Appendix B. FHWA ICE Model

Figure descriptions for the images in this appendix have been provided as alternative text usable by accessibility software. If needed, additional figure interpretation for this appendix is available from the ODOT Senior Environmental Project Manager at (503) 731-4804.

Figure B-1. FHWA Infrastructure Carbon Estimator Tool No-Build Results

	Annualized energy use (mmBTUs), per year over 30 years											
	Unmitigated						Mitigated					
	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total
Upstream Energy												
Materials	-	1,592	1,592	-	-	1,592	-	1,592	1,592	-	-	1,592
Direct Energy												
Construction Equipment	-	206	206	-	-	206	-	206	206	-	-	206
Routine Maintenance						307						307
Total	-	1,798	1,798	-	-	2,105	-	1,798	1,798	-	-	2,105

Note: To convert mmBTU to the equivalent gallons of US conventional diesel, use the conversion factor of 7.785 gallons of diesel / mmBTU. Please keep in mind that this conversion represents the equivalent amount of energy required, which can be useful for informational purposes, but it does not necessarily represent actual gallons of diesel required.

	Annual GHG emissions (MT CO2e), per year over 30 years											
	Unmitigated						Mitigated					
	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total
Upstream Emissions												
Materials	-	97	97	-	-	97	-	97	97	-	-	97
Direct Emissions												
Construction Equipment	-	15	15	-	-	15	-	15	15	-	-	15
Routine Maintenance						22						22
Total	-	112	112	-	-	134	-	112	112	-	-	134

Figure B-2. FHWA Infrastructure Carbon Estimator Tool Build Results

Results Summary

Project Inputs | Mitigation Inputs | Impacts on Vehicle Operation

	Annualized energy use (mmBTUs), per year over 30 years											
	Unmitigated						Mitigated					
	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total
Upstream Energy												
Materials	742	792	1,534	187	-	1,721	742	792	1,534	187	-	1,721
Direct Energy												
Construction Equipment	316	103	419	51	-	470	316	103	419	51	-	470
Routine Maintenance						363						363
Total	1,058	895	1,953	238	-	2,554	1,058	895	1,953	238	-	2,554

Note: To convert mmBTU to the equivalent gallons of US conventional diesel, use the conversion factor of 7.785 gallons of diesel / mmBTU. Please keep in mind that this conversion represents the equivalent amount of energy required, which can be useful for informational purposes, but it does not necessarily represent actual gallons of diesel required.

	Annual GHG emissions (MT CO2e), per year over 30 years											
	Unmitigated						Mitigated					
	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total	Roadway - new construction	Roadway-rehabilitation	Roadway - total	Bridges	Rail, bus, bicycle, ped.	Total
Upstream Emissions												
Materials	50	48	98	17	-	115	50	48	98	17	-	115
Direct Emissions												
Construction Equipment	23	7	30	4	-	34	23	7	30	4	-	34
Routine Maintenance						26						26
Total	73	55	128	21	-	175	73	55	128	21	-	175

Figure B-3. FHWA Infrastructure Carbon Estimator Tool Inputs

ICE Inputs
I-5 Rose Quarter Improvement Project

Parameter	Notes	Build	No Build
Roadway System and Infrastructure			
Average daily traffic per lane mile	Based on Traffic Demand Modeling. Only links that will be modified.	2,281	2,440
Total Existing (Centerline Miles)	Only modified sections	4.31	4.31
Total Existing (Lane Miles)	Only modified lanes	12.6	12.6
Total Existing Bicycle Lanes (Lane Miles)	Not included in analysis	0	0
Roadway Projects			
New Freeway (Lane Miles)	New lanes only, not modified	0	0
New Surface Street (Lane Miles)	New lanes only, not modified	0.64	0
Additional Constructed Freeway Lane (Lane Miles)	New lanes only, not modified	4.30	0
Additional Surface Street Lane (LaneMiles)	New lanes only, not modified	0	0
Re-alignment Freeway (Lane Miles)	Construction - change to horizontal/vertertical alignment of an existing roadway	0	0
Re-alignment Surface Street (Lane Miles)		0	0
Lane-widening Freeway (Lane Miles)	Reconstruction with lanes wider than the replaced section of roadway	0	0
Lane-widening Surface Street (Lane Miles)		0	0
Shoulder Improvement Freeway (Centerline Miles)	Construction - widening of shoulders or complete reconstruction of shoulders	1.93	0
Shoulder Improvement Surface Street (Centerline Miles)		0	0
Reconstruct Pavement Freeway (Lane Miles)	Complete reconstruction of pavement layer without adding or widening lanes	0	0
Reconstruct Pavement Surface Street (Lane Miles)		0	0
Resurface Pavement Freeway (Lane Miles)	Application of overlay of paving material to existing pavement	9.94	19.9
Resurface Pavement Surface Street (Lane Miles)		3.32	6.64
Bridges			
Construct New Bridge - Number of Bridges	LIDS	3	0
Construct New Bridge - Average Number of Spans per Bridge	1 Span each	1	0
Construct New Bridge - Average Number of Lanes per Bridge	Width - 40 (do not count shoulder) / 12 (width of a lane)	7	0
Construction Delay			
Total Project-Days of Lane Closure	Total number of project-days that travelers will experience delays (3 sites that close a lane for 5 days, enter 15 project-days)	3,618	0
ADT per Directional Segment for Lane Closure	System-wide ADT across all Traffic Segments in Project Area	28,781	0
Percentage of lanes closed during construction	Average Percentage of lanes expected to be closed for construction.	50%	0%

Note: Distances measured in Google Earth from data in I-% Rose Quarter Improvement Project API Figure dated 6/21/2017