

Appendices

F. Project Findings

SimTraffic Post-Processor
Average Results from 10 Runs
Network Performance

US 2
Existing Conditions
Weekend Peak Hour

Performance Measure	Average	Std. Dev.	Minimum	Maximum
Average Delay (seconds)	185.3	25.4	131.8	213.5
Total Delay (hours)	175	25	121	203
Average Stopped Delay (seconds)	155.1	25.2	103.1	186.7
Total Stopped Delay (hours)	147	25	94	178
Total Stops	8,579	447	7,602	9,203
Average Stops	2.53	0.12	2.31	2.70
Total Distance Traveled (miles)	3,093	43	3,035	3,174
Average Speed (mph)	10.7	1.1	10.0	13.0
Total Travel Time (hours)	300.7	30.7	237.8	339.3
Vehicles Entered	3,197	51	3,105	3,277
Vehicles Exited	3,019	40	2,958	3,107
Percent Demand Served	94.4%	1.3%	92.8%	97.2%
Fuel Used (gallons)	126	6	113	134
HC Emissions (grams)	1,269	81	1,130	1,398
CO Emissions (grams)	32,837	1,396	30,529	35,147
NOx Emissions (grams)	3,740	177	3,461	3,973

Jan 20, 2020 - 11:21am mickey.cates \\periteet.com\Files\Clients\Chelara-Douglas Transportation Council\Projects\20180027 - CDTC-SR 2 Corridor Study\Leavenworth\CADD\Exhibits\Icicle Roundabout Exhibit.dwg Layout Name: 1



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CDTC-SR 2 CORRIDOR STUDY
US 2 ROUNDABOUT AT ICICLE ROAD

FIGURE
1

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: US 2 Corridor Study	Client: Chelan Douglas T.C.
Corridor Section: Leavenworth	Date: 1/7/2020
Location: US 2 / Icicle Road	Date of Cost Index: 2020
Calculated By/Entered By: JESL	
Checked By: JDS	

US 2 Roundabout at Icicle Road

	ITEM	UNIT	ESTIMATED UNIT COST	QTY	COST
I.	RIGHT OF WAY				
	Temporary Construction Easements	EA	\$5,000	2	\$10,000
	RIGHT OF WAY TOTAL				\$10,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$6,000	0.3	\$1,800
	REMOVING EXISTING PAVEMENT	SY	\$10	5,700	\$57,000
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$10,000	1	\$10,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL, HAUL	CY	\$30	1,000	\$30,000
1.3	STORMWATER MITIGATION				
	DETENTION AND TREATMENT	SF	\$6	38,900	\$233,400
1.4	STORM SEWER				
	CATCH BASIN TYPE 1	EA	\$2,000	8	\$16,000
	CATCH BASIN TYPE 2	EA	\$3,000	3	\$9,000
	PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$125	1,450	\$181,250
	STRUCTURE EXCAVATION CL. B	CY	\$15	1,100	\$16,500
2	SURFACING				
	HOT MIX ASPHALT	TON	\$130	3,300	\$429,000
	CRUSHED SURFACING	TON	\$35	1,700	\$59,500
3	ROADSIDE DEVELOPMENT				
	SEEDING, MULCHING & FERTILIZING	ACRE	\$3,500	0.3	\$1,050
	TEMP. WATER POLLUTION & EROSION CONTROL (6%)	LS	\$87,200	1	\$87,200
	LANDSCAPING	LS	\$18,000	1	\$18,000
4	TRAFFIC				
	SIGNAL SYSTEMS (CONDUIT FOR FUTURE METERS)	LS	\$20,000	1	\$20,000
	ILLUMINATION	LS	\$80,000	1	\$80,000
	SIGNING	LS	\$5,000	1	\$5,000
	CURBS	LF	\$35	7,100	\$248,500
	SIDEWALKS	SY	\$60	600	\$36,000
	TRAFFIC CONTROL (10%)	LS	\$145,300	1	\$145,300

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: US 2 Corridor Study			Client: Chelan Douglas T.C.		
Corridor Section: Leavenworth			Date: 1/7/2020		
Location: US 2 / Icicle Road			Date of Cost Index: 2020		
5	OTHER ITEMS				
	SURVEYING	LS	\$29,100	1	\$29,100
6	MISCELLANEOUS (10%)	LS	\$171,400	1	\$171,400
7	CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$1,885,000
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$188,500	1	\$188,500
9	SUBTOTAL (ITEMS 7 & 8)				\$2,073,500
10	CONSTRUCTION				
	ENGINEERING (12% OF ITEM 9)	EST	\$249,000	1	\$249,000
	ENVIRONMENTAL COMPLIANCE (2% OF ITEM 9)	EST	\$42,000	1	\$42,000
11	CONSTRUCTION TOTAL (ITEMS 9 & 10)				\$2,364,500
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (18% OF ITEM 11)	EST	\$425,700	1	\$425,700
	ENVIRONMENTAL PERMITS	EST	\$90,000	1	\$90,000
IV.	TOTAL ESTIMATED COST				
	(ITEMS I, 14 & III)				\$2,900,000

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HCM 6th Roundabout
1: Icicle Rd & US 2

Intersection			
Intersection Delay, s/veh	7.5		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	492	565	271
Demand Flow Rate, veh/h	502	576	276
Vehicles Circulating, veh/h	164	56	461
Vehicles Exiting, veh/h	468	681	205
Ped Vol Crossing Leg, #/h	0	1	3
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	7.6	7.2	7.8
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LTR	LT	LR
Assumed Moves	LTR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	502	576	276
Cap Entry Lane, veh/h	1167	1303	862
Entry HV Adj Factor	0.980	0.981	0.982
Flow Entry, veh/h	492	565	271
Cap Entry, veh/h	1144	1278	846
V/C Ratio	0.430	0.442	0.320
Control Delay, s/veh	7.6	7.2	7.8
LOS	A	A	A
95th %tile Queue, veh	2	2	1

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 2 Corridor Study	Client: Chelan Douglas Transportation Council
Corridor Section: US-2	Date: 1/7/2020
Location: Leavenworth	Date of Cost Index: 2020
	Calculated By/Entered By: JESL
	Checked By: JDS

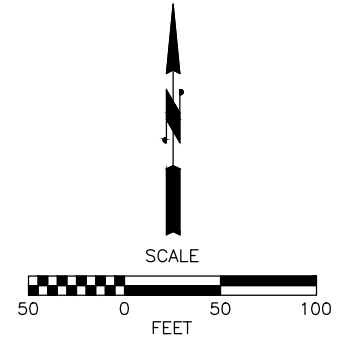
US 2 EXPRESS BUS ACCESS AT PESHASTIN

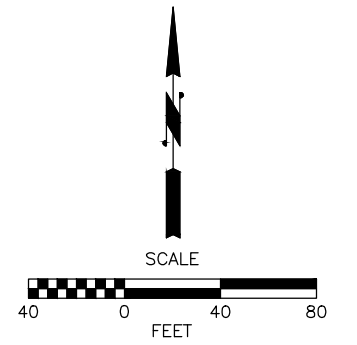
ITEM		UNIT	ESTIMATED COST	UNIT QTY	COST
I.	RIGHT OF WAY				
	RIGHT OF WAY (urban undeveloped) for bridge	SF	\$20	4,800	\$96,000
	RIGHT OF WAY TOTAL				\$96,000
II.	CONSTRUCTION				
1	PREPARATION/GRADING/DRAINAGE				
1.1	PREPARATION				
	CLEAR & GRUB, DEMO	ACRE	\$10,000	0.2	\$2,000
	REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$10,000	1	\$10,000
1.2	EARTHWORK				
	ROADWAY EXCAVATION INCL. HAUL	CY	\$40	210	\$8,400
	STRUCTURE EXCAVATION CLASS A INCL. HAUL	CY	\$25	400	\$10,000
2	STRUCTURE				
	PEDESTRIAN BRIDGE (12' wide total incl. barrier/railing, assumed steel structure)	SF	\$450	4,900	\$2,205,000
	RETAINING WALLS (FOR SIDEWALK ON HWY)	CY	\$100	1,500	\$150,000
3	SURFACING				
	CRUSHED SURFACING	TON	\$30	400	\$12,000
4	ROADSIDE DEVELOPMENT				
	TEMP. WATER POLLUTION & EROSION CONTROL (4%)	LS	\$103,700	1	\$103,700
	LANDSCAPING	LS	\$66,000	1	\$66,000
5	TRAFFIC				
	ILLUMINATION	LS	\$27,000	1	\$27,000
	SIGNING	LS	\$5,000	1	\$5,000
	CURBS	LF	\$25	600	\$15,000
	CURB RAMP	EA	\$2,000	5	\$10,000
	SIDEWALKS	SY	\$60	1,200	\$72,000
	TRAFFIC CONTROL (5%)	LS	\$129,700	1	\$129,700
5.1	OTHER ITEMS				
	SURVEYING (5%)	LS	\$302,600	1	\$302,600
6	MISCELLANEOUS (10%)	LS	\$312,900	1	\$312,900
7	CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$3,441,300

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: SR 2 Corridor Study		Client: Chelan Douglas Transportation Council			
Corridor Section: US-2		Date: 1/7/2020			
Location: Leavenworth		Date of Cost Index: 2020			
8	MOBILIZATION (10%) 10% OF ITEM 7	EST	\$344,200	1	\$344,200
9	SUBTOTAL (ITEMS 7 & 8)				\$3,785,500
10	SALES TAX 8.5% OF ITEM 9	EST	\$321,800	1	\$321,800
12	SUBTOTAL (ITEMS 9 THRU 11)				\$4,107,300
13	CONSTRUCTION ENGINEERING (12% OF ITEM 12) ENVIRONMENTAL COMPLIANCE (2% OF ITEM 12)	EST EST	\$493,000 \$83,000	1 1	\$493,000 \$83,000
14	CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$4,683,300
III.	PRELIMINARY WORK PRELIMINARY ENGINEERING (15.0% OF ITEM 14) ENVIRONMENTAL PERMITS	EST EST	\$702,500 \$140,000	1 1	\$702,500 \$140,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 14 & III)				\$5,630,000

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PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: US 2 Corridor Study	Client: Chelan Douglas T.C.
Corridor Section: Leavenworth	Date: 1/7/2020
Location: US 2 at Park and Ride	Date of Cost Index: 2020
	Calculated By/Entered By: JESL
	Checked By: JDS

US 2 UNDERCROSSING

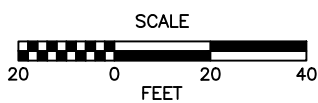
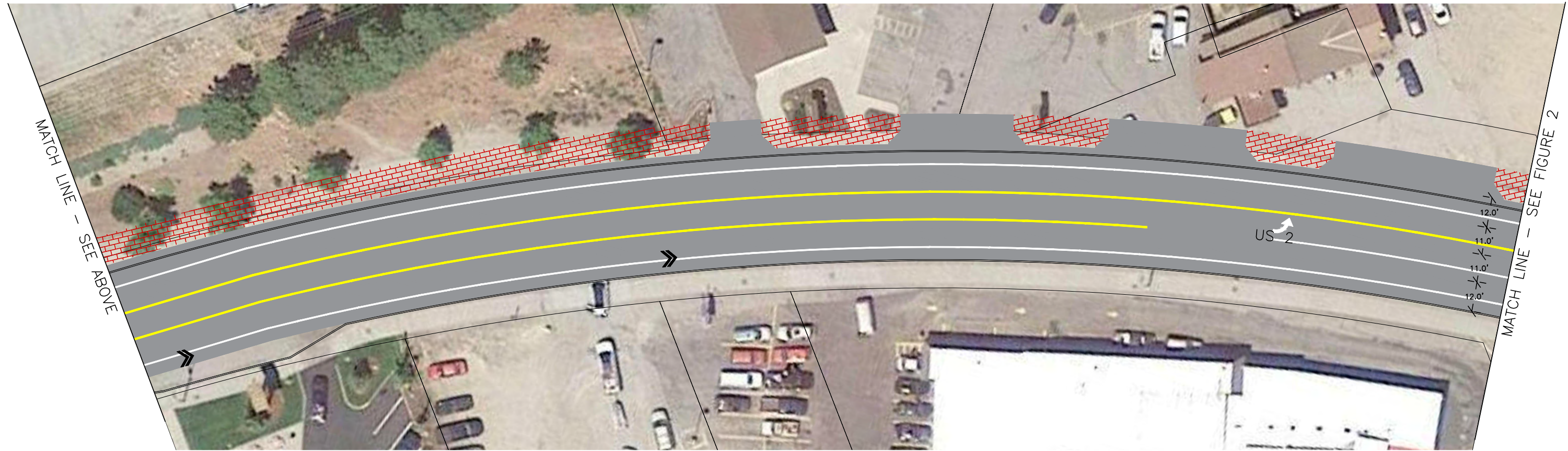
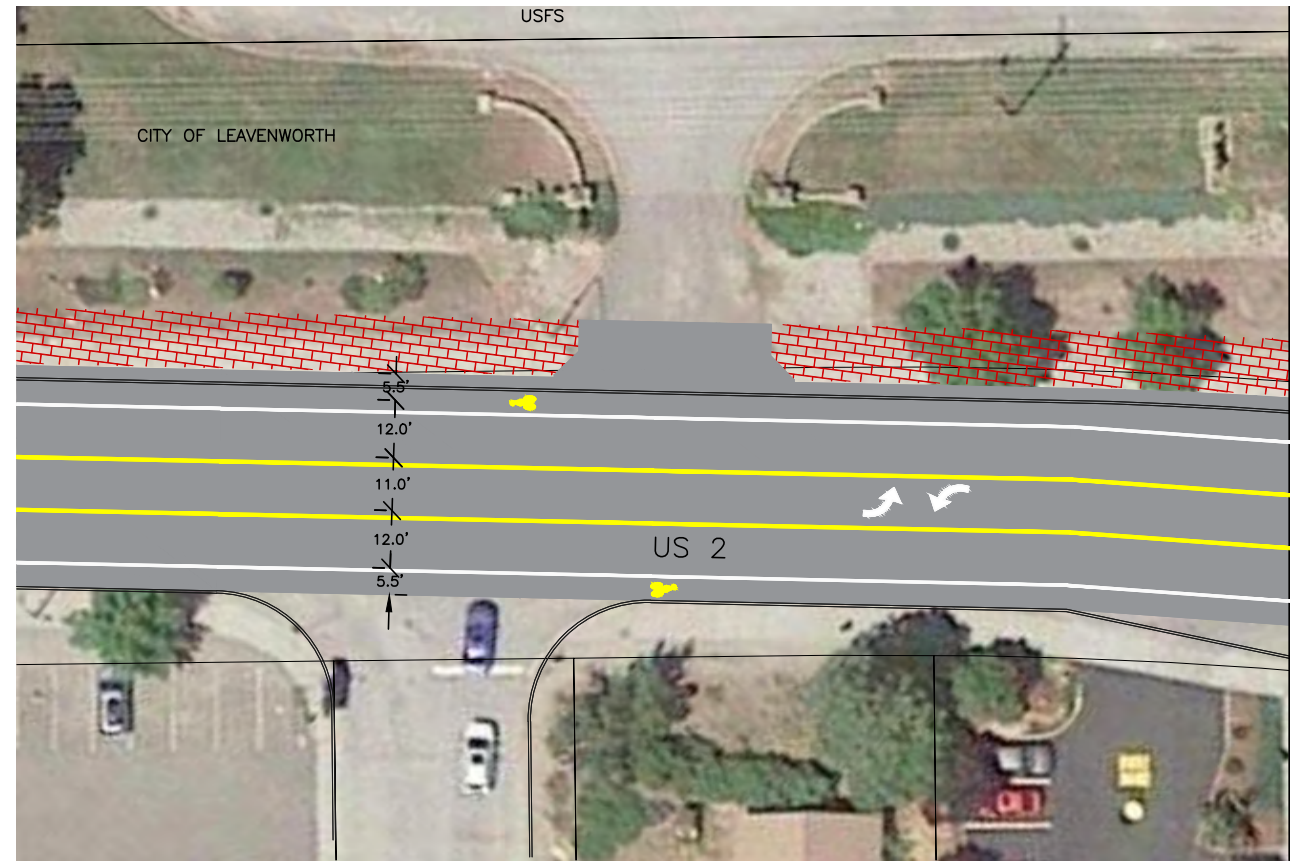
		ITEM	UNIT	ESTIMATED COST	UNIT QTY	TOTAL COST
I. RIGHT OF WAY						
		Permanent Sidewalk Easement (USFS)	SF	\$45	4,100	\$184,500
		Temporary Construction Easement (private owners)	SF	\$20	2,200	\$44,000
		RIGHT OF WAY TOTAL				\$228,500
II. CONSTRUCTION						
1		PREPARATION/GRADING/DRAINAGE				
	1.1	PREPARATION				
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$20,000	1	\$20,000
	1.2	EARTHWORK				
		STRUCTURE EX. CL. A INCL. HAUL	CY	\$100	2,300	\$230,000
	1.3	STORMWATER MITIGATION				
		DETENTION AND TREATMENT	SF	\$6	5,800	\$34,800
	1.4	STORM SEWER				
		CATCH BASIN TYPE 1	EA	\$2,000	4	\$8,000
		CATCH BASIN TYPE 2	EA	\$3,000	2	\$6,000
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$125	460	\$57,500
		STRUCTURE EXCAVATION CL. B	CY	\$15	400	\$6,000
2		STRUCTURE				
		PRECAST REINFORCED 3-SIDED BOX CULVERT	SF	\$200	1,100	\$220,000
		RETAINING WALLS (Cast in Place)	SF	\$100	5,300	\$530,000
		GRAVEL BACKFILL FOR WALL	CY	\$60	200	\$12,000
		RAILING	LF	\$250	710	\$177,500
3		SURFACING				
		PORTLAND CEMENT CONCRETE	SY	\$100	800	\$80,000
		HOT MIX ASPHALT	TON	\$120	100	\$12,000
		CRUSHED SURFACING BASE COURSE	TON	\$40	300	\$12,000
4		ROADSIDE DEVELOPMENT				
		TEMP. WATER POLLUTION & EROSION CONTROL (6%)	LS	\$91,700	1	\$91,700
		LANDSCAPING	LS	\$0	1	\$0
5		TRAFFIC				
		REMOVE AND SALVAGE SIGNAL SYSTEM	LS	\$10,000	1	\$10,000
		ILLUMINATION	LS	\$33,000	1	\$33,000
		SIGNING	LS	\$5,000	1	\$5,000
		CURBS	LF	\$25	40	\$1,000
		SIDEWALKS	SY	\$60	1,200	\$72,000
		TRAFFIC CONTROL (10%)	LS	\$152,700	1	\$152,700

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: US 2 Corridor Study		Client: Chelan Douglas T.C.			
Corridor Section: Leavenworth		Date: 1/7/2020			
Location: US 2 at Park and Ride		Date of Cost Index: 2020			
5.1	OTHER ITEMS				
	SURVEYING (6%)	LS	\$30,600	1	\$30,600
	SPECIAL ITEMS	EST	\$209,000	1	\$209,000
	UTILITY RELOCATIONS	EST	\$10,000	1	\$10,000
	BAVARIAN THEMED ARCHITECTURE AND DESIGN	EST	\$380,000	1	\$380,000
6	MISCELLANEOUS (10%)	LS	\$240,100	1	\$240,100
7	CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$2,640,900
8	MOBILIZATION (10%)				
	10% OF ITEM 7	EST	\$264,100	1	\$264,100
9	SUBTOTAL (ITEMS 7 & 8)				\$2,905,000
10	CONSTRUCTION				
	ENGINEERING (12% OF ITEM 9)	EST	\$349,000	1	\$349,000
	ENVIRONMENTAL COMPLIANCE (2% OF ITEM 9)	EST	\$59,000	1	\$59,000
11	CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$3,313,000
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15% OF ITEM 11)	EST	\$497,000	1	\$497,000
	ENVIRONMENTAL PERMITS	EST	\$40,000	1	\$40,000
IV.	TOTAL ESTIMATED COST				
	(ITEMS I, 14 & III)				\$4,080,000

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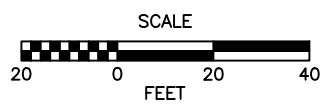
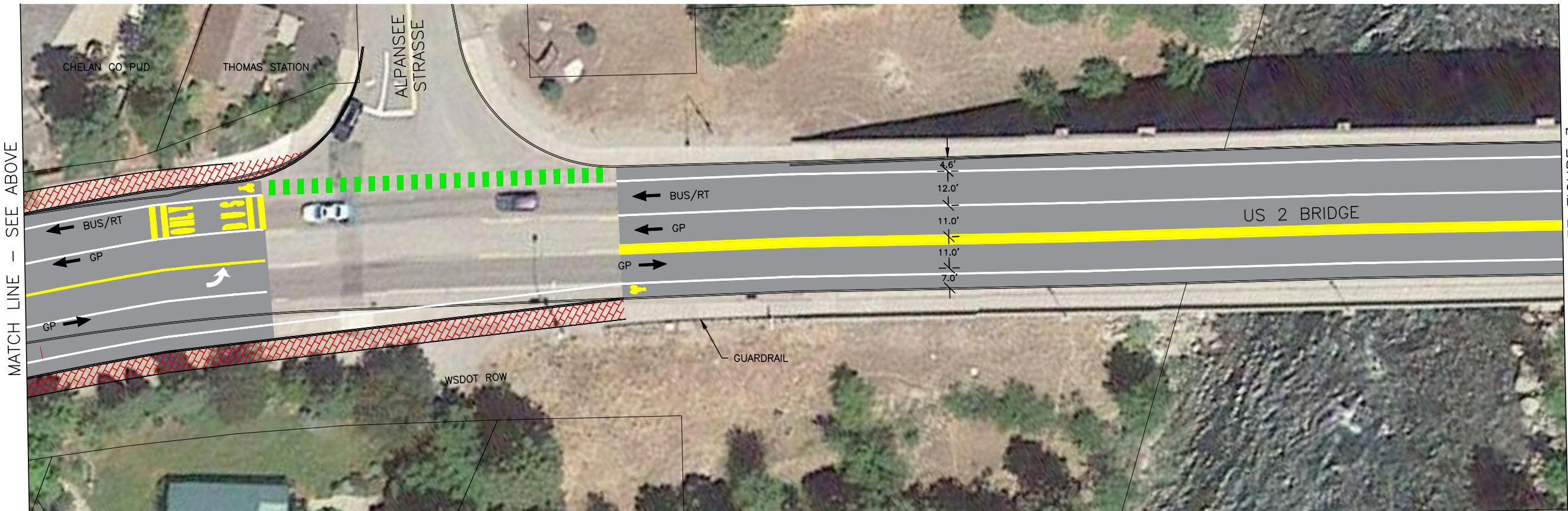
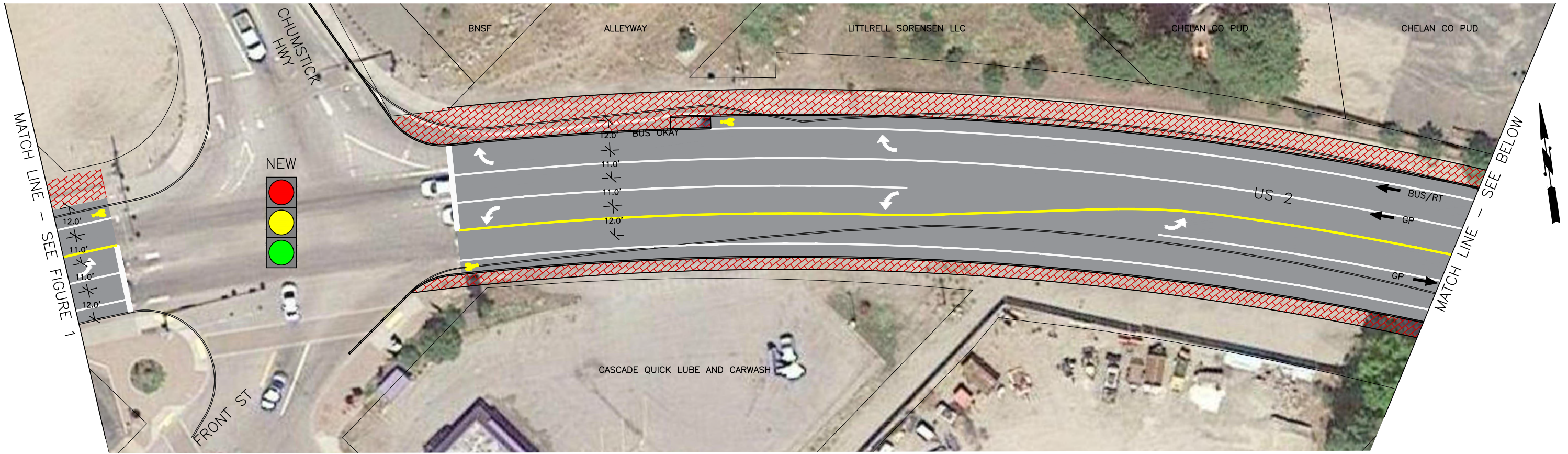


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CDTC-SR 2 CORRIDOR STUDY
 US-2 LEAVENWORTH COMPLETE STREETS

FIGURE
 1

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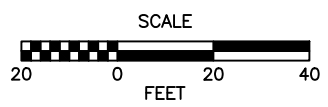
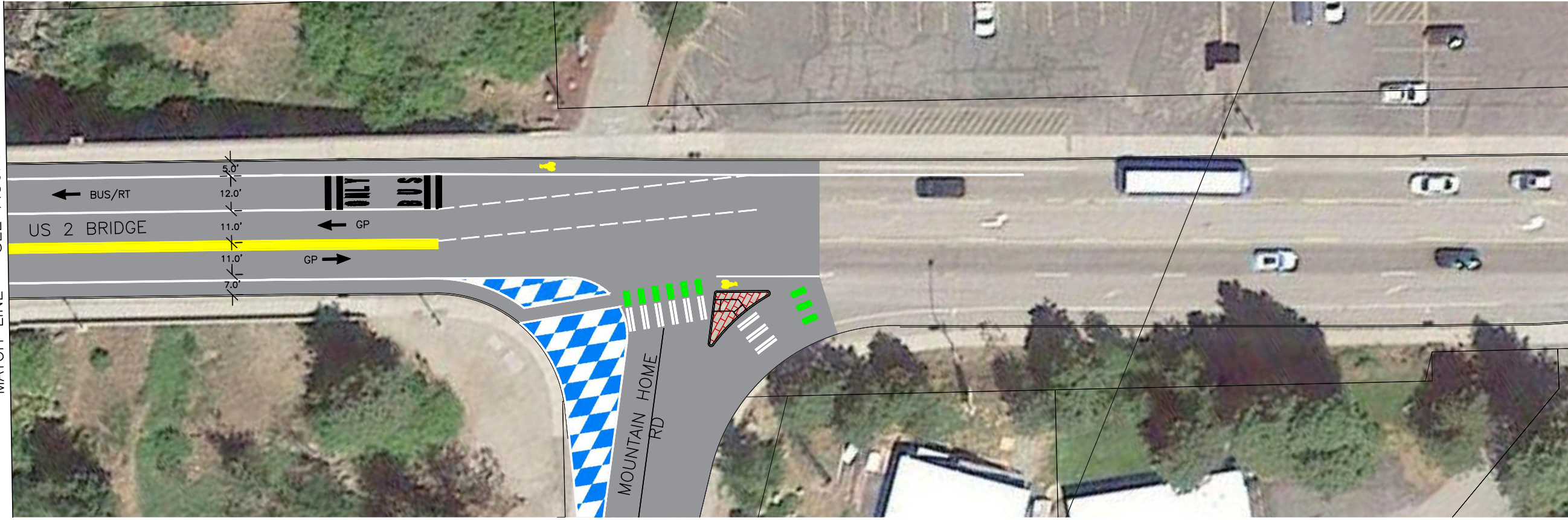


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CDTC-SR 2 CORRIDOR STUDY
 US-2 LEAVENWORTH COMPLETE STREETS

FIGURE
 2

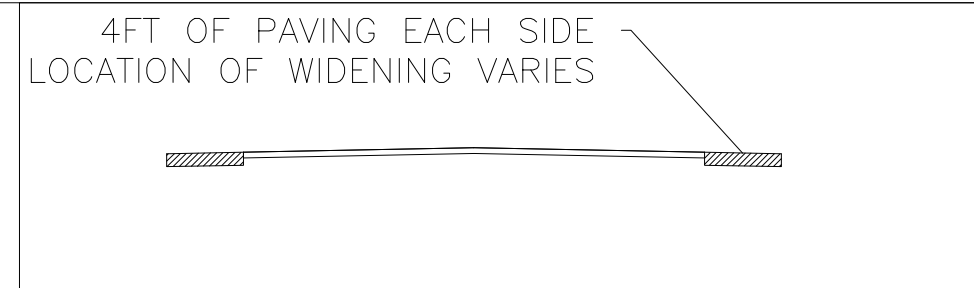
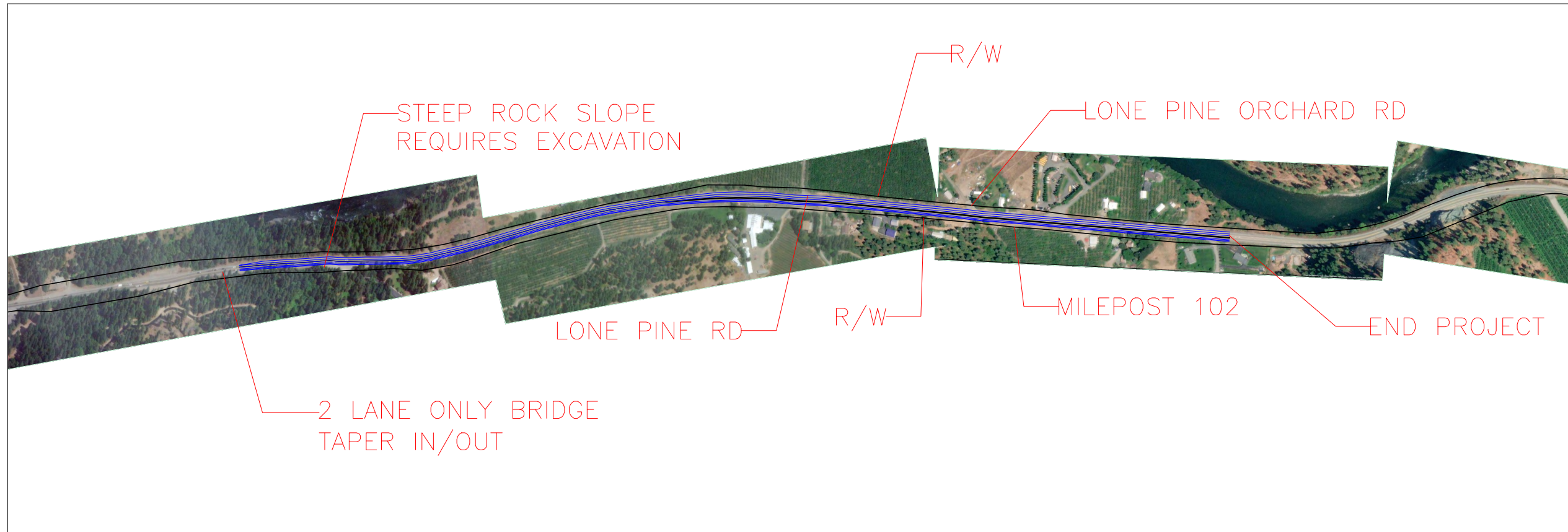
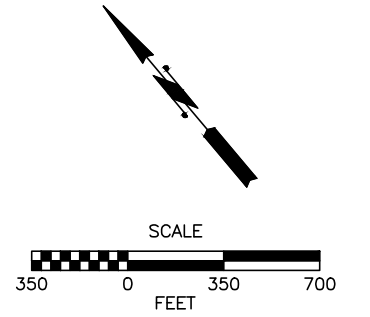
MATCH LINE - SEE FIGURE 2



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CDTC-SR 2 CORRIDOR STUDY
 US-2 LEAVENWORTH COMPLETE STREETS

FIGURE
 3



PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: US 2 Corridor Study	Client: Chelan Douglas Transportation Council
Corridor Section: Parallel to US 2 @ Wenatchee River	Date: 1/7/2020
Location: Leavenworth	Date of Cost Index: 2020
	Calculated By/Entered By: JESL
	Checked By: JDS

NEW CONNECTION TO RIVERBEND DRIVE

		ITEM	UNIT	ESTIMATED COST	UNIT QTY	COST
I.	RIGHT OF WAY					
		RIGHT OF WAY (urban developed)	SF	\$45	177,100	\$7,969,500
		RELOCATIONS: RESIDENCES	EA	\$110,000	2	\$220,000
		CONDEMNATION PROCEDURE	EA	\$100,000	1	\$100,000
		ADMINISTRATION (TITLES, APPRAISALS, ETC.)	EA	\$15,000	8	\$120,000
		RIGHT OF WAY TOTAL				\$8,409,500
II.	CONSTRUCTION					
1	PREPARATION/GRADING/DRAINAGE					
	1.1 PREPARATION					
		CLEAR & GRUB, DEMO	ACRE	\$5,000	2.7	\$13,500
		REMOVING EXISTING PAVEMENT	SY	\$10	3,900	\$39,000
		REMOVAL STRUCTURES & OBSTRUCTIONS	LS	\$20,000	1	\$20,000
	1.2 EARTHWORK					
		ROADWAY EXCAVATION INCL. HAUL	CY	\$17	25,500	\$433,500
		STRUCTURE EXCAVATION INCL. HAUL	CY	\$25	200	\$5,000
	1.3 STORMWATER MITIGATION					
		DETENTION AND TREATMENT	SF	\$6	66,300	\$397,800
	1.4 STORM SEWER					
		CATCH BASIN TYPE 1	EA	\$2,000	27	\$54,000
		CATCH BASIN TYPE 2	EA	\$3,100	7	\$21,700
		PLAIN CONC. STORM SEWER PIPE 18 IN. DIAM.	LF	\$125	2,600	\$325,000
		STRUCTURE EXCAVATION CL. B	CY	\$15	2,000	\$30,000
2	STRUCTURE					
		BRIDGE SPAN OVER WENATCHEE RIVER (STEEL)	SF	\$330	26,400	\$8,712,000
		CAST IN PLACE RETAINING WALLS	SF	\$65	3,600	\$234,000
3	SURFACING					
		HOT MIX ASPHALT	TON	\$110	2,800	\$308,000
		CRUSHED SURFACING	TON	\$32	5,300	\$169,600
4	ROADSIDE DEVELOPMENT					
		SEEDING, MULCHING & FERTILIZING	ACRE	\$5,000	1.4	\$7,000
		TEMP. WATER POLLUTION & EROSION CONTROL (6%)	LS	\$687,300	1	\$687,300
		LANDSCAPING	LS	\$82,000	1	\$82,000
5	TRAFFIC					
		ILLUMINATION	LS	\$189,000	1	\$189,000
		SIGNING	LS	\$20,000	1	\$20,000
		CEMENT CONC. TRAFFIC CURB AND GUTTER	LF	\$30	6,900	\$207,000
		CEMENT CONC. SIDEWALK	SY	\$60	3,100	\$186,000
		TRAFFIC CONTROL (10%)	LS	\$1,145,500	1	\$1,145,500
5.1	OTHER ITEMS					
		SURVEYING (6%)	LS	\$302,600	1	\$302,600

PLANNING LEVEL OPINION OF COST SUMMARY

Project Description: US 2 Corridor Study		Client: Chelan Douglas Transportation Council			
Corridor Section: Parallel to US 2 @ Wenatchee River		Date: 1/7/2020			
Location: Leavenworth		Date of Cost Index: 2020			
6	MISCELLANEOUS (10%)	LS	\$1,359,000	1	\$1,359,000
7	CONSTRUCTION SUBTOTAL (ITEMS 1 THRU 6)				\$14,948,500
8	MOBILIZATION (10%) 10% OF ITEM 7	EST	\$1,494,900	1	\$1,494,900
9	SUBTOTAL (ITEMS 9 THRU 11)				\$16,443,400
10	CONSTRUCTION				
	ENGINEERING (12% OF ITEM 12)	EST	\$1,974,000	1	\$1,974,000
	ENVIRONMENTAL COMPLIANCE (2% OF ITEM 12)	EST	\$329,000	1	\$329,000
11	CONSTRUCTION TOTAL (ITEMS 12 & 13)				\$18,746,400
III.	PRELIMINARY WORK				
	PRELIMINARY ENGINEERING (15.0% OF ITEM 14)	EST	\$2,812,000	1	\$2,812,000
	ENVIRONMENTAL PERMITS	EST	\$140,000	1	\$140,000
IV.	TOTAL ESTIMATED COST (ITEMS I, 14 & III)				\$30,110,000

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SimTraffic Post-Processor
Average Results from 10 Runs
Network Performance

US 2
New Bridge Connection
Weekend Peak Hour

Performance Measure	Average	Std. Dev.	Minimum	Maximum
Average Delay (seconds)	73.8	7.1	59.3	82.2
Total Delay (hours)	66	7	51	73
Average Stopped Delay (seconds)	51.9	5.7	40.8	59.0
Total Stopped Delay (hours)	46	6	35	52
Total Stops	6,422	342	5,685	6,967
Average Stops	2.00	0.07	1.85	2.11
Total Distance Traveled (miles)	3,039	73	2,869	3,110
Average Speed (mph)	16.5	0.7	16.0	18.0
Total Travel Time (hours)	184.1	9.7	162.3	192.9
Vehicles Entered	3,026	66	2,881	3,120
Vehicles Exited	3,029	55	2,903	3,090
Percent Demand Served	100.1%	0.8%	99.0%	101.1%
Fuel Used (gallons)	100	3	92	103
HC Emissions (grams)	1,187	114	1,022	1,386
CO Emissions (grams)	30,803	1,882	28,003	34,085
NOx Emissions (grams)	3,708	281	3,307	4,210