in consultants and engineers, and came
Online Map	There should be a drinking fountain right here. It would be nice for ducks, deer, even people who wander off the main road.
Online Map	Separated bike/pedestrian lane - similar to one in Zion/Springdale
Online Map	Not safe to have vehicle, cyclist and pedestrian in the same road section.
Online Map	Separated bike lane on the uphill side only
Online Map	disregard purple comment - wrong location. Would be nice if we could move points or delete after they have been submitted.
Online Map	Speed limit in the canyon needs to be 25mph
Online Map	"Make it quiet: the canyon needs noise control.
Online Map	No more thundering motorcycles and hotrods with modified mufflers."
Online Map	The improvements (trash enclosure?) has helped make this intersection safer, but it is still dangerous when a cyclist is heading downhill and traffic is headed uphill toward Pinecrest. Perhaps a yield sign for automobiles and cyclists headed straight thr
Online Map	I believe that the chipsealing on this road was done improperly and could have been used to help resolve cyclist/motor vehicle conflict. The initially rough

Emigration Canyon Transportation Study

	surface has been smoothed somewhat in the vehicle traffic lane but has not smoothed at all in th
Online Map	Public source of drinking water at the top next to the restrooms?
Online Map	How about some benches or picnic tables to make this a (more) inviting rest stop?
Online Map	"This lane going up hil has a good shoulder.
Online Map	Going down is a little sketchy. Widen please."
Online Map	The entire canyon needs good signage telling cars to watch for bikers and bikers to stay in the bike lane and single file. The bike lane needs to be marked well, and it needs to be clear to cars and bikers that this is the bikers space.
Online Map	Add a drinking fountain here at the fire station. Why not??!!
Online Map	Truly the best thing you could do for the canyon is to ensure the bikers have a good bike lane all the way to the top of little mountain and even down the back to east canyon. Then you must put in good signs that tell bikers to stay IN the bike lane, an
Online Map	This is a dirt area used for a parking lot by cyclist, runners, hikers and visitors to the zoo. Many days during the summer and on weekends this area is literally a zoo of people crossing the street and jockeying for parking spots. I think this lot sho
Online Map	This is another unpaved area used for parking sometimes. In the summer it attracts overnight campers and is frankly creepy knowing somebody is sleeping overnight in the bushes here. I am sure most are harmless. Ask the Sheriff what should be done.
Online Map	I see more and more runners in the canyon every year. I have seen Saturday morning running groups training. This is especially true since the canyon has become host to several competitive runs per year. This is fine and great to share the canyon, but
Online Map	Trash facilities and reminder to clean up after yourself at entrance of canyon!
Online Map	I would love to see guidelines similar to City Creek for multi-modal users. Often, runners are trying to share the space with cyclists, who are forced out of the shoulder, but are going uphill, which then impedes residential and canyon

Emigration Canyon Transportation Study

	access. I am sur
Online Map	In general, this canyon is not only a great asset for the road biking and running community, but it is also very popular and carries a lot of bike and runner traffic. Cyclist and runners are very respectful of each other and most autos/cyclists/runners
Online Map	Various areas - there are portions of the canyon where there is not enough shoulder for bicyclists. I think cyclists who ride out in the rode where there is a shoulder for bicyclists should be ticketed. Also, there are areas where rockslides block the ro
Online Map	THE ENTIRE PATH IS NOT WIDE ENOUGH AND THERE ARE ALWAYS ROCKS ON THE PATH. BIKERS SWERVE INTO THE LANES TO AVOID ROCKS MAKING IT DANGEROUS FOR CARS. NEED TO PLACE A NICE METAL CAGE TO PREVENT ROCKS FROM FALLING INTO ROADWAY. SOMETHING AESTHETICALLY ATTRA
Online Map	Emigration Cyn is unlike other local canyons in that it is a residential canyon made up of private properties. In order to make the roads safe for autos, foot and biking the county will need to exercise its authority & assume 4ft both sides of the road,
Online Map	Permanent restroom and water fountains
Online Map	There should be lighted blinking speed limit signs that show your speed like on 1300 East throughout the canyon. Many cars speed up and down the canyon. I bike the canyon 3-5 days per week for 15 years.
Online Map	Stabilize hillside - keep shoulder clear of dirt and rocks
Online Map	Lower the speed limit on Emigration Canyon Road to 35 MPH. This will help protect bicyclists (I'm not one) and pedestrians, and may cut the number of motorists who aren't residents--which would also help protect bicyclists and pedestrians. And ask traffi
Online Map	Motorcycles are excessively noisy. Especially on weekends. Large groups and obnoxious to residents.
Online Map	Cyclists shouldn't ride three abreast.
Online Map	improve parking at base of canyon
Online Map	build community/awareness through campaign where users identify through sticker their common interest in using the canyon (residents and bikes) - Sun

Emigration Canyon Transportation Study

	Valley has similar program
Online Map	Instead bike lanes on outside, consider shifting cycling path to one side and operate 2-way. The Strand in So. Cal.
Online Map	need more parking for hosting events and consider adding sidewalk or walking areas along frontages of fire stations since many people must walk along road to and from the fire station
Online Map	City built bike lanes to design standards up to County line. Need to do same all the way to East Canyon.
Online Map	City and County should post the road for single lane bicycling only and bicyclists must use bike lanes (in areas where they exist)
Online Map	special events can be problematic. trash clean up is an issue. notification to residents should be better to avoid block us in.
Online Map	Why do Harley Motorcycles get to ruin our peaceful experience in the canyon?
Online Map	Is there a way to put in a toll booth like in Mill Creek. The money can be used to improve the roads, improve safety for pedestrians, bikers and cars. Creates an opportunity to talk to people visiting the canyon, passing through. There could be a easy
Online Map	How can we manage the very loud Harleys and modified cars that ride up and down the canyon past 10:00 pm in the summer?
Online Map	Could HWY 65 be used for people powered activities every other day? (biking, skate skiing trainers, walkers)
Online Map	With all the through traffic going up and over Big Mountain, how about petitioning the State of Utah to close Highway 65 every other day to motorized vehicles (except emergency) and keep it open to bicycles and pedestrians.
Online Map	deadfall in stream can cause overflow that puts debris onto road
Online Map	This house needs to be torn down- it's an eyesore and distraction.
Online Map	This area is too congested to support a restaurant with cars coming and going. There are so many accidents here when the restaurant is operating. The zoning should be amended to not allow restaurant.
Online Map	lane markings needed to guide northbound left turns into left lane. help mitigate potential conflict with down canyon traffic.

Emigration Canyon Transportation Study

Online Map put up a sign for driveways for cars traveling up canyon. Diane Holloway is a blind driveway and it is dangerous coming out of it.

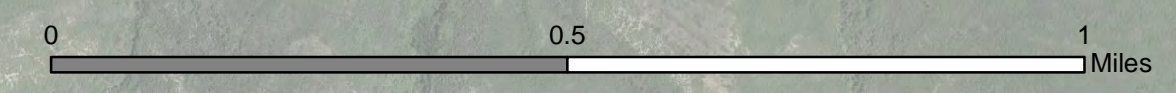
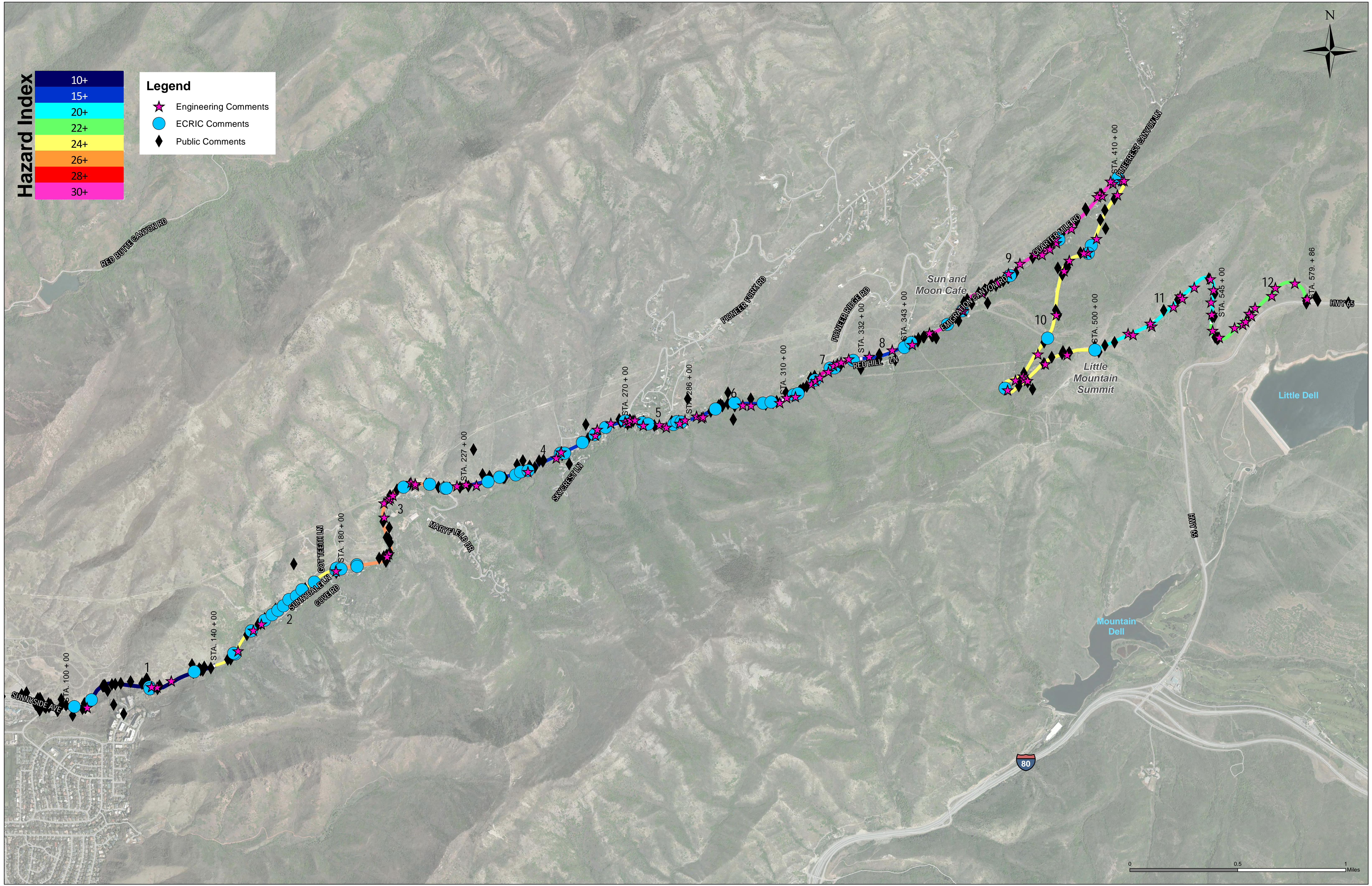
APPENDIX F: COMPLETE DEFICIENCY LIST

Hazard Index



Legend

- ★ Engineering Comments
- ECRIC Comments
- ◆ Public Comments



APPENDIX G: SEGMENT COST ESTIMATE

**Segment: 1 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 01 (STA 100+00 - 140+00)

Approximate Route Reference Mile Post (BEGIN) =	100+00	(END) =	140+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$110	
Roadway and Drainage	\$37,206	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$37,316
	Items not Estimated (20%)	\$7,463
	Construction Subtotal	\$44,779
P.E. Cost	P.E. Subtotal	\$3,582 8%
C.E. Cost	C.E. Subtotal	\$4,478 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$0
Incentives	Incentives Subtotal	\$0
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$4,000	\$4,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$45,000	\$47,000
C.E.	\$4,000	\$4,000
Incentives	\$0	\$0
Aesthetics	0.75% \$0	\$0
Change Order Contingency	9.00% \$4,000	\$4,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$57,000	\$59,000

PROPOSED COMMISSION REQUEST	TOTAL	\$57,000	TOTAL	\$59,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 1 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$4,400.00	\$4,400.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$2,200.00	\$2,200.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$450.00	\$450.00	Usually 1% of construction
015720020	Dust Control and Watering	10	1000 gal	\$15.00	\$150.00	
020560005	Borrow (Plan Quantity)	155	cu yd	\$13.00	\$2,015.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	44	cu yd			
020560020	Granular Borrow	84	Ton	\$16.00	\$1,344.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
#N/A	Raise Water Valve	0	Each	\$400.00	\$0.00	
#N/A	Relocate Hydrant	0	Each	\$3,000.00	\$0.00	
#N/A	Relocate Utility Pedestal	0	Each	\$1,500.00	\$0.00	
022210095	Remove Pipe Culvert	0	ft	\$15.00	\$0.00	
022210035	Remove Diversion Box	0	Each	\$500.00	\$0.00	
022210075	Remove Guardrail	0	ft	\$2.50	\$0.00	
#N/A	Remove Modular Block Retaining Wall	0	ft	\$20.00	\$0.00	
022210170	Remove Precast Concrete Barrier	0	ft	\$4.50	\$0.00	
028430035	Crash Cushion Type G	0	Each	\$3,500.00	\$0.00	
028410086	W-Beam Guardrail 72 inch Wood Post	0	ft	\$20.00	\$0.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	0	ft	\$50.00	\$0.00	
028440280	Precast Concrete Constant Slope Barrier, 42 Inch, Ret	0	Each	\$1,600.00	\$0.00	
028440290	Precast Concrete Constant Slope Barrier, 42 Inch, Slo	0	Each	\$2,000.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	88	cu yd	\$18.00	\$1,584.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	41	Ton	\$22.00	\$902.00	
027210020	Untreated Base Course (Plan Quantity)	22	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	44	Ton	\$70.00	\$3,080.00	
027480010	Liquid Asphalt MC-70 or MC-250	1	Ton	\$770.00	\$770.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	1	Ton	\$700.00	\$700.00	Tack Coat
028910020	Sign, Type A-1	418	sq ft	\$23.00	\$9,614.00	Chevron Signs
027710035	Concrete Curb and Gutter Type M1	0	ft	\$15.00	\$0.00	
027760010	Concrete Sidewalk	0	sq ft	\$10.00	\$0.00	
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	0	sq ft	\$80.00	\$0.00	
029380010	Tree Pruning	0	Each	\$200.00	\$0.00	
029220040	Broadcast Seed	61	1000sqft	\$20.00	\$1,220.00	
029110015	Wood Fiber Mulch	61	1000sqft	\$27.00	\$1,647.00	
023760010	Steep-Slope Erosion Control	679	sq yd	\$4.50	\$3,055.50	
029120010	Contractor Furnished Topsoil	679	sq yd	\$6.00	\$4,074.00	
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obliterate Road	0	sq yd	\$0.55	\$0.00	
Roadway Subtotal					\$37,206	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	0	ft	\$10.00	\$0.00	
026130030	Culvert End Section 18 inch	0	Each	\$500.00	\$0.00	
026130050	Culvert End Section 30 inch	0	Each	\$500.00	\$0.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	0	Each	\$500.00	\$0.00	
#N/A	Trench Drain	0	ft	\$200.00	\$0.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$50.00	\$0.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth	0	ft			
026101390	30 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$70.00	\$0.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	0	Each	\$2,600.00	\$0.00	
#N/A	Extend Concrete Drainage Box Culvert (12' wide)	0	ft	\$2,000.00	\$0.00	
Drainage Subtotal					\$0	
PI						
013150010	Public Information Services	1	Lump	\$110.00	\$110	Usually 0.25% of construction

**Segment: 2 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 02 (STA 140+00 - 180+00)

Approximate Route Reference Mile Post (BEGIN) =	140+00	(END) =	180+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$700	
Roadway and Drainage	\$223,559	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$224,259
	Items not Estimated (20%)	\$44,852
	Construction Subtotal	\$269,111
P.E. Cost	P.E. Subtotal	\$21,529 8%
C.E. Cost	C.E. Subtotal	\$26,911 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$0
Incentives	Incentives Subtotal	\$0
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$22,000	\$23,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$269,000	\$284,000
C.E.	\$27,000	\$28,000
Incentives	\$0	\$0
Aesthetics	0.75% \$2,000	\$2,000
Change Order Contingency	9.00% \$24,000	\$25,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$344,000	\$362,000

PROPOSED COMMISSION REQUEST	TOTAL \$344,000	TOTAL \$362,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 2 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$28,000.00	\$28,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$14,000.00	\$14,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$2,800.00	\$2,800.00	Usually 1% of construction
015720020	Dust Control and Watering	180	1000 gal	\$15.00	\$2,700.00	
020560005	Borrow (Plan Quantity)	3,323	cu yd	\$13.00	\$43,199.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	448	cu yd			
020560020	Granular Borrow	858	Ton	\$16.00	\$13,728.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
#N/A	Raise Water Valve	0	Each	\$400.00	\$0.00	
#N/A	Relocate Hydrant	0	Each	\$3,000.00	\$0.00	
#N/A	Relocate Utility Pedestal	1	Each	\$1,500.00	\$1,500.00	
022210095	Remove Pipe Culvert	60	ft	\$15.00	\$900.00	
022210035	Remove Diversion Box	1	Each	\$500.00	\$500.00	
022210075	Remove Guardrail	0	ft	\$2.50	\$0.00	
#N/A	Remove Modular Block Retaining Wall	0	ft	\$20.00	\$0.00	
022210170	Remove Precast Concrete Barrier	217	ft	\$4.50	\$976.50	
028430035	Crash Cushion Type G	0	Each	\$3,500.00	\$0.00	
028410086	W-Beam Guardrail 72 inch Wood Post	105	ft	\$20.00	\$2,100.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	217	ft	\$50.00	\$10,850.00	
028440280	Precast Concrete Constant Slope Barrier, 42 Inch, Ret	0	Each	\$1,600.00	\$0.00	
028440290	Precast Concrete Constant Slope Barrier, 42 Inch, Slo	0	Each	\$2,000.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	896	cu yd	\$18.00	\$16,128.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	417	Ton	\$22.00	\$9,174.00	
027210020	Untreated Base Course (Plan Quantity)	224	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	447	Ton	\$70.00	\$31,290.00	
027480010	Liquid Asphalt MC-70 or MC-250	3	Ton	\$770.00	\$2,310.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	1	Ton	\$700.00	\$700.00	Tack Coat
028910020	Sign, Type A-1	35	sq ft	\$23.00	\$805.00	Chevron Signs
027710035	Concrete Curb and Gutter Type M1	0	ft	\$15.00	\$0.00	
027760010	Concrete Sidewalk	0	sq ft	\$10.00	\$0.00	
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	0	sq ft	\$80.00	\$0.00	
029380010	Tree Pruning	0	Each	\$200.00	\$0.00	
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obilitate Road	14451	sq yd	\$0.55	\$7,948.05	
Roadway Subtotal					\$189,609	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	555	ft	\$10.00	\$5,550.00	
026130030	Culvert End Section 18 inch	1	Each	\$500.00	\$500.00	
026130050	Culvert End Section 30 inch	0	Each	\$500.00	\$0.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	1	Each	\$500.00	\$500.00	
#N/A	Trench Drain	81	ft	\$200.00	\$16,200.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	172	ft	\$50.00	\$8,600.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101390	30 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$70.00	\$0.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	1	Each	\$2,600.00	\$2,600.00	
#N/A	Extend Concrete Drainage Box Culvert (12' wide)	0	ft	\$2,000.00	\$0.00	
Drainage Subtotal					\$33,950	
PI						
013150010	Public Information Services	1	Lump	\$700.00	\$700	Usually 0.25% of construction

**Segment: 3 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 03 (STA 180+00 - 227+00)

Approximate Route Reference Mile Post (BEGIN) =	180+00	(END) =	227+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$700	
Roadway and Drainage	\$222,530	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$223,230
	Items not Estimated (20%)	\$44,646
	Construction Subtotal	\$267,876
P.E. Cost	P.E. Subtotal	\$21,488 8%
C.E. Cost	C.E. Subtotal	\$26,860 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$40,000
Incentives	Incentives Subtotal	\$723
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$21,000	\$22,000
Right of Way	\$0	\$0
Utilities	\$40,000	\$42,000
Construction	\$268,000	\$283,000
C.E.	\$27,000	\$28,000
Incentives	\$1,000	\$1,000
Aesthetics	0.75% \$2,000	\$2,000
Change Order Contingency	9.00% \$24,000	\$25,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$383,000	\$403,000

PROPOSED COMMISSION REQUEST	TOTAL \$383,000	TOTAL \$403,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 3 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$28,000.00	\$28,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$14,000.00	\$14,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$2,800.00	\$2,800.00	Usually 1% of construction
015720020	Dust Control and Watering	56	1000 gal	\$15.00	\$840.00	
020560005	Borrow (Plan Quantity)	423	cu yd	\$13.00	\$5,499.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	536	cu yd			
020560020	Granular Borrow	1,027	Ton	\$16.00	\$16,432.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
#N/A	Raise Water Valve	1	Each	\$400.00	\$400.00	
#N/A	Relocate Hydrant	1	Each	\$3,000.00	\$3,000.00	
#N/A	Relocate Utility Pedestal	0	Each	\$1,500.00	\$0.00	
022210095	Remove Pipe Culvert	0	ft	\$15.00	\$0.00	
022210035	Remove Diversion Box	0	Each	\$500.00	\$0.00	
022210075	Remove Guardrail	312	ft	\$2.50	\$780.00	
#N/A	Remove Modular Block Retaining Wall	0	ft	\$20.00	\$0.00	
022210170	Remove Precast Concrete Barrier		ft	\$4.50		
028430035	Crash Cushion Type G	2	Each	\$3,500.00	\$7,000.00	
028410086	W-Beam Guardrail 72 inch Wood Post	510	ft	\$20.00	\$10,200.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)		ft	\$50.00		
028440280	Precast Concrete Constant Slope Barrier, 42 Inch, Ret	0	Each	\$1,600.00	\$0.00	
028440290	Precast Concrete Constant Slope Barrier, 42 Inch, Slo	0	Each	\$2,000.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	1,088	cu yd	\$18.00	\$19,584.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	499	Ton	\$22.00	\$10,978.00	
027210020	Untreated Base Course (Plan Quantity)	268	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	567	Ton	\$70.00	\$39,690.00	
027480010	Liquid Asphalt MC-70 or MC-250	4	Ton	\$770.00	\$3,080.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	1	Ton	\$700.00	\$700.00	Tack Coat
028910020	Sign, Type A-1	239	sq ft	\$23.00	\$5,497.00	Chevron Signs
027710035	Concrete Curb and Gutter Type M1	616	ft	\$15.00	\$9,240.00	
027760010	Concrete Sidewalk	263	sq ft	\$10.00	\$2,630.00	
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	0	sq ft	\$80.00	\$0.00	
029380010	Tree Pruning	0	Each	\$200.00	\$0.00	
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obiliterate Road	0	sq yd	\$0.55	\$0.00	
Roadway Subtotal					\$180,350	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	1,018	ft	\$10.00	\$10,180.00	
026130030	Culvert End Section 18 inch	0	Each	\$500.00	\$0.00	
026130050	Culvert End Section 30 inch	0	Each	\$500.00	\$0.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	0	Each	\$500.00	\$0.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$50.00	\$0.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101390	30 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$70.00	\$0.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	0	Each	\$2,600.00	\$0.00	
#N/A	Extend Concrete Drainage Box Culvert (12' wide)	16	ft	\$2,000.00	\$32,000.00	
Drainage Subtotal					\$42,180	
PI						
013150010	Public Information Services	1	Lump	\$700.00	\$700	Usually 0.25% of construction

**Segment: 4 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 04 (STA 227+00 - 270+00)

Approximate Route Reference Mile Post (BEGIN) =	227+00	(END) =	270+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$9,000	
Roadway and Drainage	\$2,705,210	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$2,714,210
	Items not Estimated (20%)	\$542,842
	Construction Subtotal	\$3,257,052
P.E. Cost	P.E. Subtotal	\$260,685 8%
C.E. Cost	C.E. Subtotal	\$325,856 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$20,000
Incentives	Incentives Subtotal	\$1,511
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$261,000	\$269,000
Right of Way	\$0	\$0
Utilities	\$20,000	\$21,000
Construction	\$3,257,000	\$3,436,000
C.E.	\$326,000	\$336,000
Incentives	\$2,000	\$2,000
Aesthetics	0.75% \$24,000	\$25,000
Change Order Contingency	9.00% \$295,000	\$311,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$4,185,000	\$4,400,000

PROPOSED COMMISSION REQUEST	TOTAL \$4,185,000	TOTAL \$4,400,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 4 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$355,000.00	\$355,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$178,000.00	\$178,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$36,000.00	\$36,000.00	Usually 1% of construction
015720020	Dust Control and Watering	78	1000 gal	\$15.00	\$1,170.00	
020560005	Borrow (Plan Quantity)	0	cu yd	\$13.00	\$0.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	1,149	cu yd			
020560020	Granular Borrow	2,201	Ton	\$16.00	\$35,216.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
#N/A	Relocate Hydrant	0	Each	\$3,000.00	\$0.00	
022210095	Remove Pipe Culvert	0	ft	\$15.00	\$0.00	
022210035	Remove Diversion Box	0	Each	\$500.00	\$0.00	
022210075	Remove Guardrail	657	ft	\$2.50	\$1,642.50	
#N/A	Remove Modular Block Retaining Wall	138	ft	\$20.00	\$2,760.00	
022210170	Remove Precast Concrete Barrier	0	ft	\$4.50	\$0.00	
028430035	Crash Cushion Type G	2	Each	\$3,500.00	\$7,000.00	
028410086	W-Beam Guardrail 72 inch Wood Post	611	ft	\$20.00	\$12,220.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape	0	ft	\$50.00	\$0.00	
028440280	Precast Concrete Constant Slope Barrier, 42 Inch, Ret	0	Each	\$1,600.00	\$0.00	
028440290	Precast Concrete Constant Slope Barrier, 42 Inch, Slo	0	Each	\$2,000.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	4,896	cu yd	\$18.00	\$88,128.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	1,070	Ton	\$22.00	\$23,540.00	
027210020	Untreated Base Course (Plan Quantity)	575	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	1,185	Ton	\$70.00	\$82,950.00	
027480010	Liquid Asphalt MC-70 or MC-250	7	Ton	\$770.00	\$5,390.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	3	Ton	\$700.00	\$2,100.00	Tack Coat
028910020	Sign, Type A-1	0	sq ft	\$23.00	\$0.00	Chevron Signs
027680040	4 inch Pavement Marking Epoxy - Yellow Type 1	1,846	ft	\$0.70	\$1,292.20	
027710035	Concrete Curb and Gutter Type M1	0	ft	\$15.00	\$0.00	
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	22807	sq ft	\$80.00	\$1,824,560.00	
027610035	Continuous Longitudinal Rumble Strip - Asphalt	0	ft	\$0.28	\$0.00	
029380010	Tree Pruning	21	Each	\$200.00	\$4,200.00	
02221001D	Remove Building, Basement, and Foundation - Parcel	0	Parcel	\$5,000.00	\$0.00	Abandon Bldg Pioneer Fork
029610020	Rotomilling - 1 Inch	297	sq yd	\$1.25	\$371.25	
022210155	Obliterate Road	619	sq yd	\$0.55	\$340.45	
Roadway Subtotal					\$2,661,880	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	1,553	ft	\$10.00	\$15,530.00	
026130030	Culvert End Section 18 inch	1	Each	\$500.00	\$500.00	
026130050	Culvert End Section 30 inch	0	Each	\$500.00	\$0.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	1	Each	\$500.00	\$500.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	380	ft	\$50.00	\$19,000.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101390	30 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$70.00	\$0.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	3	Each	\$2,600.00	\$7,800.00	
#N/A	Extend Concrete Drainage Box Culvert (12' wide)	0	ft	\$2,000.00	\$0.00	
Drainage Subtotal					\$43,330	
PI						
013150010	Public Information Services	1	Lump	\$9,000.00	\$9,000	Usually 0.25% of construction

**Segment: 5 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 05 (STA 270+00 - 286+00)

Approximate Route Reference Mile Post (BEGIN) =	270+00	(END) =	286+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$5,000	
Roadway and Drainage	\$1,710,507	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$1,715,507
	Items not Estimated (20%)	\$343,101
	Construction Subtotal	\$2,058,608
P.E. Cost	P.E. Subtotal	\$164,689 8%
C.E. Cost	C.E. Subtotal	\$205,861 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$0
Incentives	Incentives Subtotal	\$0
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$165,000	\$170,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$2,059,000	\$2,172,000
C.E.	\$206,000	\$212,000
Incentives	\$0	\$0
Aesthetics	0.75% \$15,000	\$16,000
Change Order Contingency	9.00% \$187,000	\$197,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$2,632,000	\$2,767,000

PROPOSED COMMISSION REQUEST	TOTAL \$2,632,000	TOTAL \$2,767,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 5 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$200,000.00	\$200,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$100,000.00	\$100,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$20,000.00	\$20,000.00	Usually 1% of construction
015720020	Dust Control and Watering	14	1000 gal	\$15.00	\$210.00	
020560005	Borrow (Plan Quantity)	0	cu yd	\$13.00	\$0.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	207	cu yd			
020560020	Granular Borrow	396	Ton	\$16.00	\$6,336.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
#N/A	Relocate Hydrant	1	Each	\$3,000.00	\$3,000.00	
022210095	Remove Pipe Culvert	0	ft	\$15.00	\$0.00	
022210035	Remove Diversion Box	0	Each	\$500.00	\$0.00	
022210075	Remove Guardrail	364	ft	\$2.50	\$910.00	
#N/A	Remove Modular Block Retaining Wall	0	ft	\$20.00	\$0.00	
022210170	Remove Precast Concrete Barrier	0	ft	\$4.50	\$0.00	
028430035	Crash Cushion Type G	1	Each	\$3,500.00	\$3,500.00	
028410086	W-Beam Guardrail 72 inch Wood Post	0	ft	\$20.00	\$0.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape	0	ft	\$50.00	\$0.00	
028440280	Precast Concrete Constant Slope Barrier, 42 Inch, Ret	0	Each	\$1,600.00	\$0.00	
028440290	Precast Concrete Constant Slope Barrier, 42 Inch, Slo	0	Each	\$2,000.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	415	cu yd	\$18.00	\$7,470.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	192	Ton	\$22.00	\$4,224.00	
027210020	Untreated Base Course (Plan Quantity)	104	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	206	Ton	\$70.00	\$14,420.00	
027480010	Liquid Asphalt MC-70 or MC-250	2	Ton	\$770.00	\$1,540.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	1	Ton	\$700.00	\$700.00	Tack Coat
028910020	Sign, Type A-1	62	sq ft	\$23.00	\$1,426.00	Chevron Signs
027680040	4 inch Pavement Marking Epoxy - Yellow Type 1	1,846	ft	\$0.70	\$1,292.20	
027710035	Concrete Curb and Gutter Type M1	82	ft	\$15.00	\$1,230.00	
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	16250	sq ft	\$80.00	\$1,300,000.00	Pioneer Fork Sight Triangle
027610035	Continuous Longitudinal Rumble Strip - Asphalt	923	ft	\$0.28	\$258.44	
029380010	Tree Pruning	0	Each	\$200.00	\$0.00	
02221001D	Remove Building, Basement, and Foundation - Parcel	1	Parcel	\$5,000.00	\$5,000.00	Abandon Bldg Pioneer Fork
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obliterate Road		sq yd	\$0.55		
Roadway Subtotal					\$1,671,517	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	489	ft	\$10.00	\$4,890.00	
026130030	Culvert End Section 18 inch	1	Each	\$500.00	\$500.00	
026130050	Culvert End Section 30 inch	0	Each	\$500.00	\$0.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	1	Each	\$500.00	\$500.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	90	ft	\$50.00	\$4,500.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101390	30 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$70.00	\$0.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	1	Each	\$2,600.00	\$2,600.00	
#N/A	Extend Concrete Drainage Box Culvert (12' wide)	13	ft	\$2,000.00	\$26,000.00	
Drainage Subtotal					\$38,990	
PI						
013150010	Public Information Services	1	Lump	\$5,000.00	\$5,000	Usually 0.25% of construction

**Segment: 6 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 06 (STA 286+00 - 310+00)

Approximate Route Reference Mile Post (BEGIN) =	286+00	(END) =	310+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$1,200	
Roadway and Drainage	\$358,929	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$360,129
	Items not Estimated (20%)	\$72,026
	Construction Subtotal	\$432,155
P.E. Cost	P.E. Subtotal	\$34,572 8%
C.E. Cost	C.E. Subtotal	\$43,216 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$0
Incentives	Incentives Subtotal	\$0
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$35,000	\$36,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$432,000	\$456,000
C.E.	\$43,000	\$44,000
Incentives	\$0	\$0
Aesthetics	0.75% \$3,000	\$3,000
Change Order Contingency	9.00% \$39,000	\$41,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$552,000	\$580,000

PROPOSED COMMISSION REQUEST	TOTAL \$552,000	TOTAL \$580,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 6 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$50,000.00	\$50,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$25,000.00	\$25,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$5,000.00	\$5,000.00	Usually 1% of construction
015720020	Dust Control and Watering	13	1000 gal	\$15.00	\$195.00	
020560005	Borrow (Plan Quantity)	0	cu yd	\$13.00	\$0.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	180	cu yd			
020560020	Granular Borrow	344	Ton	\$16.00	\$5,504.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
022210095	Remove Pipe Culvert	0	ft	\$15.00	\$0.00	
022210035	Remove Diversion Box	0	Each	\$500.00	\$0.00	
022210075	Remove Guardrail	338	ft	\$2.50	\$845.00	
#N/A	Remove Modular Block Retaining Wall	0	ft	\$20.00	\$0.00	
022210170	Remove Precast Concrete Barrier	511	ft	\$4.50	\$2,299.50	
028430035	Crash Cushion Type G	1	Each	\$3,500.00	\$3,500.00	
028410086	W-Beam Guardrail 72 inch Wood Post	338	ft	\$20.00	\$6,760.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	511	ft	\$50.00	\$25,550.00	
028440280	Precast Concrete Constant Slope Barrier, 42 Inch, Ret	0	Each	\$1,600.00	\$0.00	
028440290	Precast Concrete Constant Slope Barrier, 42 Inch, Slo	0	Each	\$2,000.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	360	cu yd	\$18.00	\$6,480.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	168	Ton	\$22.00	\$3,696.00	
027210020	Untreated Base Course (Plan Quantity)	90	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	180	Ton	\$70.00	\$12,600.00	
027480010	Liquid Asphalt MC-70 or MC-250	2	Ton	\$770.00	\$1,540.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	1	Ton	\$700.00	\$700.00	Tack Coat
028910020	Sign, Type A-1	133	sq ft	\$23.00	\$3,059.00	Chevron Signs
027710035	Concrete Curb and Gutter Type M1	0	ft	\$15.00	\$0.00	
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	2145	sq ft	\$80.00	\$171,600.00	
029380010	Tree Pruning	13	Each	\$200.00	\$2,600.00	
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obliterate Road		sq yd	\$0.55		
Roadway Subtotal					\$326,929	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	0	ft	\$10.00	\$0.00	
026130030	Culvert End Section 18 inch	0	Each	\$500.00	\$0.00	
026130050	Culvert End Section 30 inch	0	Each	\$500.00	\$0.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	0	Each	\$500.00	\$0.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$50.00	\$0.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101390	30 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$70.00	\$0.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	0	Each	\$2,600.00	\$0.00	
#N/A	Extend Concrete Drainage Box Culvert (12' wide)	16	ft	\$2,000.00	\$32,000.00	
Drainage Subtotal					\$32,000	
PI						
013150010	Public Information Services	1	Lump	\$1,200.00	\$1,200	Usually 0.25% of construction

**Segment: 7 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 07 (STA 310+00 - 332+00)

Approximate Route Reference Mile Post (BEGIN) =	310+00	(END) =	332+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$2,200	
Roadway and Drainage	\$704,849	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$707,049
	Items not Estimated (20%)	\$141,410
	Construction Subtotal	\$848,459
P.E. Cost	P.E. Subtotal	\$67,940 8%
C.E. Cost	C.E. Subtotal	\$84,925 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$20,000
Incentives	Incentives Subtotal	\$791
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$68,000	\$70,000
Right of Way	\$0	\$0
Utilities	\$20,000	\$21,000
Construction	\$848,000	\$895,000
C.E.	\$85,000	\$88,000
Incentives	\$1,000	\$1,000
Aesthetics	0.75% \$6,000	\$6,000
Change Order Contingency	9.00% \$77,000	\$81,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$1,105,000	\$1,162,000

PROPOSED COMMISSION REQUEST	TOTAL \$1,105,000	TOTAL \$1,162,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 7 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$85,000.00	\$85,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$42,500.00	\$42,500.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$8,500.00	\$8,500.00	Usually 1% of construction
015720020	Dust Control and Watering	42	1000 gal	\$15.00	\$630.00	
020560005	Borrow (Plan Quantity)	0	cu yd	\$13.00	\$0.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	620	cu yd			
020560020	Granular Borrow	1,189	Ton	\$16.00	\$19,024.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
022210095	Remove Pipe Culvert	181	ft	\$15.00	\$2,715.00	
022210035	Remove Diversion Box	1	Each	\$500.00	\$500.00	
022210075	Remove Guardrail	1,282	ft	\$2.50	\$3,205.00	
#N/A	Remove Modular Block Retaining Wall	0	ft	\$20.00	\$0.00	
022210170	Remove Precast Concrete Barrier	98	ft	\$4.50	\$441.00	
028430035	Crash Cushion Type G	5	Each	\$3,500.00	\$17,500.00	
028410086	W-Beam Guardrail 72 inch Wood Post	1,444	ft	\$20.00	\$28,880.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	98	ft	\$50.00	\$4,900.00	
028440280	Precast Concrete Constant Slope Barrier, 42 Inch, Ret	5	Each	\$1,600.00	\$8,000.00	
028440290	Precast Concrete Constant Slope Barrier, 42 Inch, Slo	1	Each	\$2,000.00	\$2,000.00	
023160020	Roadway Excavation (Plan Quantity)	3,521	cu yd	\$18.00	\$63,378.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	578	Ton	\$22.00	\$12,716.00	
027210020	Untreated Base Course (Plan Quantity)	310	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	620	Ton	\$70.00	\$43,400.00	
027480010	Liquid Asphalt MC-70 or MC-250	4	Ton	\$770.00	\$3,080.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	2	Ton	\$700.00	\$1,400.00	Tack Coat
028910020	Sign, Type A-1	0	sq ft	\$23.00	\$0.00	Chevron Signs
027710035	Concrete Curb and Gutter Type M1	0	ft	\$15.00	\$0.00	
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	4044	sq ft	\$80.00	\$323,520.00	
029380010	Tree Pruning	0	Each	\$200.00	\$0.00	
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obliterate Road		sq yd	\$0.55		
Roadway Subtotal					\$671,289	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	369	ft	\$10.00	\$3,690.00	
026130030	Culvert End Section 18 inch	0	Each	\$500.00	\$0.00	
026130050	Culvert End Section 30 inch	1	Each	\$500.00	\$500.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	1	Each	\$500.00	\$500.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	168	ft	\$50.00	\$8,400.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101390	30 Inch Irrigation/Storm Drain, Class C, smooth	181	ft	\$70.00	\$12,670.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	3	Each	\$2,600.00	\$7,800.00	
Drainage Subtotal					\$33,560	
PI						
013150010	Public Information Services	1	Lump	\$2,200.00	\$2,200	Usually 0.25% of construction

**Segment: 8 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 08 (STA 332+00 - 343+00)

Approximate Route Reference Mile Post (BEGIN) =	332+00	(END) =	343+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$100	
Roadway and Drainage	\$33,060	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$33,160
	Items not Estimated (20%)	\$6,632
	Construction Subtotal	\$39,792
P.E. Cost	P.E. Subtotal	\$3,183 8%
C.E. Cost	C.E. Subtotal	\$3,979 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$0
Incentives	Incentives Subtotal	\$0
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$3,000	\$3,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$40,000	\$42,000
C.E.	\$4,000	\$4,000
Incentives	\$0	\$0
Aesthetics	0.75% \$0	\$0
Change Order Contingency	9.00% \$4,000	\$4,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$51,000	\$53,000

PROPOSED COMMISSION REQUEST	TOTAL	\$51,000	TOTAL	\$53,000
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Project Assumptions/Risks

1	8
2	9
3	10
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Roadway and Drainage

Segment: 8 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$4,000.00	\$4,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$2,000.00	\$2,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$400.00	\$400.00	Usually 1% of construction
015720020	Dust Control and Watering	6	1000 gal	\$15.00	\$90.00	
020560005	Borrow (Plan Quantity)	0	cu yd	\$13.00	\$0.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	88	cu yd			
020560020	Granular Borrow	168	Ton	\$16.00	\$2,688.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
022210095	Remove Pipe Culvert	0	ft	\$15.00	\$0.00	
022210035	Remove Diversion Box	0	Each	\$500.00	\$0.00	
022210075	Remove Guardrail	0	ft	\$2.50	\$0.00	
#N/A	Remove Modular Block Retaining Wall	0	ft	\$20.00	\$0.00	
022210170	Remove Precast Concrete Barrier	0	ft	\$4.50	\$0.00	
028430035	Crash Cushion Type G	0	Each	\$3,500.00	\$0.00	
028410086	W-Beam Guardrail 72 inch Wood Post	564	ft	\$20.00	\$11,280.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	0	ft	\$50.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	176	cu yd	\$18.00	\$3,168.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	82	Ton	\$22.00	\$1,804.00	
027210020	Untreated Base Course (Plan Quantity)	44	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	88	Ton	\$70.00	\$6,160.00	
027480010	Liquid Asphalt MC-70 or MC-250	1	Ton	\$770.00	\$770.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	1	Ton	\$700.00	\$700.00	Tack Coat
028910020	Sign, Type A-1	0	sq ft	\$23.00	\$0.00	Chevron Signs
027710035	Concrete Curb and Gutter Type M1	0	ft	\$15.00	\$0.00	
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall		sq ft	\$80.00		
029380010	Tree Pruning	0	Each	\$200.00	\$0.00	
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obliterate Road		sq yd	\$0.55		
Roadway Subtotal					\$33,060	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	0	ft	\$10.00	\$0.00	
026130030	Culvert End Section 18 inch	0	Each	\$500.00	\$0.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	0	Each	\$500.00	\$0.00	
026220050	Underdrain 6 Inch	0	ft	\$50.00	\$0.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	0	ft	\$50.00	\$0.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101391	36 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	0	Each	\$2,600.00	\$0.00	
Drainage Subtotal					\$0	
PI						
013150010	Public Information Services	1	Lump	\$100.00	\$100	Usually 0.25% of construction

**Segment: 9 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 9 (STA 343+00 - 410+00)

Approximate Route Reference Mile Post (BEGIN) =	343+00	(END) =	410+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$3,500	
Roadway and Drainage	\$1,131,737	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$1,135,237
	Items not Estimated (20%)	\$227,047
	Construction Subtotal	\$1,362,284
P.E. Cost	P.E. Subtotal	\$109,304 8%
C.E. Cost	C.E. Subtotal	\$136,630 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$100,000
Incentives	Incentives Subtotal	\$4,012
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015		2016	
P.E.	\$109,000		\$112,000	
Right of Way	\$0		\$0	
Utilities	\$100,000		\$106,000	
Construction	\$1,362,000		\$1,437,000	
C.E.	\$137,000		\$141,000	
Incentives	\$4,000		\$4,000	
Aesthetics	0.75% \$10,000		\$11,000	
Change Order Contingency	9.00% \$123,000		\$130,000	
SLCO Oversight	\$0		\$0	
Miscellaneous	\$0		\$0	
	TOTAL	\$1,845,000	TOTAL	\$1,941,000

PROPOSED COMMISSION REQUEST	TOTAL \$1,845,000	TOTAL \$1,941,000
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Project Assumptions/Risks

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Roadway and Drainage

Segment: 9 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$140,000.00	\$140,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$70,000.00	\$70,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$14,000.00	\$14,000.00	Usually 1% of construction
015720020	Dust Control and Watering	373	1000 gal	\$15.00	\$5,595.00	
020560005	Borrow (Plan Quantity)	3,550	cu yd	\$13.00	\$46,150.00	
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	3,150	cu yd			
020560020	Granular Borrow	6,038	Ton	\$16.00	\$96,608.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
022210095	Remove Pipe Culvert	55	ft	\$15.00	\$825.00	
022210035	Remove Diversion Box	1	Each	\$500.00	\$500.00	
022210075	Remove Guardrail	1,448	ft	\$2.50	\$3,620.00	
#N/A	Remove Modular Block Retaining Wall	163	ft	\$20.00	\$3,260.00	
022210170	Remove Precast Concrete Barrier	0	ft	\$4.50	\$0.00	
028430035	Crash Cushion Type G	11	Each	\$3,500.00	\$38,500.00	
028410086	W-Beam Guardrail 72 inch Wood Post	2,376	ft	\$20.00	\$47,520.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	299	ft	\$50.00	\$14,950.00	
023160020	Roadway Excavation (Plan Quantity)	6,300	cu yd	\$18.00	\$113,400.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	2,934	Ton	\$22.00	\$64,548.00	
027210020	Untreated Base Course (Plan Quantity)	1,575	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	3,147	Ton	\$70.00	\$220,290.00	
027480010	Liquid Asphalt MC-70 or MC-250	19	Ton	\$770.00	\$14,630.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	6	Ton	\$700.00	\$4,200.00	Tack Coat
028910020	Sign, Type A-1	170	sq ft	\$23.00	\$3,910.00	Chevron Signs
027710035	Concrete Curb and Gutter Type M1	1,820	ft	\$15.00	\$27,300.00	
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
#N/A	Retaining Wall	2,074	sq ft	\$80.00	\$165,920.00	
029380010	Tree Pruning	59	Each	\$200.00	\$11,800.00	
029610020	Rotomilling - 1 Inch	0	sq yd	\$1.25	\$0.00	
022210155	Obliterate Road	74	sq yd	\$0.55	\$40.52	
Roadway Subtotal					\$1,107,567	
Drainage						
023730010	Loose Riprap		cu yd	\$50.00		
023180010	Small Ditch Excavation (Plan Quantity)	147	ft	\$10.00	\$1,470.00	
026130030	Culvert End Section 18 inch	2	Each	\$500.00	\$1,000.00	
#N/A	Riprap Outlet Pad (Riprap a& Geotextile)	2	Each	\$500.00	\$1,000.00	
026220050	Underdrain 6 Inch	52	ft	\$50.00	\$2,600.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth	154	ft	\$50.00	\$7,700.00	
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101391	36 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	4	Each	\$2,600.00	\$10,400.00	
Drainage Subtotal					\$24,170	
PI						
013150010	Public Information Services	1	Lump	\$3,500.00	\$3,500	Usually 0.25% of construction

**Segment: 10 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 10 (STA 410+00 - 500+00)

Approximate Route Reference Mile Post (BEGIN) =	410+00	(END) =	500+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$3,000	
Roadway and Drainage	\$901,275	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$904,275
	Items not Estimated (20%)	\$180,855
	Construction Subtotal	\$1,085,130
P.E. Cost	P.E. Subtotal	\$87,475 8%
C.E. Cost	C.E. Subtotal	\$109,343 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$0
Incentives	Incentives Subtotal	\$8,303
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$87,000	\$90,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$1,085,000	\$1,145,000
C.E.	\$109,000	\$112,000
Incentives	\$8,000	\$8,000
Aesthetics	0.75% \$8,000	\$8,000
Change Order Contingency	9.00% \$98,000	\$103,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$1,395,000	\$1,466,000

PROPOSED COMMISSION REQUEST	TOTAL \$1,395,000	TOTAL \$1,466,000
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Project Assumptions/Risks

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2	9
3	10
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Roadway and Drainage

Segment: 10 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$120,000.00	\$120,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$60,000.00	\$60,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$12,000.00	\$12,000.00	Usually 1% of construction
015720020	Dust Control and Watering	0	1000 gal	\$15.00	\$0.00	
020560005	Borrow (Plan Quantity)	0	cu yd			
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	0	cu yd			
020560020	Granular Borrow	0	Ton	\$16.00	\$0.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
022210075	Remove Guardrail	2,324	ft	\$2.50	\$5,810.00	
022210170	Remove Precast Concrete Barrier	0	ft	\$4.50	\$0.00	
028430035	Crash Cushion Type G	9	Each	\$3,500.00	\$31,500.00	
028410086	W-Beam Guardrail 72 inch Wood Post	1,870	ft	\$20.00	\$37,400.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	0	ft	\$50.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	3,260	cu yd	\$18.00	\$58,680.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	0	Ton	\$22.00	\$0.00	
027210020	Untreated Base Course (Plan Quantity)	0	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	6,512	Ton	\$70.00	\$455,840.00	
027480010	Liquid Asphalt MC-70 or MC-250	0	Ton	\$770.00	\$0.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	15	Ton	\$700.00	\$10,500.00	Tack Coat
028910020	Sign, Type A-1	918	sq ft	\$23.00	\$21,114.00	Chevron Signs
027710025	Concrete Curb and Gutter Type B1		ft			
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
027860020	Asphalt Binder PG 64-34	0	Ton			OGSC Binder
029380010	Tree Pruning	13	Each	\$200.00	\$2,600.00	
029610020	Rotomilling - 1 Inch	39,112	sq yd	\$1.25	\$48,890.00	
Roadway Subtotal					\$864,334	
Drainage						
023730010	Loose Riprap	405	cu yd	\$50.00	\$20,250.00	
020750020	Geotextiles - Erosion Control	607	sq yd	\$3.00	\$1,821.00	
023180020	Surface Ditch	1,487	ft	\$10.00	\$14,870.00	
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101391	36 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9		Each			
Drainage Subtotal					\$36,941	
PI						
013150010	Public Information Services	1	Lump	\$3,000.00	\$3,000	Usually 0.25% of construction

**Segment: 11 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 11 (STA 500+00 - 545+00)

Approximate Route Reference Mile Post (BEGIN) =	500+00	(END) =	545+00
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$2,000	
Roadway and Drainage	\$633,857	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	\$635,857
	Items not Estimated (20%)	\$127,171
	Construction Subtotal	\$763,028
P.E. Cost	P.E. Subtotal	\$61,404 8%
C.E. Cost	C.E. Subtotal	\$76,755 10%
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$0
Incentives	Incentives Subtotal	\$4,519
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$61,000	\$63,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$763,000	\$805,000
C.E.	\$77,000	\$79,000
Incentives	\$5,000	\$5,000
Aesthetics	0.75% \$6,000	\$6,000
Change Order Contingency	9.00% \$69,000	\$73,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$981,000	\$1,031,000

PROPOSED COMMISSION REQUEST	TOTAL \$981,000	TOTAL \$1,031,000
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Project Assumptions/Risks

1	8
2	9
3	10
4	11
5	12
6	13
7	14

Roadway and Drainage

Segment: 11 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$78,000.00	\$78,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$39,000.00	\$39,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$7,800.00	\$7,800.00	Usually 1% of construction
015720020	Dust Control and Watering	87	1000 gal	\$15.00	\$1,305.00	
020560005	Borrow (Plan Quantity)	0	cu yd			
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	1,275	cu yd			
020560020	Granular Borrow	2,444	Ton	\$16.00	\$39,104.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
022210170	Remove Precast Concrete Barrier	0	ft	\$4.50	\$0.00	
028430035	Crash Cushion Type G	4	Each	\$3,500.00	\$14,000.00	
028410086	W-Beam Guardrail 72 inch Wood Post	3,888	ft	\$20.00	\$77,760.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	0	ft	\$50.00	\$0.00	
023160020	Roadway Excavation (Plan Quantity)	3,687	cu yd	\$18.00	\$66,366.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	1,188	Ton	\$22.00	\$26,136.00	
027210020	Untreated Base Course (Plan Quantity)	638	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	3,544	Ton	\$70.00	\$248,080.00	
027480010	Liquid Asphalt MC-70 or MC-250	8	Ton	\$770.00	\$6,160.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	8	Ton	\$700.00	\$5,600.00	Tack Coat
028910020	Sign, Type A-1	326	sq ft	\$23.00	\$7,498.00	Chevron Signs
027710025	Concrete Curb and Gutter Type B1		ft			
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
027860020	Asphalt Binder PG 64-34	0	Ton			OGSC Binder
028220030	Right-of-Way Fence, Type D (Metal Post)		ft			
029610020	Rotomilling - 1 Inch	13,638	sq yd	\$1.25	\$17,047.50	
Roadway Subtotal					\$633,857	
Drainage						
023730010	Loose Riprap		cu yd			
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101391	36 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9		Each			
Drainage Subtotal					\$0	
PI						
013150010	Public Information Services	1	Lump	\$2,000.00	\$2,000	Usually 0.25% of construction

**Segment: 12 PROJECT NAME: Emigration Canyon
Cost Estimate - Concept Level**

Prepared By: BJK

Date 2/15/2016

Proposed Project Scope: Emigration Canyon Segment 12 (STA 545+00 - 579+86)

Approximate Route Reference Mile Post (BEGIN) =	545+00	(END) =	579+86
Project Length =	#VALUE!	miles	#VALUE!
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Pulic Information Services	\$1,800	
Roadway and Drainage	\$628,869	
Traffic and Safety	\$0	
Structures	\$0	
Environmental Mitigation	\$0	
ITS	\$0	
	Subtotal	
	\$630,669	
	Items not Estimated (20%)	
	\$126,134	
	Construction Subtotal	
	\$756,803	
P.E. Cost	P.E. Subtotal	8%
	\$60,885	
C.E. Cost	C.E. Subtotal	10%
	\$76,106	
Right of Way	Right of Way Subtotal	
	\$0	
Utilities	Utilities Subtotal	
	\$0	
Incentives	Incentives Subtotal	
	\$4,259	
Miscellaneous	Miscellaneous Subtotal	
	\$0	

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$61,000	\$63,000
Right of Way	\$0	\$0
Utilities	\$0	\$0
Construction	\$757,000	\$799,000
C.E.	\$76,000	\$78,000
Incentives	\$4,000	\$4,000
Aesthetics	0.75% \$6,000	\$6,000
Change Order Contingency	9.00% \$69,000	\$73,000
SLCO Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$973,000	\$1,023,000

PROPOSED COMMISSION REQUEST	TOTAL \$973,000	TOTAL \$1,023,000
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Project Assumptions/Risks

1	8
2	9
3	10
4	11
5	12
6	13
7	14

Roadway and Drainage

Segment: 12 PROJECT NAME: Emigration Canyon

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$74,000.00	\$74,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$37,000.00	\$37,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$7,400.00	\$7,400.00	Usually 1% of construction
015720020	Dust Control and Watering	99	1000 gal	\$15.00	\$1,485.00	
020560005	Borrow (Plan Quantity)	0	cu yd			
020560010	Borrow	0	Ton			
020560015	Granular Borrow (Plan Quantity)	1,466	cu yd			
020560020	Granular Borrow	2,811	Ton	\$16.00	\$44,976.00	
020560025	Granular Backfill Borrow (Plan Quantity)	0	cu yd			
022210170	Remove Precast Concrete Barrier	390	ft	\$4.50	\$1,755.00	
028430035	Crash Cushion Type G	3	Each	\$3,500.00	\$10,500.00	
028410086	W-Beam Guardrail 72 inch Wood Post	2,960	ft	\$20.00	\$59,200.00	
028440010	Precast Concrete Barrier - 32 Inch (New Jersey Shape)	403	ft	\$50.00	\$20,150.00	
023160020	Roadway Excavation (Plan Quantity)	3,871	cu yd	\$18.00	\$69,678.00	
027120010	Lean Concrete Base Course, 4 inch thick	0	sq yd			
027210010	Untreated Base Course	1,366	Ton	\$22.00	\$30,052.00	
027210020	Untreated Base Course (Plan Quantity)	733	cu yd			
027350010	Micro-Surfacing	0	sq yd			
02737001*	Asphalt Pavement Soft Spot Repair - Type A		sq yd			
02737002*	Asphalt Pavement Soft Spot Repair - Type B		sq yd			
027410060	HMA - 3/4 Inch	3,340	Ton	\$70.00	\$233,800.00	
027480010	Liquid Asphalt MC-70 or MC-250	9	Ton	\$770.00	\$6,930.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	6	Ton	\$700.00	\$4,200.00	Tack Coat
028910020	Sign, Type A-1	594	sq ft	\$23.00	\$13,662.00	Chevron Signs
027710025	Concrete Curb and Gutter Type B1		ft			
027760010	Concrete Sidewalk		sq ft			
027850020	Chip Seal Coat, Type II	0	sq yd			
027850060	Emulsified Asphalt LMCRS-2	0	Ton			Chip Seal Emulsion
027850075	Emulsified Asphalt HFMS-2P	0	Ton			Flush Coat
027860010	Open Graded Surface Course	0	Ton			
027860020	Asphalt Binder PG 64-34	0	Ton			OGSC Binder
028220030	Right-of-Way Fence, Type D (Metal Post)		ft			
029610020	Rotomilling - 1 Inch	11,265	sq yd	\$1.25	\$14,081.25	
Roadway Subtotal					\$628,869	
Drainage						
023730010	Loose Riprap		cu yd			
026101386	18 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026101391	36 Inch Irrigation/Storm Drain, Class C, smooth		ft			
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9		Each			
Drainage Subtotal					\$0	
PI						
013150010	Public Information Services	1	Lump	\$1,800.00	\$1,800	Usually 0.25% of construction

APPENDIX H: EXISTING TRAFFIC CONDITIONS



Emigration Canyon Transportation & Roadway Improvement Study

TECHNICAL MEMORANDUM

To: H.G. Kuntzer, Lochner
Date: June, 2015
From: Fehr & Peers
Subject: Emigration Canyon Transportation & Roadway Improvement Study UT14-1048

This memorandum summarizes data collected for the Emigration Canyon Transportation & Roadway Improvement Study. Roadway data counts were collected during the fall of 2014 and the summer of 2015. Crash and accident rates were obtained from the Unified Police Department.

Data Collection 1: Lower Canyon Traffic Data

Continuous two-way vehicle counts were collected over a four day period from August 30 - September 2, 2014 (Saturday to Tuesday). This period includes a holiday weekend (Labor Day) and a typical weekday. The weather during the observation period was generally dry and sunny, with typical late-summer temperatures, suggesting that activity in the canyon was not suppressed by poor weather conditions. Automated vehicle counters were placed in the lower canyon ½-mile up-canyon from Rotary Glen Park; this location represents the highest vehicle activity area since traffic volumes are known to dissipate farther up-canyon in residential areas.

Figure 1 summarizes the daily vehicle traffic according to date. During the observation period the highest traffic occurred on Labor Day (5,200 vehicles). Traffic volumes on the other days were consistently between 4,200-4,400 vehicles. Other observations worth noting:

- Weekday traffic reflects typical commute patterns. Down canyon travel peaks 7:00-8:00 AM (244 veh./hr) as residents drive to work, and up canyon travel peaks 5:00-6:00 PM (265 veh./hr) as workers return home. It is noted that the period from 4:00-7:00 PM is the busiest three-hour period of the day (1,020 veh, two-way) and represents about 25% of the total daily traffic.

- Weekend and holiday traffic peaks between roughly 10:00 AM – 4:00 PM, representing 50-60% of total daily traffic. During this period, directional travel is fairly balanced in both directions.

Figure 1: Total Daily Traffic in Lower Emigration Canyon

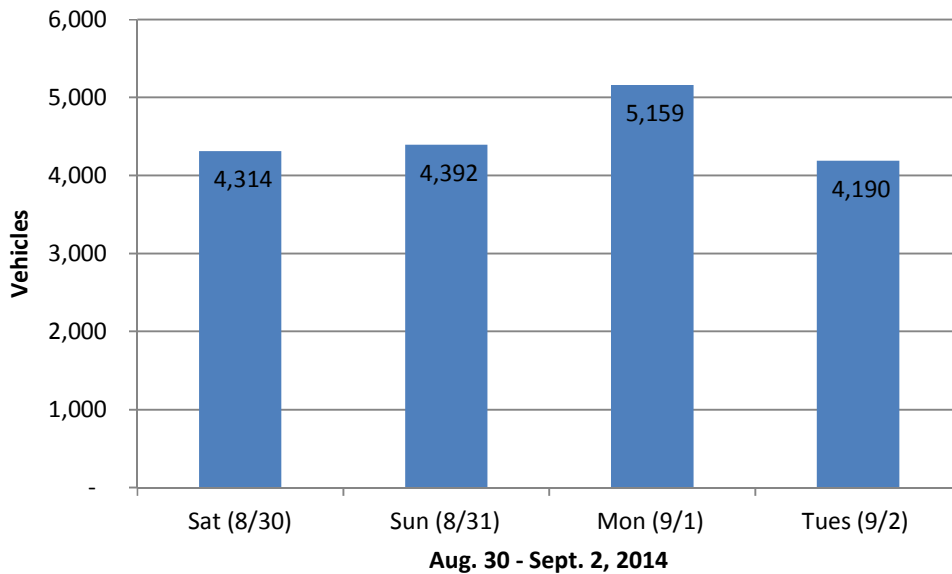
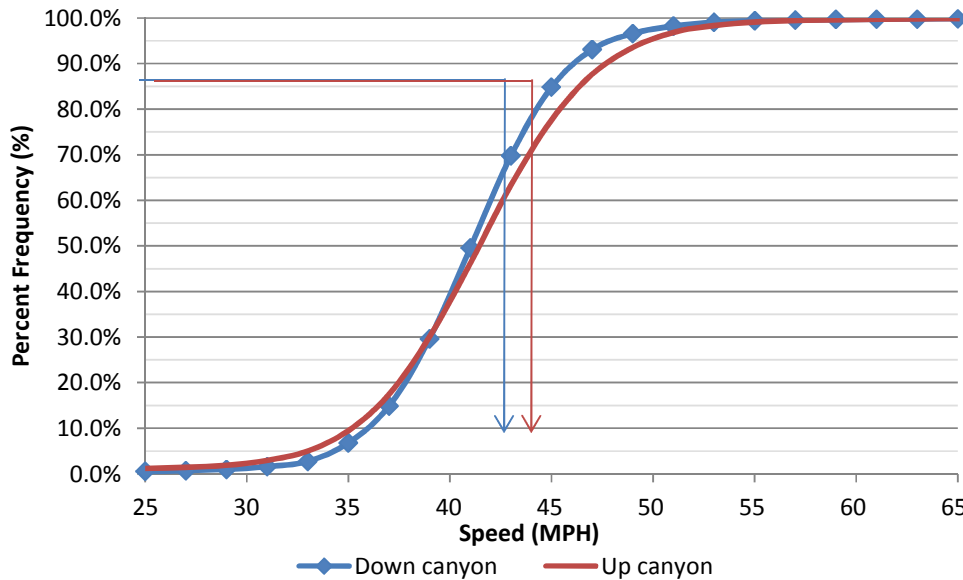


Figure 2 summarizes vehicle speeds collected in conjunction with the counts. The mean speed in both directions was observed as 42-43 miles per hour (MPH), and the 85th percentile speed was 45-46 MPH. The 85th percentile speed is the speed at or below which 85% of all vehicles are observed to travel under free flow conditions – in other words, most vehicles do not exceed this speed. Results of the speed profile analysis indicate the 85th percentile speed was almost exactly the posted speed limit (45 MPH), suggesting the speed limit is appropriate for this portion of the canyon.

Figure 2: Directional Traffic Speed in Lower Emigration Canyon



Data Collection 2: Lower/Mid/Upper Canyon Data and Active Transportation Counts

Vehicle, bicycle, and pedestrian counts were conducted at lower, mid, and upper canyon locations on Tuesday June 2nd and Saturday June 6th. This period was chosen to represent a typical weekend day and weekday. The weather during the observation periods was dry and sunny, with slightly below average temperatures, suggesting that activity in the canyon was not suppressed by poor weather conditions. These counts were undertaken to quantify different user type volumes, as well as volumes throughout Emigration Canyon. The two-directional vehicle volume for lower canyon weekend day was 4,363. This is consistent with the previous data collection period.

Figures 3 and 4 summarize the daily vehicle traffic for a weekend day and weekday, respectively, at the three Emigration Canyon count locations. These counts show a significant decrease of vehicle volume as you move up the canyon. Up canyon and down canyon volumes are fairly consistent, except for a 20% increase in up canyon travel for upper Emigration Canyon.

Figure 3: Total Daily Vehicle Traffic by Location in Emigration Canyon – Weekend Day

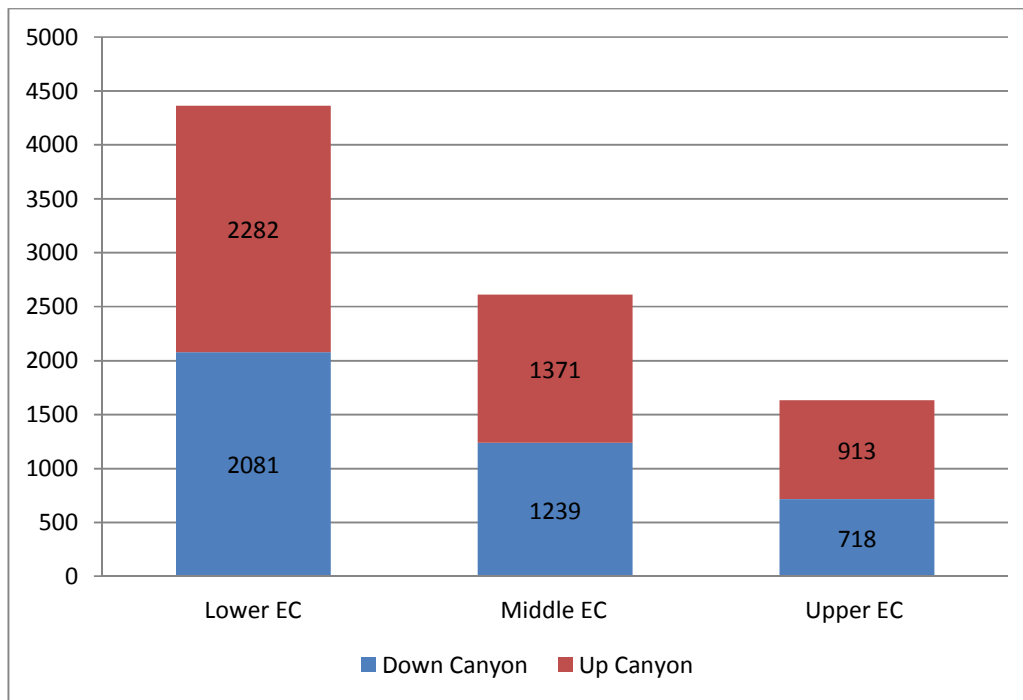
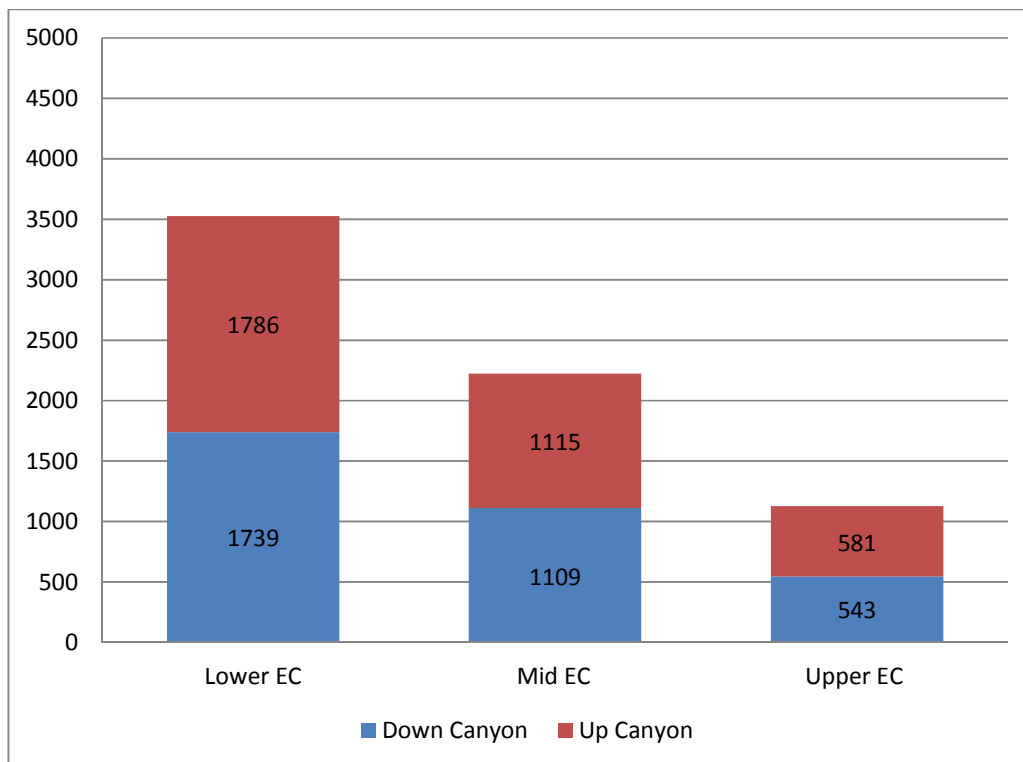


Figure 4: Total Daily Vehicle Traffic by Location in Emigration Canyon – Weekday



Figures 5 and 6 summarize the daily bicycle volumes for a weekend day and weekday, respectively, at the three Emigration Canyon count locations. These counts show a slight decrease of bicycle vehicle volume as you move up the canyon. Weekend day up canyon and down canyon volumes are consistent. Weekday up canyon volumes are consistent with 50 riders more than down canyon volumes. This could be attributed to cyclists returning after the traffic count was completed (6:00 PM) or going over the top of Little Mountain into East Canyon.

Figure 5: Total Daily Bicycle Volumes by Location in Emigration Canyon – Weekend Day

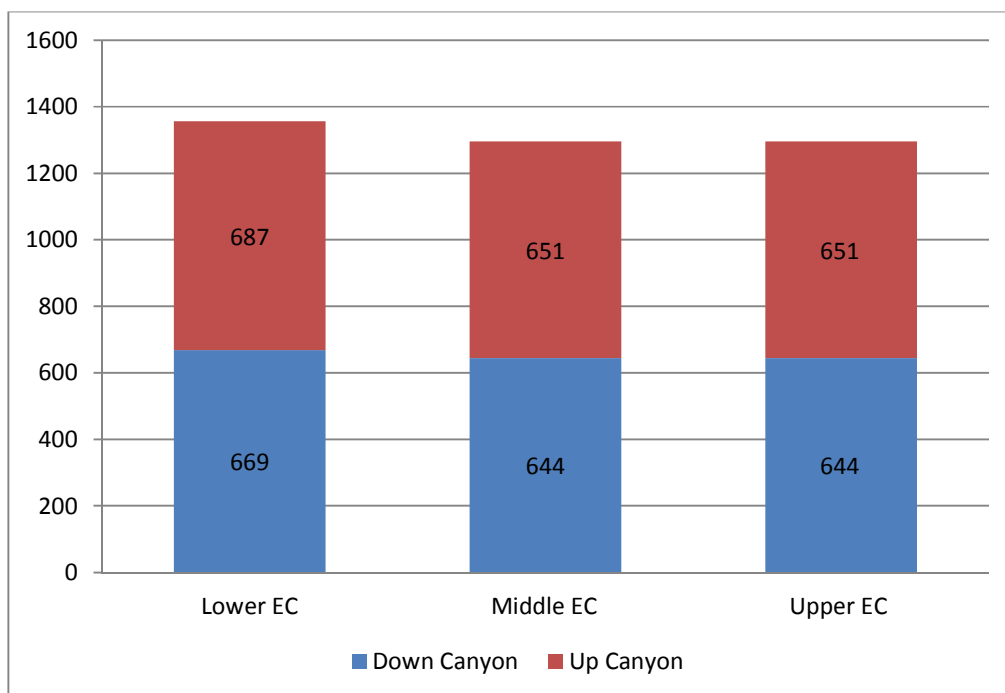
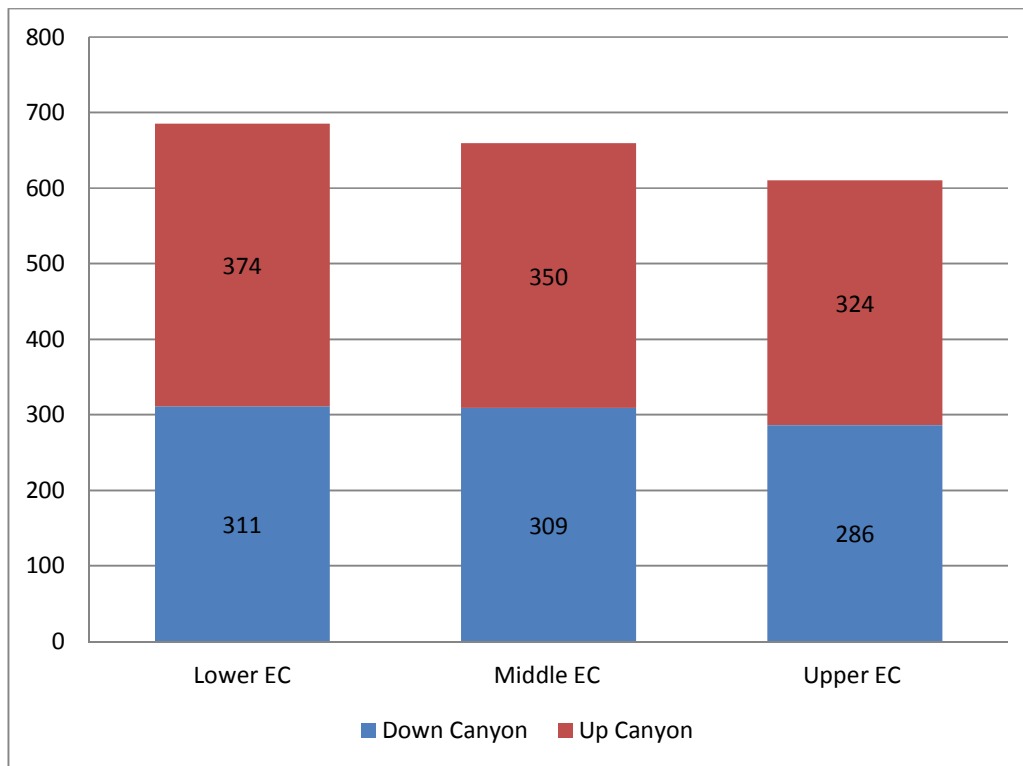


Figure 6: Total Daily Bicycle Volumes by Location in Emigration Canyon – Weekday



Figures 7 and 8 summarize the daily weekend day and weekday traffic for vehicle, bike and pedestrian counts. During both days, the vehicular traffic steady declines as you travel up Emigration Canyon, while bicycle and pedestrian traffic remain consistent throughout the canyon.

Figure 7: Total Daily Veh-Bike-Ped Traffic Within Emigration Canyon – Weekend Day

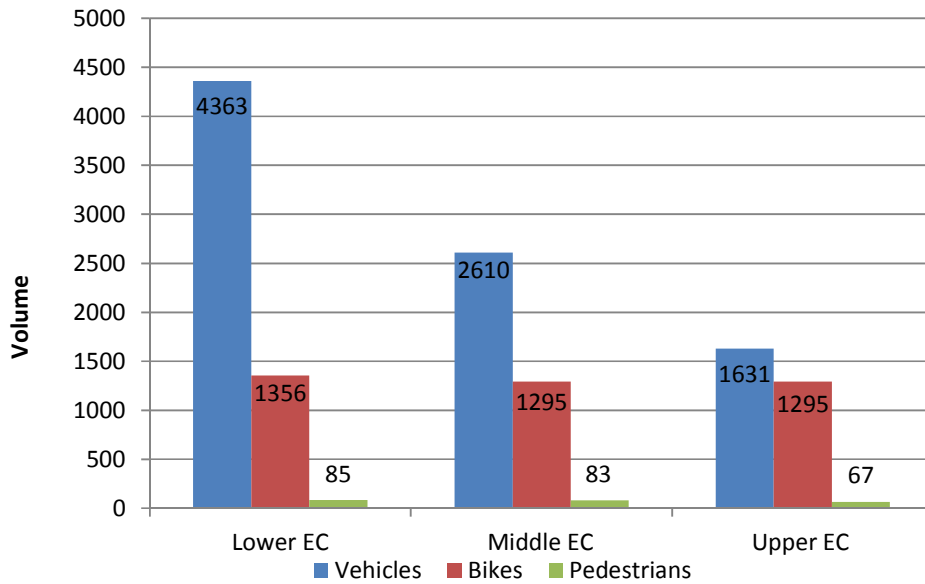


Figure 8: Total Daily Veh-Bike-Ped Traffic Within Emigration Canyon – Weekday

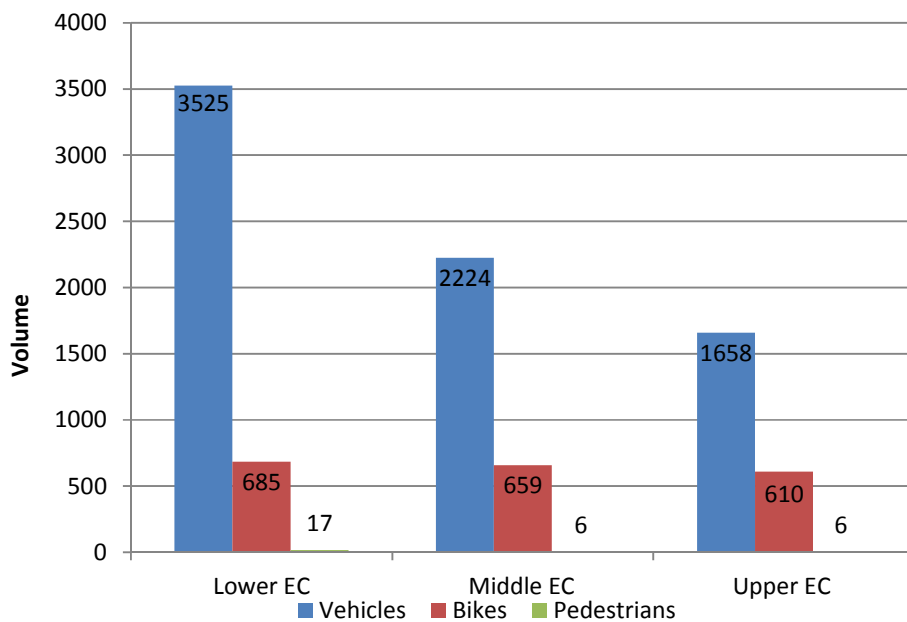


Figure 9, 10 and 11 detail the weekend day hourly vehicle and bicycle volumes at the lower, mid, and upper sections of Emigration Canyon. In all three locations vehicle volumes increase till 3:00 PM and then there is a slight decline. Bicycle volumes peak and 9:00 AM and then decrease throughout the day. In the mid and upper canyon locations bicycle volume surpasses vehicle volume. This difference is greatest at 9:00 AM at the upper canyon location, where there were 75 more bicycles than vehicles.

Figure 9: Weekend Day Hourly Counts – Lower Emigration Canyon

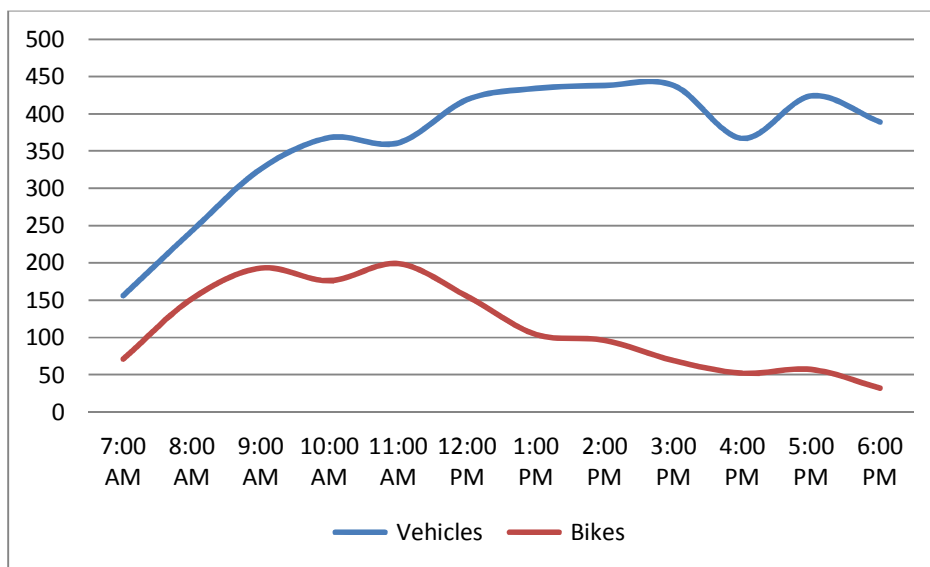


Figure 10: Weekend Day Hourly Counts – Mid Emigration Canyon

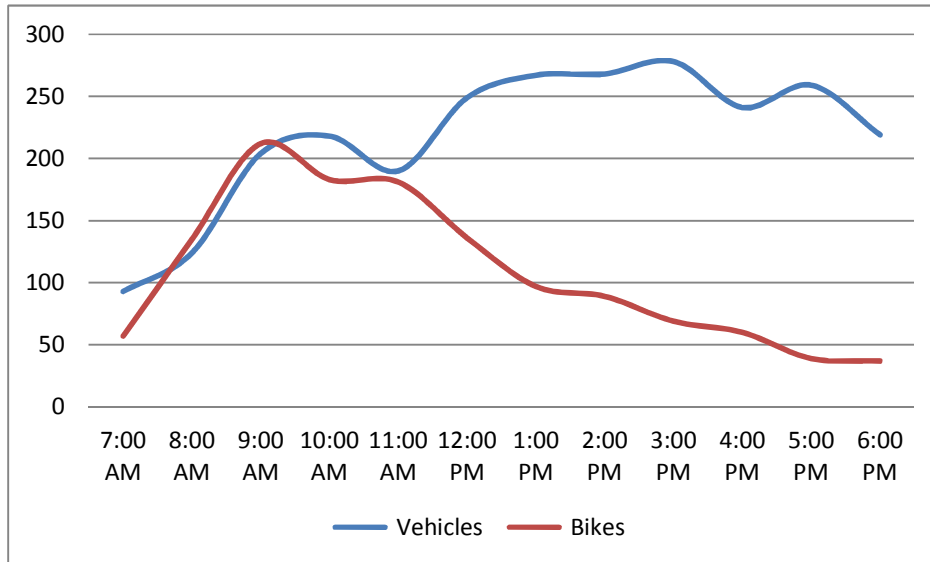


Figure 11: Weekend Day Hourly Counts – Upper Emigration Canyon

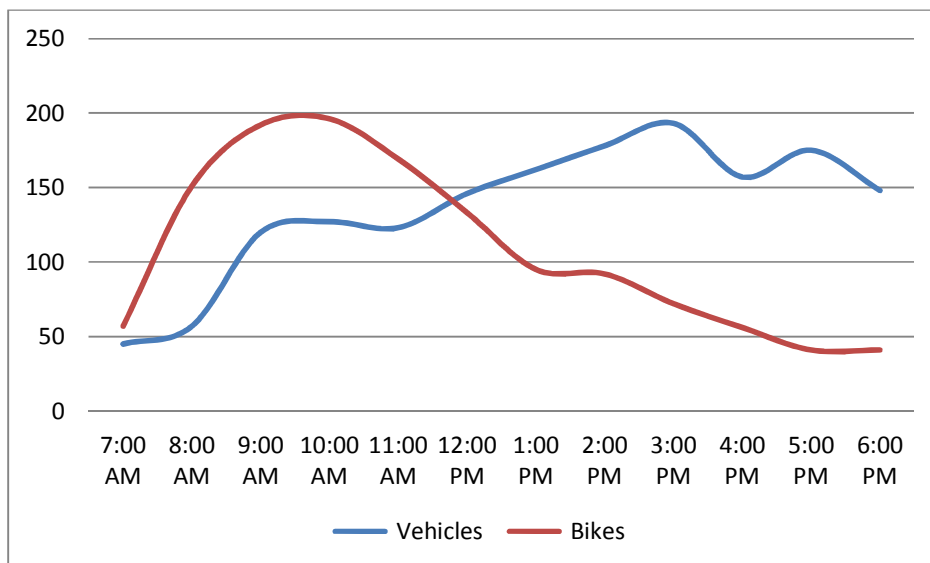


Figure 12, 13 and 14 detail the weekday hourly vehicle and bicycle volumes at the lower, mid, and upper sections of Emigration Canyon. In all three locations vehicle volumes demonstrate the typical traffic patterns, with volumes peaking during commuter periods. Consistent with the 2014 counts, the traffic peaks at 5:00 PM as workers return home. Unlike the weekend day counts, bicycle volumes start rising at 4:00 PM and peak at 6:00 PM. This pattern suggests after work recreationalists. In the upper canyon location bicycle volumes surpasses vehicle volumes at 6:00 PM.

Figure 12: Lower Emigration

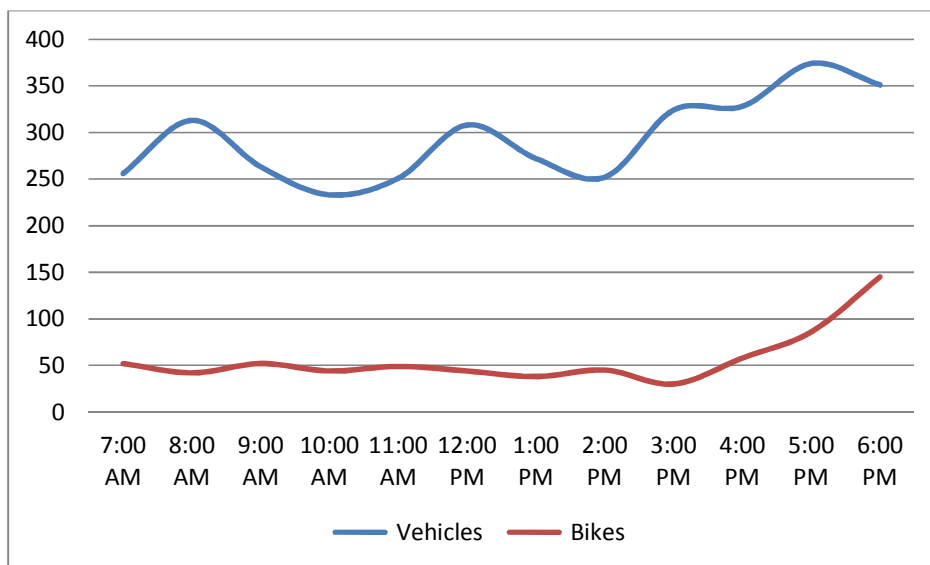


Figure 13: Mid Emigration

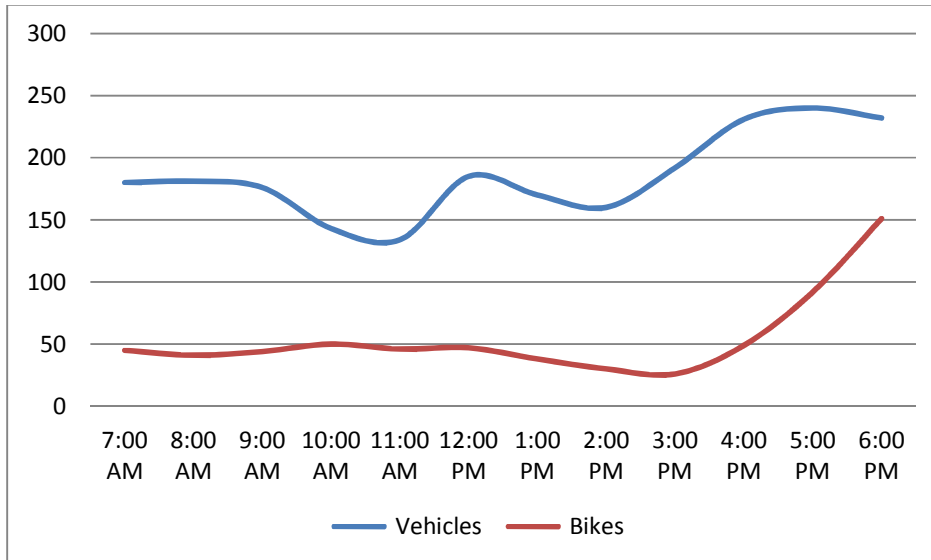
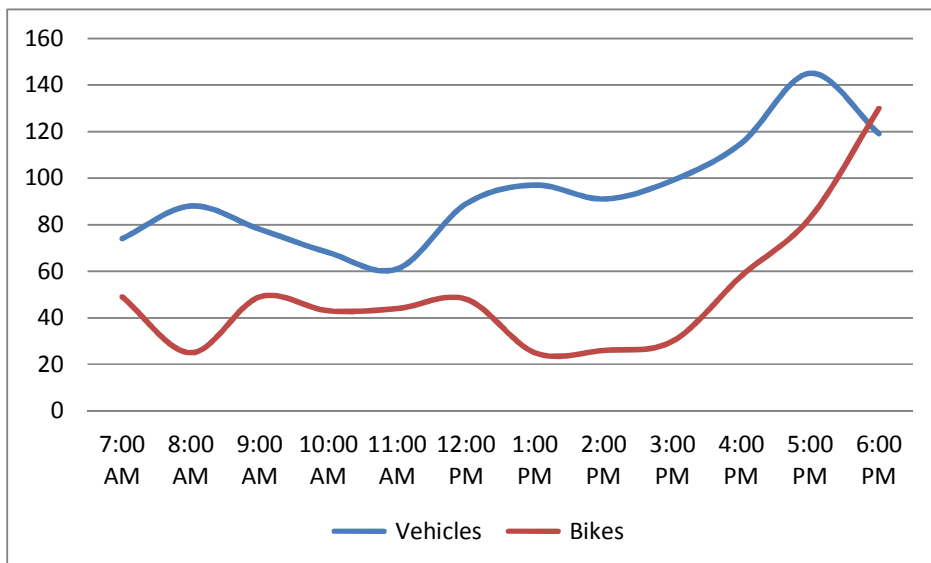


Figure 14: Upper Emigration



Crash History

An analysis of reported incidents was conducted to determine the frequency of collisions, with particular attention to those incidents involving cyclists and pedestrians.

TABLE 1 SUMMARY OF COLLISION HISTORY BY YEAR

Year	Total Number of Reported Incidents	Cyclists or Pedestrians Involved
2010	16	NA
2011	16	1 auto vs. bike
2012	14	1 bike vs. bike
2013	17	3 auto vs. bike
2014	13	1 auto vs. bike 1 auto vs. ped
Total (2010-2014)	76	5 auto vs. bike 1 bike vs. bike 1 auto vs. ped

Source: Unified Police Department of Greater Salt Lake, summarized by Fehr & Peers, 2015.

TABLE 2 SUMMARY OF COLLISION HISTORY (2010-2014)

Collision Type	Number of Reported Accidents	Percent of Total
Departed Roadway*	41	53.9%
Mult. Vehicle Collision	11	14.5%
Hit Deer	7	9.2%
Hit Parked Car (property damage only)	7	9.2%
Auto vs. Bike	5	6.5%
Road Debris	3	3.9%
Auto vs. Pedestrian	1	1.3%
Bike vs. Bike	1	1.3%

*Four "departed roadway" incidents involved deer.

Source: Unified Police Department of Greater Salt Lake, summarized by Fehr & Peers, 2015.

The following page depicts a heat map detailing crash and accident locations within Emigration Canyon. Locations with the highest amount traffic incidents are indicated with red or orange coloring. Areas that are high accident locations and also have had bicycle and/or pedestrian accidents include:

- Ruth's Diner driveway
- Mary Field Dr.
- Blacksmith Hollow
- Upper Emigration Canyon, from Bingham Fork to the Pinecrest intersection

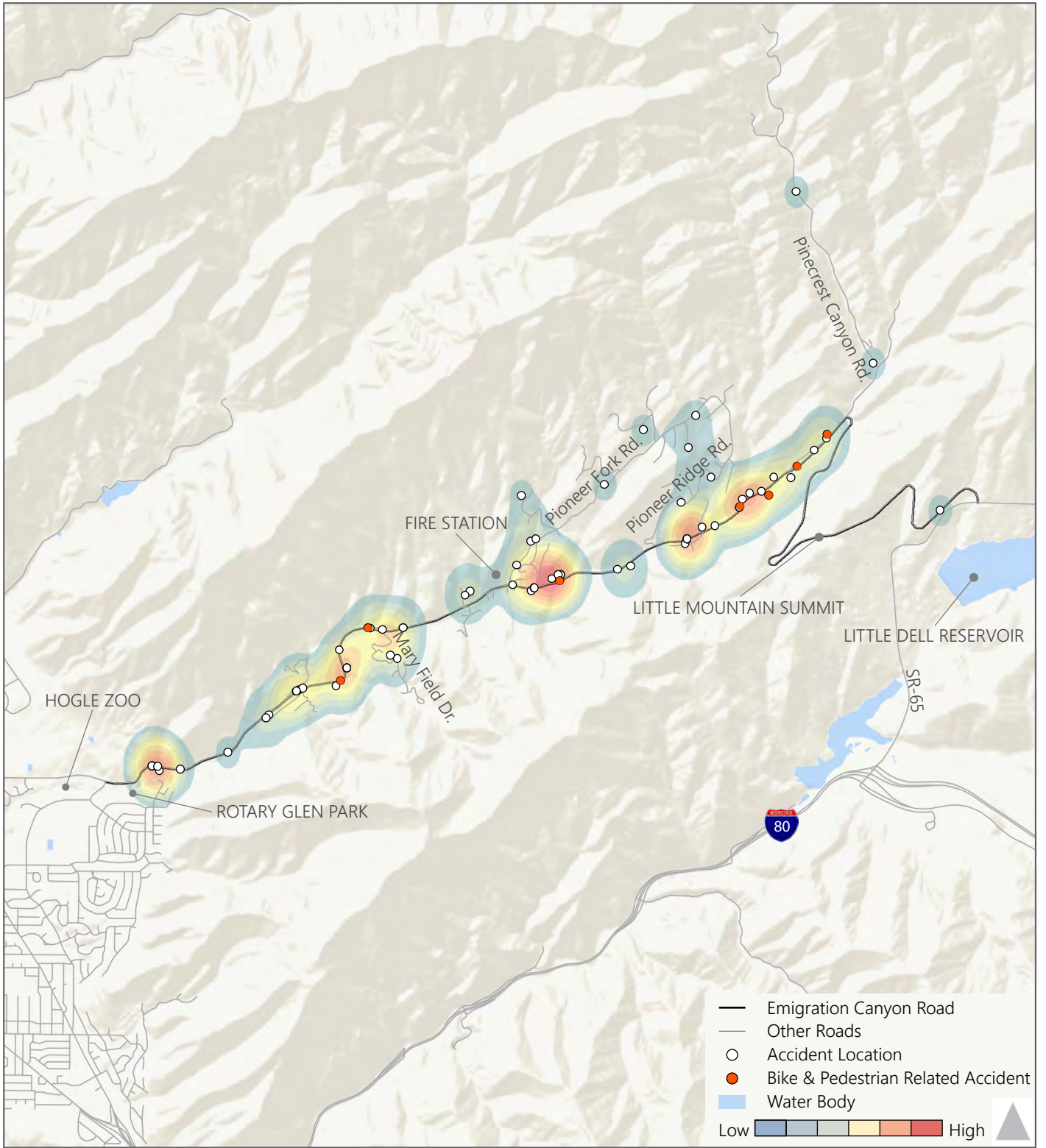


TABLE 3 DESCRIPTION OF BIKE AND PEDESTRIAN RELATED ACCIDENTS

October 18, 2011 (approx. 6:30 PM)- Eastbound driver made left-hand turn into residential drive, turning in front of single cyclist traveling downhill. The cyclist was unable to stop and struck the passenger side front bumper of the vehicle, sustaining injuries when she made contact with the road.

May 5, 2012 (approx. 11:00 AM)- Two cyclists travelling westbound (downhill) collided after one of the cyclists made a u-turn from the right side of the road, resulting in a "t-bone" collision. The cyclist who initiated the u-turn was cited for improper maneuver (u-turn across a double yellow line). One of the cyclists was transported to the hospital.

June 1, 2013 (approx. 12:30 PM) – Eastbound driver attempted to make a u-turn on a segment of the canyon road with limited visibility (double yellow line). Westbound cyclist struck the rear passenger door of the vehicle and was transported to the hospital. The cyclist was not wearing a helmet.

May 11, 2013 (approx. 11:30 AM) - Eastbound driver lost control of vehicle and hit cyclists riding in bike lane from behind, propelling cyclists down embankment. The cyclist was transported to the hospital.

November 13, 2013 (approx. 6:00 PM) – Westbound driver lost control of vehicle, over-corrected, and struck a cyclist riding in the shoulder of the eastbound travel lane. The cyclist was transported to the hospital.

October 2, 2014 (approx. 5:00 AM) – Westbound driver struck two joggers from behind. Joggers were traveling westbound on the road shoulder and wearing reflective clothing. Both pedestrians were taken to the hospital, and the driver who left the scene was later apprehended and cited for driving under the influence.

March 8, 2014 (approx. 5:00 PM) – Westbound cyclist was sideswiped by a westbound vehicle that continued on after the cyclist was knocked to the ground. The cyclist was transported to the hospital.

No reported bike-related accidents in 2010.

APPENDIX I: 2015 SALT LAKE COUNTY PAVEMENT INSPECTION RATINGS

