



APPENDIX D: CONCEPT REPORTS/COST ESTIMATES

**UTAH DEPARTMENT OF TRANSPORTATION
Region 4**

**CONCEPT REPORT
For**

Improve South Leeds NB Off-Ramp Interchange

October 28, 2008



CONCEPT REPORT

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CONCEPT REPORT SUMMARY

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SECTION 1: General Information

Project Name:	Improve South Leeds NB Off-Ramp Interchange		
Project Manager:	Kim Manwill	County:	Washington
Pin Number:		Begin Mile Post:	21.5
Project Number:		End Mile Post:	22.8
Route Number:	15	Design Year:	2010
Functional Classification:	Interstate	Design Speed:	80 mph

Describe the Purpose/Need for this Project:

The purpose of the Improve South Leeds NB Off-Ramp Interchange project is to correct the poor interchange geometry and address the accident cluster at MP 22.02. An accident cluster was identified at the poor geometry of the south Leeds NB off-ramp. The NB off-ramp merges onto the old US-91. This creates an intersection that confuses drivers on SB US-91 since it appears they should drive onto the NB off-ramp, however to continue on US-91 they must turn to the east at the merge point with the NB off-ramp. The goal of the project is to realign the ramp and to bring the ramp deceleration length up to standard. See the figure below for clarity.



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Major Project Risks:

- Oil Cost Escalation- Pavement costs make up the bulk of this projects budget. To mitigate the cost of pavement, a standard 10% contingency has been used.
- Cultural Sites – The project area is surrounded by Cultural and Paleontological sites. Mitigation for this project will include designing around these sites, as much as possible, to prevent impact.
- Right-of-way – Coordination with property owners needs to begin early enough so that property can be purchased before construction.

Project Estimate and Timeline:

Planning Estimate:		Proposed Construction FY:	2010
Total Project Cost (Current Year):	\$2,129,600	Estimated Construction Duration:	<i>1 year</i>
Construction Year Estimate (2010):	\$2,413,000	Recommended Commission Approved Amount:	

Signature Block:

Project Manager	Date	Region Preconstruction Engineer	Date
Region STIP Workshop Chair	Date	Region Director	Date
Consultant	Date		

CONCEPT REPORT SUMMARY

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SECTION 2: Design Information (Executive Summary)

Roadway / Pavement Summary (Activities 54C, 58C)	Estimated Construction Cost:	\$1,359,000
<p>Of the deficiencies identified in the I-15 Washington County Corridor Study in this area, only the NB off-ramp deficiency will be fixed with this project. The SB on-ramp deficient acceleration length, clear zone, and guardrail will be fixed by the Improve North and South Leeds Interchange and Pavement Rehabilitation (MP 19 to 27) projects.</p> <p>No major drainage issues were identified for this project, but the area will require ditches and drainage design to ensure proper drainage.</p> <p>The preliminary pavement section consists of 12” granular borrow, 8.5” untreated base course, 9.5” HMA, and 1.5” SMA, as seen in the pavement design.</p> <p>The capacity analysis for the project showed that no capacity improvements were needed from MP 19 to 27.</p>		

Traffic and Safety Summary (Activity 64C)	Estimated Construction Cost:	\$173,000
<p>A OSR will need to be completed by UDOT traffic and safety. The traffic and safety work for this project will consist of striping the relocated NB off-ramp and adding a lighting system to light the exit ramp.</p>		

Structures Summary (Activity 62C)	Estimated Construction Cost:	\$0
<p>No structural work is to be completed with this project.</p>		

Environmental Summary (Activity 52C)	Estimated Mitigation Cost:	\$0
<p>Archeological studies have been performed throughout the project area. There were a significant number of documented cultural sites from those surveys of the project, including some eligible sites. An evaluation will need to be made to determine if any new surveys will be needed or if the surveys completed will suffice.</p> <p>Several sensitive species have been identified along the corridor. Species requiring survey are: Dwarf Bearclaw Poppy, Holmgren Milkvetch, Shivwits Milkvetch, and Desert Tortoise. The Virgin Spinedace requires fish clearance prior to any construction in Quail Creek. The desert Tortoise requires tortoise clearance during the active season.</p> <p>The environmental documentation cost has been included in the PE cost in the cost estimate.</p>		

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Right of Way Summary (Activity 56C)	Estimated Property Cost:	\$154,000
Approximately 145,000 ft ² of rural farmland will need to be acquired to realign the NB off-ramp. The 2008 county recorders assessment of land has been assessed at \$148,000.		

Utility and Railroad Summary (Activity 68C)	Estimated Relocation Cost:	\$0
No utility or railroad conflicts expected.		

ITS Summary (Activity 66C)	Estimated Construction Cost:	\$0
No ITS improvements on this project.		

Public Involvement Summary (Activity 60C)	Estimated Cost:	\$15,000
The public involvement plan is to coordinate with local municipalities, Port of Entry, Truckers Association, Tourism Bureau, and local media, on project construction schedule and traffic impacts.		

Miscellaneous Summary:
As identified in the I-15 Washington County Corridor Study, this project is to be designed in coordination with three other Phase I projects in the area. The three Phase I projects are, Improve South Leeds NB Off-Ramp Interchange, Improve North and South Leeds Interchange, and Pavement Rehabilitation (MP 19 to 27). The design will need to be coordinated between the three projects.
The total construction cost includes concept report cost, PE, CE, and a 10% project contingency. See the Concept Estimate following this summary.

PIN ----- PROJECT # ----- Improve South Leeds NB Off-Ramp Interchange

Cost Estimate - Concept Level

Approximate Route Reference Post (BEGIN) =	21.500	(END) =	22.800
Accumulated Mileage (BEGIN) =	21.500	(END) =	22.800
Project Length =	1.300	miles	6,864 ft
Current Year =	2008		
Assumed Construction Year =	2010		
Assumed Yearly Inflation for Construction and Utility Items (%/yr) =	7.0%	2 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	6.0%		
Assumed Yearly Inflation for Urban Residential Right of Way (%/yr) =	6.5%		
Assumed Yearly Inflation for Urban Commercial Right of Way (%/yr) =	4.0%		
Assumed Yearly Inflation for non-Urban Right of Way (%/yr) =	2.0%		
Construction Items Contingency (% of Construction) =	10.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

For projects 1 Year out use 10%, 2 Years 9%,

10% Rural PB; 15% Urban PB; 20% Non PB

Item #		Cost	Remarks
Construction			
	Roadway and Drainage	\$1,186,909	
	Traffic and Safety	\$151,290	
	Structures	\$0	
	Environmental Mitigation	\$0	
	ITS	\$0	
	Subtotal	\$1,338,199	
	Construction Items Contingency (for minor items not listed) (10%)	\$133,820	
	Construction Subtotal	\$1,472,019	
P.E. Cost	P.E. Subtotal	\$118,000	8%
C.E. Cost	C.E. Subtotal	\$149,000	10%
	Right of Way Urban/Suburban Residential	\$0	
	Right of Way Urban Suburban Commercial	\$0	
	Right of Way non-Urban/Suburban	\$148,000	
	Utilities	\$0	
	Incentives	\$18,997	
	Miscellaneous	\$0	

Cost Estimate (ePM screen 505)	2008	2010
Concept Report Cost	2% \$30,000	\$30,000
P.E.	\$118,000	\$133,000
Right of Way	\$148,000	\$154,000
Utilities	\$0	\$0
Construction	\$1,472,000	\$1,685,000
C.E.	\$149,000	\$167,000
Incentives	\$19,000	\$22,000
Contingency	10% \$193,600	\$222,000
Miscellaneous	\$0	\$0
TOTAL	\$2,129,600	\$2,413,000

PROPOSED COMMISSION REQUEST	TOTAL	\$2,129,600	TOTAL	\$2,413,000
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Cost Estimate Summary of Assumptions - Improve South Leeds NB Off-Ramp Interchange

Unit Weights			Application Rates		
Borrow	133	lb/cf			
Gran. Backfill Borrow	133	lb/cf			
Granular Borrow	133	lb/cf			
UTBC	136	lb/cf			
HMA	152	lb/cf			
SMA	149	lb/cf			
Asphalt Cement	6.20%	OGSC			
Prime Coat	250	gal/ton	0.5	gal/sy	
Tack Coat	240	gal/ton	0.08	gal/sy	
Emulsified Asphalt LMCRS-2	250	gal/ton	0.4	gal/sy	
Flush Coat	245	gal/ton	0.11	gal/sy	
Water			42	gal/cy GB	
			51	gal/cy UTBC	
			45	gal/cy Borrow/Embank	

Choose Either Ton or Vol
Manually Input

Water			
Material	Vol cy	gal	1,000 gal
GB	2998	125916	125.9
UTBC	0	0	0.0
Borrow	21500	967500	967.5
Embankment	0	0	0.0
TOTAL			1094

Roadway	Oil								
	Prime Coat		Tack Coat		LMCRS-2		Flush Coat		
	Area sy	Tons	# of apps	Area sy	Tons	Area sy	Tons	Area sy	Tons
South Leeds NB off-ramp	7600	15.2	0	6378	0.0				
			0						
			0						
			0						
TOTALS		16			0		0		0

Pavements

Roadway	Length ft	Top Width ft	Side Slope	GB				UTBC				HMA		SMA		Asphalt Cement Tons	Chip Seal sy	4" LCBC		PCCP		Mill - "		
				Depth in	Width ft	Vol cy	Tons	Depth in	Width ft	Vol cy	Tons	Depth in	Width ft	Tons	Depth in			Tons	Width ft	Area sy	Depth in	Area sy	Depth in	Area sy
<i>Full Depth Work (1 Side):</i>																								
South Leeds NB off-ramp	2150	24	1/6	12	37.6	2997	5382	8.5	31.8	1795	3295	9.5	26.7	3454	1.5	481								
<i>Mill/Overlay Work:</i>																								
																							2	0
																							2	0
																							2	0
																							2	0
																							2	0
TOTALS							2998				3295			3454		481	0	0			0	0		0

Earthwork

Roadway	Roadway Excavation				Borrow					Granular Backfill Borrow				
	Length ft	Depth in	Width ft	Vol cy	Length ft	Depth in	Width ft	Vol cy	Tons	Length ft	Depth in	Width ft	Vol cy	Tons
South Leeds NB off-ramp				0	2150	60	54	21500	38603				0	0
													0	0
													0	0
													0	0
TOTALS				0				21500	38604				0	0

Fill South Leeds NB off-ramp Assumed depth at tie-in 60 in
South Leeds NB off-ramp Assumed width using 6:1 54 ft

Cross Section South Leeds NB off-ramp
inside shoulder lane width 4 14
outside shoulder total 6 24

Roadway and Drainage - Improve South Leeds NB Off-Ramp Interchange

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Item #	Item	Quantity	Price	Units	Cost	Remarks
Roadway and Drainage						
012850010	Mobilization	1	\$160,000.00	Lump	\$160,000	10% of construction
013150010	Public Information Services	1	\$0.00	Lump	\$0	
015540005	Traffic Control	1	\$80,000.00	Lump	\$80,000	5% of construction
01557001*	Maintenance of Traffic	0	\$0.00	Lump	\$0	
015720010	Dust Control & Watering	1094	\$25.00	1000 gal	\$27,350	
017210020	Survey	1	\$15,000.00	Lump	\$15,000	1% of construction
020560005	Borrow (Plan Quantity)	21500	\$15.00	Cu yd	\$322,500	
020560015	Granular Borrow (Plan Quantity)	2998	\$17.00	Cu yd	\$50,966	
020560025	Granular Backfill Borrow (Plan Quantity)	0	\$35.19	Cu yd	\$0	
020560030	Granular Backfill Borrow	0	\$10.00	Ton	\$0	
022210015	Remove Bridge	0	\$22,594.54	each	\$0	
002210080	Remove Fence	0	\$1.08	ft	\$0	
022210095	Remove Pipe Culvert	0	\$20.00	ft	\$0	
023160020	Roadway Excavation (Plan Quantity)	0	\$12.00	Cu yd	\$0	
023310020	Clearing and Grubbing	0	\$2,400.00	Acre	\$0	
023730010	Loose Riprap	0	\$90.00	Cu yd	\$0	
027210070	Untreated Base Course 3/4 inch or 1 inch Max	3295	\$23.50	Ton	\$77,433	
027410060	HMA - 3/4 Inch	3454	\$110.00	Ton	\$379,940	
027480010	Liquid Asphalt MC-70 or MC-250	16	\$1,000.00	Ton	\$16,000	
027480030	Emulsified Asphalt SS-1	0	\$250.00	Ton	\$0	
027520020	Portland Cement Concrete Pavement 9 inch Thick	0	\$27.82	Sq yd	\$0	
027710025	Concrete Curb and Gutter Type B1	0	\$14.00	ft	\$0	
027760010	Concrete Sidewalk	0	\$20.00	Sq yd	\$0	
027850030	Chip Seal Coat, Type C	0	\$1.00	Sq yd	\$0	
027850060	Emulsified Asphalt LMCRS-2	0	\$350.00	Ton	\$0	
02785008*	Flush Coat	0	\$250.00	Ton	\$0	
02744000*	SMA - 1/2 inch	481	\$120.00	Ton	\$57,720	
027860020	Asphalt Cement PG 64-34	0	\$200.00	Ton	\$0	
028220010	Right of Way Fence, Type G (Deer Fence)	0	\$4.00	ft	\$0	
029120050	Strip, Stockpile, and Spread Topsoil	0	\$1.00	Sq yd	\$0	Assumed LxW
029220010	Drill Seed	0	\$470.00	Acre	\$0	Assumed LxW
029610050	Rotomilling	0	\$4.50	Sq yd	\$0	
026100032	24 Inch Pipe Culvert, Class C	0	\$24.79	ft	\$0	
026100034	24 Inch Pipe Culvert, Class C	0	\$36.14	ft	\$0	
026100038	36 Inch Pipe Culvert, Class C	0	\$65.72	ft	\$0	
026100042	48 Inch Pipe Culvert, Class C	0	\$98.02	ft	\$0	
029620010	In-Place Cold Recycled Asphaltic Base	0	\$2.60	Sq yd	\$0	
Roadway and Drainage Subtotal					\$1,186,909	Back to Main

Traffic, Safety & ITS - Improve South Leeds NB Off-Ramp Interchange

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	Item	Quantity	Price	Units	Cost	Remarks
Traffic, Safety & ITS						
Traffic						
	W-Beam Guardrail	0	\$22.00	ft	\$0	
	Crash Cushion Type G	0	\$3,000.00	Each	\$0	
	Concrete Barrier (New Jersey Shape)	0	\$50.00	ft	\$0	
	Pavement Marking Paint	4300	\$0.30	ft	\$1,290	
	Pavement Message Paint	0	\$0.00	Each	\$0	
	Signs	0	\$120,000.00	Lump	\$0	
Signals						
Lighting						
	Highway Lighting System	1	\$150,000.00	Each	\$150,000	
Traffic and Safety Subtotal					\$151,290	
ITS						
	Multiduct Conduit	0	\$50,000.00	Lump	\$0	
ITS Subtotal					\$0	Back to MAIN

Structures - Improve South Leeds NB Off-Ramp Interchange

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Item #	Item	Quantity	Price	Units	Cost	Remarks
Structures						
Bridges						
	Structure Maintenance	0	\$100,000.00		\$0	
Walls						
	Retaining Wall	0	\$50.00	Sq ft ft	\$0	Assumed LxH (wall area)
Hydraulics						
	Extend Box Culvert	0	\$200.00	ft	\$0	
	New Box Culvert					
	Scour Mitigation					
Geotech						
	Geotech Report	0	\$25,000.00	Lump	\$0	
	Drilling	0	\$25,000.00	Lump	\$0	
Structures Subtotal					\$0	Back to MAIN

Environmental and Landscaping - Improve South Leeds NB Off-Ramp Interchange

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Item #	Item	Quantity	Price	Units	Cost	Remarks
Environmental & Landscaping						
Environmental						
	Wetland Mitigation	0	\$50,000.00	Lump	\$0	
	Noise Wall	0	\$1,000.00	ft	\$0	
Temporary Erosion Control						
	Silt Fence	0	\$20.00	Ft	\$0	
	Erosion Control Supervisor	0	\$20,000.00	Lump	\$0	
	Check Dams	0	\$250.00	Each	\$0	
Landscaping						
	Contractor Furnished Topsoil			sq ft		
	Strip, Stockpile, Spread Topsoil			sq ft		
	Wood Fiber Mulch			acre		
	Broadcast Seed			acre		
	Drill Seed			acre		
Environmental Mitigation Subtotal					\$0	Back to MAIN

Miscellaneous - Improve South Leeds NB Off-Ramp Interchange [Back to MAIN](#)

Item #	Item	Quantity	Price	Units	Cost	Remarks
Utilities						
	Relocate Water Line	0	\$500.00	Lump	\$0	
	Relocate Gas Line	0	\$50,000.00	Lump	\$0	
	Relocate Power Line			Lump		
	Relocate Fiber Optic			Lump		
	Relocate Phone			Lump		
	S.U.E	0	\$20,000.00	Lump	\$0	Assume \$1.00 per foot per utility
Utilities Subtotal					\$0	
Right-of-way						
	Urban/Suburban Residential	0	\$5.00	sq ft	\$0	Wasatch Front/Cache Valley/Cedar City/ Saint George areas
	Urban/Suburban Commercial	0	\$15.00	sq ft	\$0	Wasatch Front/Cache Valley/Cedar City/ Saint George areas
	non-Urban/Suburban Residential	0	\$5.00	sq ft	\$0	
	non-Urban/Suburban Commercial	0	\$15.00	sq ft	\$0	
	non-Urban/Suburban Farm	1	\$148,000.00	Lump	\$148,000	2008 appraised values of 2 parcels needed
Right-of-Way Subtotal					\$148,000	
Incentives						
	HMA Properties		\$2.00	ton		Max \$2.31 per ton of HMA
	Smoothness	5%	\$379,940.00	lump	\$18,997	% of HMA cost
	OGSC Properties		\$1.75	ton		Max \$1.83 per ton of OGSC
	Lane Rental Incentive		\$10,000.00	Lump		
	Early Completion		\$50,000.00	Lump		
Incentives Subtotal					\$18,997	
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Roadway / Pavement Summary (Activities 54C, 58C)

Project Design Criteria, as developed in the I-15 Washington County Corridor Study, is located at the end of the appendix. The following is a summary of the deficiencies located on the project.

Ramp Deficiencies

The tables below summarize the deficient ramp acceleration/deceleration lengths.

Deficient Ramp Acceleration/Deceleration Lengths

Direction	MP	Existing Length	Type	Notes
NB Decel	22.15	215.0	Tapered	Deficient deceleration

The deficient NB off-ramp deceleration length will be brought to standard on this project.

Drainage

No major drainage issues were identified for this project, but the area will require ditches and drainage design to ensure proper drainage.

Pavement Design

The pavement design will need to be provided by the region pavement engineer. A preliminary pavement section has been provided for cost estimate purposes. To realign the deficient curve and make ramp improvements will require new pavement. The following is the pavement section used in the cost estimate:

- 12 inch GB
- 8.5 inch UTBC
- 9.5 inch HMA
- 1.5 inch SMA

Traffic and Safety Summary (Activity 64C)

An Operational safety report will need to be completed by UDOT traffic and safety.

In the I-15 Washington County Corridor Study, a project specific analysis of corridor safety was completed by identifying locations with a project based high number of severe accidents (accidents level 3 or higher). By geographically analyzing the accident data from 2002 to 2005, accident clusters were identified by determining grouping location of severe accidents. Some of the accident clusters were also verified by comments from UDOT maintenance and public comment. An accident cluster was identified at MP 22.02 and it was determined to be a product of the poor geometry of the NB off-ramp. The NB off-ramp merges onto the old US-91. This creates an intersection that confuses drivers on SB US-91 since it appears they should drive onto the NB off-ramp, however to continue on US-91 they must turn to the east at the merge point with the NB off-ramp. The goal of the project is to realign the ramp and to bring the ramp deceleration length up to standard.



Structures Summary (Activity 62C)

No structural work is to be completed as part of this project.

Environmental Summary (Activity 52C)

A categorical exclusion is the expected environmental documentation for the project.

Cultural and Paleontological

Archeological studies have been performed on almost all of the project area. There were a significant number of documented cultural sites from those surveys of the project, including some eligible sites. To

Concept Report Appendix

Project Name: Improve South Leeds NB Off-Ramp Interchange

see a list of surveys and list of eligible sites, see the environmental section of the I-15 Washington County Corridor Study Technical Reports.

Wetlands

No wetlands impacts are anticipated. Proper erosion control including rip rap, vegetation, and other techniques should be used throughout the project.

Environmental

Dwarf Bearclaw Poppy - Potential habitat exists between MP 1-6 and 18-25. There is no critical habitat designated for this species. An existing population's map is available. The Dwarf Bearclaw Poppy flowers between mid-April to May, with the survey season in May.

Holmgren Milkvetch - Potential habitat exists between MP 1-6 and 18-25. Designated critical habitat is between MP 1-2. Critical habitat map and existing populations map are available. The Holmgren Milkvetch flowers between March and April with fruits by the end of April and pods that persist until end of May. Survey season is in May.

Shivwits Milkvetch - Potential habitat between MP 18-25 with critical habitat designated within the same area. There is no map available of the critical habitat. However an existing population's map is available. The Shivwits Milkvetch flowers between April and late May, by the end of June most of the plants dry up. Survey season is in May.

Desert Tortoise - Potential tortoise habitat is between MP 1-5 & MP 13-22. The Red Cliffs Desert Preserve is on north side of I-15 between MP 13.5 – 21.5. Designated critical habitat between MP 13.5-20 exists inside of the I-15 rights-of way. A map showing the designated critical habitat and preserve is available. Also a Habitat Conservation Plan is available for this species. A Presence/absence survey can be completed anytime. Clearance of tortoise is required during active season. Active season is from March 15 to October 15.

Right of Way Summary (Activity 56C)

Right-of-way acquisition will be needed to relocate the South Leeds NB off-ramp. It is anticipated that two parcels will be affected by the relocation. These parcels are about 145,000 ft². The land type for these parcels is non-primary agricultural land. The 2008 county recorder's assessment of the parcels has valued them at about \$148,000.

Utility and Railroad Summary (Activity 68C)

No utility or railroad conflicts identified.

ITS Summary (Activity 66C)

No ITS implementation on this project.

Concept Report Appendix

Project Name: Improve South Leeds NB Off-Ramp Interchange

Public Involvement Summary (Activity 60C)

The public involvement plan is to coordinate with local municipalities, Port of Entry, Truckers Association, Tourism Bureau, and local media, on project construction schedule and traffic impacts.