

FRAMEWORK

LONG RANGE TRANSPORTATION PLAN











The Integrated Planning Framework describes the planning process in detail, including the linkage between

strategic goals and project programming - and all the steps in between.

The Long Range Transportation Plan evaluates the state transportation needs from a

systems level, describes the issues and problems facing the State including future revenue and programming, and presents options for future investments, all within the context of the Integrated Planning Framework.

Corridor Visions are created for each State Significant Corridor (SSC) as a supplement to the LRTP. These define long term goals and objectives for each corridor based on the strategic goals of the Department, the investment goals of the LRTP, and the specific context of each corridor. The SSC system represents high volume routes in the state that connect major activity centers to each other and to points external to Wyoming. Urban areas are also evaluated as a group.

Corridor Plans build on the Corridor Visions by providing a more detailed look at specific needs and locationbased solutions. The plans identify a set of solutions and a recommended program of improvements to be implemented over time that address specific, documented needs.

CORRIDOR PLAN PURPOSE

This Corridor Plan is part of a set of documents created through a comprehensive planning process entitled Wyoming Connects. This set of documents captures consistent, transparent, and repeatable planning steps, analysis, and results designed to provide information to guide project selection and programming decision makers. Each document is designed to build upon prior documents and cascade the Strategic Goals of WYDOT forward from the overarching Strategic Plan to the system wide Long Range Transportation Plan, applied in the development of Corridor Visions, and the definition of Needs and potential Solutions to achieve the vision in Corridor Plans.

PERFORMANCE BASED NEEDS

The Corridor Plan utilizes a performance based approach to needs definition. A system of performance measures is used to evaluate the corridor. The architecture of this tiered system is focused on the three Investment Categories identified in the Long Range Transportation Plan: System Preservation, Safety, and Mobility. Performance measures include both absolute and comparative targets. Absolute measures gauge progress towards long term goals, while comparative measures between corridor and system performance provide information to assist in prioritization.

A need is defined as a deviation between these targets and measured performance. The first tier of the system allows for rapid identification of need in each of the Investment Categories through a Performance Indicator. The second tier provides additional information to qualify potential causes through a set of Performance Qualifiers. GIS based Mapping Analysis tools provide for a spatial analysis of these measurements to further investigate causes and identify overlapping needs.

TIERED APPROACH:

A method to evaluate performance goals at a general level and then advance through the system/hierarchy to filter data and define needs.



NEEDS DRIVEN SOLUTIONS:

Performance based needs are captured and documented. These needs remain until the performance is changed. This approach also separates the discussion of need from the discussion of projects, which enhances the transparency of prioritization.

From WYDOT's list of preferred remedies to specific problems, preliminary solutions sets are developed for the identified needs. These sets may be tailored by the specific context of the corridor. For each of the three funding scenarios of the long range plan, the solutions to be considered may vary and the size of the program change. A recommended program can be selected based on anticipated funding levels.



SSC 15 - CHEYENNE TO NEWCASTLE - US 85 **CORRIDOR PLAN**

CONTENTS

CORR	IDOR PLAN PURPOSE	INSIDE FRONT COVER		
I.	STATE SIGNIFICANT CORRIDOR 15 - DESCRIP	TION 1		
	Corridor Description	1		
	Corridor Segments	1		
П.	EVALUATION OF CORRIDOR PERFORMANCE	3		
	Step 1: Summary of Indicator and Qualifier Performance Measures	3		
	Step 2: System Preservation - Index Maps	4		
	Analysis of Investment Category Needs System Preservation	- 5		
	Step 2: Safety - Index Maps	6		
	Analysis of Investment Category Needs	- Safety 7		
	Step 2: Mobility - Index Maps	8		
	Analysis of Investment Category Needs	- Mobility 9		
	Step 3: Analysis of Planning Segment Needs	10		
	Environmental Overview	11		
	Step 4: Summary of Corridor Needs	12		
III.	SOLUTION SETS	13		
IV.	RECOMMENDATIONS	14		
	Realizing the Corridor Vision	15		
	Corridor Performance	15		

TABLES

		0		
TABLE 1	Segments for State Significant Corridor 15	2	SYSTEM PRESERVATION MAPS	
TABLE 2	Indicator and Qualifier Performance of Planning Segments	3	Rutting	A-1
TABLE 3	STIP by Year and Corridor Segment	5	Pavement Maintenance Requirement	A-2
TABLE 4	Horizontal Geometry Insufficiency	7	Pavement Variance Rating	A-3
TABLE 5	Vertical Geometry Insufficiency	7	Bridge Variance Rating	A-4
TABLE 6	Critical Crash Concentrations	7		
TABLE 7	Major Traffic Generators	9	SAFELT MAPS	
TABLE 8	Traffic Growth	9	Weather Related Crashes	A-5
TABLE 9	Truck Traffic Growth	9	Wildlife Related Crashes	A-6
TABLE 10	Local/Regional Routes with Poor PSR	9	Alcohol Related Crashes	A-7
TABLE 11	SSC 15 Structurally Deficient Bridges (L&R)	9	Non-use of Safety Restraints per Crash Data	A-8
TABLE 12	Important Environmental Considerations	11	Horizontal Geometry Insufficiency	A-9
TARIE 13	Recommended Solution Sets to Improve		Vertical Geometry Insufficiency	A-10
INDEE 10	Performance in Each Index	13	Crash Concentrations	A-11
TABLE 14	SSC 15 Recommended Strategies for Long Range Plan Funding Scenarios	14	MOBILITY MAPS	
TABLE 15	Review of Corridor Vision Goals and		Volume to Capacity Rating	A-12
	Other Considerations	15	Pavement Variance Rating (L/R)	A-13
TABLE 16	Corridor Performance	16	Traffic Growth	A-14
			Truck Traffic Growth	A-15
			Bridge Variance Rating (L/R)	A-16
			ENVIRONMENTAL CHARACTERISTICS	
			Environmental Data Summary	A-17



APPENDIX

I. STATE SIGNIFICANT CORRIDOR 15 - DESCRIPTION CORRIDOR DESCRIPTION

State Significant Corridor (SSC) 15 is 273 miles long. It follows US 85 from its intersection with I-25 north of Cheyenne to Newcastle. At Newcastle, the corridor splits to include US 16 southeast for approximately 13 miles to the Wyoming/South Dakota border as well as US 85 north to Moorcroft and its termination at I-90. SSC 15 passes through five counties along the eastern plains and crosses WYDOT Districts 1, 2, and 4. The sparse roadway network in eastern Wyoming is supported by SSC 15, connecting smaller communities along the border, as well as the urban centers of Torrington and Cheyenne.

Near Newcastle, the corridor follows the southwestern edge of the Black Hills, an important tourism and recreation destination. The economy along SSC 15 is supported primarily by agriculture and ranching. The Wyoming Women's Center, a State correctional facility, is located in Lusk; a new (2010) medium security correctional facility is located in Torrington.

Torrington, the only urban area directly on the corridor, is an agricultural center for the region's farms and ranches. Sugar beets, corn, and wheat are major products. Regular livestock auctions are held in Torrington, bringing buyers and sellers long distances.

Additional information including environmental context, key issues, and emerging trends is provided in the Corridor Visions and LRTP phases of *Wyoming Connects*. This Corridor Plan focuses on the identification of the corridor needs through the analysis of corridor performance.

CORRIDOR SEGMENTS

SSC 15 has been divided into 12 planning segments. Planning segments identify generally consistent sections of the corridor for planning level analysis. The planning segments vary in length depending on the context of the corridor. The corridor was segmented at all urban areas and at the intersection of other SSCs. Other context changes may include: roadway typical section (through lanes, shoulders, etc.), average daily traffic, intersecting routes, and terrain. Each segment break or endpoint was assigned as closely as possible to the nearest maintenance section endpoint; segments allow for an appropriate analysis and evaluation of corridor needs at a planning level while still providing geographic reference.

Table 1 and the accompanying map on the next page describe general characteristics of each corridor segment.



Farming and ranching are the dominant economic factors on SSC 15.







Table 1 - Segments for State Significant Corridor 15

		ML				
	Segment	Route	Begin	End	Length	Description
	15.01	85	16.94	43.02	26.08	I- 25 to WYO 216. Features: 2-lane cross section; intersects Local Route WYO 219 and terminates at Local Route 216; road close gate; Lodgepole Creek; ra
	15.02	85	43.02	66.30	23.28	WYO 216 to south of WYO 313. Features: 2-lane cross section with multiple 3-lane passing areas; intersects Local Route WYO 213, WYO 151 and termina Horse Creek, Bear Creek; Meriden Rest Area; ranch lands; flat terrain.
	15.03	85	63.30	92.02	25.72	WYO 313 to Torrington. Features: 2-lane cross section; segment begins at Local Route WYO 313 and intersects Local Routes WYO 152, WYO 161, WYO gates; RR at-grade crossing (2); Lone Tree Creek, irrigation canal, Springer Canal, Cherry Creek; ranch and farm lands; flat terrain.
	15.04	85	92.02	95.01	3.00	Torrington area of urban influence (pop. 5,514). Features: multilane urban cross section with curb, gutter, sidewalks, traffic signals, pedestrian crossings; s (US 26) in Torrington and Local Route WYO 159; N. Platte River; agricultural center; urban terrain.
10	15.05	85	95.01	103.26	8.24	Torrington to Lingle. Features: 5-lane cross section on US 26; intersects Local Route WYO 156; Torrington Port of Entry; Rawhide Creek; ranch lands; flat t
ridor 1	15.06	85	103.26	150.22	46.97	Lingle to Lusk. Features: 2-lane cross section with occasional center passing lane; segment terminates at Regional Route US 18/20; road close gates; C&N Rawhide Creek, Rawhide Creek (3), Six Mile Creek, Niobrara River; ranch lands; flat terrain.
Cor	15.07	85	150.22	196.00	45.78	Lusk to Mule Creek Jct. Features: 2-lane cross section; changeable message sign; road close gates; intersects Regional Route WYO 270; ranch lands and Creek; flat terrain.
	15.08	85	196.00	230.02	34.02	Mule Creek Jct. to Newcastle. Features: 2-lane cross section; segment begins at Local Route US 18 and terminates at US 16 in Newcastle; road close gate Robbers Roost Creek; Sheep Creek, Beaver Creek; W Branch Blacktail Creek; BNSF Railway grade separation; ranch lands; flat terrain.
	15.09	44	200.00	226.29	26.29	Moorcroft through Upton. Features: 2-lane cross section; segment begins at intersection with Regional Route US 14 in Moorcroft, intersects Local Route I- Rest Area; BNSF Railway parallel to route; ranch lands; rolling terrain.
	15.10	44	226.29	246.59	20.31	Northwest of Newcastle. Features: 2-lane cross section; intersects Local Route WYO 451 and terminates at Regional Route 450; BNSF Railway parallel to Creek, Oil Creek, Alum Creek; ranch lands; rolling terrain.
	15.11	44	246.59	250.05	3.46	Newcastle area (pop. 3,390). Features: multilane urban cross section with curb, gutter, sidewalks, traffic signals, pedestrian crossings; intersects US 16 Byp Cambria Creek; agricultural center; urban terrain.
	15.12	44	250.05	259.08	9.03	Newcastle to state line. Features: 2-lane cross section; road close gate; Salt Creek, Stockade Beaver Creek, Whoopup Creek; ranch lands; rolling terrain.

Source: URS Windshield Survey June 2012; Maintenance Section Reference Book 2012; Wyoming Connects: LRTP and Corridor Visions. Note: Descriptions of beginning and endpoints are approximate.



anch lands; flat terrain. Ites at Local Route WYO 313; road close gates; Little Horse Creek, 92, WYO 154, and terminates at Local Route 156; road close segment begins at Local Route WT 156 and intersects SSC 16 terrain. IW grade separation; interstate canal; unnamed draw; Dry I terminates at Local Route US 18; Old Woman Creek (2), Mule es; Mule Creek Rest Area; Cheyenne River, Bobcat Creek,

-90 B, WYO 116; road close gates; E. Branch Wind Creek; Upton

route with grade separation; Pine Creek, Turner Creek, Skull

bass; Newcastle Port of Entry; BNSF Railway grade separation

II. EVALUATION OF CORRIDOR PERFORMANCE

This section describes the evaluation of specific corridor needs based on the performance based process defined in the IPF. The Performance Based Needs Process, shown below, illustrates the steps followed for this corridor plan. Indicative Performance measures based on existing or simply defined index measurements for each investment category of System Preservation, Safety, and Mobility were evaluated to preliminarily identify need relative to long term goals. Qualifying performance measures were evaluated to better assess contributing factors to the primary need indicators. The indicators and qualifiers were evaluated and analyzed relative to system averages and, when available, previously specified performance targets. This gap analysis identifies locations where needs exist, qualifies the nature of the need, and provides information on the priority relative to the system of SSCs and available funding.

Many of the measures were established as comparisons to the system average, therefore good performance indicates performance better than the system average. The reverse is also true, poor performance indicates that performance is below the average or rated as poor for a particular indicator or qualifier. As additional corridors are evaluated, specific performance targets may be set to measure absolute performance. The IPF process recommends a mix of absolute measures to evaluate true need relative to long term goals and comparative measures to assist in determining priority.





STEP 1: SUMMARY OF INDICATOR AND QUALIFIER PERFORMANCE MEASURES

This corridor plan evaluates System Preservation, Safety, and Mobility performance using the process described in the Integrated Planning Framework, published separately. The plan analyzes the performance of planning segments described in Table 1 as compared to system averages. It identifies good, fair, poor or less, average, more performance for each segment in an overall index and for each contributing qualifier measurement.

Throughout this report, the color green is used to represent System Preservation, blue represents Safety, and yellow represents Mobility. Lighter shades represent better performance and darker shades represent worse performance compared to the system average.

Table 2 summarizes the results for each performance index and qualifier for each planning segment on the corridor.

Table 2 - Indicator and Qualifier Performance of SSC 15

		SYSTEM	VI PRESERV	ATION					SAF	ETY						MOB	LITY		
Segment	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating	Safety Index	Weather Related Crashes	Wildlife Related Crashes	Alcohol Related Crashes	Non-use of Safety Restraints	Horizontal Geometric Insufficiency	Vertical Geometric Insufficiency	Crash Concen- trations	Mobility Index	Volume to Capacity Rating	Pavement Variance Rating (L/R)	Traffic Growth	Truck Traffic Growth	Bridge Variance (L/R)
15.01	Average	Good	Less	Good	Less	Fair	Average	Average	Average	Average	Less	More	Fair	Average	Good	Fair	Average	Average	Less
15.02	Average	Good	Average	Good	Less	Fair	Average	Average	Average	Average	Less	Less	Fair	Better	Good	Fair	Less	Average	Less
15.03	Better	Good	Less	Good	Less	Good	Average	Average	Less	Less	Less	Less	Good	Average	Good	Poor	Less	Average	Less
15.04	Worse	Fair	Average	Poor	Less	Fair	Less	Less	More	More	Less	Less	Good	Average	Good	Poor	Less	Average	Less
15.05	Average	Fair	More	Good	Less	Good	Average	Average	Average	Average	Average	Less	Good	Average	Good	Poor	Less	Less	Less
15.06	Average	Good	Average	Fair	Less	Fair	Average	Average	Average	Less	Less	Average	Fair	Better	Good	Good	Less	Less	Less
15.07	Better	Good	Average	Good	Less	Poor	Average	More	Less	Less	Less	Less	Good	Average	Good	Fair	Average	Average	Less
15.08	Better	Good	Less	Good	Less	Good	Average	Average	Average	Less	Less	Less	Good	Average	Good	Good	Less	Less	Less
15.09	Average	Good	Less	Good	Average	Fair	Less	Average	Average	Average	Less	Less	Good	Average	Good	Good	Less	Less	Average
15.10	Worse	Good	Less	Good	More	Poor	Less	More	More	Less	Less	Less	Poor	Better	Good	Good	Less	Less	Less
15.11	Worse	Fair	More	Poor	Average	Good	Less	Average	Less	Average	Less	Less	Good	Average	Good	Good	Average	Average	Less
15.12	Worse	Fair	Less	Fair	More	Poor	Average	More	Less	Less	Less	Less	Good	Better	Good	Fair	Average	Average	Less







SYSTEM PRESERVATION - INDEX

STEP 2: ANALYSIS OF INVESTMENT CATEGORY NEEDS - SYSTEM PRESERVATION



Performance Index

The System Preservation Index is average or better across all segments, with the exception of segments 15.04, 15.10, 15.11, and 15.12

Performance qualifiers with a negative effect on the System Preservation Index:

- The Pavement Maintenance Requirement on segment 15.05 and 15.11 is more than average.
- The Pavement Variance Rating on segment 15.04 and 15.11 is poor.
- The Bridge Variance Rating on segment 15.10 and 15.12 is poor.

Refer to the sections below for more information.

	-						
	SYSTEM PRESERVATION						
Segment	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating		
15.01	Average	Good	Less	Good	Less		
15.02	Average	Good	Average	Good	Less		
15.03	Better	Good	Less	Good	Less		
15.04	Worse	Fair	Average	Poor	Less		
15.05	Average	Fair	More	Good	Less		
15.06	Average	Good	Average	Fair	Less		
15.07	Better	Good	Average	Good	Less		
15.08	Better	Good	Less	Good	Less		
15.09	Average	Good	Less	Good	Average		
15.10	Worse	Good	Less	Good	More		
15.11	Worse	Fair	More	Poor	Average		
15.12	Worse	Fair	Less	Fair	More		

Performance Qualifiers

Rutting

There are two locations where rutting falls within the poor category: 5 miles on ML 85 between RM 52 and 57 in segment 15.02, and less than 1 mile on ML 44 between RM 246.5 and 247.25 in segment 15.11.

Pavement Maintenance Requirements

Pavement maintenance sections recommended by the Pavement Management System (Agile Assets) and not yet selected to receive funding in the STIP will continue to decline. If not treated on the recommended schedule, treatments will become more costly as conditions deteriorate.

Approximately 4% of Corridor 15 has been identified as having a 1S need. This represents 12 miles of pavement. Segments 15.01, 15.04, and 15.12 have 1S treatments recommended by the Pavement Management System. Based upon current available funding, one project has been selected to be completed within the next several years. It is located within Segment 15.02.

Approximately 78% of Corridor 15 has been identified as having a 2S need. This represents 213 miles of pavement. Segments 15.01, 15.02, 15.03, 15.06, 15.07, 15.08, 15.09, 15.10, and 15.11 had 2S treatment recommended by the Pavement Management System. Based upon current available funding, seven projects, representing 46 miles of pavement, have been selected to be completed within the next several years.

Pavement Variance Rating

The Pavement Variance Rating is fair or better for the entire corridor with the exception of poor rating on Segments 15.04 (Torrington) and 15.11 (Newcastle). Pavement hotspots, identified by length and severity, occur in Torrington, Newcastle, segment 15.01 (most or moderately severe), and in Lusk and segment 15.02 (least severe).

Bridge Variance Rating

NOTE: See Appendix for maps documenting each performance qualifier.



Table 3 - STIP by Year and Corridor Segment



Approximately 17% has been identified as having a 3S need. This represents 46 miles of pavement. Segments 15.01, 15.04, 15.05, 15.06, and 15.08 had 3S treatment recommended by the Pavement Management System. Based upon current available funding, only two projects, representing 24 miles of pavement, have been selected to be completed within the next several years.

The Bridge Variance Rating for most of the corridor is average or better than the system average. All segments have at least one bridge. There are eight structurally deficient bridges along SSC 15, all with bridge decks under 15,000 ft² and the lowest WYDOT severity rating. The structurally deficient bridges are in Segments 15.09 (1), 15.10 (4), 15.11 (1), and 15.12 (2), resulting in Bridge Variance Ratings of average or more when compared to the system average.

210	220	230	240	250	260		270	273
						15,11]	
	15.08		15.09 1	5.10			15.	12
			223					
			_					
			None	∕ear 2010, 2 ∖442071)verlay	S	None	2013 Wide Overl	, 3S n & ay
							2013, Bridg Wide Surfa	, 3S e n & ce





STEP 2: ANALYSIS OF INVESTMENT CATEGORY NEEDS - SAFETY



Performance Index

The Safety Performance Index ranges from fair to poor across the corridor. Segments rated poor include 15.07, 15.10, and 15.12.

Performance qualifiers with poor performance include:

- Weather Related Crashes are more than the average on segments 15.07, 15.10, and 15.12.
- Alcohol Related Crashes are more than the average on segments 15.04 and 15.10
- Non-Use of Safety Restraints is more than the average on segment 15.04.
- · Crashes on Vertical Geometric Insufficient Curves are more than the average on segment 15.01.

• Crash Concentrations are rated poor on segments 15.10.

Refer to the sections below for more information.

		SAFETY							
Segment	Safety Index	Weather Related Crashes	Wildlife Related Crashes	Alcohol Related Crashes	Non-use of Safety Restraints	Horizontal Geometric Insufficiency	Vertical Geometric Insufficiency	Crash Concen- trations	
15.01	Fair	Average	Average	Average	Average	Less	More	Fair	
15.02	Fair	Average	Average	Average	Average	Less	Less	Fair	
15.03	Good	Average	Average	Less	Less	Less	Less	Good	
15.04	Fair	Less	Less	More	More	Less	Less	Good	
15.05	Good	Average	Average	Average	Average	Average	Less	Good	
15.06	Fair	Average	Average	Average	Less	Less	Average	Fair	
15.07	Poor	Average	More	Less	Less	Less	Less	Good	
15.08	Good	Average	Average	Average	Less	Less	Less	Good	
15.09	Fair	Less	Average	Average	Average	Less	Less	Good	
15.10	Poor	Less	More	More	Less	Less	Less	Poor	
15.11	Good	Less	Average	Less	Average	Less	Less	Good	
15.12	Poor	Average	More	Less	Less	Less	Less	Good	

Performance Qualifiers

Weather Related Crashes

With the exception of segment 15.01, the ratio of weather related crashes to total crashes in this corridor was below the system average. Segment 15.01 had the highest rate (34%) of crashes occurring during hazardous weather conditions, which were primarily snow, blowing snow, or blizzard conditions.

Wildlife Related Crashes

Corridor 15 has a consistently high rate of accidents that involve wildlife. Segment 15.04, in Torrington, is the one exception with only 1% of accidents involving wildlife. The remaining segments are quite high, all over 35%.

Segment 15.12 has the highest rate of accidents involving wildlife. The rating for this segment was 71%. Wildlife crashes occur along the entire 9-mile segment and primarily involve deer. Crashes occurred in all lighting conditions: dawn, daylight,

dusk, and darkness. Noticeably higher concentrations occurred near RM 253 and 254. There is no direct correlation with migration routes documented by the Wyoming Game and Fish Department.

Alcohol Related Crashes

The percentage of alcohol related crashes varies throughout the corridor, with most of the corridor segments being at or below the system average. Segments 15.11 and 15.12 did not have any alcohol related crashes. However, segment 15.04, in Torrington, had a higher rate of alcohol related crashes, and segment 15.10, between Upton and Newcastle, had the highest rate of alcohol related crashes, more than three times the system average. The locations were concentrated near RM 238 and 239.

Non-use of Safety Restraint

The ratio of crashes in which a restraint device was not worn to total crashes varies within SSC 15 from below the system average to higher than the system average. The highest percentage of crashes in which seat belts were not worn occurred in segment 15.04. In this segment, 80% of crashes had at least one occupant who was not wearing a safety restraint.

Horizontal Geometry Insufficiency

Corridor 15 has three horizontal alignments that were found to be insufficient based on the associated posted speed and an assumed emax of 8%. The horizontal alignment insufficiency was calculated along ML 85 at route markers 102.9, 132.1 and 143.6. Two crashes were recorded at the horizontal insufficiency at route marker 102.9, there were no crashes at the other two locations.

Further study will need to take place at route marker 102.9 to determine specific needs of each alignment and the constraints to which it was designed and built. The data is not clear if the crashes were directly related to geometry. However, locations with several accidents should be further studied.

Table 4 - Horizontal Geometry Insufficiency

Segment	ML Route	Route Marker	# of Crashes
15.05	ML85	102.86	2

Vertical Geometry Insufficiency

Several vertical alignments were found to be insufficient based on the associated posted speed and the length of the curve for stopping sight distance. Segment 15.01 has the most insufficient vertical alignments within the corridor. Most locations had 0 to 1 crashes near an area of vertical concern. Further study is required to determine specific needs of each alignment and the constraints to which it was designed and built.

Within segment 15.01 there was one location that had 2 crashes near a reported vertical deficiency at RM 31.5 on ML85. The data is not clear if the crash was directly related to the geometry. However, this location should be further studied. Because of the low number of crashes and funding constraints, careful consideration should be taken to find locations where there are many crashes that can be attributed to poor roadway geometry.

Table 5 - Vertical Geometry Insufficiency

Segment	ML Route	Route Marker	Curve Type	# of Crashes
15.01	ML85	31.48	SAG	2

Crash Concentrations

Crash concentrations are identified by locating spatially significant clusters of individual crash events that are of a similar severity level. The concentrations fall into one of two severity types: Critical, which consists of only "Critical" level crashes, and Other, which consists of "Severe" and "Damage" level crashes.

There are five Critical concentrations on Corridor 15, which are listed in Table 6. Additionally, there is one Other type concentration. Segment 15.10 through Torrington exhibits the most crash concentrations with 2 Critical concentrations, which occur between RM 241 and 242 and RM 237.5 and 238.3.

Table 6 - Critical Crash Concentrations

Sogmont	ML Pouto	Route Marker				
Segment	MIL ROULE	From	То			
15.01	ML85	36.8	37.7			
15.02	ML85	61.25	61.7			
15.06	ML85	112	113.3			
15.10	ML85	241	242			
15.10	ML85	237.5	238.3			

NOTE: See Appendix for maps documenting each performance qualifier.







MOBILITY – INDEX

STEP 2: ANALYSIS OF INVESTMENT CATEGORY NEEDS - MOBILITY



Performance Index

The Mobility Performance Index for SSC 15 ranges from average to better than average.

		MOBILITY							
Segment	Mobility Index	Volume to Capacity Rating	Pavement Variance Rating (L/R)	Traffic Growth	Truck Traffic Growth	Bridge Variance (L/R)			
15.01	Average	Good	Fair	Average	Average	Less			
15.02	Better	Good	Fair	Less	Average	Less			
15.03	Average	Good	Poor	Less	Average	Less			
15.04	Average	Good	Poor	Less	Average	Less			
15.05	Average	Good	Poor	Less	Less	Less			
15.06	Better	Good	Good	Less	Less	Less			
15.07	Average	Good	Fair	Average	Average	Less			
15.08	Average	Good	Good	Less	Less	Less			
15.09	Average	Good	Good	Less	Less	Average			
15.10	Better	Good	Good	Less	Less	Less			
15.11	Average	Good	Good	Average	Average	Less			
15.12	Better	Good	Fair	Average	Average	Less			

Five regional routes connect to SSC 15. The condition of each local and regional route is associated with a planning segment and directly influences the mobility of that segment. The condition of several local and regional routes is poor. There are currently two structurally deficient bridges on the local and regional routes.

SSC 15 is subject to heavy loads associated with of all the energy development in the area, as well as agricultural products equipment, and stock movement. This route fulfills an important function of connecting the smaller communities along the border with each other as well as the urban centers of Torrington and Cheyenne.

Numerous field observations of 2' shoulder widths with rumble strips were noted, as well as occasional narrower shoulders. This is only adequate for low volume highways. While most of this corridor has low traffic volumes, the minimal shoulder width does not provide adequate width for safe refuge for disabled vehicles.

Table 7 - Major Traffic Generators

Major Traffic Generators
Employment centers - Torrington, Newcastle
Energy industry truck traffic - gas/oil/wind
Agriculture/ranching - farm to market transport
Dispersed local/regional recreation on public lands - Thunder Basin National Grassland and Black Hills National Forest
Correctional Facility - Lusk and Torrington

Performance Qualifiers

Volume to Capacity Rating

The Volume to Capacity Rating reflects mobility and the quality of travel on a corridor or segment. It compares roadway demand (vehicle volumes) with roadway supply (carrying capacity). The volume to capacity rating for the entire SSC 15 is good.

Traffic Growth

The average traffic growth within the SSC System is 1.42%. The majority of segments in this corridor are below this average. Segment 15.12 has the highest average annual traffic growth rate. This segment connects the eastern limits of Newcastle to the South Dakota state line on ML44.

Table 8 - Traffic Growth

Segment	AADT 2010	Average 20 Year Growth
15.01	1,781	1.05%
15.02	1,718	0.90%
15.03	1,982	0.86%
15.04	8,504	0.80%
15.05	4,462	0.81%
15.06	957	0.69%
15.07	1,955	1.13%
15.08	848	0.36%
15.09	1,477	0.68%
15.10	1,616	0.65%
15.11	3,021	1.25%
15.12	1,753	1.77%

Truck Traffic Growth

The average truck traffic growth within the system is 1.34%. All segments of SSC 15 are below this average. The majority of the corridor is a 2-lane rural roadway classification. Segment 15.07 has the highest average annual truck growth rate. This segment is from Lusk north to Mule Creek Junction via ML85.

Table 9 - Truck Traffic Growth

Segment	AADTT 2010	% Trucks 2010	Truck Traffic Growth
15.01	267	16.14%	1.03%
15.02	234	14.71%	0.71%
15.03	332	15.99%	1.01%
15.04	622	7.16%	0.67%
15.05	510	11.92%	0.23%
15.06	168	14.86%	-0.70%
15.07	345	18.46%	1.22%
15.08	140	15.95%	-0.28%
15.09	178	10.97%	0.11%

15.10	219	14.58%	0.06%
15.11	403	17.49%	1.02%
15.12	187	10.69%	0.95%

Local and Regional Roads

Local and Regional Routes that connect to the SSC affect the Mobility Performance Indicator. These routes serve the important function of connecting rural areas to the primary routes. While traffic volumes are typically low on these secondary routes, maintaining them in acceptable condition is important to general mobility for the state. This analysis includes pavement and bridge condition as qualifiers.

Local and Regional Roads Impacting Pavement Variance Rating (L/R)

The Mobility Index may be affected by local and regional routes that have poor pavement condition as reflected by the Pavement Variance Rating (PVR). The PVR is the product of Pavement Sufficiency Rating (PSR) calculated as the deviation from the system average. Poor PSR is reported on local/regional routes associated with segments 15.03, 15.04, 15.05, and 15.07. Table 10 lists the local/regional routes with poor PSR.

Table 10 - Local/Regional Routes with Poor PSR

Cormont			Route	Marker		
Segment	Average PVR	IVIL ROULE	Begin	End	Average PSR	
15.03	1.12	ML153	0.00	1.02	2.13	
15.03	1.32	ML1602	108.84	130.20	1.93	
15.03	2.05	ML802	0.00	8.02	1.20	
15.03	1.44	ML807	0.00	14.07	1.81	
15.03	1.01	ML811	0.00	7.03	2.24	
15.04	1.54	ML805	0.00	14.28	1.71	
15.04	0.79	ML808	0.45	12.78	2.46	
15.05	1.54	ML805	0.00	14.28	1.71	
15.07	1.34	ML39	41.73	63.24	1.91	

Bridge Variance Rating (L/R)

below.

Table 11 - SSC 15 Structurally Deficient Bridges on Local/Regional Routes					
Segment	ML Route	Route Marker			
15.09	ML600	12.79			
15.09	ML2302	25.76			

NOTE: See Appendix for maps documenting each performance qualifier.

CORRIDO

The bridge variance rating for local and regional routes on SSC 15 shows 2 structurally deficient bridges. The locations of the bridges are shown in the table





STEP ω **ANALYSIS** QF PLANNING SEGMENT NEED

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- (0.26 0.76).

Environmental Overview

The Wyoming Interagency Spatial Database and Online Management System (WISDOM) was queried to identify natural resources that could be impacted by transportation projects. The following summary lists the general type of potentially impacted resources. The project development phase should investigate these resources in more detail to determine if mitigation activities are required. Please see Appendix and http://wisdom.wygisc.org/ for detailed information.

There are six different terrestrial habitat types located throughout the seven special management areas within SSC 15. Six federally listed species within the corridor fall into one of three categories, candidate, endangered, and threatened. Three big game species and fifteen raptor species are found in SSC 15. There are three different categories that fall under the aquatic habitat. There are twenty-one watersheds, three aquatic crucial priority areas, and one combined crucial priority area. See Table 12 for general locations.

Table 12 - Environmental Considerations

Category	SOUTH (I-25 - Lingle)	CENTRAL (Lingle - Newcastle)	NORTH (Newcastle - Moorcroft)
Big Game Crucial Range	na	Mule Deer	Mule Deer White-tailed Deer
Big Game Migration Route	Pronghorn Antelope	na	na
WGFD Aquatic Crucial Priority Areas SHP	Lower Lodgepole & Muddy Creeks	Niobrara Prairie Stream & Riparian Corridors	na
WGFD Terrestrial Crucial Priority Areas SHP	Shortgrass Prairie	South Black Hills	Newcastle Sagebrush-Mixed Grass Habitats within Major Sage- Grouse Complexes South Black Hills
WGFD Combined Crucial Priority Areas SHP	Goshen Hole & Lower Horse Creek	na	na
Occurrence & Distribution (Federally Listed Species)	Colorado Butterfly Plant Greater Sage Grouse Ute ladies' tresses Whooping Crane Yellow-billed Cuckoo	Black-footed Ferret Greater Sage Grouse	Greater Sage Grouse



Summary of Needs

This section summarizes needs by planning segment for each of the three performance indicators and the supporting performance qualifiers. The summary identifies overlapping needs, which provides guidance in the efficient prioritization of projects to best address deficiencies. The practice of completing projects that simultaneously address multiple needs may present cost savings as well as being most effective in improving performance indexes across the system. The summary also lists other needs in each of the three performance measurement areas. For more information about needs at the corridor level, see the maps in the appendix which compare both system level and corridor level needs.

SSC 15 needs occur in several categories: pavement condition of Local/Regional routes, mostly in the Newcastle area, plus pavement condition on the main route in Newcastle and Moorcroft; structurally deficient bridges on US 16; wildlife/vehicle crashes on US 85 north of Lusk and on US 16 in the Newcastle area; alcohol related crashes in Torrington and northwest of Newcastle along US 16; critical crashes associated with the non-use of safety restraints in Torrington; and an insufficient vertical curve associated with an area of crash concentrations north of Cheyenne.

Several environmental factors should also be considered when conducting project level planning, including a Pronghorn migration route on the southern part of the corridor and crucial Deer range in the central and northern parts of the corridor. Greater Sage Grouse are noted throughout the corridor.

Based on the needs identified in this analysis and the recommended strategies and solution sets, there is no corridor wide need to preserve or acquire additional rights of way to accommodate needed improvements. Local and specific ROW requirements based needs within the urban areas of Torrington and Newcastle should be evaluated in the Urban Areas Corridor Plan and in cooperation with local governments and planning organizations.

Overlapping Needs

Overlapping needs are identified on five segments:

- 1) 15.01 SAFETY: Insufficient Vertical Curve, Crash Concentrations
- (2) 15.04 SYSTEM PRESERVATION/SAFETY/MOBILITY: System Preservation Index, Pavement Hotspots, Pavement Variance Rating, Alcohol Related Crashes, Non-use of Safety Restraints, Pavement Variance Rating on Local/Regional Routes
- 3 15.10 - SYSTEM PRESERVATION/SAFETY: Structurally Deficient Bridges (4), Wildlife Related Crashes, Alcohol Related Crashes, Critical Crash Concentrations (2)
- 4 15.11 SYSTEM PRESERVATION: System Preservation Index, Pavement Maintenance Requirement and Pavement Variance Rating, Structurally Deficient Bridge (1)
- 5 15.12 SYSTEM PRESERVATION/SAFETY: Structurally Deficient Bridges, Wildlife Related Crashes

Other Performance Index Needs

System Preservation







15.09 - Structurally Deficient Bridge

- 15.02 Crash Concentration
- 15.06 Crash Concentration
- 15.03 Pavement Variance Rating on Local/Regional Routes
- **10** 15.05 Pavement Variance Rating on Local/Regional Routes
- 11 ML600B Structurally Deficient Bridges on Local/Regional Routes
- 12 ML2302B Structurally Deficient Bridges on Local/Regional Routes

III. SOLUTION SETS

A solutions menu was created to address the needs identified in the previous sections. This menu identifies potential solution strategies grouped by performance measure categories. The strategies are a preliminary list based on industry accepted approaches and the efforts to date of WYDOT programs to document preferred approaches. This list is not intended to be all-inclusive, but represents types of improvements that may be employed to address documented needs.

Section IV recommends how the solution sets may be efficiently grouped depending on funding availability.

Table 13 - Recommended Solution Sets to Improve Performance in Each Index

System Preservation	Safety		
Pavement Maintenance Requirement & Pavement Variance Rating Rutting Mill Mill and overlay 1S Treatments Mill and overlay Seal Coat Cleaning and sealing joints Patching pavement Micro surfacing 2S Treatments Roadway Restoration 3S Treatments Reconstruct Roadway Roadway widening Upgrade geometric design Bridge Variance Rating Bridge Replacement Channel reconstruction Cleaning and sealing bridge members Lower weight limits Restore drainage systems Scour countermeasures	Weather Related Signage Automated anti-icing systems Grooved pavement ITS Larger signs Snow berms/grading Snow fencing Warning beacons Wildlife Related Animal detection systems Animal jump-out or one-way gates ITS Remove brush from ROW Signage Warning beacons Wildlife bridge/underpass Wildlife fencing Alcohol Related Centerline rumble strips ITS Law Enforcement Media campaign Shoulder rumble strips	Horizontal Geometry Centerline rumble strips Dynamic curve warning system Guardrail Improve/restore superelevation Lighting Oversize/length restrictions Reconstruction/realignment Reduce posted speed Reflectors Shoulder rumble strips Signage Warning beacons <i>Vertical Geometry</i> Larger signs Reconstruction/realignment Reduce posted speed Reflectors Signage Warning beacons <i>Safety Restraints</i> ITS Law Enforcement Media campaign	Volume to C Traffic Grow Accelera Capacity Decelera Increase Intersect improver Multimoo Passing Shoulde Through Turn Ian Bridge Vari Bridge F Channel Cleaning member Lower al bridge Restore Scour co

Mobility

Capacity Rating & wth / Truck Traffic Growth ation lane y improvements ation lane lane width tion/interchange ments dal improvements lanes r widening h lanes

iance (L/R) Replacement I reconstruction g and sealing bridge 's Ilowable weight limits on

drainage systems ountermeasures Pavement Variance Rating (L/R)

CORRIDOR 15

Rutting Mill Mill and overlay

1S Treatments Cleaning and sealing joints Micro surfacing Mill and overlay Patching pavement Seal Coat

2S Treatments Roadway Restoration

3S Treatments Reconstruct Roadway Roadway widening Upgrade geometric design SOLUTION SETS

IV. RECOMMENDATIONS

This section describes recommendations for strategies and priorities to address corridor needs. The selected strategies address the needs described in previous sections and are organized by the three strategic performance areas: System Preservation, Safety, and Mobility. These recommendations provide information and guidance consistent with the Strategic and Long Range Plans to help WYDOT select projects in coordination with the STIP process.

The recommended strategies have been packaged into solution sets that recognize the inherent overlap that investments may have across performance areas. For example, an intersection improvement may simultaneously improve traffic flow (Mobility) and reduce crashes (Safety).

The solution sets are tiered to the three Funding Scenarios identified in the Long Range Transportation Plan. The funding scenarios describe a progressively increasing budget, with generally defined allocations to System Preservation, Safety, and Mobility. With each succeeding level of investment, additional funding is allocated to address shortfalls in performance-based goals.

- Funding Scenario 1 The continuation of program funding at current levels. Most funding is directed to System Preservation needs. System characteristics are expected to decline with inflation and increasing construction costs over time. Few major projects to address Safety, other than with specially restricted and allocated funds, or Mobility would be implemented.
- Funding Scenario 2 Funding over and above the base level would allow additional investments in pavement and bridge projects to meet WYDOT goals.
- Funding Scenario 3 Additional funding over and above Scenario 2 would allow WYDOT to maintain and improve existing conditions, achieve pavement and bridge condition goals, plus invest in major projects to improve Mobility.

Funding Scenario 1

Funding Scenario 1, defined as the continuation of current program funding, is focused primarily on addressing System Preservation needs through preventive maintenance efforts. For this corridor, the plan recommends that these funds remain allocated to preventive maintenance, along with reserving a portion to address identified safety needs. Safety needs include specific wildlife-related crash prone areas and some geometric insufficiencies. These needs may be only partially met under current funding and should be focused on areas with documented overlapping needs. Additional needs that cannot be met under Scenario 1 may be delayed pending additional funds under Scenarios 2 or 3.

- Minor surface treatments on the SSC mainline, including mill and overlay.
- Minor surface treatments on local and regional routes to extend service life.
- Bridge rehabilitation and replacement of structurally deficient bridges on the SSC mainline.
- Bridge rehabilitation on structurally deficient bridges on local and regional routes.
- Minor projects to improve safety not involving major construction, such as signage, right-of-way work, and law enforcement.

Funding Scenario 2

If sufficient funds to preserve the system in at least its current operational form are made available, WYDOT will direct funding to strengthen pavement and bridge conditions



across the system, including on local and regional routes. SSC 15 has significant needs on local and regional routes in pavement and bridge conditions. This scenario would allow investments to fully achieve WYDOT goals in the System Preservation investment category.

- Preventive maintenance could be deferred and/or advanced, depending on life cycle, as recommended by the Pavement Management System.
- Reconstruction (2S) to address geometric insufficiencies.
- Improvement of pavement condition of Local and Regional Routes, to include preventive maintenance or mill and overlay.
- Bridge rehabilitation on structurally deficient bridges on local and regional routes.
- Minor projects to improve safety not involving major construction, such as rumble strips, lighted signage, fencing, and media campaigns.

Funding Scenario 3

If additional funds are made available to WYDOT under Funding Scenario 3, opportunities would be created to address all three investment categories, thus preserving the investment and improving the overall "health" of the system. Additional funds allow project

selection to address overlapping needs, therefore investing funds most effectively. The additional funds would expand to include other items to improve performance in the Mobility Index.

- deficiencies.

- Roadway reconstruction to address deficiencies in Torrington and Newcastle.
- Intersection and signalization improvements in Torrington and Newcastle.

- impacts on migration routes or critical habitat areas.

Performance Measurement over Time

As these performance measures are continually monitored over time it will become evident how the recommended solution strategies and the selected projects address the needs of the corridor and the overall system. Addressing deficiencies documented in the corridor plan will effectively improve the System Preservation, Safety, and Mobility indexes at both the corridor and system level.

Ongoing performance measure documentation is critical to identify trends, capture the existing health of the system, and allowing an accurate forecast of the future health of Wyoming's Transportation system. The need for additional funding and/or more aggressive solutions will become evident if performance measures fail to meet WYDOT goals.

Roadway reconstruction (3S) to meet long term goals, including correction of geometric

• Roadway widening (3S), including shoulders, to better address truck traffic.

• Turn lanes, passing lanes, and other auxiliary lanes to address spot congestion and safety issues.

 Intelligent Transportation Systems (ITS) to address safety problems in areas with identified poor performance including advanced animal detection systems, alcohol use, and safety restraints. • Wildlife underpasses or overpasses in high crash locations to enhance safety of motorists and limit

REALIZING THE CORRIDOR VISION

As part of the statewide Wyoming Connects and Long Range Transportation Plan, the Corridor Vision for SSC 15 - and all SSCs - focuses on the identification of overall system performance aggregated from the evaluations of each individual corridor's "health" relative to WYDOT's long-term Strategic Goals. The identified types of investment needs (system preservation, safety, and mobility) expressed in the Corridor Vision are reflected in the three primary need indicators of this Corridor Plan. The analysis of each investment type generated goals representing corridor health issues as communicated by the planning and public process used in development of the Vision. See Wyoming **Connects:** Corridor Visions for more information.

Corridor Vision Goals

The Cheyenne to Newcastle Corridor Vision captured Key Issues and Emerging Trends of critical importance and how SSC 15 could best serve the communities it connects over the long term. While issues were identified relative to each investment type, the Primary Investment Type is System Preservation:



The primary need for the corridor is to maintain the existing system in terms of roadway pavement conditions and deficient bridges. In specific spot locations throughout the corridor, passing lanes may need to be added to accommodate the combination of increasing truck traffic, commuter traffic, and recreational travel and to improve safety.

Additional goals which reflect the full context, character, and issues of SSC 15 were set as high priority goals as indicated in Table 15. A review of these Vision Goals compared to the findings of this Corridor Plan provides for a conformance check and identifies additional issues to be considered when evaluating potential projects and implementation plans.

Corridor Visions				
Investme Categor	ent 'Y	Goal	High Priority	
System Preservati	ion	Preserve the existing transportation system	~	The corridor vision iden type. The corridor plan confirms this direction a Torrington and Newcas improvements with ove
		Support farm to market economic sustainability		By addressing system of corridor plan will help s
Safety		Reduce fatalities, injuries, and property damage crash rate	~	The corridor plan identi Implementing minor implementing minor implementing a large number of critical alcohol use, failure to u
Mobility	,	Improve public transportation opportunities		While not a high priority lesson deterioration on transportation would als elderly, and the physica

CORRIDOR PERFORMANCE

Table 16 shows SSC 15 corridor performance compared to the system. The center of each chart indicates the value of the performance index, with each section indicating the performance qualifier for each measure.

Table 16 - Corridor Performance



Index is average compared to all other corridors. Performance qualifiers had average to better than average performance across all qualifiers.

Coordination with System Priorities

The corridor comparison can be used to help assign a priority level to entire corridors, if conditions warrant. The Corridor Plans – Executive Summary is published under separate cover and provides an overview of corridor comparisons. The summary identifies areas of greatest need within all performance indexes and for performance qualifiers across the state system. By addressing these areas of greatest need, whether by program, corridor, or corridor segment WYDOT will ensure positive changes in reported conditions throughout Wyoming.

Dashboard from Corridor Visions



roads, especially in Newcastle and Torrington. Improved public so improve mobility of those without access to private vehicles, the Illy impaired.

