MID-STATES CORRIDOR

APPENDIX J – FLOODPLAIN IMPACT ANALYSIS

Mid-States Corridor
Tier 1 Environmental Impact Study

Prepared for

Indiana Department of Transportation

Mid-States Regional Development Authority

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FLOODPLAIN IMPACTS MAP & DETAILED ANALYSIS

Introduction

The purpose of this section is to provide additional details regarding the potential floodplain impacts by the Mid-State Corridor alternatives. While the summary table, **Table 3.17-1**, in **Volume 1, Section 3.17.3** provides an overview of potential floodplain impacts by range, the subsequent tables in this appendix isolate the impacts according to the extended alternative variations (e.g., Super-2 vs expressway; Loogootee bypass options) and individual local improvements that are a part of each alternative.

As identified in Volume I, floodplains are protected through local and state regulations with state jurisdiction held by the Indiana Department of Natural Resources (IDNR). Regulation of floodplains serves to protect people and property, and is required for access to the National Flood Insurance Program (NFIP). As established through the standards set forth in the Flood Control Act (IC 14-28-1), the state regulates development in the floodway, requiring IDNR approval for all types of construction, excavation, and filling. IDNR has jurisdiction in floodways only for project sites with drainage areas greater than one square mile. Projects encroaching on the regulatory floodway that cause water "surface increases of up to 0.15 ft. may be permitted if IDNR determines there are no adverse effects, unreasonable hazards to safety of life or property, or unreasonable detrimental effects on fish, wildlife, and botanical resources." (IDNR, 2018). An IDNR approved permit does not replace the need for local permits. With respect to local regulations, some communities may restrict development in the regulatory floodways. (IDNR, 2018 and IGA, 2020).

The Flood Control Act (IC 14-28-1) regulates various development activities (e.g. structures, obstructions, deposits, and/or excavations) within the floodway of any State waterway by requiring DNR approval prior to the beginning of the project in the form of a permit from the Director of the Department of Natural Resources. Based on the regulatory oversight and control from the Flood Control Act limiting cumulative effects to floodplains, no adverse cumulative effects are anticipated from project.

Resource Analysis

Both floodplain and floodway impacts were summarized in **Volume 1, Section 3.17.2** using three (3) impact measures: 1) total impact acreage, 2) linear feet of transverse impacts, and 3) linear feet of longitudinal impacts. Transverse and longitudinal impacts were simplified to linear feet to provide a reference to the potential length of the working alignment and local improvements within these resources. Because transverse and longitudinal impacts are expressed as linear feet, no variation will be expressed between a Super-2 and expressway of a working alignment. Determination of transverse and longitudinal impacts were assigned manually. In some cases, both types may occur. When this is so, the dominant orientation of impact was assigned. A brief summation of these impacts is as follows:

- Longitudinal encroachment impacts listed from greatest to least alternatives are O, P (east bypass), B, M, P (west bypass) and C.
- Alternative C has no longitudinal encroachment of floodplain and floodway.

- Alternative O has the greatest longitudinal encroachment, which occurs only in the local improvements segments the alternative, notably LI-17 and LI-18 near French Lick.
- Alternatives P has a wide range of longitudinal encroachments that vary between the bypass variations.
- Traverse encroachment impacts listed from greatest to least alternatives are M, P, C, O, and B.
- Floodplain area impacts listed from greatest to least alternatives are M, P, C, O, and B.
- The Super 2 variation of the western bypass of Alternative P results in the least potential floodplain impacts of the Alternative P variations.

Alternatives B, C, M, & O each have one (1) alignment that can be either a Super-2 or expressway. Alternative P has two (2) alignments that differ in where Loogootee is bypassed, each with an expressway and Super-2 variation. **Tables 1-3** of this appendix present the impacts associated with each of these alignment variations. **Table 4** shows the breakdown of floodplain impacts by individual local improvement. **Figure 1** highlights the floodplain resources and presents the working alignments; **Figure 2** delineates differences in assignment for longitudinal vs. traverse impacts.

Alternative B is the only alternative which does not share a portion of its working alignment in Section 2. Alternatives C, M, O, and P all share most of their working alignment through Section 2. Alternative O also shares a significant amount of alignment with alternatives C, M, and P but breaks off south of the existing US 231 East Fork of the White River crossing. **Table 2** shows no longitudinal impacts are present for Alternatives C, M, O, or P in Section 2. It can be assumed that future alignment modifications within Section 2 would result in similar changes to potential floodplain and floodway impacts for Alternatives C, M, O, and P. **Table 2** also indicates that the Section 3 eastern Loogootee bypass options have greater potential longitudinal impacts than the western options.

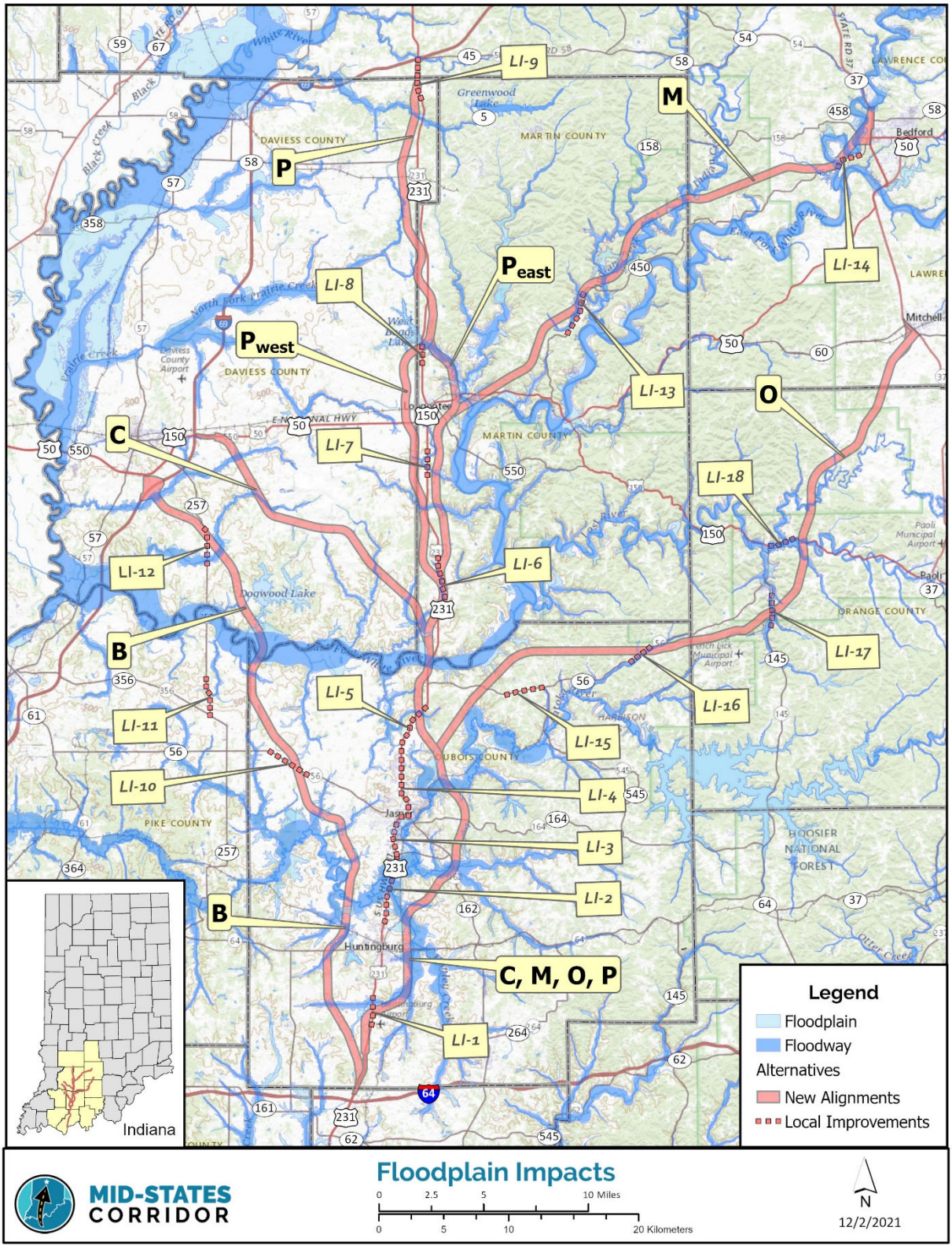

FIGURE 1: POTENTIAL FLOODPLAIN IMPACTS

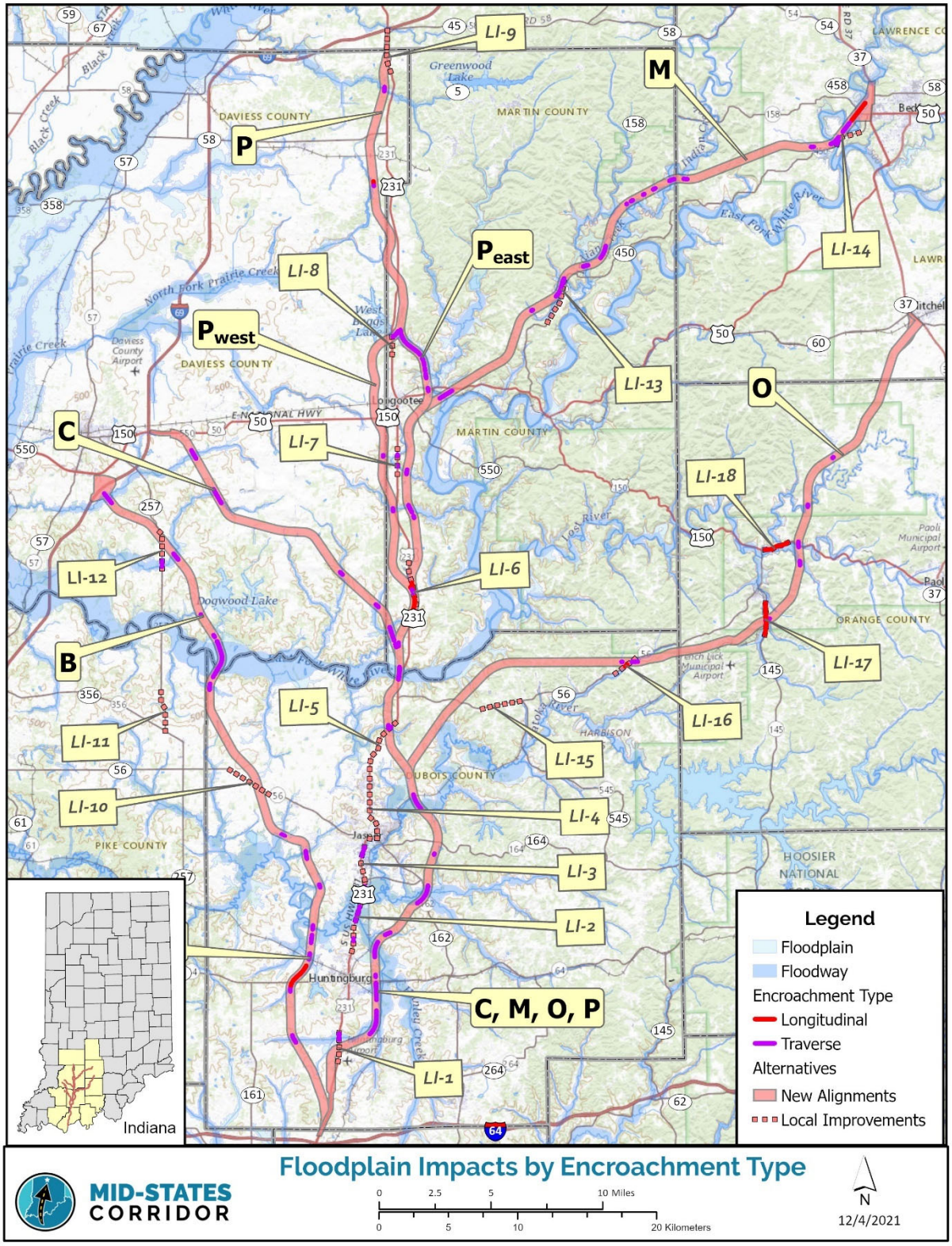

FIGURE 2: POTENTIAL FLOODPLAIN IMPACTS BY ENCROACHMENT TYPE

TABLE 1: POTENTIAL FLOODPLAIN AND FLOODWAY AREA IMPACTS (ACRES)

	Alternative B		Alternative C		Alternative M		Alternative O		Alternative P			
	B2	B3	C2	C3	M2	M3	O2	O3	P2e	P2w	P3e	P3w
Floodway Impacts*												
Section 2	94	75	194	150	194	150	186	145	194	194	150	150
Section 2 - LI**	48	48	51	51	51	51	51	51	51	51	51	51
Section 3	144	131	107	84	484	437	58	54	168	131	146	108
Section 3 - LI	5	5	-	-	18	18	34	34	10	10	10	10
Total – Route	238	206	301	234	678	587	244	198	362	325	296	258
Total – LI	53	53	51	51	69	69	85	85	61	61	61	61
Grand Total	**291**	**260**	**352**	**285**	**747**	**657**	**330**	**284**	**424**	**386**	**357**	**320**
Floodplain Impacts***												
Section 2	178	146	255	194	255	194	244	188	255	255	194	194
Section 2 – LI	72	72	75	75	75	75	75	75	75	75	75	75
Section 3	184	169	140	111	731	657	72	66	261	160	222	134
Section 3 – LI	8	8	-	-	31	31	61	61	16	16	16	16
Total – Route	362	315	395	305	986	851	317	253	516	415	416	329
Total – LI	79	79	75	75	106	106	136	136	91	91	91	91
Grand Total	**441**	**394**	**470**	**380**	**1,092**	**957**	**452**	**389**	**607**	**506**	**507**	**419**

* Tier 1 Alternative impacts are reported in ranges including all the local improvements, facility types, and bypass variations. Facility type 1, freeways, has been removed from consideration. Therefore, no modifications to existing US 231 in Section 1 are anticipated.

** LI = Local Improvement

***Floodplain includes the areas of both the Floodway (the channel of the river/stream which conveys the water downstream and must remain unobstructed to prevent an increase in BFE) and the Flood Fringe (the remaining portion of the floodplain).

TABLE 2: FLOODPLAIN LONGITUDINAL CROSSINGS IMPACTS (LINEAR FEET)

	Alternative B		Alternative C		Alternative M		Alternative O		Alternative P			
	B2	B3	C2	C3	M2	M3	O2	O3	P2e	P2w	P3e	P3w
Floodway Impacts*												
Section 2	2,077	2,077	-	-	-	-	-	-	-	-	-	-
Section 2 - LI**	-	-	-	-	-	-	-	-	-	-	-	-
Section 3	-	-	-	-	2,283	2,283	-	-	2,703	421	2,703	421
Section 3 - LI	-	-	-	-	-	-	7,388	7,388	-	-	-	-
Total – Route	2,077	2,077	-	-	2,283	2,283	-	-	2,703	421	2,703	421
Total – LI	-	-	-	-	-	-	7,388	7,388	-	-	-	-
Grand Total	**2,077**	**2,077**	**-**	**-**	**2,283**	**2,283**	**7,388**	**7,388**	**2,703**	**421**	**2,703**	**421**
Floodplain Impacts***												
Section 2	5,195	5,195	-	-	-	-	-	-	-	-	-	-
Section 2 - LI	-	-	-	-	-	-	-	-	-	-	-	-
Section 3	-	-	-	-	3,884	3,884	-	-	6,916	881	6,916	881
Section 3 - LI	-	-	-	-	-	-	13,840	13,840	-	-	-	-
Total – Route	5,195	5,195	-	-	3,884	3,884	-	-	6,916	881	6,916	881
Total – LI	-	-	-	-	-	-	13,840	13,840	-	-	-	-
Grand Total	**5,195**	**5,195**	**-**	**-**	**3,884**	**3,884**	**13,840**	**13,840**	**6,916**	**881**	**6,916**	**881**

* Tier 1 Alternative impacts are reported in ranges including all the local improvements, facility types, and bypass variations. Facility type 1, freeways, has been removed from consideration. Therefore, no modifications to existing US 231 in Section 1 are anticipated.

** LI = Local Improvement

***Floodplain includes the areas of both the Floodway (the channel of the river/stream which conveys the water downstream and must remain unobstructed to prevent an increase in BFE) and the Flood Fringe (the remaining portion of the floodplain).

TABLE 3: FLOODPLAIN TRANSVERSE CROSSINGS IMPACTS (LINEAR FEET)

	Alternative B		Alternative C		Alternative M		Alternative O		Alternative P			
	B2	B3	C2	C3	M2	M3	O2	O3	P2e	P2w	P3e	P3w
Floodway Impacts*												
Section 2	6,913	6,913	19,381	19,381	19,381	19,381	18,743	18,743	19,381	19,381	19,381	19,381
Section 2 - LI**	7,092	7,092	7,731	7,731	7,731	7,731	7,731	7,731	7,731	7,731	7,731	7,731
Section 3	11,278	11,278	11,156	11,156	25,846	25,846	4,583	4,583	17,515	13,044	17,515	13,044
Section 3 - LI	1,463	1,463	-	-	1,817	1,817	-	-	555	555	555	555
Total – Route	18,191	18,191	30,537	30,537	45,227	45,227	23,326	23,326	36,896	32,425	36,896	32,425
Total – LI	8,555	8,555	7,731	7,731	9,548	9,548	7,731	7,731	8,286	8,286	8,286	8,286
Grand Total	**26,746**	**26,746**	**38,268**	**38,268**	**54,775**	**54,775**	**31,058**	**31,058**	**45,182**	**40,711**	**45,182**	**40,711**
Floodplain Impacts***												
Section 2	13,269	13,269	25,412	25,412	25,412	25,412	24,583	24,583	25,412	25,412	25,412	25,412
Section 2 - LI	10,191	10,191	10,830	10,830	10,830	10,830	10,830	10,830	10,830	10,830	10,830	10,830
Section 3	13,195	13,195	14,575	14,575	39,471	39,471	5,549	5,549	21,963	15,705	21,963	15,705
Section 3 - LI	1,463	1,463	-	-	2,203	2,203	-	-	574	574	574	574
Total – Route	26,464	26,464	39,987	39,987	64,883	64,883	30,132	30,132	47,374	41,117	47,374	41,117
Total – LI	11,654	11,654	10,830	10,830	13,033	13,033	10,830	10,830	11,404	11,404	11,404	11,404
Grand Total	**38,118**	**38,118**	**50,817**	**50,817**	**77,916**	**77,916**	**40,962**	**40,962**	**58,779**	**52,521**	**58,779**	**52,521**

* Tier 1 Alternative impacts are reported in ranges including all the local improvements, facility types, and bypass variations. Facility type 1, freeways, has been removed from consideration. Therefore, no modifications to existing US 231 in Section 1 are anticipated.

** LI = Local Improvement

***Floodplain includes the areas of both the Floodway (the channel of the river/stream which conveys the water downstream and must remain unobstructed to prevent an increase in BFE) and the Flood Fringe (the remaining portion of the floodplain).

TABLE 4: FLOODPLAIN IMPACTS BY LOCAL IMPROVEMENT

Local Improvements*				Floodplain Impacts					
LI-#	Existing Road	Alternatives	Section	Impact Area (ac)		Longitudinal Crossing (ft)		Transverse Crossing (ft)	
				Floodway	Floodplain**	Floodway	Floodplain	Floodway	Floodplain
LI-1	US 231	B, C, M, O, P	2	3	5	-	-	907	1,469
LI-2	US 231	B, C, M, O, P	2	45	53	-	-	6,186	6,825
LI-3	US 231	B, C, M, O, P	2	-	13	-	-	-	1,897
LI-4	US 231	C, M, O, P	2	-	-	-	-	-	-
LI-5	US 231	C, M, O, P	2	3	3	-	-	639	639
LI-6	US 231	M, P	3	7	10	-	-	-	-
LI-7	US 231	M, P	3	3	6	-	-	555	574
LI-8	US 231	P	3	-	-	-	-	-	-
LI-9	US 231	P	3	-	-	-	-	-	-
LI-10	SR 56	B	2	-	-	-	-	-	-
LI-11	SR 257	B	2	-	-	-	-	-	-
LI-12	SR 257	B	3	-	-	-	-	1,463	1,463
LI-13	SR 450	M	3	1	7	-	-	349	715
LI-14	SR 450	M	3	7	7	-	-	914	914
LI-15	SR 56	O	3	-	-	-	-	-	-
LI-16	SR 56	O	3	3	10	-	646	-	-
LI-17	SR 145	O	3	10	29	1,694	7,500	-	-
LI-18	US 150	O	3	21	22	5,694	5,694	-	-

* Local Improvements are associated with the alternative

***Floodplain includes the areas of both the Floodway (the channel of the river/stream which conveys the water downstream and must remain unobstructed to prevent an increase in BFE) and the Flood Fringe (the remaining portion of the floodplain).