

6

Implementation Plan

Chapter 5 presented the long-term improvement concepts developed for the I-95 mainline and interchanges located within the study area. These improvements were designed to address the identified corridor deficiencies, improve capacity in the design year, and provide for future growth to year 2025. In addition to these long-term improvements, there is potential to implement numerous near-term improvement projects to address existing mainline, interchange and intersection deficiencies along the corridor. This chapter identifies these near-term improvement concepts and provides a recommended strategy for implementing both the near-term and long-term improvements. This implementation plan includes a prioritization of recommended improvements based on identified needs and anticipated environmental and right-of-way impacts. The implementation plan also outlines a recommended construction sequence based on priority, estimated costs and funding availability.

6.1 Overview of Recommended Improvements

The recommended improvement concepts presented in the previous chapter are consistent with the goals and objectives of this study. These goals, which are discussed in detail in Section 1.2, include:

- Preserving and improving the capacity of I-95
- Addressing each interchange's unique operating conditions and placement in the overall system
- Enhancing arterial street system operations
- Providing for future growth

The mainline widening and interchange improvements developed by the study team to meet the study objectives listed above and presented thus far are *long-term improvement concepts*. The overall complexity, construction costs, schedule, and level of environmental and right-of-way impacts associated with these improvements are characteristic of large-scale construction projects that typically require considerable amounts of time to design and build. The study team has recognized that while these projects are in the early stages of planning and development, the potential exists for smaller-scale projects to be initiated and constructed in the near-term to help meet the study objectives and address immediate corridor needs. These *near-term improvement concepts* can be designed and implemented in a relatively short period of time at a relatively low cost with only minor right-of-way and environmental impacts as compared to the long-term improvements. The following is a brief

summary of the long-term improvement recommendations presented in Chapter 5 and an overview of the types of potential near-term improvements that were evaluated by the study team.

Recommended Long-Term Improvement Concepts

The recommended long-term improvements consist of mainline capacity improvements along I-95 and safety and operational improvements at the interchanges and intersections located along the study corridor. Mainline capacity improvements include widening the existing two-lane sections where future capacity deficiencies are anticipated to provide a third travel lane and 14 foot shoulders. The recommended interchange improvements consist of both generalized improvements and interchange-specific improvements. Generalized improvements include standardizing acceleration and deceleration lanes, providing standard horizontal and vertical geometry at ramp junctions, and providing adequate intersection capacities and levels of service at ramp and secondary roadway intersections. Interchange-specific improvements include major ramp reconfigurations at particular interchanges that were identified through the study's public outreach program as requiring specialized attention.

Potential Near-Term Improvement Concepts

The potential near-term improvements identified by the study team predominantly consist of safety and operational improvements at the mainline and ramp junctions and at the ramp and secondary roadway intersections. The ramp junction improvements include standardizing acceleration and deceleration lanes where these improvements can be accommodated with minimal impacts to existing right-of-way and environmental resources. The intersection improvements include providing additional turn lanes and signalization upgrades in deficient locations where potential impacts will be minimal.

The near-term improvements also consist of several moderately complex interchange ramp reconfigurations and median improvements in locations that were identified by the study team as requiring immediate attention. The interchange improvements, although typically involving more impacts and higher construction costs than the other near-term improvements, are considerably less complex and less expensive than the long-term recommendations at the same locations. The improvements at these interchanges are compatible with the long-term recommendations, however they provide significant transportation-related benefits in the near-term. The median improvements consist of reconstructing the existing grassed median located between Exit 70 and Exit 75 to incorporate wider paved shoulders and concrete median barrier.

6.2 Near-Term Improvement Program

The near-term improvement program in the following sections provides a recommendation for specific improvement projects that can be initiated immediately to address the needs of the I-95 corridor. The implementation of these projects is based on the priority assigned to each improvement, the availability of funding, and the environmental permitting and right-of-way requirements of the projects.

6.2.1 Speed-Change Lanes

Nonstandard acceleration and deceleration lanes located throughout the study corridor provide less than adequate length for vehicles to make the necessary speed changes required to enter and exit the mainline traffic stream. As a result, vehicles must utilize a portion of the mainline to execute the speed change, thus disrupting the flow of through traffic. The disruptions in traffic flow where nonstandard speed-change lanes are located result in both operational deficiencies at the ramp merge and diverge points, and safety concerns for all roadway users.

Review of the existing geometric conditions conducted in Chapter 2 showed that approximately 80% of the acceleration and deceleration lanes throughout the study area are deficient based upon 2001 AASHTO and ConnDOT HDM design standards. An evaluation of the deficient locations revealed that more than half are candidates for near-term improvement projects based upon the criteria established by the study team. Candidate projects were defined as those that can be implemented without modifying existing bridge structures or without causing significant environmental impacts. In addition, all candidate improvements can be accommodated within the existing right-of-way. The recommended improvements in the candidate locations consist of providing standard deceleration or acceleration lanes to accommodate a safe transition to or from the existing ramp design speeds.

The deficient locations that were identified as candidates for near-term improvements were prioritized by the study team based upon safety and operational considerations and identified need. Ramp junctions located within high accident locations are considered high priority improvements. Locations identified through the public outreach program as recognized safety or operational hazards are also considered high priority improvements. Medium priority ramp junctions are located where both the existing mainline level of service (LOS) and the existing ramp merge or diverge LOS are deficient (LOS E or F). All other candidate locations are low priority improvements.

Table 6-1 summarizes the near-term improvement potential and priority given to each of the interchange ramps located within the I-95 study corridor. Shaded locations in the table are not near-term improvement candidates. An explanation is provided under the comments section in the table for the locations not meeting the near-term improvement criteria. The approximate construction cost associated with providing a fully-reconstructed, standardized speed-change lane is shown for each improvement candidate. These costs were developed in accordance with ConnDOT and FHWA guidelines for preliminary cost estimating and include major roadway items, minor roadway items, incidentals, contingencies, preliminary engineering and lump sum items where appropriate. The estimated construction cost for all of the recommended improvements in 2004-dollars is approximately \$12.36 million. It should be noted that these near-term improvement recommendations are typically not compatible with the long-term improvement concepts in most locations. As a result, it will be necessary to reconstruct the near-term improvements in order to fully accommodate the long-term, mainline widening improvement concept.

**Table 6-1
Prioritization of Near-Term Speed-Change (Acceleration/Deceleration) Lane Improvements**

Location	Estimated Ramp Speed ¹ (mph)	Speed-Change Lane			Estimated Construction Cost (2004 \$)	Priority (Low, Med, High)	Comments
		Existing Length (ft)	Standard Length (ft)	Deficiency (ft)			
Northbound							
Exit 54 On	35	400	1230	830	\$320,000	Low	
Exit 55 Off	50	200	340	140	-	-	Bridge impacts
Exit 55 On	45	500	820	320	\$160,000	Med	
Exit 56 Off	45	100	390	290	\$130,000	Med	
Exit 56 On	40	450	1000	550	\$230,000	Low	
Exit 57 Off	50	150	340	190	\$100,000	Low	
Exit 57 On	25	500	1420	920	\$350,000	Low	
Exit 58 Off	50	200	340	140	-	-	Culvert impacts
Exit 58 On	40	500	1000	500	-	-	Bridge impacts
Exit 59 Off	45	100	390	290	\$130,000	Low	
Exit 59 On	50	700	580	N/A	-	-	Existing length exceeds standard length
Exit 60 On	35	525	1230	705	\$280,000	Low	
Exit 61 Off	40	200	440	240	\$120,000	Low	
Exit 61 On	50	600	580	N/A	-	-	Existing length exceeds standard length
Exit 62 Off	50	150	340	190	-	-	Bridge impacts
Exit 62 On	35	575	1230	655	-	-	Bridge impacts
Exit 63 Off	50	150	340	190	\$100,000	Low	
Exit 63 On	40	480	1000	520	\$220,000	Low	
Exit 64 Off	50	250	340	90	\$70,000	Low	
Exit 64 On	40	350	1000	650	\$260,000	Low	
Exit 65 Off	50	225	340	115	\$80,000	Low	
Exit 65 On	40	1000	1230	230	\$130,000	Low	
Exit 66 Off	35	>340	340	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 66 On	20	375	1520	1145	-	-	Bridge impacts
Exit 67 (Elm St) On	35	650	1230	580	\$240,000	Low	
Exit 67 (Rte 154) Off	35	225	490	265	\$120,000	Low	
Exit 68 On	50	-	-	-	-	-	Lane ahead location - no improvement required
Exit 69 Off	45	300	390	90	\$70,000	Low	

**Table 6-1
Prioritization of Near-Term Speed-Change (Acceleration/Deceleration) Lane Improvements**

Location	Estimated Ramp Speed ¹ (mph)	Speed-Change Lane			Estimated Construction Cost (2004 \$)	Priority (Low, Med, High)	Comments
		Existing Length (ft)	Standard Length (ft)	Deficiency (ft)			
Exit 69 On	40	-	-	-	-	-	Lane ahead location - no improvement required
Exit 70 Off	50	-	-	-	-	-	Exit only lane - no improvement required
Exit 70 On	40	600	1000	400	\$180,000	High	
Exit 71 Off	35	100	490	390	-	-	Bridge impacts
Exit 71 On	35	<1230	1230	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 72 Off	45	>390	390	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 72 On	35	650	1700	1050	\$390,000	Med	Standard length factored for 3.5% upgrade
Exit 73 Off	40	100	440	340	\$150,000	Med	
Exit 73 On	35	425	1230	805	\$310,000	Med	
Exit 74 Off	40	150	440	290	\$130,000	Med	
Exit 74 On	35	700	1230	530	\$220,000	Med	
Exit 75 Off	40	650	440	N/A	-	-	Existing length exceeds standard length
Exit 75 On	35	350	1230	880	\$340,000	Med	Additional analysis required; See Section 6.2.3.a
Exit 76 Off	50	440	340	N/A	-	-	Existing length exceeds standard length
Exit 80 On	35	725	1230	505	\$220,000	Low	
Exit 81 Off	25	550	550	N/A	-	-	Existing length equals standard length
Exit 81 On	25	1000	1420	420	\$190,000	Low	
Exit 82 Off	40	450	440	N/A	-	-	Existing length exceeds standard length
Exit 82 On	35	550	1230	680	\$270,000	Low	Potential auxiliary lane to Exit 82A off-ramp
Exit 82A Off	45	350	390	40	\$50,000	Low	
Exit 82A On	50	>580	580	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 83 Off	45	>390	390	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 83 On	50	-	-	-	-	-	Lane ahead location - no improvement required
Exit 84 On	25	-	-	-	-	-	Lane ahead location - no improvement required
Exit 85 Off	50	340	340	N/A	-	-	Existing length equals standard length
Exit 86 Off	50	-	-	-	-	-	Exit only lane - no improvement required
Exit 87 Off	35	500	490	N/A	-	-	Existing length exceeds standard length
Exit 87 On	50	1100	580	N/A	-	-	Existing length exceeds standard length
Exit 88 Off	45	150	390	240	\$120,000	Low	

**Table 6-1
Prioritization of Near-Term Speed-Change (Acceleration/Deceleration) Lane Improvements**

Location	Estimated Ramp Speed ¹ (mph)	Speed-Change Lane			Estimated Construction Cost (2004 \$)	Priority (Low, Med, High)	Comments
		Existing Length (ft)	Standard Length (ft)	Deficiency (ft)			
Exit 88 On	45	650	820	170	\$110,000	Low	
Exit 89 Off	50	340	340	N/A	-	-	Existing length equals standard length
Exit 89 On	45	600	820	220	-	-	Bridge impacts
Exit 90 Off	50	275	340	65	-	-	Bridge impacts
Exit 90 On	35	4500	1230	N/A	-	-	Existing length exceeds standard length
Exit 91 Off	50	300	340	40	\$50,000	Low	
Exit 91 On	45	500	820	320	\$160,000	Low	
Exit 92 Off	45	250	470	220	\$110,000	High	3.0% downgrade
Exit 92 On	50	100	580	480	\$210,000	High	
Exit 93 Off	50	200	410	210	\$110,000	Low	Standard length factored for 3.0% downgrade
Exit 93 On	45	575	820	245	-	-	Bridge impacts
Southbound							
Exit 54 Off	45	100	390	290	-	-	Bridge impacts
Exit 55 Off	40	225	440	215	-	-	Bridge impacts
Exit 55 On	45	400	820	420	\$190,000	Low	
Exit 56 Off	30	520*	520	N/A	-	-	*Recent construction - assumed standard length
Exit 56 On (1)	40	575	1000	425	\$190,000	Med	
Exit 56 On (2)	30	1350*	1350	N/A	-	-	*Recent construction - assumed standard length
Exit 57 Off	50	200	410	210	\$110,000	Low	Standard length factored for 3.0% downgrade
Exit 57 On	25	525	1420	895	\$340,000	Low	
Exit 58 Off	45	150	390	240	\$120,000	Low	
Exit 58 On	35	500	1230	730	\$290,000	Low	
Exit 59 Off	50	175	340	165	-	-	Bridge impacts
Exit 59 On	45	525	820	295	\$150,000	Low	
Exit 60 Off	50	225	340	115	\$80,000	Low	
Exit 61 Off	45	250	390	140	\$80,000	Low	
Exit 61 On	20	625	1520	895	\$340,000	Low	
Exit 62 Off	35	100	490	390	-	-	Bridge impacts
Exit 62 On	20	325	1520	1195	-	-	Bridge impacts

Table 6-1
Prioritization of Near-Term Speed-Change (Acceleration/Deceleration) Lane Improvements

Location	Estimated Ramp Speed ¹ (mph)	Speed-Change Lane			Estimated Construction Cost (2004 \$)	Priority (Low, Med, High)	Comments
		Existing Length (ft)	Standard Length (ft)	Deficiency (ft)			
Exit 63 Off	35	150	490	340	-	-	Bridge impacts
Exit 63 On	35	560	1230	670	-	-	Bridge impacts
Exit 64 Off	50	300	340	40	\$50,000	Low	
Exit 64 On	40	475	1000	525	-	-	Bridge impacts
Exit 65 Off	50	400	340	N/A	-	-	Existing length exceeds standard length
Exit 65 On	40	450	1000	550	\$230,000	Low	
Exit 66 Off	40	325	440	115	\$80,000	Low	
Exit 66 On	20	450	1520	1070	-	-	Bridge impacts
Exit 67 (Elm St) Off	50	475	340	N/A	-	-	Existing length exceeds standard length
Exit 67 (Rte 154) On (1)	35	600	1230	630	\$260,000	Low	
Exit 67 (Rte 154) On (2)	20	325	1520	1195	-	-	Bridge impacts
Exit 68 Off	45	>390	390	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 69 Off	50	-	-	-	-	-	Exit only lane - no improvement required
Exit 69 On	35	<1230	1230	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 70 Off	35	100	390	290	\$130,000	High	
Exit 70 On	45	-	-	-	-	-	Lane ahead location - no improvement required
Exit 71 Off	50	>340	340	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 71 On	40	625	1000	375	\$180,000	High	
Exit 72 Off	35	100	490	390	-	-	Bridge impacts
Exit 72 On	35	<1230	1230	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 73 Off	35	150	490	340	-	-	Bridge impacts
Exit 73 On	35	550	1230	680	\$270,000	Med	
Exit 74 Off	20	480	690	210	\$110,000	Med	Standard length factored for 3.5% downgrade
Exit 74 On	20	275	1520	1245	\$450,000	High	Identified through public outreach as high priority
Exit 75 Off	35	300	490	190	\$100,000	Med	Additional analysis required; See Section 6.2.3.a
Exit 75 On	35	50	2030	1980	-	-	Culvert impacts
Exit 76 On	50	1100	580	N/A	-	-	Existing length exceeds standard length
Exit 80 Off	40	550	440	N/A	-	-	Existing length exceeds standard length
Exit 81 Off	25	450	550	100	\$70,000	Med	



Table 6-1
Prioritization of Near-Term Speed-Change (Acceleration/Deceleration) Lane Improvements

Location	Estimated Ramp Speed ¹ (mph)	Speed-Change Lane			Estimated Construction Cost (2004 \$)	Priority (Low, Med, High)	Comments
		Existing Length (ft)	Standard Length (ft)	Deficiency (ft)			
Exit 81 On	35	825	1230	405	\$190,000	Med	
Exit 82 Off	40	>440	440	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 82 On	35	750	615	N/A	-	-	Standard length factored for 5.0% downgrade
Exit 82A On	35	<1230	1230	N/A	-	-	Existing auxiliary lane - no improvement potential
Exit 83 Off	50	-	-	-	-	-	Exit only lane - no improvement required
Exit 84 Off	50	-	-	-	-	-	Exit only lane - no improvement required
Exit 85 On	25	-	-	-	-	-	Lane ahead location - no improvement required
Exit 86 On	50	-	-	-	-	-	Lane ahead location - no improvement required
Exit 87 Off (1)	50	800	340	N/A	-	-	Existing length exceeds standard length
Exit 87 Off (2)	50	560	340	N/A	-	-	Existing length exceeds standard length
Exit 87 On	35	1400	1230	N/A	-	-	Existing length exceeds standard length
Exit 88 Off	35	350	490	140	\$80,000	Low	
Exit 88 On	25	850	1420	570	\$240,000	Low	
Exit 89 Off	35	275	490	215	-	-	Bridge impacts
Exit 89 On	25	275	1420	1145	\$420,000	Low	
Exit 90 Off	35	300	490	190	\$100,000	Low	
Exit 90 On	25	850	1420	570	\$240,000	High	Identified through public outreach as high priority
Exit 91 Off	35	275	490	215	\$110,000	Low	
Exit 91 On	25	750	1420	670	\$270,000	Low	
Exit 92 Off	stop	525	615	90	\$70,000	High	
Exit 92 On	35	100	630	530	\$220,000	High	Existing taper entrance to climbing lane; 3.0% upgrade
Exit 93 Off	50	240	340	100	\$70,000	Low	
Exit 93 On	40	100	230	130	\$100,000	Low	Existing taper entrance to climbing lane; 3.1% upgrade
Subtotal – High Priority					\$1,790,000		
Subtotal – Medium Priority					\$2,760,000		
Subtotal – Low Priority					\$7,810,000		
Total Cost of Improvements					\$12,360,000		

Note: Shaded entries are not candidates for near-term improvement projects.
1 Ramp speeds were estimated from existing ramp geometry as determined from aerial photography.

6.2.2 Intersections

Intersection capacity analyses were performed and discussed in Chapters 2 and 3 at all signalized and unsignalized ramp and secondary roadway intersections as well as at several other intersections located throughout the corridor. The analyses conducted and discussed in Chapter 3 were used to identify deficient intersections in the 2025 design hour. Long-term improvement recommendations were then made to address these deficiencies. Similarly, the analyses conducted and discussed in Chapter 2 were used to identify deficient intersections in the 2002 design hour. Intersections that were identified as being deficient in the 2002 existing condition, or those that were identified as being high accident locations, were determined to be candidates for near-term improvement projects by the study team. The recommended improvements at the candidate intersections consist of providing signalization at unsignalized intersections, modifying existing traffic signal timings and phasings, and/or providing additional turn lanes where possible with minimal impacts. It is anticipated that signal timing and phasing modifications can be implemented by internal ConnDOT staff and local maintenance forces.

The locations that were identified as candidates for near-term intersection improvements were prioritized by the study team based upon safety and operational considerations. High accident intersections are considered high priority improvement projects. Intersections experiencing saturated conditions with level of service E or F, but which are not high accident locations, are considered low priority improvement projects.

Table 6-2 provides a summary of the recommended improvements and lists the priority assigned to each of the candidate intersections located within the I-95 study corridor. The estimated construction cost associated with providing the improvements for each candidate intersection is also shown. These costs were developed in accordance with ConnDOT and FHWA guidelines for preliminary cost estimating and include major roadway items, minor roadway items, incidentals, contingencies, preliminary engineering and lump sum items where appropriate. The estimated construction cost for all of the recommended intersection improvements in 2004-dollars is approximately \$1.64 million. The intersections where new turn lanes are recommended are illustrated on Figure 6-1 (Sheets 1 to 4). These near-term intersection improvement recommendations are compatible with the long-term improvement concepts in most locations. As a result, it will not be necessary to modify or reconstruct the majority of the near-term improvements in order to fully accommodate the long-term intersection improvement concepts.



**Table 6-2
Prioritization of Near-Term Intersection Improvements**

Intersection	Existing LOS	Recommended Improvements	Proposed LOS	Estimated Cost (2004 \$)	Priority (Low, High)	Comments
Signalized						
US Rte 1 at Cedar Street	F	Signal timing/phasing modifications	E	\$1,500	Low	Intersection within limits of current DOT improvement project
Exit 55 SB Ramps at US Rte 1	F	Signal timing/phasing modifications; Separate EB left and right turn lanes	D	\$160,000	Low	
US Rte 1 at SR 718	C	Signal timing/phasing modifications; Increase red/yellow time	D	\$1,500	High	High accident location; LOS decreases due to increased red/yellow time
Exit 63 NB On-Ramp at Rte 81	F	Signal timing/phasing modifications	B	\$1,500	Low	
Exit 63 SB Ramps at Rte 81	F	Signal timing/phasing modifications; Re-stripe EB left/thru and right turn lanes	C	\$2,000	Low	
Exit 70 SB On-Ramp at Rte 156	F	Signal timing/phasing modifications	A	\$1,500	Low	
Exit 70 SB Off-Ramp at US Rte 1	F	Signal timing/phasing modifications	E	\$1,500	Low	Additional EB left turn lane required to provide LOS D
Exit 82 NB Ramps at Rte 85	E	Signal timing/phasing modifications	E	\$1,500	Low	Additional EB left turn lane required to provide LOS D
Exit 82 SB Ramps at Rte 85	F	Signal timing/phasing modifications; Increase red/yellow time	C	\$1,500	High	High accident location
US Route 1 at Route 85	F	Signal timing/phasing modifications; Increase red/yellow time	D	\$1,500	High	High accident location
Exit 90 NB Off-Ramp at Rte 27	F	Signal timing/phasing modifications	C	\$1,500	Low	
Rte 27 at Coogan Boulevard	F	Signal timing/phasing modifications; Increase red/yellow time	D	\$1,500	High	High accident location
Exit 91 NB Off-Ramp at Rte 234	E	Signal timing/phasing modifications; Increase red/yellow time	B	\$1,500	High	High accident location
Exit 92 SB On-Ramp at Rte 2	F	Signal timing/phasing modifications	B	\$1,500	Low	
Unsignalized						
Cedar Street at Cedar Knolls Dr	F	Signalization	C	\$140,000	Low	
Exit 59 SB Ramps at SR 718	E	Signalization; Separate EB left and right turn lanes	B	\$220,000	Low	Minor wetland impacts
Exit 61 NB Ramps at Rte 79	F	Signalization	C	\$140,000	Low	
Exit 64 NB Ramps at Rte 145	E	Signalization; Separate EB left and right turn lanes	A	\$320,000	High	Identified through public outreach as high priority based on sightline restrictions
Exit 64 SB Ramps at Rte 145	F	Signalization; Separate WB left and right turn lanes	B	\$220,000	High	Identified through public outreach as high priority; Minor wetland impacts



Table 6-2
Prioritization of Near-Term Intersection Improvements

Intersection	Existing LOS	Recommended Improvements	Proposed LOS	Estimated Cost (2004 \$)	Priority (Low, High)	Comments
Exit 67 NB Off-Ramp at Rte 154	F	Signalization	A	\$140,000	Low	
Exit 89 NB Ramps at SR 614	F	Signalization	B	\$140,000	Low	
Exit 89 SB Ramps at SR 614	F	Signalization	B	\$140,000	Low	
Subtotal – High Priority				\$547,500		
Subtotal – Low Priority				\$1,092,500		
Total Cost of Improvements				\$1,640,000		

6.2.3 Interchanges

The long-term interchange-specific improvement concepts presented previously in Section 5.4.2 were designed to address identified safety and operational problems that currently exist at several interchanges in the project area. The study team evaluated the improvements in these areas for the potential to recommend the full-build interchange improvement or a portion of the improvement as a near-term project. Candidate projects were defined as those that could provide transportation-related benefits while functioning independently of the overall improvement concept. Prioritization of the candidate near-term projects was based upon the apparent severity of the existing conditions and the perceived urgency to address these conditions at each location. The priority assigned to each project is included in the detailed project descriptions below.

Exit 59 – SR 718 (Goose Lane), Town of Guilford

The long-term improvement concept at this location relocates the northbound ramps to intersect US Route 1 in a button-hook configuration approximately 800 feet west of the existing US Route 1, Goose Lane and Soundview Road intersection. This configuration is designed to eliminate the operational problems caused by the existing location of the northbound ramps intersection. Currently, southbound traffic queuing on Goose Lane at the intersection of Goose Lane and US Route 1 interferes with the operations of the northbound off-ramp, which is located approximately 100 feet north, causing significant delays. Recent signalization of the northbound ramps intersection on Goose Lane is expected to improve operations in this area, however the close spacing of these intersections remains an undesirable condition.

The recommended near-term improvement concept illustrated on Figure 6-2 (Sheet 1 of 7) relocates the northbound off-ramp to the location proposed for the long-term improvement while maintaining the existing northbound on-ramp. The off-ramp, which is transitioned from the existing two-lane section in this area, directly impacts the ConnDOT salt shed and maintenance facility located on the southbound side of US Route 1. Approximately 0.23 acres of wetlands are also directly impacted by the improvements. This near-term improvement concept is considered high priority due to the identified need to improve operations at the existing intersections of the northbound ramps and US Route 1 with Goose Lane. The recent opening of the Yale-New Haven Hospital Shoreline Medical Center on Goose Lane also contributes to the need for high-priority improvements at this interchange.

Exit 81 – Parkway North, Town of Waterford

The long-term improvement concept in the area of Exits 81, 82 and 82A eliminates the existing northbound and southbound mainline weaves between Exit 82 and Exit 82A by extending the frontage road system to Route 85 and relocating direct access to and from I-95 and the frontage roads. Part of the overall improvement includes extending Parkway North to Route 85 and replacing both the southbound off-ramp to Parkway North at Exit 81 and the southbound on-ramp from Route 85 at Exit 82.

The recommended near-term improvement illustrated on Figure 6-2 (Sheets 2 through 4 of 7) consists of providing this component of the overall long-term improvement concept. The existing Parkway North facility is extended easterly to Route 85 and a pair of button-hook ramps located between existing Exit 81 and Route 85 links Parkway North to southbound I-95. This configuration replaces the southbound off-ramp to Parkway North and the southbound on-ramp from Route 85. The existing southbound off-ramp to Parkway North at Exit 81 has been identified as a major safety hazard by local authorities due to the nonstandard exit geometry of the ramp and the high volume of traffic utilizing the ramp to access commercial development in the area.

Approximately 0.80 acres of wetlands are directly impacted by the recommended improvements at Exit 81. Right-of-way impacts in this area are limited because the State of Connecticut owns the majority of the land and the residential structures impacted by the improvements.

Currently, this near-term improvement concept is considered low priority. However, the future prioritization is dependent upon the Town of Waterford's development plan to provide an access road to Parkway North via Route 85. Implementation of the town's plan will create an immediate need for this project to be implemented due to the influx of traffic it will bring to the area.

Exit 82 – Route 85 (Broad Street), Town of Waterford

As discussed above, the long-term improvement concept in the area of Exits 81, 82 and 82A eliminates the existing northbound and southbound mainline weaves between Exit 82 and Exit 82A by extending the frontage road system to Route 85 and relocating direct access to and from I-95 and the frontage roads. Part of the overall improvement includes reconfiguring the northbound ramps at Route 85 such that the southbound left-turn movement onto the existing northbound on-ramp is eliminated.

The recommended near-term improvement illustrated on Figure 6-2 (Sheets 5 and 6 of 7) consists of providing this component of the overall long-term improvement concept. The northbound off-ramp, which is transitioned from the existing two-lane section in this area, is realigned to provide sufficient area for the northbound on-ramp to be relocated as an inside loop-ramp between I-95 and the realigned off-ramp. In addition, an auxiliary lane is provided between the relocated on-ramp and the existing frontage road off-ramp at Exit 82A due to the short spacing between the ramps. By relocating the on-ramp to the west side of Route 85, southbound traffic along Route 85 bound for northbound I-95 is required to make a right turn to the on-ramp. The existing left turn to the on-ramp is creating severe backups at this intersection during peak hours due to high traffic volumes generated by numerous shopping malls and other commercial development in the area.

The existing right shoulder on the Route 85 overpass is wide enough to accommodate the additional northbound acceleration lane without requiring major bridge structure modifications. However, the reconfiguration of the ramps requires substantial right-of-way takings including the acquisition of several residential homes in the area. In addition, approximately 0.23 acres of wetlands are directly impacted by the recommended improvements. Despite these impacts, this project is designated a high priority due to the recognized immediate need to alleviate the traffic congestion in this area caused by queued southbound left-turning traffic on Route 85.

A sub-component of the near-term improvement recommendation described above is a recommendation to review the existing advance guide signage located along the southbound lanes of Route 85. A comment received during a public information meeting held in September 2004 suggested that inadequate signing may be contributing to the congested conditions that commonly occur at the intersection of Route 85 and the northbound ramps at Exit 82. Potential signing improvements could include the placement of signs along southbound Route 85 that direct traffic destined for northbound I-95 to utilize the left lane. This will better position vehicles for access to the left turn lane farther upstream so that fewer vehicles will be required to change lanes in the vicinity of this intersection. These signs could be placed as far north as the Crystal Mall access to Route 85. It is recommended that this review, including the implementation of any signing improvements, be conducted concurrently with the permitting and design phases of the overall near-term improvement recommendation at Exit 82. These signs will serve as a temporary, but immediate improvement until construction of the overall near-term improvement is complete.

Exit 90 – Route 27 (Greenmanville Road/White Hall Avenue), Town of Stonington

The long-term improvement concept at this location addresses the need to discourage motorists who are exiting northbound I-95 from utilizing Coogan Boulevard to access Mystic Aquarium. This concept is aimed at reducing the traffic demand and the number of accidents at the intersection of Route 27 and Coogan Boulevard. The long-term improvement concept provides a two-lane northbound exit and improved overhead destination signage to reduce driver confusion at critical decision points and provide ample opportunity for motorists to maneuver to the correct lane for their destination.

The near-term improvement concept at Exit 90 illustrated on Figure 6-2 (Sheet 7 of 7) consists of widening the existing northbound deceleration lane and ramp to provide a two-lane exit beginning immediately north (east) of the Mystic River structure. The additional exit lane in conjunction with advance overhead destination signage improvements is intended to provide the same type of benefits as the long-term improvement concept by reducing driver confusion and providing more opportunity for motorists to maneuver to the correct lane for their destination. The improvement concept also recommends a review of the existing destination signage for Mystic Seaport and Mystic Aquarium to identify potential signing improvements that will also better direct motorists to their destinations. Potential improvements could include modifications to the existing overhead destination signage located over the off-ramp. This is a high priority improvement that will supplement the recent Mystic Seaport signing improvements that were implemented in the area by Department of Transportation's Office of Maintenance at the request of Mystic Seaport representatives.

6.2.3.a Additional Analysis Requirements

The public participation component of this study, which is discussed in detail in Chapter 7, provided a significant amount of feedback from the public that influenced the development of the final corridor recommendations. However, some of this feedback identified areas with particular deficiencies that could not be adequately addressed in time for improvement recommendations to be incorporated into this study. Additional analysis will be required in these areas so that effective solutions can be developed to address the identified deficiencies.

Exits 92 & 93 – Route 2/Route 49/Route 216/Route 184, Towns of Stonington/North Stonington

A comment received from a concerned citizen subsequent to a public information meeting held in September 2004 suggested that inadequate signing may be contributing to an unnecessary volume of through-traffic along Route 184 in North Stonington. The citizen was concerned about the effects this traffic has on the safety of local residents and local traffic, which often includes school buses that make frequent stops along this route. The primary target of potential signing improvements would be casino patrons who are accessing I-95 from Exit 93 via Route 184.

The near-term recommendation at Exit 92 and Exit 93 consists of conducting an inventory of existing destination guide signs in the vicinity of these interchanges and implementing potential signing improvements that will divert unnecessary traffic from Route 184. Potential signing improvements may include the installation of signs along southbound I-95 directing motorists destined for Foxwoods Casino to Exit 92, and the installation of signs along southbound Route 2 directing motorists to northbound I-95 via Route 49 and Exit 92. These improvements are a high priority and consequently, it is recommended that further investigation of near-term signing modifications in this area be initiated upon completion of this study.

Table 6-3 provides a summary of the recommended near-term interchange improvements and lists the priority assigned to each of the interchanges. The estimated construction cost associated with providing the improvements at each interchange is also shown. These costs were developed in accordance with ConnDOT and FHWA guidelines for preliminary cost estimating and include roadway, right-of-way and wetland mitigation costs. Minor roadway items, incidentals, contingencies, preliminary engineering and lump sum items are also included in the estimate. The estimated construction cost for all of the recommended interchange improvements in 2004-dollars is approximately \$13.76 million. It should be noted that the near-term improvement recommendations are typically compatible with the long-term improvement concepts and only minor modifications will be required to complete the conversion to the long-term improvements.

**Table 6-3
Prioritization of Near-Term Interchange Improvements**

Interchange	Estimated Cost (2004 \$)	Priority (Low, High)	Comments
Exit 59, NB Off-Ramp at US Rte 1	\$2,010,000	High	ConnDOT salt shed relocation; Minor wetland impacts
Exit 82, NB Ramps at Rte 85	\$4,800,000	High	Major right-of-way impacts; Minor wetland impacts
Exit 90, NB Off-Ramp at Rte 27	\$450,000	High	No impacts; Cost includes potential improvements
Exits 92 / 93, Additional Analysis	TBD ¹	High	Identified through public outreach
Exit 81, SB Ramps at Parkway North	\$6,500,000	Low	Minor right-of-way impacts; Major wetland impacts
Subtotal – High Priority			
		\$7,260,000	
Subtotal – Low Priority			
		\$6,500,000	
Total Cost of Improvements			
		\$13,760,000	

¹ TBD – To Be Determined. The construction costs associated with these improvements will be based upon the recommendations developed from the additional analysis that is required as described in Section 6.2.3.a.

6.2.4 Median Improvements

A narrow grassed median separates the northbound and southbound lanes of I-95 beginning near the northern (eastern) limit of Exit 70 and extending approximately 8.25 miles north to the northern (eastern) limit of Exit 75. The inside paved shoulders generally range in width between two and four feet in this area. The grassed median ranges between 12 to 16 feet in width so that the entire median area including shoulders is approximately 20 feet wide. Nonstandard metal beam guide rail extends along the center of the median through this section.

Because the available space between the inside lanes and the guide rail is limited, a safety hazard is created during routine grass mowing operations in the median. These operations require the partial closure of a small section of the inside travel lane in the vicinity of the maintenance equipment as it progresses along the median. The narrowing of the travel lanes creates a “bottleneck” behind the mowing operation under typical traffic conditions resulting in compromised safety of both the maintenance crews and the traveling public.

The near-term improvement concept in this area consists of reconstructing the existing median to provide wider paved inside shoulders and standard concrete median barrier separation between opposing lanes of traffic. The recommended typical section for the median improvements is shown in Figure 6-3. As illustrated in the figure, five-foot wide inside shoulders and a ten-foot wide median barrier are provided. Improvements to the existing drainage system located along the median are anticipated in conjunction with the reconstruction. These

improvements to the median are consistent with the long-term improvement concept in this area and will typically not require subsequent reconstruction when the long-term improvements are implemented.

The near-term median improvements are considered a high priority project due to the immediate safety needs that the improvements address. The estimated construction cost associated with providing the recommended improvements in 2004-dollars is approximately \$13.4 million. No major environmental or right-of-way impacts are anticipated.

6.2.5 Near-Term Implementation Plan

Table 6-4 provides a summary of the near-term improvement program described in the previous sections. The improvement categories (i.e. speed-change lanes, median improvements, intersections, and interchanges) and the prioritized improvements under each category are listed in order of the recommended order of implementation. It is assumed that the implementation of the near-term improvement recommendations will be primarily dependent upon the priority assigned to each improvement. High priority improvements will be implemented first to address the most urgent safety and operational deficiencies identified in the study corridor. Implementation of medium and low priority improvements will follow accordingly. In addition, improvements that directly benefit mainline operations, and consequently the most users, will be implemented first and those benefiting interchange and secondary roadway operations will follow. On this basis, the acceleration and deceleration lane improvements are the recommended highest priority projects because the safe and efficient operation of ramp merge and diverge locations affects both mainline and ramp operations. These improvements in turn will benefit the highest volume of users.

Table 6-4
Summary of Near-Term Improvement Program

Improvement	Estimated Cost (2004 \$)	Relative Impacts	Comments
Speed-Change Lanes			
High Priority	\$1,790,000	Low	High accident locations or identified problem areas
Medium Priority	\$2,690,000	Low	Operational deficiencies on mainline and at ramp junctions
Low Priority	\$7,880,000	Low	No major operational/safety issues; Progress upon funding
Median Improvements			
Exits 70 to 75 – High Priority	\$13,400,000	Low	No major impacts; Progress immediately
Intersections			
High Priority	\$547,500	Low	High accident locations or identified problem areas
Low Priority	\$1,092,500	Low	Deficient intersection capacities; Progress upon funding availability
Interchanges			
Exit 59 – High Priority	\$2,010,000	Med	Minor right-of-way impacts; Minor wetland impacts
Exit 82 – High Priority	\$4,800,000	High	Major right-of-way impacts; Minor wetland impacts
Exit 90 – High Priority	\$450,000	Low	No major impacts; Progress immediately
Exits 92 / 93 – High Priority	TBD ¹	TBD ¹	Progress immediately to determine improvement requirements
Exit 81 – Low Priority	\$6,500,000	High	Minor right-of-way impacts; Major wetland impacts
Subtotal – High Priority		\$22,997,500	
Subtotal – Medium Priority		\$2,690,000	
Subtotal – Low Priority		\$15,472,500	
Total Cost of Program		\$41,160,000	

¹ TBD – To Be Determined. The construction costs and impacts associated with these improvements will be based upon the recommendations developed from the additional analysis that is required as described in Section 6.2.3.a.

Although ideally the implementation of the near-term improvement program will be dictated by the overall priority assigned to each project, it is likely that the actual implementation of the program will be influenced by funding availability, right-of-way requirements and environmental permitting requirements where applicable. To expedite the implementation process and minimize the affects of these other influences, it is recommended that the following occur upon completion of this study to initiate the near-term improvement program:

- Begin preliminary design of the highest priority improvements
- Begin securing funds for construction
- Initiate the environmental permitting process where permits will be required

By initiating the near-term improvement program immediately upon completion of this study, it is anticipated that construction of the more substantial improvements will begin by 2008. In addition, implementation of the lesser improvements – which include signal timing modifications and lane striping changes – can potentially begin immediately to improve conditions in the corridor. Figure 6-4 illustrates the near-term implementation plan and provides anticipated dates for design and construction broken down into three phases based on priority.

It should be noted that each location identified as a near-term improvement candidate has independent utility. As such, it will be possible to implement any number of improvements under a single construction contract (for example, the southbound acceleration lane improvements at Exit 74 or all speed-change lane improvements could be considered a single project). This factor may be critical if funding availability is limited as the design of these projects is completed.

6.3 Long-Term Improvement Program

In order to execute the implementation of the overall long-term improvement recommendations, it is necessary to divide the improvements into smaller, less complex projects that can be designed, permitted, funded and constructed within a reasonable time-frame. These smaller projects are then prioritized on the basis of identified need and implemented in a logical sequence of construction. The long-term improvement program presented in the following sections has been developed to divide and prioritize the full-build improvements and recommend a plan for the implementation of these improvements.

6.3.1 Prioritization Strategy

The study team evaluated the results of the mainline operation analyses for the 2002 existing condition (Chapter 2) and the 2025 no-build condition (Chapter 3) to identify the corridor sections that will have the most immediate need for capacity improvements as the traffic demand along I-95 increases to its anticipated 2025 levels. The study team then assigned priority to each of these sections based on the level of need established for each section.

The evaluation of the mainline operation analyses presented a clear indication that those mainline and interchange sections located in Area 2 of the I-95 corridor (the three main geographic areas of the corridor are defined in Section 5.3.3) will experience the most congested travel conditions in 2025 and therefore, are in most need of capacity improvements. This need is best defined by the average volume-to-capacity (V/C) ratio within Area 2, which is 1.14 in the design year. Those sections located in Area 1, which has an average V/C ratio of

0.86, and Area 3, which has an average V/C ratio of 0.75, will experience the second and third most congested travel conditions, respectively.

Based on the study team's evaluation of the mainline operations analyses, the recommended improvements have been prioritized such that those improvements within Area 2 are highest priority, those within Area 1 are next highest priority and those within Area 3 are lowest priority.

Having established the basic priority of the three major geographic areas of the project, the study team then grouped several series of mainline and interchange sections within each area. This was done to determine the limits for smaller-scale projects that can potentially be progressed as independent phases of the full-build improvement recommendation. For the purposes of this study, it is assumed that these *sub-projects* would be approximately 4 to 6 miles in length and cost less than \$150 million (in 2004-dollars) to construct. The priority assigned to each of these projects is mainly dependent upon a logical sequence of construction that will minimize segmentation of the corridor as the projects are progressed. This sequence of construction is the basis for the long-term implementation plan presented in the following section.

6.3.2 Long-Term Implementation Plan

The long-term implementation plan presented in Table 6-5 and illustrated in Figure 6-5 was developed by the study team to provide a recommended sequence of construction for the long-term corridor improvement concepts. This plan considers the priority assigned to each section based on the future needs and deficiencies of the corridor, the sizes and estimated construction costs of assumed sub-projects, and the logical order of implementation of each sub-project that will minimize segmentation of the corridor. Segmentation can occur, for example, along a highway where a typical two-lane roadway section is interrupted by segments of roadway with three lanes. The merging of traffic at the points where lane reductions occur can cause a "bottleneck" effect in the traffic stream thus negatively affecting traffic operations and creating safety concerns within the corridor. The order of implementation of each sub-project within each section is described in detail below. The potential effect of permitting requirements on the recommended implementation plan is discussed in Section 6.4.3.

Area 2 – Highest Priority

Area 2 is geographically defined within the study area as the section of I-95 located between the Connecticut River just south of Exit 70 in Old Lyme and the Thames River near Exit 84 in New London. The recommended order of implementation of the sub-projects within Area 2 is:

1. Exit 71 to Exit 74 (terminating at the southern limit of the Route 11 project)
2. Exit 70 to Exit 71 (excluding Exit 71)
3. Exit 81 to Exit 83 (beginning at the northern limit of the Route 11 project)

The study team identified the sub-project that incorporates the improvement concepts at Exit 71 and Exit 72 as the highest priority project within Area 2. This designation is based on the severity of the existing mainline weaving conditions between the interchanges. Because no near-term recommendations are appropriate in this area to alleviate the operational and safety issues associated with the weaving conditions, it is recommended that these issues be addressed as part of the first long-term improvements to be constructed in the study area. These improvements will terminate at the southern limit of the Route 11 project and match the three-lane sections proposed under that project.

In order to eliminate the segmentation created by the transition from the existing three-lane sections near Exit 70 to the existing two-lane sections and back to the proposed three-lane sections at Exit 71, it is recommended that the section between Exit 70 and Exit 71 be completed as the next highest priority project. Similarly, to eliminate the two-lane sections located between the northern limit of the Route 11 project near Exit 81 and the three-lane sections near Exit 83, it is recommended that this section be completed last, but prior to the implementation of the Area 1 improvements. It is anticipated that the recommended near-term improvements in this area will alleviate the most urgent safety and operational issues until the long-term recommendations are implemented.

Area 1 – Medium Priority

Area 1 is geographically defined within the study area as the section of I-95 located between the southern project limit at Exit 54 in Branford and the Connecticut River just north of Exit 69 in Old Saybrook. The recommended order of implementation of the sub-projects within Area 1 is:

1. Exit 54 to Exit 57 (beginning at the northern limit of the New Haven Harbor Crossing Corridor Improvements, Contract D, and excluding Exit 57)
2. Exit 57 to Exit 60 (excluding Exit 60)
3. Exit 60 to Exit 63 (excluding Exit 63)
4. Exit 63 to Exit 65 (including Exit 65)
5. Exit 65 to Exit 69

The study team identified the sub-project that matches into ConnDOT's current New Haven Harbor Crossing Corridor Improvements, Contract D, as the highest priority project within Area 1. Contract D, which is scheduled for completion in 2005, will provide three-lane sections that terminate at the northbound off-ramp and southbound on-ramp at Exit 54 in Branford. In order to avoid further segmentation of the corridor between Exit 54 and Area 2, it is recommended that the sub-project between Exit 54 and Exit 57 be constructed first. The remaining sub-projects will be implemented from south to north through Area 1 of the I-95 corridor. Upon completion of the section located between Exit 65 and Exit 69, the study corridor will consist of three-lane sections between Exit 54 and Exit 88.

Area 3 – Lowest Priority

Area 3 is geographically defined within the study area as the section of I-95 located between the Thames River just south of Exit 85 and the northern project limit at the Rhode Island state line. The recommended order of implementation of the sub-projects within Area 3 is:

1. Exit 89 to Exit 91 (excluding Exit 91)
2. Exit 91 to Exit 92
3. Exit 85 to Exit 89 (excluding Exit 89)

The study team identified the sub-project that matches into the existing three-lane section just south of Exit 89 as the highest priority project within Area 3. It is recommended that the construction of the three-lane sections be completed to Exit 92 prior to the completion of the sub-project located between Exit 85 and Exit 89. This project provides the recommended 14 foot wide inside and outside shoulders in conjunction with the reconstruction of the existing three-lane sections in this area. Because this sub-project is not a capacity improvement project, it is recommended that it be constructed last in the study corridor.



**Table 6-5
Long-Term Implementation Plan**

Sub-Project	MM	to	MM	Length (mi)	Estimated Cost (2004 \$)	Anticipated Year of Expenditure	Annual Inflation Rate	Adjusted Cost	Priority	Comments	
Area 2 - Connecticut River to Thames River											
1	Exit 71 to Exit 74	82.86	-	87.42	4.56	\$115,500,000	2010 ~ 2012	2.75%	\$143,500,000	High	Highest priority, initiate first
2	Exit 70 to Exit 71	78.93	-	82.86	3.93	\$83,200,000	2012 ~ 2014	2.75%	\$106,200,000	High	Excludes Exit 71
3	Exit 81 to Exit 83	89.68	-	93.47	3.79	\$108,000,000	2012 ~ 2014	2.75%	\$141,700,000	High	
Area 1 - Branford to Connecticut River											
4	Exit 54 to Exit 57	53.17	-	59.00	5.83	\$123,700,000	2014 ~ 2016	2.75%	\$166,800,000	Med	Excludes Exit 57
5	Exit 57 to Exit 60	59.00	-	62.52	3.52	\$103,900,000	2014 ~ 2016	2.75%	\$143,800,000	Med	Excludes Exit 60
6	Exit 60 to Exit 63	62.52	-	68.08	5.56	\$114,100,000	2016 ~ 2018	2.75%	\$162,300,000	Med	Excludes Exit 63
7	Exit 63 to Exit 65	68.08	-	73.44	5.36	\$119,800,000	2016 ~ 2018	2.75%	\$175,200,000	Med	Includes Exit 65
8	Exit 65 to Exit 69	73.44	-	78.44	5.00	\$111,700,000	2018 ~ 2020	2.75%	\$167,800,000	Med	
Area 3 - Thames River to Rhode Island											
9	Exit 89 to Exit 91	99.78	-	103.91	4.13	\$98,700,000	2018 ~ 2020	2.75%	\$152,400,000	Low	Excludes Exit 91
10	Exit 91 to Exit 92	103.91	-	107.70	3.79	\$47,800,000	2020 ~ 2022	2.75%	\$75,800,000	Low	
11	Exit 85 to Exit 89	94.70	-	99.78	4.98	\$76,400,000	2020 ~ 2022	2.75%	\$124,500,000	Low	Excludes Exit 89; Lowest Priority
Total Cost of Improvement Program (Including \$10 million for utility relocations)									\$1,570,000,000		

6.4 Environmental Considerations/Permitting Strategy

To provide an overview of the anticipated environmental documentation and permitting needs, this section describes the regulatory framework, lists relevant guidance documents specific to Federal-Aid highway construction in Connecticut, and provides a complete list of permits that may be required to implement the project elements based on the feasibility study-level environmental analysis conducted to date.

6.4.1 Regulatory Framework

The 58-mile Feasibility Study corridor has been broken into 50 discrete sections, including 29 interchange sections and 21 mainline sections. Implementation of the long-term improvement concepts described in Chapters 5 and 6, and the near-term improvement program described in Chapter 6, would be subject to State and Federal environmental regulations. The overarching environmental policy is the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321) and the corresponding State policy, Connecticut Environmental Policy Act (CEPA). The nature of the improvements and the associated potential environmental impacts will determine the extent of NEPA/CEPA environmental documentation required. NEPA allows three types of environmental documents to be used depending on the potential impacts of the project.

- A. *Categorical Exclusion* (CE) checklists are used where anticipated project impacts are clearly minor, such as landscaping or construction of a bus passenger shelter.
- B. *Environmental Assessments* (EAs) are prepared for projects that do not qualify for a CE but do not clearly rise to the level of requiring an Environmental Impact Statement. Environmental Assessments typically result in a Finding of No Significant Impact (FONSI) but occasionally may prompt an EIS.
- C. An *Environmental Impact Statement* (EIS) is required for projects with the potential for significant environmental impacts.

Impacts associated with the various I-95 improvements would vary in the type of NEPA/CEPA document required. For example, a simple lane addition that does not extend beyond the existing right-of-way and that does not impact any wetlands may be adequately addressed by a Categorical Exclusion (CE), while a ramp reconfiguration that impacts homes and tidal wetlands may require an EA/FONSI or EIS.

In terms of the environmental process as would be applied to the I-95 corridor improvements, it is anticipated that fiscal constraints will necessitate prioritization of corridor improvements that would extend over many years. Each individual sub-project as described in Sections 6.2 and 6.3 would be documented and permitted separately. The environmental documentation would reference and build on the current feasibility study, and could begin prior to or coincident with preliminary design. Site specific data collection and impact analysis would be conducted in support of the individual environmental documents and permits (e.g., soil sampling to determine spoils management requirements, and flagging and surveying wetlands to accurately quantify impacts). The associated coordination with the regulatory agencies would set the stage for the permit process, which would be completed later in design. Any public informational and public participation requirements would be assessed early in the NEPA/CEPA study, based on potential impacts, public interest, and in accordance with ConnDOT's *A Guide for Public Outreach* (November 1995) which describes recommended practices for public and municipal coordination and outreach.

Implementation of this project will require several permits, certifications, and technical reviews, at various Federal and State levels of jurisdiction. The following Federal environmental statutes and Executive Orders must be considered relative to the improvements:

- A. National Environmental Policy Act (NEPA) of 1969, (42 U.S.C. 4321) (At the State level, the Connecticut Environmental Policy Act (CEPA) is the functional equivalent of the Federal NEPA, and largely mirrors the process.)
- B. Department of Transportation Act of 1966, Section 4(f) (49 U.S.C. 303)
- C. Coastal Zone Management Act (CZM) of 1972 (16 U.S.C. 1451)
- D. Protection of Wetlands (E.O. 11990)
- E. Floodplain Management and Protection (E.O. 11988)
- F. Endangered Species Act of 1973 (16 U.S.C. 1531)
- G. Fish and Wildlife Coordination Act of 1956 (16 U.S.C. 661)
- H. Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855)
- I. Clean Water Act of 1977 (33 U.S.C. 1251)
- J. National Historic Preservation Act of 1966, Section 106 (16 U.S.C. 470)
- K. Protection and Enhancement of the Cultural Environment (E.O. 11593)
- L. Farmlands Protection Policy Act of 1981 (7 U.S.C. 4201)
- M. Clean Air Act Amendments of 1990 (42 U.S.C. 7401)
- N. Noise Control Act of 1972 (42 U.S.C. 4331)
- O. Uniform Relocation Assistance and Real Property Acquisitions Act of 1970 (42 U.S.C. 4601)
- P. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (E.O. 12898)
- Q. Native American Graves Protection and Repatriation Act of 1990 (23 U.S.C. 3001)

The lead Federal agency funding the implementation of the improvements would be the Federal Highway Administration (FHWA). FHWA's Connecticut Division Operations Plan (September 30, 1997) lists the following Regulations and Guides as 'the primary resources that regulate and guide the NEPA process in the FHWA Connecticut Division Office' (excluding NEPA and the Executive Orders listed above):

- A. Preservation of the Nation's Wetlands issued August 24, 1978 (DOT Order 5660.1A)
- B. Floodplain Management and Protection (DOT Order 5650.2)
- C. FHWA Mission Statement
- D. FHWA Environmental Policy Statement (1994)
- E. Environmental Impact and Related Procedures (23 CFR 771)
- F. Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772)
- G. Mitigation of Environmental Impacts to Privately Owned Wetlands (23 CFR 777)
- H. FHWA Environmental Guidebook
- I. Guidance for Preparing and Processing Environmental and 4(f) Documents, dated October 30, 1987 (Technical Advisory (TA) 6640.8A)
- J. Connecticut Programmatic Categorical Exclusion Agreement
- K. Connecticut Programmatic Wetland Finding

One of FHWA's duties is oversight and approval of any access modification to the interstate system. FHWA's review of proposed improvements must be coordinated with the overall NEPA review.

6.4.2 Potential Environmental Permits/Compliance Requirements

Compliance with most of the regulations and guidelines listed above would be achieved during the NEPA/CEPA process. Generally following but overlapping the NEPA process is the permit process, which would result in the following specific permits, as applicable for each individual project. (A description of the resource-related permits [Air, Wetlands, Farmland, etc.] is provided in the applicable sections of Chapter 4.)

- A. Section 404 Wetland Permit, for the discharge of all dredged or fill materials into waters of the U.S. (Administered by U.S. Army Corps of Engineers, with veto authority retained by US EPA)
- B. Section 10 of the Rivers and Harbors Act of 1899 (for construction of any structure in, on, or over navigable waters, excavating or depositing material into those waters, or any other work affecting the course, location, or capacity of such waters) (administered by USACOE)
- C. U.S. Coast Guard Bridge Permit (General Bridge Act of 1946) (administered by USCG)
- D. Clean Air Act Conformity Determination (determined by FHWA)
- E. Hazardous Materials Regulations (administered by EPA under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA))
- F. Magnuson-Stevens Fishery Conservation and Management Act (FHWA to determine compliance based on consultation with National Marine Fisheries Service)
- G. Section 106 Coordination/ Historic Preservation Memorandum of Agreement (coordination with the State/Tribal Historic Preservation Office)
- H. Section 4(f) Determination (determined by FHWA)
- I. Coastal Management Consistency Concurrence (including Coastal Flood Hazard Area impact considerations) (Determined by CTDEP)
- J. Water Quality Certification under Section 401 of the Federal Clean Water Act (granted by CTDEP)
- K. Connecticut Inland Wetlands and Watercourses and/or Tidal Wetlands Permits or General Permit for Water Resources Construction Activities (granted by CTDEP)
- L. Air Quality Indirect Source Permit (any new interchange service, or any new highway on a new location, or any new lane, greater than a mile in length and connecting either signalized intersections or expressway interchanges will require a permit from CTDEP)

6.4.3 Schedule and Cost Implications

The I-95 corridor improvements would be implemented with consideration given to transportation and safety needs, logical sequencing of construction (as discussed in Section 6.3), the complexity of the environmental documents needed, and the monetary and environmental (both natural and social) costs. Highly necessary improvements that would yield large transportation benefits and require minimal environmental documentation requirements (a CE and programmatic-type permits) and minimal expense would likely be implemented first. Improvements that would yield similarly large transportation benefits but with more complex documentation needs and greater costs might be somewhat lower priority, while elements yielding only moderate benefits and requiring extensive NEPA documents and individual permits, at relatively large costs might be assigned lowest priority.

Wetland impact permits are granted at both the State and Federal levels, and typically have considerable impact on project cost and schedule. In addition to the design and construction costs associated with avoiding and minimizing wetland impacts (lengthening structures, providing retaining walls, etc.) and providing compensation for unavoidable wetland losses, there may be lengthy processing times. The approximate processing time for a Tidal and/or Inland Wetland Permit from CTDEP oftentimes is greater than a year. Depending on impact thresholds, these permits can be in the form of Programmatic General Permits or Individual Permits. For example, in order to qualify for coverage under the Corps' GP-41 Programmatic General Permit (for Connecticut), a project must have wetland impacts under one acre, and have no permanent fill in tidal wetlands, among other considerations. If the proposed impacts are less than 5,000 square feet, the project may qualify under Category 1 (Non-reporting/minimal impacts).

Hazardous Materials regulations can also result in substantial cost increases where special materials disposal methods are necessary. During the permitting and design phase, testing would reveal any 'Areas of Environmental Concern' (AOEC) that might require special handling.

6.5 Other Considerations

In addition to such factors as project priority, size, cost, and environmental permitting requirements which can affect the implementation of the long-term improvement concepts, the study team has identified several other notable issues that should be considered early in the planning and design stages that could influence the overall implementation plan. These other considerations are described in detail below:

- **Construction Sequencing** – Each individual sub-project identified in the long-term implementation plan will be constructed over multiple construction seasons due to their size and complexity. In addition, each sub-project involves full-depth reconstruction of the mainline, replacement of bridge structures, and interchange and intersection improvements which will affect the travel patterns of thousands of motorists during construction. For these reasons, careful consideration to the sequencing of construction of each sub-project will be required to maintain mobility through the corridor and ensure the safety of the traveling public while facilitating efficient construction of these projects. The overall sequencing will involve both the sequencing issues associated with multiple phases of individual sub-projects and the sequencing of adjacent sub-projects in the corridor. Some of the more important aspects to consider include the maintenance of interchange access, the effects of changing roadway profiles to provide standard vertical clearances for bridge structures, and temporary erosion and sedimentation control.
- **Disposal of Contaminated Materials** – The median areas and areas adjacent to the outside edge of pavement are potentially contaminated with lead from the exhaust of vehicles passing through the corridor. Although this contamination is typically very low level, groundwater standards in certain towns dictate the potential for on-site use or disposal of this material. Because it is typically expensive to ship this material off-site and pay for replacement material in towns where it is not acceptable to utilize this material, consideration should be given to beneficial on-site uses elsewhere in the corridor, preferably within the limits of project under consideration.
- **Waste/Borrow Transfer Sites** – Although many of the sub-projects identified in the long-term implementation plan are “waste” projects – meaning that an excess of excavated material generated during construction will need to be wasted or disposed of – there are several projects that will require fill material for construction. Where feasible and logical considering the overall implementation plan, these “borrow”



projects should be constructed last. By constructing these areas last, it will be possible to locate and permit certain sites on these projects where waste material for other projects can be stored and used for fill in the future. The utilization of these waste/borrow transfer sites can provide substantial cost savings on these projects since borrow material would be available on-site and would not need to be purchased from another location.