Wyoming Department of

Transportation



Risk and Resiliency Plan for Critical Freight

Transportation Assets



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Wyoming Department of Transportation Risk and Resiliency Plan for Freight Assets

The Federal Highway Administration (FHWA) requires risk and resiliency planning for all State Transportation Asset Management Plans (TAMP). They require only pavement and bridge analyses, leaving states to decide which other assets and performance areas to assess. This document provides an overview of risk and resilience for freight movement and its associated economic component on Wyoming Department of Transportation (WYDOT) assets.

In the past, risk and resiliency were informally addressed on WYDOT roads. The process usually depended on staffs' knowledge of the condition of roads and the history of extreme events to assess the level of risk and determine the most suitable solutions. This method doesn't formally address potentially lower cost, more effective proactive measures, and relied on the memory of staff that often retired, thus losing that all important information.

While concepts of freight's roles in economic risk and resiliency analyses have similar processes with their TAMP counterparts, they vary significantly having differing types of assets and performance processes. Figure 1 incorporates the following assets into a risk and resiliency framework for freight-related assets:

- Highways
- Railroads
- Pipelines
- Airports
- Intermodal connectors
- Ports

Each of these assets does not operate independently of each other. If the capacity is reached for one mode, operators of that asset may seek to supplement the lack in capacity by using another mode. For example, petroleum produced in a recently developed Wyoming location is hauled by truck 100 or more miles to an intermodal facility and loaded onto trains. In some cases, the trains will offload the petroleum to pipelines that are able to carry the additional capacity. The interdependence of each asset should be address in any risk and resilience plan involving freight movement to the level it may affect WYDOT controlled assets.

While WYDOT and the State of Wyoming have no ports, port facilities in other States can have significant effects on Wyoming's economy and freight movement. The risks associated with the decisions and conditions at those ports may increase or decrease the prosperity of Wyoming by reducing or increasing the cost to transport Wyoming's goods to market. For example, some West Coast states have banned the transport of coal to their port facilities causing Wyoming coal producers to find more distant and more costly alternate routes to ship coal to East Asian markets. This underscores the fact that the State is not an island unto itself and therefore WYDOT needs to remain aware of national and global trends and activities that may affect Wyoming freight movement processes.

Figure 1 outlines the WYDOT Freight Risk and Resiliency Plan. It provides the analytical steps and processes to establish critical freight infrastructure, identify the highest potential risks on critical facilities, estimate the potential cost of each risk, develop prospective mitigation actions, identify processes to create resiliency associated with each risk, and determine future actions to improve the process. WYDOT has not applied all the steps in the process, but is currently enacting an interim process using most of these steps.

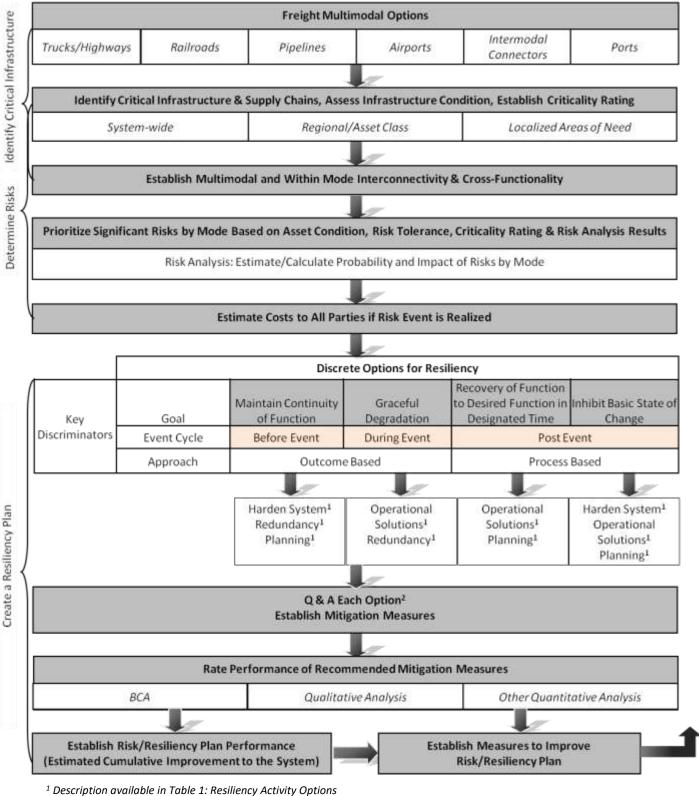


Figure 1: The WYDOT Risk and Resiliency Processes to Assess Freight Needs

² Description available in Table 2: Q & A for Each Resiliency Activity Option

The "Discrete Options for Resiliency" portion of Figure 1 is derived from the "Resilience in Transportation Planning, Engineering, Management, Policy, and Administration", NCHRP Project 20-05, Synthesis Topic 48-13 report written by The National Academies Press and was obtained from the US Department of Homeland Security.

Pipeline, rail, and intermodal transfer facilities in Wyoming are privately owned. While risks can be partially assessed for these facilities, the determination of resiliency improvement activities should remain a function of the facilities' owners. WYDOT therefore addresses those facilities only where potential resiliency activities overlap into WYDOT controlled freight assets.

How WYDOT Establishes Critical Freight Infrastructure

WYDOT's first step in performing resiliency analysis on the State's freight network is to identify all critical freight infrastructure owned by the State. While not all freight infrastructure is owned and/or under control of the State, there is still value in being aware of its potential to disrupt to WYDOT transportation assets. WYDOT assesses freight infrastructure that is not under WYDOT control only to the level necessary to determine its potential effects on WYDOT owned infrastructure if disruptions were to occur on such facilities.

Each item listed under "Freight Infrastructure Types" below has or could have interdependent relationships. For example, if capacity is limited for one type of infrastructure, producers may shift their freight transportation to another mode. In the event of a disruption, the State or private industry may seek to temporarily transfer freight to an alternative mode. The purpose of this portion of the analysis therefore is not to just identify the risks associated with each mode, but to identify potential alternative modes that may become critical should events warrant and to establish their codependent criticality. Only facilities on a fairly large scale may be assessed in this "critical facility" identification process.

Freight Infrastructure Types

WYDOT evaluates the following infrastructure types in its freight and resiliency planning.

- Highways, last-mile facilities, highway maintenance facilities, administrative facilities
- Railroads, trains and other rail facilities
- Pipelines and pipeline facilities
- Airports, airplanes and air facilities
- Intermodal facilities
- Ports (external ports and their interactions with Wyoming freight)
- Facilities at the origin or destination (producers and/or receivers)

For each freight multimodal option, critical portions of the system and individual assets are identified to reduce the process to manageable levels and focus on facilities where the consequences of failure are most extreme. WYDOT incorporates the condition and performance of assets in its decisions to determine the assets' criticality since a facility in poor condition generally has a much higher chance of failure than a facility in good condition. WYDOT will re-analyze the criticality of these infrastructure assets on a fairly regular basis since infrastructure and performance conditions can change rapidly.

Lower "critically" rated assets are removed from further analysis to reduce the list to the most serious potential problem areas and make the risk and resilience analysis process more manageable. Given the variability of potential risks and the unlikely chance that quantifiable data is available for each, qualitative- and quantitative-based criticality ratings are applied.

This report applies quantifiable measures when readily available and qualitative methods where adequate data is not available to establish asset criticality. WYDOT used the following criteria to establish these "critical facilities":

- Is the facility identified as a Key Freight Corridor in the WYDOT Freight Plan?
- Is the facility on Wyoming's National Highway Freight Network?
- Is the facility on Wyoming's National Multimodal Freight Network?
- Is the facility considered national, regional or local in nature?
- What freight volumes are transferred via the facility? (truck volumes were used)

The following are potential additional criteria for future criticality analyses:

- What level of hardships would users face in a disrupting event?
- What is the approximate quantity and value of goods transported on the facility?
- What is the time-sensitivity of the freight moved on the facility?
- What level of non-freight activity occurs on the facility?
- How critical is the facility to non-freight users?
- What other freight critical facilities depend on this facility and to what level?
- How non-transferable are the facilities freight to other modes? (consider ease of transfer, alternate mode capacity and alternate mode costs)

WYDOT used the applied criteria from Table 1 along with their weightings and the methods to determine the value of each when applied to specific freight assets. The resulting criticality index for each facility is a weighted calculation to a scale of 1 to 10. Their weightings are based on their estimated contribution to the overall criticality of freight movement.

Primary Facility Criterion	Scoring Method	Weighting
Is the facility identified as a Key Freight Corridor in the WYDOT Freight Plan?	Yes: 10 points No: 0 points	5
Is the facility on Wyoming's National Highway Freight Network?	Yes: 10 points Partially: 5 points No: 0 points	4
Is the facility on Wyoming's National Multimodal Freight Network?	Yes: 10 points Recommended: 5 points No: 0 points	1
Is the facility considered national, regional or local in nature? (Interstates = national, other NHS = regional and remaining facilities = local)	National: 10 points Regional: 5 points Local: 0 points	5
What freight volumes are transferred via the facility? (AADTT)	Values rescaled to 0 through 10 where possible 10 = very high value/quantity	10

Table 1: Scoring and Weighting Methods for Primary Critical Assets

A limited number of freight transportation facilities within WYDOT's control are deemed critical facilities to be included in risk analysis. Alternate routes are assessed for their ability to provide relief in the event of a disruption and determine the intensity of the disruption. Facilities with no or poorly performing alternate routes should receive a higher risk rating than those that have better alternate routes.

A written discussion regarding the scoring, issues, and other comments is captured for each of the selected critical facilities that exhibit high risk factors. These discussions serve as potential guidance when disruptions occur and will be used to revised future updates to these analysis procedures.

How WYDOT Identifies High Risk Critical Freight Infrastructure in Wyoming

The risk analysis estimates the probability and likely impact of the occurrence of the identified risk. WYDOT eliminates lower risk critical assets from further analysis to reduce the analysis to manageable levels. Risk analysis provides the necessary information to make the needed reductions.

Potentially high risk assets are more easily recognized and analyzed by grouping them into mode and geographical extent categories. Risks at state-wide and regional levels are often a different priority and a different nature than at a localized level. For example, a bridge may be at high risk for flood damage, but at a system-wide level the average risk of flood damage may be negligible. Therefore, there would be little value to prioritize all bridges in the state as high priority because only one location is at high risk.

Each critical freight facility that is under WYDOT control is assessed for the probability and consequence of potential risks. The following potential disrupting events may be used in the risk analysis for highway freight movement:

- 1. Funding shortfalls reducing WYDOT budget
- 2. Unexpected rapid construction and maintenance cost increases
- 3. Disruption in construction material supplies
- 4. Sudden deterioration of assets
- 5. State, National and global shifts in economic development and the movement of goods
- 6. Shift in internal or external regulations or policies
- 7. Shift in priorities
- 8. Severe winter weather
- 9. Severe flooding
- 10. Regionalized wildfires
- 11. Technology failures
- 12. Acts of terror
- 13. Shifts in the economic and employment trends within the State
- 14. Rapid upward shift in truck usage of roads, increased demand
- 15. Significant traffic congestion and delays
- 16. Seismic activity

- 17. Crashes, bridge strikes, damage to infrastructure
- 18. Significant project delays
- 19. Hazardous material spills
- 20. Environmental issues
- 21. Utility caused disruptions
- 22. Events that attract inordinate traffic volumes

The following potential disrupting events may be used in the risk analysis for air freight movement:

- 1. Prolonged or extended severe weather
- 2. Funding shortfalls reducing WYDOT budget
- 3. Rapid construction and maintenance cost increases
- 4. Rapid unexpected deterioration of assets
- 5. Local, national & global shifts in economic development and the movement of goods
- 6. Shift in internal or external regulations or policies
- 7. Movement of hub routes to more distant locations
- 8. Cost increases for air cargo services
- 9. Severe weather or other acts of nature
- 10. Technology failures
- 11. Other acts of nature
- 12. Acts of terror
- 13. Significant project delays
- 14. Airplane crashes
- 15. Loss of air cargo service to key airports
- 16. Airport facilities become functionally obsolete for air cargo

Since some of the risks identified above may not reach the high risk level to be further analyzed, they are not analyzed for resilience planning. Also, WYDOT may not have enough data to adequately evaluate certain risks.

WYDOT considers potential problems caused by or resulting to nodal facilities not shown in the list of assets when establishing risk levels and resiliency needs. These facilities may include refineries, agricultural facilities, mining facilities, or forestry and timber facilities. While quantitative analyses are not always possible for these types of facilities due to the lack of applicable information and the excessive resources it would take to perform, they are recognized in the process as influential to freight risk and resiliency.

The Risk Analysis Process

WYDOT compares the list of potential risks to each facility to see if the risk is applicable and is significant enough to assume the possibility that such events might occur on that facility in the future. Only risks categorized as "High" are analyzed in the risk analysis process. After all risks are established for each facility, WYDOT collects any applicable data associated with the risks for the normal condition and forecast condition associated with disruptions. One or more levels of disruption per risk type may be assessed for a single facility and the facility may therefore receive multiple risk ratings. Table 2 shows the measures, risk criteria, and risk scoring measures used in the analysis.

Measure	Probability Criteria	Consequence	Measure Scoring	Risk Measures
Bridge Strikes	Bridge strikes since 1994	Criteria AADT on the route carried by the bridge(s)	NA	Probability and consequence use a range of 1 to 5 based on percentile
Flood Damage to Bridges	 Flood event capacity Stream flow variability Scour critical PM2 condition score County flood frequency score 	 County flood consequence score Detour delay score Deck area score 	Weightings 1) Flood event capacity: 10 2) Stream flow variability: 5 3) Scour: 10 4) PM2 score: 3 5) County flood frequency: 4 6) County flood consequence: 3 7) Detour delay: 10 8) Deck Area: 3	ranking. Probability and consequence use a range of 1 to 5 based on percentile ranking.
Winter Weather	 Closure frequency (from freight plan) Non-closure winter weather delay (from travel time data) converted to frequency equivalent 	 Closure duration (from freight plan) Non-closure delay costs (derived from travel time data) 	Probability measures for non-closure delay were converted to equivalent hours of closure and summed with hours of closure. Consequence measures were converted to costs of truck delay and summed.	Probability and consequence use a range of 1 to 5 based on percentile ranking.
Light High Profile Vehicle Blowover Risk	Light high profile blowover frequency (from freight plan)	Light high profile blowover duration (from freight plan) times AADTT	Probability is the number of light high profile vehicle closures. Consequence is the total annual hours of truck delay for light high profile vehicles (includes all trucks since no data were available for the number of light high profile vehicles)	Probability and consequence use a range of 1 to 5 based on percentile ranking
Non- attainment Area Creation Risk by County	WY DEQ monitoring data for: 1) PM 10 2) PM 2.5 3) Nitrous oxide 4) Ozone	1) County population	For probability calculated the most current level of pollutants compared to exceedance levels using the highest readings of each site within the county.	Probability and consequence use a range of 1 to 5 based on percentile ranking
Non- attainment Area Creation Risk by Critical Road Segments	 Average pollutant level (see above) for each pollutant. Maximum pollutant level (see above) for each pollutant. Total delay for each road segment (see "Winter Weather" section). 	1) County population	 For probability: calculated the percentile ranking for each measure into percentages. averaged the pollutant level percentiles then averaged the result with the delay measure percentiles. 	Probability and consequence use a range of 1 to 5 based on percentile ranking

 Table 2: Risk Analysis Scoring Schema for Establishing Risk "Probability" and "Consequence"

The probability of a disruptive event occurring may be based upon the type of event, the temporal nature of the event, the location of the affected facility, and a variety of other possible conditions. The probability a future disruptive event may best be approximated using the history of such events. WYDOT

uses this history to apply a probability of the event reoccurring. A value of 1 to 5 is assigned to the facility based on the event type's frequency.

The consequence and probability scores are compared to the matrix in Table 3 to determine whether the risk is low, moderate or high. High risk, critical facilities are forwarded for the development of various resiliency improvement proposals.

			Consequence											
_		1	4	5										
	1	L	L	L	L	М								
Probability	2	L	L	М	М	М								
bab	3	L	М	М	н	H								
Pro	4	L	М	н	н	H								
	5	М	М	H	H	H								

Table 3: Risk Determination Matrix

Prioritized Critical Highway Freight Facilities

WYDOT prioritizes each critical asset based on its criticality rating, condition/performance and risk analysis results for inclusion in resiliency planning. WYDOT applies a more thorough and comprehensive resiliency analysis process to the higher priority critical assets. The prioritization process combines the risk results, condition, and the facilities' criticality ratings. In this case, each variable is equally weighted to calculate a composite priority grade and score. The high ("H") priority locations are more thoroughly assessed in the resiliency analysis.

WYDOT assesses each high priority critical asset for its connectivity to other facilities, its adequacy to provide the desired relief from the extreme event's effects, and its resistance to cascading issues over a wider cross-section of the system. This may include determining whether transferring traffic to another mode is reasonable, improving the facility is cost-effective, and/or establishing operational plans for action during the disrupting event.

The "Discrete Options for Resiliency" table in Figure 1 organizes resiliency processes into resiliency response types or goals, and temporal performance of the processes (event cycle). WYDOT categorizes each goal/event cycle into the potential resiliency improvement types. Descriptions of those resiliency improvement types are shown in Table 4. For each high priority critical asset, each of these improvement types is assessed for applicability as a proposed solution type and against each corresponding question in Table 5.

Table 4: Resiliency Activity Options

Resiliency Activity	Description
Harden the System	Improve the condition and resiliency of the asset or corridor to withstand more severe events.
Create Redundancy	Identify or build flexible alternative routes and/or modes.
Operational Solutions	Repair and/or mitigate the undesirable conditions during and after the extreme event.
Planning	Establish advanced decisions and processes to effectively address future risk events. Assess and revise past activities as needed.

Table 5: Q & A for Each Resiliency Activity Option

Harden System	Create Redundancy	Operational Solutions	Planning
		Solutions	
 Where are the weakest points in the facility? What improvements can be made to the facility to resist deterioration during extreme events? How much better will the facility perform during extreme events if the improvement is implemented? Will the improvement last through the life- 	 What potential redundant facilities exist? Do we have proper approvals to use the redundant facilities? What event duration is expected? Does the redundant facility provide adequate temporary capacity? Are the redundant facilities structurally capable to handle the proposed traffic for the duration of the event and subsequent remediation? Are there proper plans and infrastructure in place to efficiently use the redundant facility such as communication to users and operators, other agencies, communication to landowners along the route, etc.? 	 Who should be involved in the operational activities? Who should take the lead? What resources are needed? What event duration is expected? What conditions define "back to normal"? How effectively and efficiently will the operational solution improve conditions during and after the 	 Who should be involved in the planning and decisions associated with the remediation of the event? Who should take the lead? What resources are there available? Which solutions provide the best performance outcome and which provide the most cost-effective outcome? What does recovery look like? What are the benefits versus costs of each proposed solution? What are the social, economic, and environmental outcomes of each solution? How does each proposed solution compare to all the other
cycle of the asset? 5. What are the costs and life-cycle costs of the proposed improvement?	 Are the proper plans in place to return traffic to the affected facility? Will the use of the redundant facility be overly costly to WYDOT or others? 	event? 7. Can ITS or other technological solutions be applied?	 solutions? 9. Which solutions provide expected consistency to users? 10. Who should be involved in the planning processes? 11. What criteria should define success or failure?

- 3. What is the history of this extreme event in this area?
- 4. What are social and economic implications of the resiliency decision?

Some of the questions in Table 5 are applicable to more than one resiliency activity option and should therefore be considered for each option.

WYDOT rates multiple proposed solutions for each high risk facility to estimate their comparative performance. Various analysis methods relevant to the risk type are created and performed as part of the process. The highest performing solutions are captured in the resiliency plan. The results of each highest rated solution is combined to assess the estimated cumulative effect of the plan and used to establish improvements to future risk and resilience plan revisions and expansions. Expansion may require seeking out third party data sources and/or developing additional knowledge, information and data in-house.

Resiliency recommendations are provided to project development decision-makers to be included in project development and project selection process. Each potential project is assessed for asset conditions, user needs and resiliency potential.

Critical Highway Freight Corridors

The freight corridors shown in Table 6 were selected for criticality analysis based on their existence as a Key Freight Corridor in the Freight Plan, as a part of the National Highway Freight Network, or as a part of the National Multimodal Freight Network. Additional selection criteria included truck traffic volumes (AADTT) and whether they serve mostly National, Regional of Local interests. Only Interstate highways were considered National, while Regional included only non-Interstate NHS routes.

					National		Does the facility primarily
				Key WY	Highway Freight	National Multimodal	serve National (N),
	From		Truck	Freight	Network	Freight Network (R=	Regional (R) or Local (L)
acility	RM	To RM	AADT	Corridor	(P=partial)	recommended)	interests?
5th Street	100.84	101.14	1250		X	Х	
A-209-2	5.02	5.087	NA		X	X	
Burlington Tr	101.35	101.79	NA		X	X	
Campstool Rd	0.08	5.02	166		X	X	L
Campstool Wy	0	0.265	459		Х	Х	L
Casper Future	0	4.987	NA		Х	Х	L
Christensen Rd	0	0.58	440		Х	Х	L
Christensen Rd	0.416	0.926	NA		Х	Х	L
College Dr	0	6.873	483		Х	Х	R
CR 927	0	0.214	120		Х	Х	L
Fox Farm Rd	0	1.84	282		Х	Х	L
Greeley Hwy	3.538	8.472	512		Х	Х	R
High Plains Rd	100	103.14	7		Х	Х	L
I 80 Service Rd	0	1.382	862		Х	Х	L
I-25	0	300	1515	Х	Х	Х	Ν
1-80	0	402	6041	Х	Х	Х	Ν
1-90	0	207	858	Х	Х	Х	Ν
Lincolnway	358.01	361.44	619		Х	Х	L
Logan Av	100.30	100.71	522		Х	Х	L
Morrie Avenue	99.661	100.49	NA		Х	Х	L
Nationway	101.19	103.18	359		Х	Х	L
Round Top Rd	0	1.81	176		Х	Х	L
Casper Bypass	0	2.9	1040		Х	Х	R
US 20-26	0	0.087	158		Х	Х	R
US 20-26	0.087	2.34	202		Х	Х	R
US 20-26	4.518	11.733	588		Х	Х	R
US-191	0	110	418	х		R	R
US-20/US-26	0	100	385	Х	Р	R	R
US-20/WY-789	100	257	301	Х		R	R
US-26	0	38	288	Х		R	R
US-26	48	56	435	Х		R	R
US-26/WY-789	104	127	556	Х		R	R
US-287	0	44	506	Х		R	R

Table 6: Corridors Evaluated for Potential Critical Freight Corridors

US-30	0	100	836	Х	х	R	R
US-85	17	230	267	Х		R	R
Venture Drive	105.98	107.07	NA		Х	Х	L
Waterford	98.664	99.549	7		Х	Х	L
WY 220	0	0.04	NA		Х	Х	R
WY 220	113.36	117.21	627		Х	Х	R
WY 253	0	0.56	680		Х	Х	L
WY 254	1.336	4.06	568		Х	Х	L
WY 258	7.85	18.289	624		Х	Х	L
WY 258	18.289	18.44	720		Х	Х	L
WY 505	186.88	187.88	181		Х	Х	L
WY-220	44	117	711	Х	Р	R	R
WY-59	0	112	643	Х		R	R

WYDOT scored critical freight corridors using the schema in Table 7. The weightings were set based on the perceived impact of each criterion on the importance of the freight route.

 Table 7: Criteria for Scoring Critical Freight Routes

Criterion	Scoring Method	Weighting
Is the facility identified as a Key Freight Corridor in the WYDOT Freight	Yes: 10 points	5
Plan?	No: 0 points	
Is the facility on Wyoming's National Highway Freight Network?	Yes: 10 points	4
	Partially: 5 points	
	No: 0 points	
Is the facility on Wyoming's National Multimodal Freight Network?	Yes: 10 points	1
	Recommended: 5 points	
	No: 0 points	
Is the facility considered national, regional or local in nature?	National: 10 points	5
	Regional: 5 points	
	Local: 0 points	
AADTT	Values rescaled to 0 through 10	10
	where possible	
	10 = very high value/quantity	

WYDOT selected the highest scoring 25% of all assessed corridors for risk analysis. They are shown in Table 8.

Table 8: The Highest 25% of Critical Freight Corridors

	<u> </u>	From			
Rank	Facility	RM	To RM	Miles	Score
1	I-80	0	402	402	10
2	I-25	0	300	300	7
3	1-90	0	207	207	6.56
4	US-30	0	100	100	5.35
5	WY-220	44	117	73	4.47
6	US-20/US-26	0	100	100	4.25
7	Casper Bypass	0	2.9	2.9	3.69
8	WY-59	0	112	112	3.62
9	US-26/WY-789	104	127	23	3.56
10	US-287	0	44	44	3.53
11	US-26	48	56	8	3.48
12	US-191	0	110	110	3.47
		TOTAL MIL	ES:	1481.9	

Risk Analysis and Resiliency Action Plans

The risk analysis estimates the risks to assets based on the probability of a disrupting event and the consequence of the hazard if it were to occur. This process uses the matrix in Table 3 to assign high, medium or low risk levels.

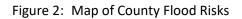
WYDOT created resiliency action plans to prioritize high risk locations. The resiliency action proposals fit into three temporal categories; 1) before the event, 2) during the event, and 3) after the event. They include the activity types shown in Table 4.

Bridge Flooding Resiliency

Bridge Flood Risks

WYDOT performed bridge flooding risk analyses over regional and individual asset scales. Flood risks were estimated using flood histories by county, and were obtained from the *"Wyoming Multi-Hazard Mitigation Plan"* Wyoming Office of Homeland Security, June 2011. Probability scores were calculated using the number of flooding events on the applicable stream since the last dam was built. Consequence scores were estimated per event based on their descriptions of the past flood events. Figure 2 is a flood risk map created from that analysis.

Stream flow flood event levels were assessed for individual bridges on the critical freight routes where adequate USGS stream flow data were available. Annual peak flows were extracted for each bridge location and graphed into flood return interval hydrographs using the Gumbel Distribution method (see https://serc.carleton.edu/hydromodules/steps/166250.html. Flood risks were assessed for the bridges in Table 9.



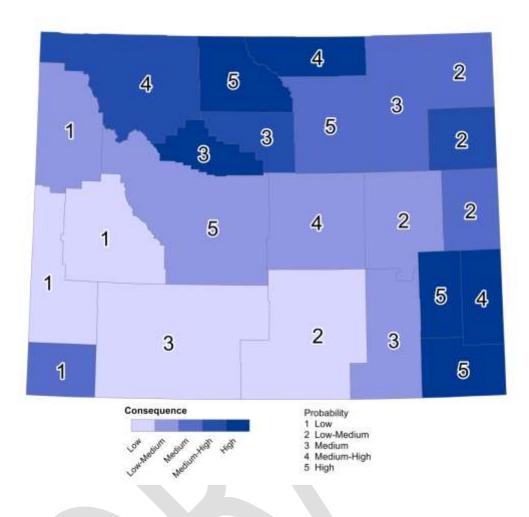


 Table 9: Flood Return Interval and Stream Flow Variability for Significant Bridges on the Critical Freight Corridors

						Flood Event										
Stream Name	Facility		Bridge ID 1	•	10-yr	20-yr	30-yr	40-yr	50-yr	60-yr	70-yr	80-yr	90-yr	100-yr	200-yr	% Stream Flow Variability
Crow Creek	I-25	10.37	AAZ	AAY	347	466	536	585	623	654	681	704	724	742	861	114%
N. Platte River	I-25	125.52	CZT	czs	10739	13477	15079	16216	17097	17817	18426	18954	19419	19836	22574	85%
N. Platte River	I-25	188.34	DKW	AIJ	6962	7635	8029	8308	8525	8702	8852	8981	9096	9198	9871	32%
N. Platte River	I-25	188.34	DKW	AIJ	6622	7852	8572	9083	9479	9802	10076	10313	10522	10709	11940	62%
M.F. Powder River	I-25	253.96	AKI	АКН	733	900	997	1066	1120	1164	1201	1233	1261	1287	1454	76%
N.F. Powder River	I-25	258.98	AKN	AKM	410	511	570	612	645	672	694	714	731	746	847	82%
Clear Creek	I-25	299.17	ALV		972	1170	1285	1367	1431	1483	1527	1565	1599	1629	1827	68%
Bear River	1-80	5.91	AMM	AML	2904	3481	3819	4059	4245	4397	4526	4637	4735	4823	5401	66%
Blacks Fork	I-80	44.85	ANV	ANU	1899	2390	2678	2882	3040	3169	3278	3373	3457	3531	4023	86%
Blacks Fork	I-80	77.48	AOS	AOR	5590	7127	8026	8664	9158	9563	9904	10200	10461	10695	12232	91%
Green River	1-80	86.38	APA	AOZ	12600	15617	17382	18635	19606	20400	21071	21652	22165	22624	25641	80%
N. Platte	I-80	229	LCQ	AUK	11975	14469	15928	16963	17766	18422	18977	19457	19881	20260	22754	69%

			-													
Rock Creek	1-80	258.95	AVD	AVC	1418	1676	1827	1934	2017	2085	2142	2192	2236	2275	2533	60%
Laramie River	1-80	312.44	AXK	AXJ	1860	2299	2556	2738	2880	2995	3093	3178	3252	3319	3758	78%
Crow Creek	I-80	363.87	DCA	DBZ	324	435	500	546	582	611	636	657	676	693	804	114%
Tongue River	1-90	15.01	BBA	BAZ	3700	4583	5100	5466	5751	5983	6179	6350	6500	6634	7517	79%
Goose Creek	1-90	20.59	BBK	BBJ	2255	2790	3103	3325	3498	3639	3758	3861	3952	4033	4569	79%
Clear Creek	1-90	58.38	BDI	BDH	972	1170	1285	1367	1431	1483	1527	1565	1599	1629	1827	68%
Crazy Woman Creek	1-90	73.18	BEC	BEB	1465	1907	2165	2348	2490	2606	2704	2789	2864	2931	3373	100%
Powder River	1-90	88.98	BEU	BET	8016	10526	11995	13037	13846	14506	15064	15548	15975	16356	18867	104%
Belle Fourche River	1-90	152.92	BGT	BGS	2443	3255	3729	4066	4328	4541	4722	4878	5016	5140	5952	110%
Sand Creek	1-90	205.35	DHQ	DHP	255	338	387	422	449	471	490	506	520	533	616	109%
Wind River	US26/ WY789	123.43	LCU		17433	21993	24660	26552	28020	29220	30234	31112	31887	32580	37140	87%
Blacks Fork	US-30	95.55	JBC		5590	7127	8026	8664	9158	9563	9904	10200	10461	10695	12232	91%
North Platte River	WY-59	0.71	FDB		6962	7635	8029	8308	8525	8702	8852	8981	9096	9198	9871	32%
Sweetwater River	WY- 220	62.73	BUD		1627	2071	2331	2515	2658	2775	2874	2959	3035	3102	3546	91%
North Platte River	WY- 220	94.33	LIK		5240	6055	6531	6869	7132	7346	7527	7684	7822	7946	8761	52%
North Platte River	WY- 220	116.41			5240	6055	6531	6869	7132	7346	7527	7684	7822	7946	8761	52%

WYDOT plotted a best-fit logarithmic trend and the resulting trend line equation for each graph. The equation was used to estimate various flood events. The Figure 3 graph is an example of the return interval hydrographs.

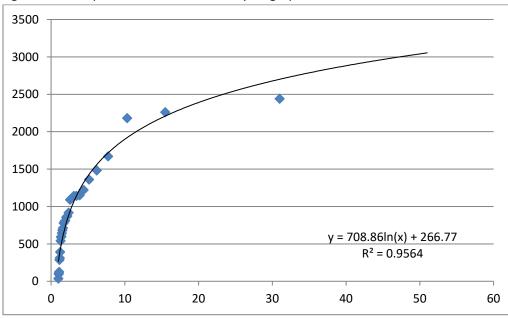


Figure 3: Example of a Return Interval Hydrograph

Each variable was weighted according to its assumed potential to measure forecast bridge damage during a flood. Table 10 shows the weightings.

	Probability	Consequence
Designed Bridge Capacity	10	
Stream Flow Variability	5	
Scour Critical Rating	10	
Bridge Condition	3	
County Flood Analysis Probability Rating	4	
Delay on Nearest Detour		10
Bridge Deck Area		3
County Flood Analysis Consequence Rating		3

 Table 10:
 Weighting Factors for Bridge Flood Risk Variables

The following are descriptions of the columns provided in Table 10 (Table 11 shows the comparable scores):

Probability Ratings

- Designed Bridge Capacity: A weighting given to the bridge's design to withstand certain flood events. For example, "the bridge is designed to withstand a 25-year flood event".
- Stream Flow Variability: A percentage measuring how inconsistent the flows of the stream the bridge spans. Typical stream flow data were taken from the time the last upstream dam was built.
- Scour Critical Rating: A weight value based on its NBI Scour Critical Rating.
- Bridge Condition: A weighting value given to the bridge measure based on the FHWA PM2 performance measure for the condition of the bridge.
- County Flood Analysis Probability Rating: A weighting based on the historical frequency of flooding in the county it is located.

Consequence Ratings

- Delay on the Nearest Detour: A weighting based on the detour length and number of vehicles detoured if the bridge were to fail from flooding. This measure assumes the flooding will also cause the closure of nearby parallel bridges on the same stream.
- Bridge Deck Area: A weighting based on the size of the bridge. The measure assumes that larger bridges will take longer to repair than shorter bridges.
- County Flood Analysis Consequence Rating: A weighting based on the historical damage from flooding in the county it is located.

WYDOT categorized bridge flood risks into High, Medium or Low for each bridge. Only "High" risk bridges were forwarded for further resiliency planning. Table 11 shows the results of the bridge flood risk analysis.

Table 11: Risk Results for Bridge Flood Locations

Stream Name	Facility	RM	Bridge ID	Capacity Score	Variability Score	Scour Score	Condition Score	County Probability	County Consequence	Detour Delay Score	Deck Area Score	Probability Score	Consequence Score	Probability Rating	Consequence Rating	Risk Rating
N. Platte River	I-25	125.52	CZT	87	20	20	30	40	30	70	30	197	130	3	5	Н
S.F. Powder River	I-25	246.3	AJW	87	25	20	27	40	18	50	21	199	89	4	3	Н
Blacks Fork River	I-80	77.48	AOS	87	35	20	27	24	6	90	18	193	114	3	4	Н
Blacks Fork River	I-80	77.48	AOR	87	35	20	27	24	6	90	18	193	114	3	4	Н
Crazy Woman Creek	1-90	73.18	BEC	87	40	20	18	40	18	50	12	205	80	4	3	н
Crazy Woman Creek	1-90	73.18	BEB	87	40	20	18	40	18	50	12	205	80	4	3	н
Powder River	1-90	88.98	BEU	87	45	20	18	40	18	50	27	210	95	5	3	Н
Powder River	1-90	88.98	BET	87	45	20	18	40	18	50	27	210	95	5	3	Н
Wind River	US26/ WY789	123.43	LCU	100	35	20	3	40	12	80	27	198	119	4	4	Н
Crow Creek	I-25	10.37	AAZ	87	45	20	18	40	30	40	3	210	73	5	2	М
Crow Creek	1-25	10.37	AAY	87	45	20	27	40	30	40	3	219	73	5	2	М
N Laramie River	1-25	87.03	AEB	87	15	20	18	40	30	70	12	180	112	2	4	М
N Laramie River	1-25	87.03	AED	87	15	20	27	40	30	70	0	189	100	2	3	М
N. Platte River	I-25	125.52	CZS	87	20	20	18	40	30	70	30	185	130	2	5	М
N. Platte River	I-25	188.34	DKW	87	5	50	27	32	12	30	30	201	72	4	2	М
N. Platte River	I-25	188.34	AIJ	87	5	50	27	32	12	30	24	201	66	4	2	М
S.F. Powder River	I-25	246.3	AJV	87	25	20	18	40	18	50	21	190	89	3	3	М
Green River	1-80	86.38	APA	87	30	20	18	24	6	90	21	179	117	2	4	М
N. Platte	I-80	229	LCQ	87	15	20	3	16	6	100	21	141	127	1	5	Μ
N. Platte	I-80	229	AUK	87	15	20	18	16	6	100	21	156	127	1	5	М
Crow Creek	I-80	363.87	DCA	87	50	20	3	40	30	30	6	200	66	4	2	М
Crow Creek	I-80	363.87	DBZ	87	50	20	3	40	30	30	6	200	66	4	2	М
Tongue River	1-90	15.01	BBA	87	30	20	18	32	30	80	21	187	131	2	5	М
Tongue River	1-90	15.01	BAZ	87	30	20	18	32	30	80	24	187	134	2	5	М
Belle Fourche River	1-90	152.92	BGT	87	40	20	27	16	18	70	15	190	103	3	3	М
Belle Fourche River	1-90	152.92	BGS	87	40	20	27	16	18	70	15	190	103	3	3	М
Blacks Fork River	US-30 WY-	95.55	JBC	100	35	20	18	24	6	60	12	197	78	3	2	М
Sweetwater River	220	62.73	BUD	100	35	20	27	32	12	60	3	214	75	5	2	М
M.F. Powder River	I-25	253.96	AKI	87	15	20	27	40	18	40	18	189	76	2	2	L
M.F. Powder River	I-25	253.96	AKH	87	15	20	27	40	18	40	18	189	76	2	2	L
N.F. Powder River	I-25	258.98	AKN	87	25	20	18	40	18	10	3	190	31	3	1	L
N.F. Powder River	I-25	258.98	AKM	87	25	20	3	40	18	10	3	175	31	1	1	L
S Fork Crazy Woman Creek	I-25	278.26	AKZ	87	25	20	18	40	18	0	9	190	27	3	1	L
S Fork Crazy Woman Creek	I-25	278.26	AKY	87	25	20	18	40	18	0	9	190	27	3	1	L

M Fork Crazy	1.05	070 50		07	05	00	40	40	40	0	45	400	22	_		
Woman Creek	I-25	279.56	ALD	87	25	20	18	40	18	0	15	190	33	3	1	L
M Fork Crazy Woman Creek	I-25	279.56	ALC	87	25	20	18	40	18	0	15	190	33	3	1	L
Clear Creek	I-25	299.17	ALV	87	10	20	0	40	18	0	0	157	18	1	1	L
Bear River	I-80	5.91	AMM	87	10	20	27	8	18	60	27	152	105	1	4	L
Bear River	I-80	5.91	AML	87	10	20	27	8	18	60	27	152	105	1	4	L
Blacks Fork River	I-80	44.85	ANV	87	30	20	27	8	18	80	6	172	104	1	4	L
Blacks Fork River	I-80	44.85	ANU	87	30	20	30	8	18	80	6	175	104	1	4	L
Green River	I-80	86.38	AOZ	87	30	20	3	24	6	90	21	164	117	1	4	L
Rock Creek	I-80	258.95	AVD	87	5	20	18	16	6	90	3	146	99	1	3	L
Rock Creek	I-80	258.95	AVC	87	5	20	18	16	6	90	3	146	99	1	3	L
Laramie River	I-80	312.44	AXK	87	20	20	18	24	12	20	15	169	47	1	1	L
Laramie River	I-80	312.44	AXJ	87	20	20	18	24	12	20	15	169	47	1	1	L
Goose Creek	I-90	20.59	BBK	87	25	20	3	32	30	20	12	167	62	1	1	L
Goose Creek	I-90	20.59	BBJ	87	25	20	18	32	30	20	12	182	62	2	1	L
Clear Creek	I-90	58.38	BDI	87	10	20	18	40	18	10	9	175	37	1	1	L
Clear Creek	I-90	58.38	BDH	87	10	20	18	40	18	10	9	175	37	1	1	L
Sand Creek	I-90	205.35	DHQ	87	45	20	30	16	18	30	9	198	57	4	1	L
Sand Creek	I-90	205.35	DHP	87	45	20	30	16	18	30	9	198	57	4	1	L
Big Sandy River	US-191	40.8	BRL	100	5	20	18	24	6	60	0	167	66	1	2	L
North Platte River	WY- 220	94.33	LIK	100	5	20	18	32	12	80	24	175	116	1	4	L
North Platte River	WY- 220	116.41	BUN	100	5	50	18	32	12	20	24	205	56	4	1	L
North Platte River	WY-59	0.71	FDB	100	5	20	30	32	12	0	27	187	39	2	1	L

Table 12 shows the results of prioritizing all the high risk rated bridges. WYDOT prioritized these bridges by their risk ratings, bridge conditions and critical freight corridor rank. While resiliency analysis is performed and action plans created for all the bridges listed in Table 12, those with the "H" priority rating are proposed for more thorough mitigation, action development and resiliency planning than are lower rated bridges.

Stream Name	Facility	RM	Bridge ID	Risk Score	Condition Score	Criticality Ranking	Risk Grade	Condition Grade	Criticality Grade	Composite Grade	Priority Score	Priority Rating
N. Platte River	I-25	125.5	CZT	15	30	2	4	5	4	4.3	1	Н
Blacks Fork River	I-80	77.5	AOS	12	27	1	1	4	5	3.3	2	Н
Blacks Fork River	I-80	77.5	AOR	12	27	1	1	4	5	3.3	2	Н
S.F. Powder River	I-25	246.3	AJW	12	27	2	1	4	4	3.0	4	М
Powder River	I-90	89.0	BEU	15	18	3	4	2	3	3.0	4	М
Powder River	I-90	89.0	BET	15	18	3	4	2	3	3.0	4	М
Wind River	US26/WY789	123.4	LCU	16	3	6	5	1	1	2.3	7	L
Crazy Woman Creek	I-90	73.2	BEC	12	18	3	1	2	3	2.0	8	L
Crazy Woman Creek	I-90	73.2	BEB	12	18	3	1	2	3	2.0	8	L

Table 12: Prioritized List of "High" Flood Risk Rated Bridges

Bridge Flood Action Plans

Action plans were created for each high risk bridge on the critical freight network (see Appendix A for the full action plans). Table 13 shows the potential actions to mitigate each bridge flood risk and the priority for each action.

Bridge ID	Stream Name	Facility Carried	RM	Priority Rating	Potential Actions	Action Priority	Comments
CZT	N. Platte River	I-25	125.5	Η	Replace with a higher capacity bridge. Upgrade approaches accordingly. See if additional scour-related improvements can	3 2	Too expensive. Wait until bridge condition warrants replacement. Scour Critical = 8. No significant issue
					be added. Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	1	with scour protection. Appears to be the most cost-effective solution. Disruption to freight not extreme. Should plan alternative routing.
AOR, AOS	Blacks Fork River	I-80	77.5	Н	Replace with higher capacity bridges. Upgrade approaches accordingly.	3	Too expensive. Wait until bridge conditions warrant replacement.
					See if additional scour-related improvements can be added.	2	Scour Critical = 8. No significant issue with scour protection.
					Repair the bridges following each incident. Establish and enact reroute procedures in the event the bridges are closed.	1	Appears to be the most cost-effective solution. Should plan alternative routing.
AJW	S.F. Powder	I-25	246.3	М	Replace with a higher capacity bridge(s). Upgrade approaches accordingly.	3	Too expensive. Wait until bridge condition warrants replacement.
	River				See if additional scour-related improvements can be added.	2	Scour Critical = 8. No significant issue with scour protection.
					Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the bridge(s) is closed.	1	Appears to be the most cost-effective solution. Disruption to freight not extreme. Should plan alternative routing.
BET, BEU	Powder River	I-90	89	М	Replace with higher capacity bridges. Upgrade approaches accordingly.	3	Too expensive. Wait until bridge conditions warrants replacement.
					See if additional scour-related improvements can be added.	2	Scour Critical = 8. No significant issue with scour protection.
					Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the bridge(s) is closed.	1	Appears to be the most cost-effective solution. Disruption to freight not extreme. Should plan alternative routing.
LCU	Wind River	US26/ WY789	123.4	L	Replace with a higher capacity bridge. Upgrade approaches accordingly.	3	Too expensive. Wait until bridge condition warrants replacement.
					See if additional scour-related improvements can be added.	2	Scour Critical = 8. No significant issue with scour protection.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	1	Appears to be the most cost-effective solution. Disruption to freight not extreme. Should plan alternative routing.
BEB, BEC	Crazy Woman	I-90	73.2	L	Replace with higher capacity bridges. Upgrade approaches accordingly.	3	Too expensive. Wait until bridge condition warrants replacement.
	Creek				See if additional scour-related improvements can be added.	2	Scour Critical = 8. No significant issue with scour protection.
					Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the bridges are closed.	1	Appears to be the most cost-effective solution. Disruption to freight not extreme. Should plan alternative routing.

Table 13: Action Plan Summary for "High" Flood Risk Rated Bridges

Bridge Strike Resiliency

Bridge Strike Risks

Bridge strikes (collisions with bridges from over-height loads) do not typically create a need for lengthy detouring of traffic when they occur on bridges crossing <u>over</u> the critical facility. In this case, WYDOT will often close the bridge until repairs are made. Bridge strikes to bridges that <u>carry</u> the critical facility can create significant delays to traffic particularly when no parallel facility is available. WYDOT assessed only those bridges that carry the critical routes for resiliency planning.

WYDOT collected bridge strike records for the years 1994 through 2017 or beginning from when the bridge was built if after 1994. The number of bridge strikes represents the probability, and truck volumes for the potential consequence of future bridge strikes. Paired bridges on Interstate highways were treated as a single bridge for the analysis since the second bridge usually poses the same hazard as the struck bridge. Table 14 shows the forecast risks of bridge strikes on the critical corridors. The bridges are paired on Interstate and adjacent parallel routes carrying the same crossing facility.

		n bridge S	Bridge				
Bridges	LRS_ID	RM	Strikes	AADTT	Probability	Consequence	Risk
ATO, ATN	I-80	210.99	3	3412	4	5	Н
КЈС, КЈВ	I-80	219.84	2	3556	4	5	Н
AYR, AYS	I-80	357.68	2	3557	4	5	Н
ASP, ASQ	I-80	187.19	4	2830	5	4	Н
ANH	I-80	23.8	2	2938	4	4	Н
AOQ	I-80	77.31	3	3293	4	4	н
AOX, AOY	I-80	85.35	3	3293	4	4	Н
AQZ	I-80	130.84	3	2830	4	4	Н
ARN	I-80	146.85	2	2830	4	4	н
ASV	I-80	196.16	2	2844	4	4	Н
AUR	I-80	235.21	2	2984	4	4	н
AVG	1-80	260.24	2	2984	4	4	Н
LBN	I-80	313.19	2	2984	4	4	Н
AGI, AGH	I-25	146	15	1016	5	3	Н
AGX, AGY	I-25	160.87	4	1016	5	3	н
FDH, FDG	I-25	188.60	5	1045	5	3	Н
AAS, AAR	I-25	8.84	3	2314	4	3	н
ABC	I-25	10.59	3	1391	4	3	н
ADD	I-25	57.65	2	1044	4	3	н
AFY	I-25	137.56	2	1016	4	3	Н
AGC	I-25	139.76	2	1016	4	3	Н
AGW, AGV	I-25	156.18	2	1016	4	3	Н
АНО, АНР	I-25	175.59	2	1016	4	3	Н
AIH	I-25	188.19	3	1016	4	3	Н
AZW	I-80	383.3	3	2431	4	3	н

Table 14: Risk Results for Bridge Strikes

ATI	I-80	206.18	1	3412	1	5	м
ATM	I-80	209.46	1	3412	1	5	М
ATS	I-80	212.73	1	3412	1	5	М
ATW	I-80	215	1	3556	1	5	м
KHZ	I-80	219.59	1	3556	1	5	м
AXU	I-80	326.6	1	3557	1	5	м
AXW	I-80	328.5	1	3557	1	5	м
AYE	I-80	340.64	1	3557	1	5	М
AYG	I-80	342.56	1	3557	1	5	М
AYO	I-80	352.8	1	3557	1	5	М
AZG	I-80	361.79	1	3557	1	5	М
AZI	I-80	362.04	1	3557	1	5	М
DBO	I-80	364.9	1	3557	1	5	М
DBR	I-80	367.42	1	3557	1	5	М
CZJ	I-25	117.68	4	811	5	2	м
CZV, CZU	I-25	126.06	5	811	5	2	М
BMA	I-25	186.45	9	557	5	2	М
DAI	I-90	128.09	5	484	5	2	М
ADZ, ADY	I-25	84	2	854	4	2	м
AER, AEQ	I-25	96.43	2	811	4	2	М
AEX	I-25	100.56	3	811	4	2	М
AFO, AFP	I-25	131.59	3	811	4	2	м
DEN	US-20/26	2.09	2	640	4	2	м
FDB	WY-59	0.72	3	578	4	2	М
CYL	WY-59	112.16	2	722	4	2	М
BBM	I-90	20.92	2	582	4	2	М
BCE, BCD	I-90	33.59	2	592	4	2	М
BDD	I-90	56.36	3	592	4	2	М
CDL, CDK	I-90	132.39	2	484	4	2	м
DOI	I-25	210.41	4	328	5	1	м
DBD	I-90	139.3	7	50	5	1	м
AMF	I-80	3.45	1	3250	1	4	L
AMT	I-80	12.6	1	2938	1	4	L
AMS	I-80	13	1	2938	1	4	L
AMU	I-80	13.95	1	2938	1	4	L
AMX	I-80	15.8	1	2938	1	4	L
ANK	I-80	30.3	1	2938	1	4	L
AOJ	I-80	61	1	3293	1	4	L
LEV	I-80	91.53	1	3293	1	4	L
ARC	I-80	135.1	1	2830	1	4	L
ARQ	I-80	150.81	1	2830	1	4	L
ARY	I-80	165.58	1	2830	1	4	L
ASE	I-80	172	1	2830	1	4	L

ASO	1-80	184.29	1	2830	1	4	L
AUP	I-80	234.56	1	2984	1	4	L
AVK	I-80	267.18	1	2984	1	4	L
AVP	I-80	271.6	1	2984	1	4	L
АХВ	I-80	309.04	1	2984	1	4	L
LBL, LBM	I-80	312.97	1	2984	1	4	L
BUO	ML21	116.73	1	1045	1	3	L
ААА	I-25	0.34	1	2314	1	3	L
ААН	I-25	2.66	1	2314	1	3	L
AAI	I-25	3.26	1	2314	1	3	L
AAV	I-25	9.14	1	1391	1	3	L
DCV	I-25	45.21	1	1123	1	3	L
DCX	I-25	50.648	1	1123	1	3	L
AFU	I-25	137.41	1	1016	1	3	L
AFZ	I-25	138.65	1	1016	1	3	L
AGM	I-25	150	1	1016	1	3	L
АНЈ	I-25	170.68	1	1016	1	3	L
AHX	I-25	185.75	1	1016	1	3	L
EWO	I-25	189.51	1	1016	1	3	L
ANP	I-80	37.01	1	2448	1	3	L
ANS	I-80	42	1	2448	1	3	L
AZR	I-80	377.3	1	2494	1	3	L
BAE	I-80	391.39	1	2431	1	3	L
BAJ	I-80	401.13	1	2431	1	3	L
BAM	I-80	401.46	1	2431	1	3	L
BRH	I-25	79.28	1	854	1	2	L
AEB	1-25	87.03	1	811	1	2	L
AFH	I-25	109.49	1	811	1	2	L
FDC	WY-59	1.16	1	578	1	2	L
DZY	I-90	9.8	1	522	1	2	L
DZZ	I-90	11.12	1	582	1	2	L
EAF	I-90	14.6	1	582	1	2	L
ККҮ	I-90	23.14	1	592	1	2	L
BCY	I-90	51.36	1	592	1	2	L
DAT	I-90	135.41	1	575	1	2	L
BGG	I-90	146.71	1	575	1	2	L
BGH	I-90	147.59	1	575	1	2	L
DHN	I-90	205.29	1	436	1	2	L
AJU, AJT	I-25	244.96	2	216	4	1	L
APR	I-80	101.16	3	50	4	1	L
BDN	I-90	63.51	2	291	4	1	L
ACN	I-25	39.2	1	20	1	1	L
AIT	I-25	191.64	1	328	1	1	L

DFL	I-25	227.99	1	328	1	1	L
AKF	I-25	249.69	1	216	1	1	L
АКО	I-25	261.43	1	198	1	1	L
ALX	I-25	299.32	1	188	1	1	L
BDJ	I-90	58.65	1	291	1	1	L
BDR	I-90	65.98	1	291	1	1	L
BDY	I-90	69.64	1	291	1	1	L
BDZ	I-90	72.99	1	291	1	1	L
BEX	I-90	91.49	1	291	1	1	L
BFD	I-90	102.52	1	291	1	1	L
BFF	I-90	106.14	1	291	1	1	L
BJH	I-90	187.53	1	316	1	1	L

WYDOT prioritized the high risk bridge strike locations based on their risk, bridge condition, and their location on the critical freight network within the State. Table 15 shows those results.

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Bridges	LRS ID	RM	Bridge Strikes	AADTT	Probability	Consequence	Risk Score	Condition Score	Criticality Score	Risk Grade	Condition Grade	Criticality Grade	Composite Grade	Priority Score	Priority Rating
ANH	I-80	23.8	2	2938	4	4	16	5	1	4	5	5	4.67	1	Н
AQZ	I-80	130.84	3	2830	4	4	16	5	1	4	5	5	4.67	1	Н
ASV	I-80	196.16	2	2844	4	4	16	4	1	4	5	5	4.67	1	Н
AVG	I-80	260.24	2	2984	4	4	16	5	1	4	5	5	4.67	1	Н
ATO, ATN	I-80	210.99	3	3412	4	5	20	6	1	5	3	5	4.33	5	Н
AYR, AYS	I-80	357.68	2	3557	4	5	20	6	1	5	3	5	4.33	5	Н
AOQ	I-80	77.31	3	3293	4	4	16	6	1	4	3	5	4.00	7	Н
ARN	I-80	146.85	2	2830	4	4	16	6	1	4	3	5	4.00	7	Н
LBN	I-80	313.19	2	2984	4	4	16	6	1	4	3	5	4.00	7	Н
ASP, ASQ	I-80	187.19	4	2830	5	4	20	7	1	5	1	5	3.67	10	М
КЈС, КЈВ	I-80	219.84	2	3556	4	5	20	7	1	5	1	5	3.67	10	Μ
ΑΟΧ, ΑΟΥ	I-80	85.35	3	3293	4	4	16	7	1	4	1	5	3.33	12	Μ
AUR	I-80	235.21	2	2984	4	4	16	7	1	4	1	5	3.33	12	М
AGX, AGY	I-25	160.87	4	1016	5	3	15	5	2	3	5	2	3.33	12	М
FDH, FDG	I-25	188.6	5	1045	5	3	15	5	5	3	5	1	3.00	15	Μ
AZW	I-80	383.3	3	2431	4	3	12	6	1	1	3	5	3.00	15	Μ
ABC	I-25	10.59	3	1391	4	3	12	5	2	1	5	2	2.67	17	М
AGC	I-25	139.76	2	1016	4	3	12	5	2	1	5	2	2.67	17	М
AGI, AGH	I-25	146	15	1016	5	3	15	6	2	3	3	2	2.67	17	М
AIH	I-25	188.19	3	1016	4	3	12	4	2	1	5	2	2.67	17	М
AAS, AAR	I-25	8.84	3	2314	4	3	12	7	1	1	1	5	2.33	21	L

Table 15: Prioritized List of "High" Risk Bridge Strikes

AFY	I-25	137.56	2	1016	4	3	12	6	2	1	3	2	2.00	22	L
ADD	I-25	57.65	2	1044	4	3	12	6	2	1	3	2	2.00	22	L
AGW, AGV	I-25	156.18	2	1016	4	3	12	6	2	1	3	2	2.00	22	L
AHO, AHP	I-25	175.59	2	1016	4	3	12	6	2	1	3	2	2.00	22	L

Bridge Strike Action Plans

Action plans were created for each high risk bridge on the critical freight network (see Appendix B for the full action plans). Table 16 shows the potential actions to mitigate each bridge strike risk and the priority for each action.

Table 16: Action Plan Summary for "High" Bridge Strike Rated Bridges

Bridge ID	Facility Carried	RM	Crossing Feature	Priority Rating	Potential Actions	Action Priority	Comments
ANH	I-80	23.8	Leroy Rd	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Very low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
AQZ	I-80	130.84	WY-377 (Point of	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
			Rocks)		Increase warning signage.	1	Fairly low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
ASV	I-80	196.16	Riner Rd	Η	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Very low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
AVG	I-80	260.24	County Rd 3	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Very low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.

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					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented.
ATO, ATN	I-80	210.99	Two Mile Draw	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Very low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented.
AYR, AYS	1-80	357.68	WY-222	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	High truck volumes pass under bridges to access Wal Mart Distribution Center. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes. High truck volumes pass under bridges to access Wal Mart Distribution Center. Would require rerouting these trucks during construction.
AOQ	I-80	77.31	Machinery Pass	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Very low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented.
ARN	I-80	146.85	Patrick Draw	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Very low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented.
LBN	I-80	313.19	US-287	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	4	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Very low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
ASP, ASQ	I-80	187.19	WY-789	M	Increase warning signage.	1	Moderate volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the	2	Moderate volume road crossing under the bridge. Parallel bridge available if this bridge

					event the bridge is closed.		is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
KJB, KJC	I-80	219.84	WY-76 and	М	Replace with a higher clearance bridge. Upgrade approaches accordingly.	3	Very costly. WYDOT should monitor before taking such a stringent action.
100			UPRR		Increase warning signage and discuss with UPRR to discuss mitigation efforts.	1	Warning signage may be ineffective. Best to keep UPRR informed.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed. Discuss with UPRR to discuss mitigation efforts.	2	Parallel bridge available if this bridge is damaged, though higher likelihood that both bridges would be damaged if struck by a train rather than a truck.
AOX, AOY	I-80	85.35	County Road 59	М	Increase warning signage.	1	Low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including possible drainage issues.
AUR	I-80	235.21	US- 30/WY- 130	М	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
AGX, AGY	1-25	160.87	US-87	M	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
FDH, FDG	I-25	188.6	WY-220	М	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
AZW	I-80	383.3	County Rd 146-1	M	Increase warning signage.	1	Low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including possible drainage issues.
ABC	I-25	10.59	Missile Dr	М	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.

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					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
AGC	I-25	139.76	WY-94	М	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Lower the grade under the bridge.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
AGH, AGI	1-25	146	WY-96	M	Replace with a higher clearance bridge. Upgrade approaches accordingly.	3	Very costly. WYDOT should monitor before taking such a stringent action.
					Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
AIH	I-25	188.19	WY-255	М	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Replace with a higher clearance bridge. Upgrade approaches accordingly.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Replace with a higher clearance bridge. Upgrade approaches accordingly.	3	Fairly costly with a few potential additional issues created if implemented including drainage and ramp grade changes.
AAS, AAR	I-25	8.84	I-80	L	Increase warning signage.	1	Very high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Very high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
AFY	I-25	137.56	County Road 1	L	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
ADD	I-25	57.65	WY-321	L	Increase warning signage.	1	Low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Low volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
AGW, AGV	I-25	156.18	Bixby Rd	L	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
aho, Ahp	I-25	175.59		L	Increase warning signage.	1	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.
					Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	2	Fairly high volume road crossing under the bridge. Parallel bridge available if this bridge is damaged.

Winter Weather Closure and Delay Resiliency

Winter Weather Closure and Delay Risks

Winter weather road closure and weather-related delay were analyzed for risks to the traveling public and to WYDOT. Road closure durations were derived from road closure information provided by WYDOT ITS from the years 2005 through 2014. Figure 4 shows the road closures for this time period for all NHS roads in the State. Approximate annual hours and costs of weather-related delay per mile were calculated from NPMRDS travel time data for the Critical Tourism routes. Those results are shown in Figures 5 and 6, respectively. Only winter months (November through April) were applied to remove the effects of construction-related delay. The total hours of delay are used to calculate the "probability" risk score for winter weather and the costs of those delays for the "consequence" risk score.

Winter weather risk levels were determined for each road segment based on the risk matrix in Table 3. Risk scores were calculated by multiplying the 1 through 5 frequency rating by the 1 through 5 consequence rating. The risk scores were then prioritized from the highest to the lowest to estimate and extract the highest risk facilities. The results can be seen in the Table 17. The higher priority road segments will have more thorough resiliency planning applied.

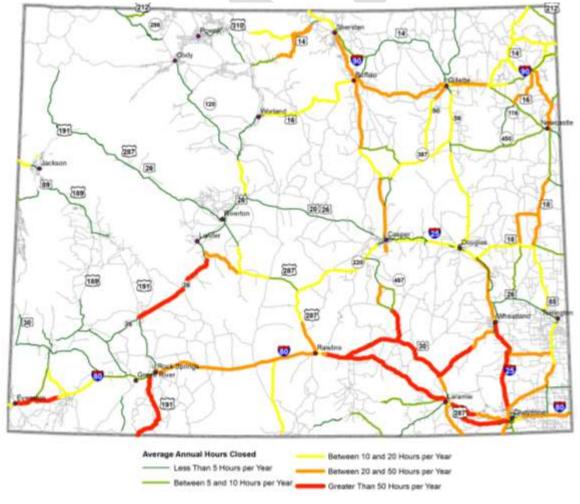


Figure 4: Annual Hours of Winter Weather-Related Road Closures

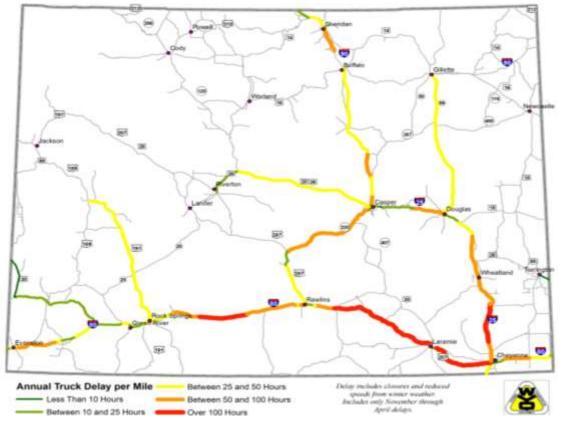
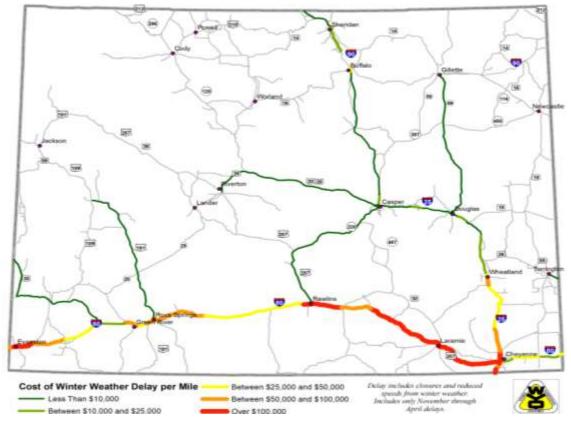


Figure 5: Annual Hours of Weather-Related Delay per Mile on Critical Freight Corridors

Figure 6: Annual Cost of Weather-Related Delay per Mile on Critical Freight Corridors



La cilita	LRS ID	From RM	To RM	Total Annual Weather-Related Delay Hours per Mile	Total Annual Weather-Related Delay Cost per Mile	Probability	Consequence	Risk Rating
I-25	ML25B	7.85	8.845	40	\$590,290	3	5	н
I-80	ML80B	322.741	334.86	254	\$461,100	5	5	н
I-80	ML80B	316.48	322.741	127	\$454,418	5	5	н
I-25	ML25B	10.586	12.697	89	\$383,949	4	5	н
I-80	ML80B	211.28	215.304	52	\$240,431	3	5	н
I-80	ML80B	255.269	272.13	245	\$238,702	5	5	н
I-80	ML80B	334.86	359.195	258	\$228,178	5	5	н
I-80	ML80B	272.13	310.12	375	\$162,394	5	4	н
I-25	ML25B	0	2.662	39	\$160,202	3	4	н
I-80	ML80B	221.493	234.786	98	\$134,415	4	4	н
I-25	ML25B	8.845	10.586	44	\$127,789	3	4	н
I-80	ML80B	6.033	18.098	78	\$110,578	4	4	н
I-25	ML25B	12.697	17.042	57	\$104,584	4	4	н
I-25	ML25B	2.662	7.85	40	\$99,251	3	4	н
I-80	ML80B	234.786	255.269	125	\$97,617	5	4	н
I-25	ML25B	25.442	34.45	137	\$96,126	5	4	н
I-80	ML80B	104.774	110.913	32	\$85,362	3	4	н
I-80	ML80B	122.049	142.006	90	\$67,363	4	3	н
I-25	ML25B	17.042	25.442	82	\$62,605	4	3	н
I-80	ML80B	18.098	34.428	75	\$62,497	4	3	н
I-25	ML25B	73	78.93	75	\$55,741	4	3	н
I-80	ML80B	142.006	174.066	114	\$45,905	5	3	н
I-25	ML25B	65.26	73	87	\$41,335	4	3	н
I-25	ML25B	34.45	54.591	130	\$39,918	5	3	н
I-80	ML80B	174.066	209.19	94	\$39,220	4	3	Н
I-25	ML25B	54.591	65.26	72	\$37,900	4	3	н
I-80	ML80B	219.12	221.493	32	\$249,170	2	5	м
I-80	ML80B	209.19	211.28	25	\$225,196	2	5	м
I-80	ML80B	3.235	6.033	31	\$185,033	2	4	м
I-80	ML80B	215.304	219.12	22	\$115,589	2	4	М
I-80	ML80B	34.428	39.612	28	\$69,813	2	4	м
I-80	ML80B	98.787	104.774	31	\$69,207	2	3	м
I-80	ML80B	82.608	89.13	25	\$65,068	2	3	м
I-80	ML80B	110.913	122.049	42	\$65,054	3	3	м
I-80	ML80B	370.083	386.067	52	\$44,419	3	3	м
I-25	ML25B	299.331	300.261	32	\$32,900	2	3	М

 Table 17: Winter Weather Risk Evaluation for Critical Freight Corridors

I-80	ML80B	47.962	65.537	38	\$29,187	3	2	м
I-25	ML25B	298.018	299.331	33	\$25,899	3	2	м
I-25	ML25B	189.52	197.51	52	\$22,715	4	2	м
1-90	ML90B	24.961	33.334	52	\$19,800	4	2	м
1-90	ML90B	33.334	41.96	55	\$18,930	4	2	м
I-25	ML25B	80.856	92.38	52	\$17,021	3	2	м
1-25	ML25B	92.38	111.69	76	\$15,607	4	2	м
I-25	ML25B	140.1	160.88	54	\$8,776	4	2	М
I-80	ML80B	310.12	311.367	13	\$169,175	1	4	L
I-80	ML80B	311.367	313.32	14	\$161,123	1	4	L
I-80	ML80B	313.32	316.48	20	\$137,069	1	4	L
I-80	ML80B	0	3.235	16	\$84,382	1	4	L
I-80	ML80B	89.13	91.475	13	\$79,256	1	4	L
I-80	ML80B	359.195	361.64	6	\$43,048	1	3	L
I-80	ML80B	91.475	98.787	12	\$37,354	1	3	L
I-25	ML25B	78.93	80.856	18	\$31,906	1	3	L
I-80	ML80B	401.2	402.78	12	\$31,415	1	3	L
I-80	ML80B	39.612	47.962	21	\$29,821	1	2	L
I-80	ML80B	386.067	401.2	29	\$22,623	2	2	L
I-80	ML80B	363.617	370.083	19	\$21,932	1	2	L
I-80	ML80B	361.64	363.617	6	\$21,803	1	2	L
I-90	ML90B	22.902	24.961	13	\$18,977	1	2	L
I-80	ML80B	65.537	82.608	19	\$15,923	1	2	L
I-90	ML90B	20.634	22.902	14	\$15,318	1	2	L
I-25	ML25B	160.88	165.88	15	\$12,309	1	2	L
I-25	ML25B	126.48	135.47	22	\$11,352	2	2	L
I-25	ML25B	135.47	140.1	11	\$8,653	1	2	L
I-25	ML25B	111.69	126.48	28	\$8,605	2	1	L
I-90	ML90B	9.485	20.634	40	\$8,562	3	1	L
I-25	ML25B	185.35	189.52	22	\$7,258	1	1	L
WY-220	ML21B	113.38	117	11	\$6,912	1	1	L
I-90	ML90B	0	9.485	24	\$6,755	2	1	L
I-25	ML25B	291.1	298.018	33	\$5,302	3	1	L
I-25	ML25B	165.88	182.53	16	\$4,654	1	1	L
I-25	ML25B	197.51	210.42	25	\$4,161	2	1	L
I-25	ML25B	210.42	228	54	\$3,994	4	1	L
WY-59	ML43B	61	112	46	\$3,534	3	1	L
I-25	ML25B	182.53	185.35	5	\$3,257	1	1	L
WY-220	ML21B	20	33.21	35	\$3,047	3	1	L
US-30	ML12B	31	52.6	11	\$2,652	1	1	L
US-191	ML13B	0	110	35	\$2,170	3	1	L
I-25	ML25B	228	254.25	30	\$1,588	2	1	L
US-20/US-26	ML34B	0	10	26	\$1,565	2	1	L

WY-220	ML21B	44	113.38	58	\$1,560	4	1	L
I-25	ML25B	254.25	291.1	38	\$1,488	3	1	L
WY-220	ML21B	33.21	44	13	\$1,484	1	1	L
WY-59	ML43B	0	61	34	\$1,300	3	1	L
US-26/WY-789	ML20B	104	127	11	\$1,233	1	1	L
US-30	ML12B	52.6	100	23	\$1,140	2	1	L
Casper Bypass	ML47B	0	2.9	6	\$1,054	1	1	L
WY-220	ML21B	0	20	25	\$1,049	2	1	L
US-30	ML12B	0	31	8	\$991	1	1	L
US-20/US-26	ML34B	10	100	29	\$773	2	1	L
US-26	ML28B	48	56	3	\$653	1	1	L

WYDOT prioritized the high risk winter weather locations from Table 17 based on their risk, condition measure ("Total Annual Weather-Related Delay Hours per Mile"), and their location on the critical freight network within the State. Table 18 shows those results.

Facility	LRS ID	From RM	To RM	Risk Score	Condition Score	Criticality Ranking	Risk Grade	Condition Grade	Criticality Grade	Composite Grade	Priority Score	Priority Rating
I-80	ML80B	322.741	334.86	25	294	1	4	5	5	4.7	1	Н
I-80	ML80B	255.269	272.13	25	273	1	4	5	5	4.7	1	Н
I-80	ML80B	272.13	310.12	20	390	1	4	5	5	4.7	1	Н
I-80	ML80B	334.86	359.195	25	268	1	4	4	5	4.3	4	Н
I-80	ML80B	316.48	322.741	25	167	1	4	4	5	4.3	4	Н
I-80	ML80B	234.786	255.269	20	149	1	4	4	5	4.3	4	Н
I-80	ML80B	6.033	18.098	20	112	1	4	3	5	4.0	7	Н
I-80	ML80B	221.493	234.786	16	111	1	3	3	5	3.7	8	М
I-80	ML80B	18.098	34.428	16	88	1	3	2	5	3.3	9	М
I-80	ML80B	122.049	142.006	12	97	1	1	3	5	3.0	10	М
I-80	ML80B	142.006	174.066	12	96	1	1	3	5	3.0	10	М
I-25	ML25B	10.586	12.697	16	102	2	3	3	2	2.7	12	М
I-25	ML25B	25.442	34.45	15	151	2	2	4	2	2.7	12	М
I-25	ML25B	34.45	54.591	15	142	2	2	4	2	2.7	12	М
I-80	ML80B	3.235	6.033	15	57	1	2	1	5	2.7	12	М
I-80	ML80B	174.066	209.19	12	93	1	1	2	5	2.7	12	М
I-80	ML80B	211.28	215.304	12	67	1	1	1	5	2.3	17	L
I-25	ML25B	7.85	8.845	15	70	2	2	2	2	2.0	18	L
I-25	ML25B	17.042	25.442	12	89	2	1	2	2	1.7	19	L
WY-220	ML21B	113.38	117	12	87	5	1	2	1	1.3	20	L
I-25	ML25B	2.662	7.85	12	60	2	1	1	2	1.3	20	L

Table 18: Prioritization of High Risk Winter Weather Critical Freight Corridors

Winter Weather Action Plans

Action plans were created for each high risk, winter weather impacted road segment on the critical freight network (see Appendix C for the full action plans). Table 19 shows the potential actions to mitigate each high risk, winter weather location and the priority for each action.

Facility Name	From RM	To RM	Priority Rating	Potential Actions	Action Priority	Comments				
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.				
				Build snow fences	5	Snow fence coverage on this road is near maximum.				
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective.				
I-80	322	334	Η	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.				
				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.				
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.				
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.				
				Build snow fences	5	Snow fence coverage on this road is already extensive.				
			Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective.				
I-80	255	272		Η	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.			
									Implement Connected Vehicle roadway condition communication technology.	2
					Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.			
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.				
				Build snow fences	5	Snow fence coverage on this road is already extensive.				
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective.				
I-80	80 272	310	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.				
				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.				
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.				
I-80	334	359	H	Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.				

Table 19: Action Plan Summary for "High" Risk Winter Weather Roads

				Build snow fences	5	Snow fence coverage on this road is already extensive.
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	6	Canyon area limits snow fence areas.
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	5	Likely to be expensive. May not have enough effect to be cost-effective.
I-80	316	322	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	4	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	3	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	5	Need to investigate potential snow fence areas.
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective.
I-80	234	255	н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement	4	Currently being applied by default. Districts
				during extreme weather events.		typically know conditions and issues associated with rerouting trucks. Some negative side-effects
						may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	5	Need to investigate potential snow fence areas.
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective.
I-80	6	18	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
	-	-		Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
					L	

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				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Need to investigate potential snow fence areas.
				Build snow fences	5	Likely to be expensive. May not have enough effect to be cost-effective.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	
I-80	18	34	М	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	5	Snow fence coverage on this road is already extensive.
1.00	100	140	м	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-80	122	142	М	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	5	Snow fence coverage on this road is already extensive.
1.00	140	474		Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-80	142	174	М	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	5	Likely to be expensive. May not have enough effect to be cost-effective.
I-25	10	12	М	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.

				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	5	Need to investigate potential snow fence areas.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-25	25	34	М	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	5	Need to investigate potential snow fence areas.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-25	34	54	М	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
			Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.	
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	5	Likely to be expensive. May not have enough effect to be cost-effective.
1.00				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	4	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-80	3	6	М	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	3	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Build snow fences	5	Need to investigate potential snow fence areas.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-80	174	209	М	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	4	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
I-80	211	215	L	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	4	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.

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				Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	3	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	4	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-25	7	8	L	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	3	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	4	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-25	17	25	L	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	3	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	4	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
WY220	113	117	L	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	3	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.
				Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done.
				Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	4	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
I-25	2	7	L	Implement Connected Vehicle roadway condition communication technology.	2	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
				Establish alternative routing procedures to implement during extreme weather events.	3	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes. May not be available under certain conditions.

Light High-Profile Vehicle Blowover Resiliency

Light High-Profile Vehicle Blowover Risk

WYDOT assessed the risks of light high-profile vehicle blowover risks on roads that experience high wind events. The analysis did not include all the critical freight routes because only a few are capable of being posted for light high-profile vehicle closures.

Light high-profile vehicle crashes from high winds do not themselves significantly increase delay, but the associated road closures do cause significant delay to freight movement. Therefore, light high-profile vehicle closures were deemed significant enough for risk and resiliency assessment. Table 20 shows the results of that risk assessment.

LRS ID	Facility	From RM	To RM	Closure Frequency	AADTT	Total Closure Duration Hours	Total Annual Delay for Trucks (hours)	Frequency	Consequence	Risk Rating
ML25	I-25	0	8.84	25	4629	125	24,109	4	5	н
ML25	I-25	8.84	80.85	34	2206	170	15,626	5	4	н
ML80	I-80	224.3	316.71	8	5967	24	5,967	2	3	м
ML25	I-25	80.85	132	15	1622	15	1,014	3	1	L
ML80	1-80	316.71	370.39	3	7114	15	4,446	1	2	L
ML80	I-80	205.95	224.3	3	6968	15	4,355	1	1	L

Table 20: Light High-Profile Vehicle Blowover Risk Results for Critical Freight Corridors

Light High-Profile Vehicle Blowover Action Plans

Action plans were created for each significantly impacted road segment showing a high light high-profile vehicle blowover risk on the critical freight network (see Appendix D for the full action plans). Table 21 shows the potential actions to mitigate each high risk location and the priority for each action.

Table 21: Action Plan Summ	narv for Roads wi	th Liaht Hiah-Profile	Vehicle Blowover Risks
	nary jor noads wi	the Eight finght frojne	

Facility LRS ID	From RM	To RM	Facility Name	Priority Rating	Potential Actions	Action Priority	Comments
ML25B	0	9	I-25	Η	Establish alternative routing procedures to implement during extreme wind events.	1	Lowest cost. Currently being applied by default, though alternative routes are not being identified. May not be cost-effective for trucks.

					Significantly reduce truck speed limits during wind events using variable speed limit signage.	4	Reduced speeds may not be heeded by truck drivers.
					Assess and modify safety barriers, cuts, slopes and other geometrics that cause high wind gust areas.	5	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
					Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
					Implement Connected Vehicle roadway condition communication technology.	2	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.
ML25B	9	81	I-25	Η	Establish alternative routing procedures to implement during extreme wind events.	1	Lowest cost. Currently being applied by default, though alternative routes are not being identified. May not be cost-effective for trucks.
					Significantly reduce truck speed limits during wind events using variable speed limit signage.	4	Reduced speeds may not be heeded by truck drivers.
					Assess and modify safety barriers, cuts, slopes and other geometrics that cause high wind gust areas.	5	May be expensive. Technology may not be up to standards yet. Potentially could significantly improve truck movement.
					Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
					Implement Connected Vehicle roadway condition communication technology.	2	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.
ML80B	224	317	I-80	М	Establish alternative routing procedures to implement during extreme wind events.	1	Lowest cost. Currently being applied by default, though alternative routes are not being identified. May not be cost-effective for trucks.
					Significantly reduce truck speed limits during wind events using variable speed limit signage.	4	Reduced speeds may not be heeded by truck drivers.
					Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
					Implement Connected Vehicle roadway condition communication technology.	2	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.
ML25B	81	132	I-25	L	Establish alternative routing procedures to implement during extreme wind events.	1	Lowest cost. Currently being applied by default, though alternative routes are not being identified. May not be cost-effective for trucks.
					Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
					Implement Connected Vehicle roadway condition communication technology.	2	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.
ML80B	317	370	1-80	L	Establish alternative routing procedures to implement during extreme wind events.	1	Lowest cost. Currently being applied by default, though alternative routes are not being identified. May not be cost-effective for trucks.
					Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
					Implement Connected Vehicle roadway condition communication technology.	2	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.

ML80B	206	224	I-80	L	Establish alternative routing procedures to implement during extreme wind events.	1	Lowest cost. Currently being applied by default, though alternative routes are not being identified. May not be cost-effective for trucks.
					Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	3	Much of infrastructure is in place. Need buy-in from truckers. CV Pilot Project not complete.
					Implement Connected Vehicle roadway condition communication technology.	2	Currently being applied by default. Districts typically know conditions and issues associated with rerouting trucks. Some negative side-effects may occur on alternative routes.

Environmental Resiliency

Environmental Risks

WYDOT assessed the environmental risks of the creation of nonattainment areas within the State. Pollutant levels were obtained from Wyoming DEQ's Air Quality Monitoring Network, *Wyoming Ambient Air Monitoring Annual Network Plan* 2016

(http://deq.wyoming.gov/media/attachments/Air%20Quality/Monitoring/Annual%20Network%20Plans /Annual-Network-Plan_2016-Final.pdf). Staff calculated the percentages attained toward exceedance levels for each pollutant type by county then averaged the values for a "Nonattainment Score". WYDOT applied only the percentage for highest level pollutant to each county and to all critical freight corridors within each county.

In addition to the pollutant levels, WYDOT incorporated the annual truck delay per mile on each road segment to the probability side of the risk analysis. The delay values were taken from the results of the winter weather risk analysis described earlier in this document. WYDOT assumes that truck delay is a significant contributor to pollutant emissions and therefore is a reasonable predictor of potential pollutant increases.

WYDOT applied the population of each county as its consequence measure of risk, because WYDOT assumes that the people living within the county are the most negatively affected by pollutants. Table 22 shows the results of the environmental risk analysis.

LRS ID	Facility	From RM	To RM	Population	Annual Delay Hours per Mile	PM10 (24-hr)	PM2.5 (24-hr)	NOX	Ozone	Nonattainment Score	Delay Score	Probability Score	Probability	Consequence	Risk
ML80	I-80	280.9	316.71	39290	81052	65%	38%	40%	87%		100%	86%	5	3	н
ML80	I-80	316.71	336.6	39290	74993	65%	38%	40%	87%	72%	98%	85%	5	3	Н
ML80	I-80	336.6	370.39	101650	55726	78%	43%	60%	90%	79%	97%	88%	5	5	Н
ML80	I-80	3.45	33.39	20610	23255	34%	0%	13%	89%	61%	94%	77%	5	3	Н
ML80	I-80	187.25	199.05	43860	22041	63%	54%	32%	96%	78%	90%	84%	5	4	Н
ML80	I-80	105.1	187.25	43860	20518	63%	54%	32%	96%	78%	89%	84%	5	4	н
ML80	I-80	48.33	57.04	20610	13995	34%	0%	13%	89%	61%	84%	73%	4	3	Н

Table 22: Risk Results for Nonattainment Area Creation

Wyoming Department of Transportation Risk and Resilience Plan for Freight

ML80	1-80	370.39	377.37	101650	12883	78%	43%	60%	90%	79%	79%	79%	5	5	н
ML25	1-25	0	8.84	101650	11380	78%	43%	60%	90%	79%	78%	78%	5	5	Н
ML80	1-80	0	3.45	20610	11375	34%	0%	13%	89%	61%	76%	69%	4	3	Н
ML80	1-80	57.04	105.1	43860	10153	63%	54%	32%	96%	78%	75%	77%	4	4	Н
ML25	I-25	8.84	25.27	101650	9505	78%	43%	60%	90%	79%	73%	76%	4	5	Н
ML80	1-80	377.37	402.78	101650	9116	78%	43%	60%	90%	79%	71%	75%	4	5	Н
ML80	1-80	33.39	48.33	20610	8978	34%	0%	13%	89%	61%	70%	66%	4	3	Н
ML90	1-90	119.2	132.94	49730	6662	75%	54%	32%	90%	76%	67%	72%	4	4	Н
ML90	1-90	132.94	147.45	49730	4121	75%	54%	32%	90%	76%	60%	68%	4	4	Н
ML21	WY-220	113.38	117	83130	3788	51%	47%	44%	90%	74%	59%	66%	4	4	Н
ML90	1-90	23.07	41.96	31090	3601	65%	114%	35%	80%	94%	57%	75%	4	3	Н
ML25	1-25	175.1	191.62	83130	2962	51%	47%	44%	90%	74%	49%	62%	3	4	Н
ML20	US26/WY789	104	127	40070	2734	27%	66%	4%	89%	68%	46%	57%	3	4	Н
ML43	WY-59	61	112	49730	2680	75%	54%	32%	90%	76%	44%	60%	3	4	Н
ML90	1-90	9.92	23.07	31090	2476	65%	114%	35%	80%	94%	43%	68%	4	3	Н
ML90	1-90	0	9.92	31090	1872	65%	114%	35%	80%	94%	41%	67%	4	3	Н
ML34	US-20/US-26	0	10	83130	1787	51%	47%	44%	90%	74%	38%	56%	3	4	Н
ML21	WY-220	57	113.38	83130	1671	51%	47%	44%	90%	74%	35%	54%	3	4	Н
ML25	I-25	191.62	228.25	83130	1560	51%	47%	44%	90%	74%	33%	54%	3	4	Н
ML90	1-90	96	119.2	49730	1528	75%	54%	32%	90%	76%	30%	53%	3	4	Н
ML13	US-191	0	51.62	43860	1107	63%	54%	32%	96%	78%	21%	50%	3	4	Н
ML80	1-80	224.3	280.9	15870	53703	18%	49%	57%	67%	57%	95%	76%	4	2	М
ML80	1-80	199.05	205.95	15870	22041	18%	49%	57%	67%	57%	90%	74%	4	2	М
ML80	1-80	205.95	214.1	15870	20188	18%	49%	57%	67%	57%	87%	72%	4	2	М
ML80	1-80	214.1	224.3	15870	18963	18%	49%	57%	67%	57%	86%	72%	4	2	М
ML25	I-25	135.49	175.1	14480	3470	81%	28%	24%	87%	71%	54%	62%	3	2	М
ML28	US-26	48	56	13360	3343	73%	32%	25%	84%	69%	52%	61%	3	2	М
ML25	1-25	132	135.49	14480	2986	81%	28%	24%	87%	71%	51%	61%	3	2	М
ML25	1-25	120.82	132	14480	2771	81%	28%	24%	87%	71%	48%	59%	3	2	М
ML21	WY-220	44	57	15870	1671	18%	49%	57%	67%	57%	35%	46%	3	2	М
ML43	WY-59	0	56.51	14480	1252	81%	28%	24%	87%	71%	24%	47%	3	2	М
ML43	WY-59	56.51	61	14480	1252	81%	28%	24%	87%	71%	24%	47%	3	2	М
ML13	US-191	51.62	110	9590	1039	37%	46%	24%	90%	70%	19%	44%	3	2	М
ML12	US-30	89.3	100	43860	684	63%	54%	32%	96%	78%	6%	42%	2	4	М
ML25	I-25	228.25	234.84	83130	595	51%	47%	44%	90%	74%	3%	39%	2	4	М
ML34	US-20/US-26	10	68.43	83130	549	51%	47%	44%	90%	74%	0%	37%	2	4	М
ML34	US-20/US-26	68.43	100	40070	549	27%	66%	4%	89%	68%	0%	34%	2	4	М
ML25	I-25	25.27	47.25	8810	13570	0%	0%	0%	0%	0%	83%	41%	2	2	L
ML25	I-25	47.25	53.96	8810	13289	0%	0%	0%	0%	0%	81%	40%	2	2	L
ML25	I-25	53.96	60.54	8810	7830	0%	0%	0%	0%	0%	68%	34%	2	2	L
ML25	I-25	60.54	84.75	8810	5910	0%	0%	0%	0%	0%	65%	33%	2	2	L
ML25	I-25	84.75	120.82	8810	4461	0%	0%	0%	0%	0%	63%	32%	2	2	L
ML90	1-90	147.45	155.24	7700	4121	0%	0%	0%	0%	0%	60%	30%	2	1	L

ML90	1-90	41.96	56.74	8480	3503	0%	0%	0%	0%	0%	56%	28%	2	1	L
ML90	1-90	155.24	189.6	7700	1788	0%	0%	0%	0%	0%	40%	20%	2	1	L
ML90	1-90	56.74	96	8480	1528	0%	0%	0%	0%	0%	30%	15%	2	1	L
ML90	1-90	189.6	207.14	7700	1455	0%	0%	0%	0%	0%	29%	14%	1	1	L
ML12	US-30	31	52.6	19960	1307	0%	0%	0%	0%	0%	27%	13%	1	3	L
ML21	US-287	20	33.21	15870	1180	18%	49%	57%	67%	57%	22%	40%	2	2	L
ML25	I-25	297.74	300.091	8480	987	0%	0%	0%	0%	0%	17%	9%	1	1	L
ML12	US-30	0	31	19960	834	0%	0%	0%	0%	0%	16%	8%	1	3	L
ML25	I-25	280.27	297.74	8480	813	0%	0%	0%	0%	0%	14%	7%	1	1	L
ML25	I-25	254.66	280.27	8480	792	0%	0%	0%	0%	0%	13%	6%	1	1	L
ML21	US-287	0	20	15870	709	18%	49%	57%	67%	57%	11%	34%	2	2	L
ML21	US-287	33.21	44	15870	688	18%	49%	57%	67%	57%	10%	33%	2	2	L
ML12	US-30	52.6	89.3	19960	684	0%	0%	0%	0%	0%	6%	3%	1	3	L
ML25	I-25	234.84	254.66	8480	613	0%	0%	0%	0%	0%	5%	2%	1	1	L

WYDOT prioritized the high risk environmental roads based on their risk, condition measure (averaged pollutant levels in relation to exceedance levels for the four pollutants analyzed), and their priority on the critical freight network. Table 23 shows those results.

	3: Prioritized	Nonuttu	iiiiiieiii /		eutioi	TNOUU	3		
LRS ID	Facility	From RM	To RM	Risk Grade	Condition Grade	Criticality Grade	Composite Grade	Priority Score	Priority Rating
ML80	I-80	336.6	370.39	6	4	5	5.00	1	н
ML80	I-80	370.39	377.37	6	4	5	5.00	1	н
ML80	I-80	377.37	402.78	5	4	5	4.67	3	н
ML25	I-25	0	8.84	6	4	3	4.33	4	н
ML80	I-80	105.1	187.25	5	3	5	4.33	4	н
ML80	I-80	187.25	199.05	5	3	5	4.33	4	н
ML25	I-25	8.84	25.27	5	4	3	4.00	7	н
ML80	I-80	57.04	105.1	4	3	5	4.00	7	н
ML80	I-80	280.9	316.71	4	2	5	3.67	9	Н
ML80	I-80	316.71	336.6	4	2	5	3.67	9	Н
ML80	I-80	3.45	33.39	4	1	5	3.33	11	М
ML90	I-90	119.2	132.94	4	3	3	3.33	11	М
ML90	I-90	132.94	147.45	4	3	3	3.33	11	м
ML90	I-90	0	9.92	1	5	3	3.00	14	м
ML90	I-90	9.92	23.07	1	5	3	3.00	14	М
ML90	I-90	23.07	41.96	1	5	3	3.00	14	М
ML21	WY-220	113.38	117	4	2	2	2.67	17	м
ML80	I-80	0	3.45	1	1	5	2.33	18	L
ML80	I-80	33.39	48.33	1	1	5	2.33	18	L
ML80	I-80	48.33	57.04	1	1	5	2.33	18	L
ML90	1-90	96	119.2	1	3	3	2.33	18	L
ML25	I-25	175.1	191.62	1	2	3	2.00	22	L
ML25	I-25	191.62	228.25	1	2	3	2.00	22	L
ML13	US-191	0	51.62	1	3	1	1.67	24	L
ML21	WY-220	57	113.38	1	2	2	1.67	24	L
ML43	WY-59	61	112	1	3	1	1.67	24	L
ML20	US26/WY789	104	127	1	2	1	1.33	27	L
ML34	US-20/US-26	0	10	1	2	1	1.33	27	L

Table 23: Prioritized Nonattainment Area Creation Roads

Environmental – Nonattainment Area Creation Action Plan

WYDOT formed action plans for each road segment with a high potential to cause the inadvertent creation of nonattainment areas in Wyoming (see Appendix D for the full action plans). Table 24 shows the potential actions to mitigate each high risk road and the priority for each action.

 Table 24:
 Action Plan Summary for High Risk Environmental – Nonattainment Area Creation Roads

Facility LRS ID	From RM	To RM	Facility Name	Priority Rating	Potential Actions	Action Priority	Comments		
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.		
					Build snow fences	4	Snow fence coverage on this road is near maximum. Not effective in summer months.		
ML80B	336	370	I-80	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.		
					Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.		
					Provide diesel retrofit incentives	F	Year round improvement. Could be very costly and may		
					to the trucking industry. Provide electrified truck parking areas to reduce truck idling.	5	require future investments as truck fleets get replaced. Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.		
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.		
					Duild anour fanage	4	Snow fence coverage on this road is near maximum. Not		
ML80B	370	377	I-80	H	Build snow fences Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	effective in summer months. Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.		
WEGGE	010		1-00	1-00	1-00		Implement Connected Vehicle		May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy-
					technology on the road.	2	in from truckers. CV Pilot Project not complete.		
					Provide diesel retrofit incentives to the trucking industry.	5	Year round improvement. Could be very costly and may require future investments as truck fleets get replaced.		
					Provide electrified truck parking areas to reduce truck idling.	1	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.		
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.		
					Build snow fences	4	Snow fence coverage on this road is near maximum. Not effective in summer months.		
ML80B	377	402	I-80	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	7	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.		
					Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.		
					Provide diesel retrofit incentives to the trucking industry.	6	Year round improvement. Could be very costly and may require future investments as truck fleets get replaced.		
					Increase the use of PrePass at the port of entry.	1	Very low cost. Requires trucker buy-in.		

					Provide electrified truck parking	F	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from	
				_	areas to reduce truck idling. Assess and modify current	5	truckers.	
					snow removal and roadway			
					management procedures as		Lowest cost, though much is already done. Not effective	
					needed.	4	in summer months.	
					Build snow fences	5	Snow fence coverage on this road is near maximum. Not effective in summer months.	
					Assess and modify safety			
					barriers, cuts, slopes and other geometrics that cause snow drifting.	7	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.	
ML25B	0	8	I-25	Η	Implement Connected Vehicle	~	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy-	
					technology on the road.	3	in from truckers. CV Pilot Project not complete.	
					Provide diesel retrofit incentives	6	Year round improvement. Could be very costly and may require future investments as truck fleets get replaced.	
					to the trucking industry. Increase the use of PrePass at	U	require information as truck neets get replaced.	
					the port of entry.	1	Very low cost. Requires trucker buy-in.	
					Provide electrified truck parking		Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from	
				_	areas to reduce truck idling.	2	truckers.	
					Assess and modify current			
					snow removal and roadway management procedures as		Lowest cost, though much is already done. Not effective	
					needed.	2	in summer months.	
					Build snow fences	3	Snow fence coverage on this road is near maximum. Not effective in summer months.	
	ML80B 105				Assess and modify safety			
ML80B		187	I-80	I-80 H	barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.	
							_	May be expensive. Technology may not be up to standards yet. Could significantly improve truck
					Implement Connected Vehicle technology on the road.	1	movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	
					Provide diesel retrofit incentives	4	Year round improvement. Could be very costly and may	
					to the trucking industry.	4	require future investments as truck fleets get replaced. Provides emission reductions and improved safety.	
					Provide electrified truck parking		Mostly effective in winter months. Requires buy-in from	
					areas to reduce truck idling.	5	truckers.	
					Assess and modify current			
					snow removal and roadway			
					management procedures as needed.	2	Lowest cost, though much is already done. Not effective in summer months.	
						۷	Snow fence coverage on this road is near maximum. Not	
					Build snow fences	3	effective in summer months.	
					Assess and modify safety			
					barriers, cuts, slopes and other		Literation in the second state of the second s	
ML80B	187	199	I-80	Н	geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.	
WILOUD	101	100	1-00	11		~	May be expensive. Technology may not be up to standards yet. Could significantly improve truck	
					Implement Connected Vehicle technology on the road.	1	movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	
					Provide diesel retrofit incentives		Year round improvement. Could be very costly and may	
					to the trucking industry.	4	require future investments as truck fleets get replaced.	
				Provide electrified truck parking areas to reduce truck idling.	5	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.		

ML25B 8		25	5 I-25	Н	Assess and modify current snow removal and roadway management procedures as needed. Build snow fences Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	3 4 6	Lowest cost, though much is already done. Not effective in summer months. Snow fence coverage on this road is near maximum. Not effective in summer months. Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months. May be expensive. Technology may not be up to attacded upt Could again from the up to
					Implement Connected Vehicle technology on the road. Provide diesel retrofit incentives to the trucking industry. Provide electrified truck parking	2 5	standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete. Year round improvement. Could be very costly and may require future investments as truck fleets get replaced. Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from
					areas to reduce truck idling.	1	truckers.
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.
ML80B 57				Build snow fences Assess and modify safety	4	Snow fence coverage on this road is near maximum. Not effective in summer months.	
	57	105	15 I-80	30 H	barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.
					Implement Connected Vehicle technology on the road. Provide diesel retrofit incentives	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete. Year round improvement. Could be very costly and may
					to the trucking industry. Provide electrified truck parking	5	require future investments as truck fleets get replaced. Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from
					areas to reduce truck idling.	1	truckers.
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.
					Build snow fences	4	Snow fence coverage on this road is near maximum. Not effective in summer months.
ML80B	280	316	I-80	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.
					Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Provide diesel retrofit incentives to the trucking industry.	5	Year round improvement. Could be very costly and may require future investments as truck fleets get replaced.
					Provide electrified truck parking areas to reduce truck idling.	1	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.
	• • •				Assess and modify current snow removal and roadway management procedures as		Lowest cost, though much is already done. Not effective
ML80B	316	336	I-80	Н	needed.	2	in summer months. Snow fence coverage on this road is near maximum. Not
					Build snow fences	3	effective in summer months.

					Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	6	Likely to be expensive. May not have enough effect to be cost-effective. Not effective in summer months.	
					Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	
					Provide diesel retrofit incentives to the trucking industry.	4	Year round improvement. Could be very costly and may require future investments as truck fleets get replaced.	
					Provide electrified truck parking areas to reduce truck idling.	5	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.	
					Assess and modify current snow removal and roadway management procedures as needed.	2	Lowest cost, though much is already done. Not effective in summer months.	
ML80B 3				Build snow fences	3	Snow fence coverage on this road is near maximum. Not effective in summer months.		
	3	33	I-80	M	Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	
					Provide electrified truck parking areas to reduce truck idling.	4	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.	
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.	
					Build snow fences	4	Snow fence coverage on this road is near maximum. Not effective in summer months.	
ML90B	119	132	I-90	I-90 M	I-90 M	Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Provide electrified truck parking areas to reduce truck idling.	1	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.	
					Assess and modify current snow removal and roadway management procedures as needed.	2	Lowest cost, though much is already done. Not effective in summer months.	
					Build snow fences	3	Snow fence coverage on this road is near maximum. Not effective in summer months.	
ML90B	132	147	I-90	Μ	Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	
					Provide electrified truck parking areas to reduce truck idling.	. 4	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.	
				I-90 M	Assess and modify current snow removal and roadway management procedures as needed.		Lowest cost, though much is already done. Not effective in summer months.	
ML90B	0	9	I-90		Build snow fences	2 3	Snow fence coverage on this road is near maximum. Not effective in summer months.	
					Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	

					Provide electrified truck parking areas to reduce truck idling.	4	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.
					Assess and modify current snow removal and roadway management procedures as needed.		Lowest cost, though much is already done. Not effective in summer months. Snow fence coverage on this road is near maximum. Not
ML90B	9	23	I-90	Μ	Build snow fences Implement Connected Vehicle technology on the road.	5	effective in summer months. May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Increase the use of PrePass at the port of entry.	1	Very low cost. Requires trucker buy-in. Provides emission reductions and improved safety.
				Provide electrified truck parking areas to reduce truck idling. Assess and modify current	2	Mostly effective in winter months. Requires buy-in from truckers.	
					Assess and modify current snow removal and roadway management procedures as needed.	2	Lowest cost, though much is already done. Not effective in summer months.
	00	41	1.00	м	Build snow fences	3	Snow fence coverage on this road is near maximum. Not effective in summer months.
ML90B 23	41	I-90	М	Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	
					Provide electrified truck parking areas to reduce truck idling.	4	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.
ML21B	113	117	WY- 220	М	Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Provide diesel retrofit incentives to the trucking industry.	4	Year round improvement. Could be very costly and may require future investments as truck fleets get replaced. Provides emission reductions and improved safety.
					Provide electrified truck parking areas to reduce truck idling.	1	Mostly effective in winter months. Requires buy-in from truckers.
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.
ML80B	0	3	I-80	L	Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Increase the use of PrePass at the port of entry.	1	Very low cost. Requires trucker buy-in. Provides emission reductions and improved safety.
					Provide electrified truck parking areas to reduce truck idling.	4	Mostly effective in winter months. Requires buy-in from truckers.
ML80B	33	48	I-80	L	Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.

					Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete. Provides emission reductions and improved safety.
					Provide electrified truck parking areas to reduce truck idling.	1	Mostly effective in winter months. Requires buy-in from truckers.
					Assess and modify current snow removal and roadway management procedures as needed.	2	Lowest cost, though much is already done. Not effective in summer months.
ML80B	48	57	I-80	L	Build snow fences	3	Snow fence coverage on this road is near maximum. Not effective in summer months.
					Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Assess and modify current snow removal and roadway management procedures as needed.	2	Lowest cost, though much is already done. Not effective in summer months.
ML90B	96	119	I-90	L	Build snow fences	3	Snow fence coverage on this road is near maximum. Not effective in summer months.
					Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Assess and modify current snow removal and roadway management procedures as needed.	3	Lowest cost, though much is already done. Not effective in summer months.
ML25B	ML25B 175	191	I-25	I-25 L	Implement Connected Vehicle technology on the road.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Provide electrified truck parking areas to reduce truck idling.	1	Provides emission reductions and improved safety. Mostly effective in winter months. Requires buy-in from truckers.
					Assess and modify current snow removal and roadway management procedures as needed.	2	Lowest cost, though much is already done. Not effective in summer months.
ML25B	191	228	I-25	L	Build snow fences	3	Snow fence coverage on this road is near maximum. Not effective in summer months.
					Implement Connected Vehicle technology on the road.	1	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
					Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done. Not effective in summer months.
ML13B 0	51	1 0S- 191	US- 191 L	Build snow fences Implement Connected Vehicle	2	Not effective in summer months. May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy-	
				_	technology on the road.	3	in from truckers. CV Pilot Project not complete.
ML21B	57	113	WY- 220	L	Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done. Not effective in summer months.
					Build snow fences	2	Not effective in summer months.

					Implement Connected Vehicle technology on the road.	3	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
	~ 4		1404 50) L	Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done. Not effective in summer months.
ML43B	_43B 61 112	112	2 WY-59		Build snow fences Implement Connected Vehicle technology on the road.	2	Not effective in summer months. May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.
			US-26/		Assess and modify current snow removal and roadway management procedures as needed.	1	Lowest cost, though much is already done. Not effective in summer months.
ML20B	L20B 104 127	WY- 789	-	Build snow fences Implement Connected Vehicle technology on the road.	2 3	Not effective in summer months. May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete.	
ML34B	0	10	US-20/ US-26	L	Implement Connected Vehicle technology on the road. Provide diesel retrofit incentives to the trucking industry.	2	May be expensive. Technology may not be up to standards yet. Could significantly improve truck movement. Some of infrastructure is in place. Need buy- in from truckers. CV Pilot Project not complete. Year round improvement. Could be very costly and may require future investments as truck fleets get replaced. Provides emission reductions and improved safety.
					Provide electrified truck parking areas to reduce truck idling.	1	Mostly effective in winter months. Requires buy-in from truckers.

Figure 7 shows the locations for high risk highway freight assets. The highest combined risks are concentrated along I-80 and I-25 in southeast Wyoming, particularly the weather-related risks.



Figure 7: Highest Risk Highway Freight Locations

Merging of Freight Resiliency Action Plans

WYDOT merged freight action plans to better identify, consolidate and revise propose action priorities. The plans were merged based on overlapping locations with location termini set based on changes in the combined risks. Table 25 shows 22 consolidated road sections from the action plans.

Table 25:	Risks at Consolidated Locations

		Roadwa	ys				Bridges	
			-	Risks				sks
Facility -22	Lon 0		Winter Weather	Light High- Profile Vehicle Blowover	× Environment	Bridge RM	Bridge Flood	× Bridge Strike
1-25	0	25	Х	Х	Х	8.84 10.59		X X
I-25	25	54	Х	Х				
I-25	54	132		Х		57.65 125.5	Х	Х
1-25	132	175				137.56 139.76 146 156.18 160.87		X X X X X
I-25	175	228			Х	175.59 188.19 188.6		X X X X
I-25	246.3	246.3				246.3	х	
I-80	0	34	Х		Х	23.8		Х
I-80	34	122			X	77.31 77.5 85.35	х	x x
I-80	122	199	Х		X	130.84 146.85 187.19 196.16		X X X X X
I-80	199	206	X					
I-80	206	209	Х	Х				
I-80	209	280	X	x		210.99 219.84 235.21 260.24		X X X X
I-80	280	359	Х	Х	Х	313.19 357.68		X X
I-80	359	402			Х	383.3		Х
I-90	0	41			Х			
I-90	73	89				73.2 89	X X	
I-90	96	147			Х			
US-191	0	51			Х			
US-20/ US-26	0	10			Х			
US-26/ WY-789	104	127			Х	123.4	 Х	
WY-220	57	113			Х	120.7		
WY-220	113	117	Х		Х			
WY-59	61	112			Х			

Resiliency Task Plans

WYDOT merged the action plans according to common risk factors, prioritized each, and created a series of potential resiliency tasks. WYDOT prioritized the resiliency plans according to the weighting values shown in Table 26. The weighting values were established according to the perceived level of disruption that each risk poses to the movement of vehicles on critical freight corridors. The tasks were assessed from highest to lowest priority, keeping only the highest priority tasks for the lower priority road sections. Multiple tasks are proposed for most locations based on the number and intensity of the risks. WYDOT does not intend for each task to be implemented, but to provide WYDOT engineers and planners a potential list of tasks to evaluate for feasibility.

Risk	Weight
Winter Weather	10
Light High-Profile	
Vehicle Blowover	3
Environmental	3
Bridge Flood	7
Bridge Strike	5

Table 26: Weighting Factors Used to Estimate Risk Location Priorities

Interstate 80 - RM 280 to RM 359

Priority: 1

This roadway section exhibits high risks for winter weather, air quality and bridge strikes at RM 313.91 and 357.68 (bridges LBN, AYR and AYS). These bridges carry I-80 and could lead to significant issues if a bridge strike were to close I-80. Daily truck volumes are nearly 7,800 and daily vehicle volumes exceed 14,200. Estimated truck delay cost exceeds \$724,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to try to reduce the length of closures and decrease delay conditions.
- 2. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology for long-term winter weather and light high-profile vehicle closures.
- 3. WYDOT should establish alternate routing procedures for long-term winter weather and light high-profile vehicle closures. These procedures should convey to truckers the alternate route,

oversize/overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process should also be conveyed through "Connected Vehicle" communication technology.

- 4. WYDOT should investigate the need for more advanced warning and better height limit warning signage. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures should be established for I-80. The procedures should include those alternate routing procedures described in point 3 above along with developing individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 5. WYDOT should create or incentivize the electrification of truck parking areas to reduce truck emissions.
- 6. WYDOT should assess the practicality of lowering the grade under each high risk strike bridge.
- 7. WYDOT should investigate the installation of snow fences.

Interstate 80 - RM 209 to RM 280

Priority: 2

This highway section exhibits high risks for winter weather, light high-profile vehicle blowover and bridge strikes at RM 210.99, 219.84, 235.21, and 260.24 (bridges ATO, ATN, ASP, ASQ, AUR and AVG). These bridges carry I-80 and could lead to significant issues if a bridge strike were to close the road. Daily truck volumes are over 5,500 and average daily traffic is over 10,500. Estimated truck delay cost exceeds \$645,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 2. WYDOT should establish alternative routing procedures for long-term winter weather and light high-profile vehicle closures. These procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the alternate route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process should also be conveyed through "Connected Vehicle" communication technology.
- 3. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology for long-term winter weather, light high-profile vehicle closure and tailpipe emission mitigation.
- 4. WYDOT should investigate the need for more advanced warning and better height limit warning signage for the bridges identified above for bridge strike risk. If the investigations show that improved signage won't likely decrease bridge strikes, then alternative routing procedures should be established for I-80. The procedures should include those alternative routing procedures described in point 2 above along with developing individual task plans assigning specific tasks to individuals to accomplish the smooth transitions to and from the alternate route(s).
- 5. WYDOT should assess the practicality of lowering the grade under each high risk strike bridge.

Interstate 80 - RM 0 to RM 34

Priority: 3

This roadway section exhibits high risks for winter weather, air quality and bridge strike at RM 23.8 (bridge ANH). This bridge carries I-80 and could lead to significant issues if a bridge strike were to close I-80. Daily truck volumes are over 6,000 and daily vehicle volumes are nearly 13,300. Estimated truck delay cost is nearly \$689,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 2. WYDOT should establish alternate routing procedures for long-term winter weather and light high-profile vehicle closures. These procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process should also be conveyed through "Connected Vehicle" communication technology.
- 3. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology for long-term winter weather and light high-profile vehicle closures.
- 4. To reduce tailpipe emissions, WYDOT should investigate and implement the expansion of PrePass to more trucks approaching the port-of-entry.
- 5. WYDOT should investigate the need for more advanced warning and better height limit warning signage. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures should be established for I-80. The procedures should include those alternate routing procedures described in point 2 above and WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 6. WYDOT might assess the practicality of lowering the grade under the high risk bridge to mitigate further bridge strikes.

Interstate 80 – RM 122 to RM 199

Priority: 4

This roadway section exhibits high risks for winter weather, air quality and bridge strikes at RM 130.84, 146.85, 187.19 and 196.16 (bridges AQZ, ARN, ASV, ASP and ASQ). These bridges carry I-80 and could lead to significant issues if a bridge strike were to close I-80. Daily truck volumes are nearly 5,300 and daily vehicle volumes are over 11,500. Estimated truck delay cost is nearly \$324,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 2. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology to establish safety parameters to reduce closures or allow more trucks to operate during high wind events.

- 3. WYDOT should investigate the need for more advanced warning and better height limit warning signage for high risk bridge strike locations. If the investigations show that improved signage won't likely decrease bridge strikes, WYDOT should establish alternate routing procedures to mitigate bridge strike events. These procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process should also be conveyed through "Connected Vehicle" communication technology. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 4. WYDOT should assess the practicality of lowering the grade under the high risk strike bridges.
- 5. WYDOT should investigate the installation of snow fences.

Interstate 80 – RM 34 to RM 122

Priority: 5

This highway section exhibits high risks for air quality, bridge flooding at RM 77.5 (bridges AOR and AOS) and bridge strikes at RM 77.31 and 85.35 (bridges AOQ, AOX and AOY). Each of these bridges carries I-80 and could lead to significant issues if a bridge strike were to close I-80. Daily truck volumes are over 7,100 and daily vehicle volumes are over 14,000. Estimated truck delay is nearly 12,333 hours per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should create or incentivize the electrification of truck parking areas.
- 2. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology for long-term winter weather, light high-profile vehicle closure and tailpipe emission mitigation.
- 3. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to try to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 4. WYDOT should investigate the need for more advanced warning and better height limit warning signage for the bridges identified as high risk for bridge strikes. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures should be established for I-80. WYDOT should establish alternate routing procedures that convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 5. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 6. WYDOT should assess the practicality of lowering the grade under each bridge that is high risk for bridge strikes.
- 7. Alternate routing procedures should be established for I-80 in the event the bridges identified as high risk for flooding are flood damaged and closed. WYDOT should establish alternate routing procedures that convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area.

WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).

8. WYDOT should investigate the installation of snow fences.

Interstate 25 - RM 0 to RM 25

Priority: 6

This highway section exhibits high risks for winter weather, light high-profile vehicle blowover, air quality and bridge strikes at RM 8.84 and 10.59 (bridges ABC, AAS and AAR). Each of these bridges carries I-25 and could lead to significant issues if a bridge strike were to close I-25. Daily truck volumes are over 3,400 and daily vehicle volumes are over 11,800. Estimated truck delay cost is nearly \$552,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology for long-term winter weather, light high-profile vehicle closure and tailpipe emission mitigation.
- 2. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to try to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 3. WYDOT should create or incentivize the electrification of truck parking areas.
- 4. To reduce tailpipe emissions, WYDOT should investigate and implement the expansion of PrePass to more trucks approaching the port-of-entry.
- 5. WYDOT should investigate the need for more advanced warning and better height limit warning signage for the bridges identified as high risk for bridge strikes. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures should be established for I-25. WYDOT should establish alternate routing procedures that convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 6. WYDOT should assess the practicality of lowering the grade under each high risk strike bridge.

Interstate 25 – RM 54 to RM 132

Priority: 7

This highway section exhibits high risks for light high-profile vehicle blowover, bridge strikes at RM 57.65 (bridge ADD) and bridge flooding at RM 125.5 (bridge CZT). These bridges carry I-25 and could lead to significant issues if a bridge strike or flood were to close I-25. Daily truck volumes are over 1,600 and daily traffic volumes exceed 8,000. The following are recommended actions to mitigate the identified risks:

1. WYDOT should investigate the need for more advanced warning and better height limit warning signage for the bridges identified for high risk strike potential above. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures

should be established for I-25. Alternate routing procedures should convey to truckers the alternate route, oversize/ overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).

- 2. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology for long-term winter weather, light high-profile vehicle closure and tailpipe emission mitigation.
- 3. WYDOT should create or incentivize the electrification of truck parking areas.
- 4. WYDOT should investigate increasing scour prone attributes and/or replacing the high risk of flooding bridge.

Interstate 25 - RM 25 to RM 54

Priority: 8

This highway section exhibits high risks for winter weather and light high-profile vehicle blowover. Daily truck volumes are over 2,200 and daily vehicle volumes are nearly 7,800. Estimated truck delay cost is nearly \$200,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 2. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology to establish safety parameters to reduce closures or allow more trucks to operate during high wind events.
- 3. WYDOT should establish alternative routing procedures for long-term winter weather and light high-profile vehicle closures. These procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the alternate route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process should also be conveyed through "Connected Vehicle" communication technology.

Interstate 80 - RM 206 to RM 209

Priority: 9

This highway section exhibits high risks for winter weather and light high-profile vehicle blowover. Daily truck volumes are nearly 6,500 and daily vehicle volumes are over 12,300. Estimated truck delay cost is nearly \$331,000 per mile per year. The following are recommended actions to mitigate the identified risks:

1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.

- 2. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology to establish safety parameters to reduce closures or allow more trucks to operate during high wind events.
- 3. WYDOT should establish alternative routing procedures for long-term winter weather and light high-profile vehicle closures. These procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the alternate route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process should also be conveyed through "Connected Vehicle" communication technology.

Interstate 80 – RM 199 to RM 206

Priority: 10

This highway section exhibits high risks for winter weather. Daily truck volumes are over 5,600 and daily vehicle volumes are over 12,300. Estimated truck delay cost is nearly \$331,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 2. WYDOT should research and develop "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology to establish safety parameters to reduce closures or allow more trucks to operate during high wind events.

Interstate 80 - RM 359 to RM 402

Priority: 11

This highway section exhibits high risks for air quality and bridge strikes at RM 383.3 (bridge AZW). Daily truck volumes are approximately 500, daily vehicle volumes nearly 3,000 and truck delay is approximately 21,600 hours per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should create or incentivize the electrification of truck parking areas.
- 2. WYDOT should research, develop and implement "Connected Vehicle" technology on this road.
- 3. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 4. To reduce tailpipe emissions, WYDOT should investigate and implement the expansion of PrePass to more trucks approaching the port-of-entry.
- 5. WYDOT should build snow fences in higher drift and reduced visibility areas.
- 6. WYDOT should investigate the need for more advanced warning and better height limit warning signage for the bridge identified for high risk strike potential above. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures should be established for I-80. Alternate routing procedures should convey to truckers the alternate route, oversize/ overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process might also be conveyed through "Connected Vehicle"

communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).

7. WYDOT should assess the practicality of lowering the grade under the high risk bridge.

WY 220 - RM 113 to RM 117

Priority: 12

This roadway section exhibits high risks for winter weather and air quality. Daily truck volumes are over 1,000 and daily vehicle volumes are nearly 18,200. Estimated truck delay cost is over \$261,000 per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should create or incentivize the electrification of truck parking areas.
- 2. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures and decrease delay conditions.
- 3. WYDOT should develop and implement "Connected Vehicle" communication, vehicle to vehicle, and vehicle to infrastructure technology for long-term winter weather and light high-profile vehicle closures.
- 4. WYDOT should establish alternate routing procedures. These procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the route. This process should also be conveyed through "Connected Vehicle" communication technology.

Interstate 25 at RM 246.3

Priority: 13

This road section exhibits high risks for bridge flooding at RM 246.3 (bridge AJW). This bridge carries I-25 and could lead to significant issues if a flood were to close I-25. Daily truck volumes are 435 and daily vehicle volumes are nearly 2,000. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should investigate the possibility of adding additional scour protection to the bridge.
- 2. Alternate routing procedures should be established for I-25. The alternate routing procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability. Alternate routes may include rerouting to parallel lanes. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 3. WYDOT might consider replacing the bridge with a bridge that can convey a higher streamflow capacity.

Interstate 25 – RM 175 to RM 228

Priority: 14

This highway section exhibits high risks for air quality and bridge strikes at RM 175.59, 188.19 and 188.6 (bridges AHO, AHP, AIH, FDH and FDG). These bridges carry I-25 and could lead to significant issues if a bridge strike were to close I-25. Daily truck volumes are nearly 700 and daily vehicle volumes exceed 3,100. Estimated truck delays are 1,953 hours per mile per year. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should create or incentivize the electrification of truck parking areas.
- 2. WYDOT should develop and implement "Connected Vehicle" technology for long-term winter weather, light high-profile vehicle closure and tailpipe emission mitigation.
- 3. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 4. WYDOT should investigate the feasibility of building additional snow fences.
- 5. WYDOT should investigate the need for more advanced warning and better height limit warning signage for the bridges identified as high risk for bridge strikes. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures should be established for I-80. WYDOT should establish alternate routing procedures that convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes or routing to highways in adjacent states. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 6. WYDOT should assess the practicality of lowering the grade under each high risk strike bridge.

Interstate 90 - RM 73 to RM 89

Priority: 15

These bridges are at high risk for flooding. They are located at RM 73.2 and 89 (bridges BEB, BEC, BET and BEU). These bridges carry I-90 and could lead to significant issues if a flood were to damage the bridge and close I-90. Daily truck volume estimates are 539 and daily vehicle volumes are nearly 3,500. The following are recommended actions to mitigate the identified risks:

- WYDOT should establish alternate routing procedures that convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the route. Alternate routes may include highways in adjacent states. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 2. WYDOT should upgrade scour prone features in the South Fork of the Powder River if feasible.
- 3. WYDOT should investigate whether replacing the bridges with higher streamflow capacity bridges is feasible.

US-26/WY-789 - RM 104 to RM 127

Priority: 16

This highway section exhibits high risks for air quality and bridge flooding at RM 123.4 (bridge LCU). The bridge is on the causeway crossing Boysen Reservoir. Daily truck volumes are approximately 460, daily vehicle volumes over 900 and annual truck delay is approximately 2,700 hours per mile. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 2. WYDOT should research, develop and implement "Connected Vehicle" technology on this road.
- 3. WYDOT should build snow fences in higher drift and reduced visibility areas.
- 4. WYDOT should establish alternate routing procedures for bridge flooding closures. These procedures should convey to truckers the alternate route, oversize/overweight limitations, available services, and truck parking availability along the route. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s). This process should also be conveyed through "Connected Vehicle" communication technology.
- 5. WYDOT should investigate the possibility of adding additional scour protection to the bridge.

Interstate 25 – RM 132 to RM 175

Priority: 17

This highway section exhibits high risk for bridge strikes at RM 137.56, 139.76, 146, 156.18 and 160.87 (bridges AFY, AGC, AGH, AGI, AGW, AGV, AGX and AGY). These bridges carry I-25 and could lead to significant issues if a bridge strike were to close I-25. Daily truck volumes are over 1,800 and daily vehicle volumes exceed 9,900. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should investigate the need for more advanced warning and better height limit warning signage for these bridges. If the investigations show that improved signage won't likely decrease bridge strikes, then alternate routing procedures should be established for I-25. Alternate routing procedures should convey to truckers the alternate route, oversize/ overweight limitations, available services, and truck parking availability along the route. Alternate routes may include rerouting to parallel lanes. This process might also be conveyed through "Connected Vehicle" communication technology if available in the area. WYDOT should develop individual task plans assigning specific tasks to accomplish the smooth transition to and from the alternate route(s).
- 2. WYDOT should assess the practicality of lowering the grade under the high risk bridges or replacing the bridges.

Interstate 90 - RM 0 to RM 41

Priority: 18

This highway section exhibits high risks for air quality. Daily truck volumes are approximately 1,200, daily vehicle volumes over 7,700 and annual truck delay is approximately 2,850 hours per mile. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should create or incentivize the electrification of truck parking areas.
- 2. WYDOT should develop and implement "Connected Vehicle" technology for long-term winter weather, light high-profile vehicle closure and tailpipe emission mitigation.
- 3. To reduce tailpipe emissions, WYDOT should investigate and implement the expansion of PrePass to more trucks approaching the port-of-entry.
- 4. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 5. WYDOT should investigate the feasibility of building additional snow fences.

Interstate 90 - RM 96 to RM 147

Priority: 19

This highway section exhibits high risks for air quality issues. Daily truck volumes are over 600, daily vehicle volumes are over 4,400 and annual truck delay is approximately 3,600 hours per mile. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should develop and implement "Connected Vehicle" technology.
- 2. WYDOT should create or incentivize the electrification of truck parking areas.
- 3. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 4. WYDOT should investigate the feasibility of building additional snow fences.

WY 59 - RM 61 to RM 112

Priority: 20

This highway section exhibits high risks for air quality issues. Daily truck volumes are over 1,200, daily vehicle volumes are over 8,900 and annual truck delay is approximately 2,700 hours per mile. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should develop and implement "Connected Vehicle" technology.
- 2. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 3. WYDOT should investigate the feasibility of building additional snow fences.

US 191 - RM 0 to RM 51

Priority: 21

This highway section exhibits high risks for air quality issues. Daily truck volumes are over 600, daily vehicle volumes are nearly 3,200 and annual truck delay is approximately 1,100 hours per mile. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should develop and implement "Connected Vehicle" technology.
- 2. WYDOT should investigate the feasibility of building additional snow fences.
- 3. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.

WY 220 - RM 57 to RM 113

Priority: 22

This highway section exhibits high risks for air quality issues. Daily truck volumes are approximately 400, daily vehicle volumes nearly 3,000 and annual truck delay is approximately 1,700 hours per mile. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should continue to assess and modify their snow removal and winter weather management procedures to reduce the length of closures, decrease delay conditions, and reduce tailpipe emissions from vehicle idling and acceleration-deceleration cycles.
- 2. WYDOT should investigate the feasibility of building additional snow fences.
- 3. WYDOT should research "Connected Vehicle" technology for this road and implement applicable technologies.

US 20/26 - RM 0 to RM 10

Priority: 23

This urban highway section exhibits high risks for air quality issues. Daily truck volumes are approximately 780, daily vehicle volumes nearly 13,200 and annual truck delay is approximately 1,800 hours per mile. The following are recommended actions to mitigate the identified risks:

- 1. WYDOT should provide electrified truck parking areas to reduce truck idling.
- 2. WYDOT should research "Connected Vehicle" technology for this road and implement applicable technologies.
- 3. WYDOT should provide incentives for diesel retrofits.

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Appendix A

Bridge Flooding Action Plans

Wyoming Department of Transportation Freight Resilience Action Plans - Bridge Flooding

Analysis Year:		2018								
Asset / Locatio	n:	I-25 at N Platte River, ML25 at 125.5	, Bridge ID = CZT							
Ownership:		WYDOT		Criticality Rank:	2 of 46					
Risk Probability	y Rtg:	3		Risk Consequence Rtg:	5					
Priority Rtg: High				Issue Type:	Infrastructural					
Issues:		A fairly long detour may be required i	d if damage is extensive. The bridge is in fairly poor condition (NHPP rating of 4). Large deck area. In a high risk county.							
Vulnerabilities			Strengths							
Possible long of	letour		Redundant route is available if not damaged also	Return I-25 traffic to normal conditions as quickly as	possible.					
The only Inters	tate route for th	ne area		Minimize user, agency and societal costs.						
Bridge carries	1449 trucks per	r day		Minimize truck delays.						
Large bridge o	ver a large rive	r								
	-	Scour Rating = 8.								
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders					
В	H	Replace with a higher capacity bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	1. Inform WTA and municipalities in the area					
В	Н	Upgrade scour prone attributes of the bridge.	1. Lower cost than full replacement.	 May be expensive. May not provide adequate protection for large floods. 						
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA. 					

Wyoming Department of Transportation Freight Resilience Action Plans - Bridge Flooding

Analysis Year:		2018					
Asset / Location:		I-80 at Blacks Fork River, ML80 at 77.5, Bridge IDs = AOS and AOR					
Ownership:		WYDOT		Criticality Rank:	1 of 46		
Risk Probability Rtg:		3		Risk Consequence Rtg:	4		
Priority Rtg:		High		Issue Type:	Infrastructural		
Issues: Very high truck traffic. A fairl		Very high truck traffic. A fairly long de	ng detour may be required if both bridges are damaged. The bridges are in fair condition. High stream flow variability.				
Vulnerabilities			Strengths	Objectives			
Possible long d	letour		Paired bridges may provide a redundant route if not	Return I-80 traffic to normal conditions as quickly as possible.			
The only Interstate route for the area			damaged also	Minimize user, agency and societal costs.			
Bridges carry 7151 trucks per day. Scour Rating = 8.				Minimize truck delays.			
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,	Antiona	Deep	Cons	Potential Tasks Involving Stakeholders		
the Event	<u>P</u> lan	Actions	Pros		Stakenolders		
В	Н	Replace with higher capacity bridges. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	1. Inform WTA and municipalities in the area		
В	Н	Upgrade scour prone attributes of the bridges.	 Lower cost than full replacement. Scour protection upgrades will protect both bridges. 	 May be expensive. May not provide adequate protection for large floods. 			
D, A	R, O	Repair the bridges following each incident. Establish and enact reroute procedures in the event the bridges are closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement(s). 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA. 		

Wyoming Department of Transportation Freight Resilience Action Plans - Bridge Flooding

Analysis Year:		2018					
Asset / Location:		I-25 at S.F. Powder River, ML25 at 246.3, Bridge ID = AJW					
Ownership:		WYDOT		Criticality Rank:	2 of 46		
Risk Probability Rtg:		4		Risk Consequence Rtg:	3		
Priority Rtg:		Medium		Issue Type:	Infrastructural		
Issues: A fa		A fairly long detour may be required i	fairly long detour may be required if both bridges are damaged. The bridge is in fair condition (NHPP rating of 5). In a high risk county for probability.				
Vulnerabilities			Strengths	Objectives			
Possible long detour			Redundant route is available if not damaged also	Return I-25 traffic to normal conditions as quickly as possible.			
The only Inters	tate route for th	ne area		Minimize user, agency and societal costs.			
Bridge carries 218 trucks per day. Scour Rating = 8.				Minimize truck delays.			
Perform <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders		
В	Н	Replace with a higher capacity bridge(s). Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	1. Inform WTA and municipalities in the area		
В	Н	Upgrade scour prone attributes of the bridges.	 Lower cost than full replacement. Some scour protection upgrades will also protect the adjacent bridge. 	 May be expensive. May not provide adequate protection for large floods. 			
D, A	R, O	Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the bridge(s) is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement(s). 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA. 		

Analysis Year:	2018			
Asset / Location:	I-90 at Powder River, ML90 at 89.0), Bridge IDs = BET and BEU		
Ownership:	WYDOT		Criticality Rank:	3 of 46
Risk Probability Rtg:	5		Risk Consequence Rtg:	3
Priority Rtg:	Medium		Issue Type:	Infrastructural
Issues:	A fairly long detour may be require	d if both bridges are damaged. High stream flow variabilit	y. In a high flood probability county.	
Vulnerabilities		Strengths	Objectives	
Possible long detour		Paired bridges may provide a redundant route if not	Return I-90 traffic to normal conditions as qui	ckly as possible.
The only Interstate route f	or the area	damaged also	Minimize user, agency and societal costs.	
Bridges carry 572 trucks p	er day. Scour Rating = 8.		Minimize truck delays.	
Perform Action Before, During or After the Funct		Broo	Com	Potential Tasks Involving

Replace with higher capacity bridges. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	1. Inform WTA and municipalities in the area
Upgrade scour prone attributes of the bridges.	 Lower cost than full replacement. Scour protection upgrades will protect both bridges. 	 May be expensive. May not provide adequate protection for large floods. 	
Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the bridge(s) is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement(s). 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
	accordingly. Upgrade scour prone attributes of the bridges. Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the	accordingly. 1. Permanent fix. Shouldn't have to address later. Upgrade scour prone attributes of the bridges. 1. Lower cost than full replacement. Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the 1. Fast recovery of facility function. 2. Short-term lower agency cost compared to bridge replacement.	accordingly. 1. Permanent fix. Shouldn't have to address later. businesses and residents. Upgrade scour prone attributes of the bridges. 1. Lower cost than full replacement. 1. May be expensive. Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the 1. Fast recovery of facility function. 1. May be expensive. 2. Short-term lower agency cost compared to bridge 1. Multiple closures may be cumbersome to users, businesses and residents. 2. Damage may be extensive requiring bridge

Analysis Year: 2018		2018			
Asset / Location: US-26 at Wind River, ML20 at 123.4			Bridge ID = LCU		
Ownership:		WYDOT		Criticality Rank:	3 of 46
Risk Probability	v Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Low		Issue Type:	Infrastructural
Issues:		25-year flood event capacity. A very l	ong detour may be required. Fairly high stream flow var	iability. In a high flood probability county.	
Vulnerabilities			Strengths	Objectives	
Possible long d	etour		Upstream portion of Boysen Reservoir may provide	Return US-26 traffic to normal conditions as quickly	as possible.
Chokepoint in th	he system		a buffer to flooding.	Minimize user, agency and societal costs.	
Bridge carries 4	13 trucks per o	lay. Scour Rating = 8.		Minimize truck delays.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher capacity bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	1. Inform WTA and municipalities in the area
В	Н	Upgrade scour prone attributes of the bridge.	1. Lower cost than full replacement.	 May be expensive. May not provide adequate protection for large floods. 	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.

Analysis Year:	2018			
Asset / Location:	I-90 at Crazy Woman Creek, ML90	at 73.2, Bridge IDs = BEB and BEC		
Ownership:	WYDOT		Criticality Rank:	3 of 46
Risk Probability Rtg:	4		Risk Consequence Rtg:	3
Priority Rtg:	Low		Issue Type:	Infrastructural
Issues:	A fairly long detour may be required	d if both bridges are damaged. High stream flow variabilit	y. In a high flood probability county.	
Vulnerabilities		Strengths	Objectives	
Possible long detour		Paired bridges may provide a redundant route if not	Return I-90 traffic to normal conditions as quick	ly as possible.
The only Interstate route for	or the area	damaged also	Minimize user, agency and societal costs.	
Bridges carry 520 trucks p	er day. Scour Rating = 8.		Minimize truck delays.	
Perform Harden, Action Before, Bedundant During or After Operational		Dree	Core	Potential Tasks Involving

During or After the Event	<u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
B	H	Replace with higher capacity bridges. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	1. Inform WTA and municipalities in the area
В	Н	Upgrade scour prone attributes of the bridges.	 Lower cost than full replacement. Scour protection upgrades will protect both bridges. 	 May be expensive. May not provide adequate protection for large floods. 	
D, A	R, O	Repair the bridge(s) following each incident. Establish and enact reroute procedures in the event the bridges are closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement(s). 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.

Wyoming Department of Transportation Risk and Resilience Plan for Freight

Appendix B

Bridge Strike Action Plans

Analysis Year:		2018			
Asset / Location	n:	I-80 at Leroy Rd, ML80 at 23.8, Bridg	je ID = ANH		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		High		Issue Type:	Infrastructural
Issues:		Underclearance is 14.17 ft. The bridg	e is in moderate condition (NHPP rating of 5). Very high	n truck traffic. 2 strikes since 1994.	
Vulnerabilities			Strengths	Objectives	
Possible long d (unkikely).	detour if both br	idges (ANH & ANK) damaged	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	s possible.
The only Inters	tate route for th	ne area.		Minimize user, agency and societal costs.	
Bridge carries 2	2938 trucks per	r day.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	H	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018			
Asset / Location: I-80 at WY-377, ML80 at 130.84, Brid		I-80 at WY-377, ML80 at 130.84, Brid	lge ID = AQZ		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	v Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		High		Issue Type:	Infrastructural
Issues:		Underclearance is 14.5 ft. The bridge	is in moderate condition (NHPP rating of 5). Very high	truck traffic. 3 strikes since 1994.	
Vulnerabilities			Strengths	Objectives	
Possible long de (unkikely).	etour if both bri	dges (AQZ & AQY) damaged	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Interst	tate route for th	e area.		Minimize user, agency and societal costs.	
Bridge carries 2	2830 trucks per	day.		Minimize truck delays.	
-				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, Operational.				Potential Tasks Involving
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018			
Asset / Location	n:	I-80 at Riner Rd, ML80 at 196.16, Bri	dge ID = ASV		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		High		Issue Type:	Infrastructural
Issues:		Underclearance is 14.24 ft. The bridg	e is in fairly poor condition (NHPP rating of 4). Very hig	h truck traffic. 2 strikes since 1994.	
Vulnerabilities			Strengths	Objectives	
Possible long d (unkikely).	letour if both bri	dges (ASV & ASW) damaged	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Interst	tate route for th	e area.		Minimize user, agency and societal costs.	
Bridge carries 2	2844 trucks per	day.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,		_		Potential Tasks Involving
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018			
Asset / Location: I-80 at County Rd 3, ML80 at 260.24,		I-80 at County Rd 3, ML80 at 260.24	, Bridge ID = AVG		
Ownership: WYDOT		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		High		Issue Type:	Infrastructural
Issues:		Underclearance is 17.32 ft. The bridg	ges are in moderate condition (NHPP rating of 5). Very h	nigh truck traffic. 2 strikes since 1994.	
Vulnerabilities			Strengths	Objectives	
Possible long detour if both bridges (AVH & AVG) damaged (unkikely).			Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	s possible.
The only Inters				Minimize user, agency and societal costs.	
Bridge carries 2	2984 trucks pe	r day.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, P lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

•	•••	•	•	U	
Analysis Year:		2018			
Asset / Locatior	n:	I-80 at Two Mile Draw, ML80 at 210.	99, Bridge ID = ATO & ATN		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	Rtg:	4		Risk Consequence Rtg:	5
Priority Rtg:		High		Issue Type:	Infrastructural
Issues:		Underclearance is 14.17 ft. The bridg	es are in moderate condition (NHPP rating of 6). Very h	igh truck traffic. 2 strikes on ATO and 1 on ATN since	1994.
/ulnerabilities			Strengths	Objectives	
ossible long d	etour if both b	ridges are damaged (unkikely).	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Interst	tate route for t	he area.		Minimize user, agency and societal costs.	
Bridge carries 3	3412 trucks pe	r day per bridge.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform_	Harden,				
<u>Action B</u> efore, During or After	Redundant,				Potential Tasks Involving
the Event	<u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Stakeholders
				1. Expensive.	
		Replace with a higher clearance bridge. Upgrade approaches		 Requires temporary rerouting solution. May create long-term hardships for users, 	
В	н	accordingly.	1. Permanent fix. Shouldn't have to address later.	businesses and residents.	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
					1. Establish procedures with WH
		Repair the bridge following each	1. Fast recovery of facility function.	1. Multiple closures may be cumbersome to users,	and local transportation
		incident. Establish and enact	2. Short-term lower agency cost compared to bridge	businesses and residents.	departments along the redundation
ПΔ	RO	reroute procedures in the event the	replacement.	2. Damage may be extensive requiring bridge	route.

		Repair the bridge following each	1. I astrecovery of lacinty function.		
		incident. Establish and enact	2. Short-term lower agency cost compared to bridge	businesses and residents.	departments along the redundant
		reroute procedures in the event the	replacement.	2. Damage may be extensive requiring bridge	route.
D, A	R, O	bridge is closed.	3. Fairly low user cost during repair.	replacement.	2. Inform WTA.
				1. May not be feasible given the current	
				conditions.	
			1. Likely to be a lower cost than bridge	2. May be drainage issues.	
В	Н	Lower the grade under the bridge.	replacement.	3. May create vertical sight issues.	

Analysis Year:		2018			
Asset / Location: I-80 at WY-222, ML80 at 357.68, Brid Ownership: WYDOT Risk Probability Rtg: 4			Ige ID = ATR & ATS	Criticality Bank:	1 of 46
		4		Criticality Rank:	5
Priority Rtg:	y Rig.	4 High		Risk Consequence Rtg: Issue Type:	o Infrastructural
Flionity Rig.		-			
Issues:		Underclearance is 16.08 ft. High truck traffic. 1 strike on each bridge since 1	k volumes pass under bridges to access Wal Mart Distri 994.	bution Center. The bridges are in moderate condition	(NHPP rating of 6). Very high truck
Vulnerabilities		<u> </u>	Strengths	Objectives	
Possible long d (unkikely).	letour if both br	idges (AYR & AYS) damaged	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Inters	tate route for th	ne area.		Minimize user, agency and societal costs.	
Bridge carries 3	3557 trucks per	^r day per bridge.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, O perational,				Potential Tasks Involving
the Event	Plan	Actions	Pros	Cons	Stakeholders
В	н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. Significant rerouting of trucks on WY-222 may be needed. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. Significant rerouting of trucks on WY-222 would be needed. 	1. High truck volumes pass under bridges to access Wal Mart Distribution Center. Would require rerouting these trucks during construction.

Analysis Year:		2018			
Asset / Location	n:	I-80 at Machinery Pass, ML80 at 77.3	31, Bridge ID = AOQ		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 14.24 ft. The bridg	es are in moderate condition (NHPP rating of 6). Very h	high truck traffic. 3 bridge strikes since 1994.	
Vulnerabilities			Strengths	Objectives	
(unkikely).		dges (AOP & AOQ) damaged	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	s possible.
The only Inters				Minimize user, agency and societal costs.	
Bridge carries 3	3293 trucks per	day.		Minimize truck delays.	
P (Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:	0 1	2018	5	0	
Asset / Location	n:	I-80 at Patrick Draw, ML80 at 146.85	, Bridge ID = ARN		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	/ Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 15.16 ft. The bridg	es are in moderate condition (NHPP rating of 5). Very h	igh truck traffic. 2 bridge strikes since 1994.	
Vulnerabilities			Strengths	Objectives	
Possible long d (unkikely). The only Interst Bridge carries 2	tate route for th		Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as Minimize user, agency and societal costs. Minimize truck delays. Maintain safety and mobility in the region.	possible.
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018			
Asset / Location	n:	I-80 at US-287, ML80 at 313.19, Brid	ge ID = LBN		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	/ Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 18.57 ft. Very high	n truck traffic. 2 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
The only Interst	tate route for th	ne area.	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
Bridge carries 2	2984 trucks pe	r day.	Fairly short detour, but through Laramie.	Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,				Potential Tasks Involving
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. Likely to be a lower cost than bridge replacement. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues 	 Establish procedures with WHI and local transportation departments along the redundant route. Inform WTA.
В	H	Lower the grade under the bridge.	replacement.	May create vertical sight issues.	

Analysis Year:		2018			
Asset / Location: I-80 at WY-789, ML80 at 187.19, Br		I-80 at WY-789, ML80 at 187.19, Brid	lge ID = ASP & ASQ		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 15.49 and 15.16 ft	Very high truck traffic. 4 bridge strikes since 1994 (2	per bridge).	
Vulnerabilities			Strengths	Objectives	
Possible long of	letour if both br	idges damaged (unkikely).	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Inters	tate route for th	le area.		Minimize user, agency and societal costs.	
Bridge carries	2830 trucks per	day per bridge.		Minimize truck delays.	
-				Maintain safety and mobility in the region.	
Perform	Harden,				
Action Before, During or After	Redundant,				Potential Tasks Involving
the Event	<u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Stakeholders
				1. Expensive.	
		Replace with a higher clearance bridge. Upgrade approaches		 Requires temporary rerouting solution. May create long-term hardships for users, 	
В	Н	accordingly.	1. Permanent fix. Shouldn't have to address later.	businesses and residents.	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
					1. Establish procedures with WHP
		Repair the bridge following each	1. Fast recovery of facility function.	1. Multiple closures may be cumbersome to users,	and local transportation
		incident. Establish and enact	2. Short-term lower agency cost compared to bridge	businesses and residents.	departments along the redundant
		reroute procedures in the event the	replacement.	2. Damage may be extensive requiring bridge	route.
D, A	R, 0	bridge is closed.	3. Fairly low user cost during repair.	replacement.	2. Inform WTA.
				1. May not be feasible given the current	
			1. Likely to be a lower cost than bridge	conditions. 2. May be drainage issues.	

Repair the bridge following each

reroute procedures in the event the

UPRR to discuss mitigation efforts.

Lower the grade under the bridge.

incident. Establish and enact

bridge is closed. Discuss with

R. 0

Н

D, A

В

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Analysis Year:		2018			
Asset / Location	n:	I-80 at WY-76 and UPRR, ML80 at	219.84, Bridge ID = KJC, KJB		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	5
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 18.93 and 17.85	ft. Most likely train hits. Very high truck traffic. 2 brid	ge strikes since 1994 (1 per bridge).	
Vulnerabilities			Strengths	Objectives	
The only Interst	tate route for t	he area.	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly	as possible.
Bridge carries 3	3556 trucks pe	r day per bridge.	Detour could be made through Sinclair.	Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform	Harden,				
Action Before, During or After	Redundant, Operational.				Potential Tasks Involving
the Event	<u>D</u> perational, <u>P</u> lan	Actions	Pros	Cons	Stakeholders
		Poplace with a higher electronee		1. Expensive.	
		Replace with a higher clearance bridge. Upgrade approaches		 Requires temporary rerouting solution. May create long-term hardships for users, 	1. Work with UPRR an mitigatio
В	H	accordingly.	1. Permanent fix. Shouldn't have to address later.	businesses and residents.	plans and efforts.
		Increase warning signage and discuss with UPRR to discuss			1. Work with UPRR an mitigatio
В	H H	mitigation efforts.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	plans and efforts.
	· · · ·				rr

1. Fast recovery of facility function.

3. Fairly low user cost during repair.

replacement.

2. Short-term lower agency cost compared to bridge

1. Permanent fix. Shouldn't have to address later.

1. Multiple closures may be cumbersome to users,

2. Damage may be extensive requiring bridge

businesses and residents.

1. Cost may be prohibitive.

replacement.

1. Establish procedures with WHP and local transportation

departments along the redundant

3. Work with UPRR an mitigation

route.

2. Inform WTA.

plans and efforts.

1. Work with UPRR.

	0 1		0	0	
Analysis Year:		2018			
Asset / Location	n:	I-80 at County Rd 59, ML80 at 85.35,	Bridge ID = AOX, AOY		
Ownership: WYDOT		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 17.59 ft Very higl	n truck traffic. 3 bridge strikes since 1994 (AOX hit twice	a).	
Vulnerabilities			Strengths	Objectives	
Possible long d	letour if both br	ridges damaged (unkikely).	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Interst			ů ů	Minimize user, agency and societal costs.	
Bridge carries 3	3293 trucks per	r day per bridge.		Minimize truck delays.	
0				Maintain safety and mobility in the region.	
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHF and local transportation departments along the redundant route. Inform WTA.
				 May not be feasible given the current conditions. 	

Analysis Year:		2018			
Asset / Location	n:	I-80 at US-30/WY-130, ML80 at 235.	21, Bridge ID =AUR		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 164 ft. Very high	truck traffic. 2 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
Possible long d (unkikely).	letour if both br	idges (AUR & AUQ) damaged	Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Interst	tate route for th	ie area.		Minimize user, agency and societal costs.	
Bridge carries 2	2984 trucks per	day.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	H	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018			
Asset / Location: I-25 at US-87 , ML25 at 160.87, E		I-25 at US-87 , ML25 at 160.87, Bridg	ge ID =AGX, AGY		
Ownership: WYDOT		WYDOT		Criticality Rank:	2 of 46
Risk Probability	y Rtg:	5		Risk Consequence Rtg:	3
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 16.01 ft. Fairly hig	h truck traffic. 4 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
Bridge carries	1016 trucks pe	r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	s possible.
				Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,	A	_		Potential Tasks Involving
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018			
Asset / Location	n:	I-25 at WY-220, ML25 at 188.6, Bridg	ge ID = FDG, FDH		
Ownership:		WYDOT		Criticality Rank:	2 of 46
Risk Probability	/ Rtg:	5		Risk Consequence Rtg:	3
Priority Rtg:		Low		Issue Type:	Infrastructural
Issues:		Underclearance is 16.24 ft Fairly high	gh truck traffic. 5 bridge strikes since 1994 (4 hits on FD	Н).	
Vulnerabilities			Strengths	Objectives	
Alternate detou	irs may create	traffic problems.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	possible.
The only Interst	tate route for th	ne area.	Alternate detours available.	Minimize user, agency and societal costs.	
Carries 1045 tr	ucks per day p	er bridge.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
		Repair the bridge following each incident. Establish and enact	 Fast recovery of facility function. Short-term lower agency cost compared to bridge 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge 	1. Establish procedures with WHF and local transportation departments along the redundant route.
D, A	R, 0	reroute procedures in the event the bridge is closed.	replacement. 3. Fairly low user cost during repair.	replacement.	2. Inform WTA.

,	0				
Analysis Year: 2018					
Asset / Location	n:	I-80 at County Rd 146-1, ML80 at 38	3.3, Bridge ID =AZW		
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	v Rtg:	4		Risk Consequence Rtg:	3
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 14.57 ft. Very high	truck traffic. 2 bridge strikes since 1994.		
Vulnerabilities		· · ·	Strengths	Objectives	
Possible long d	etour if both br	idges (AZW & AZV) damaged			
(unkikely).			Parallel bridge is available if not damaged also.	Return I-80 traffic to normal conditions as quickly as	possible.
The only Interst	tate route for th	ne area.		Minimize user, agency and societal costs.	
Bridge carries 2	2431 trucks per	day.		Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform	Harden,				
<u>Action B</u> efore, During or <u>A</u> fter	Redundant,				Potential Tasks Involving
the Event	<u>O</u> perational, P lan	Actions	Pros	Cons	Stakeholders
1				1. Expensive.	
		Replace with a higher clearance		2. Requires temporary rerouting solution.	
В	н	bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	3. May create long-term hardships for users, businesses and residents.	
			*		
В	H	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
l		Densis the bridge following each	1. Fast resources of facility function	1. Multiple cleaures may be sumbarrame to users	1. Establish procedures with WHP
		Repair the bridge following each incident. Establish and enact	 Fast recovery of facility function. Short-term lower agency cost compared to bridge 	1. Multiple closures may be cumbersome to users, businesses and residents.	and local transportation departments along the redundant
		reroute procedures in the event the	replacement.	2. Damage may be extensive requiring bridge	route.
D, A	R, O	bridge is closed.	3. Fairly low user cost during repair.	replacement.	2. Inform WTA.
				1. May not be feasible given the current	
				conditions.	
		I successful and a constant the building	1. Likely to be a lower cost than bridge	2. May be drainage issues.	
В	H	Lower the grade under the bridge.	replacement.	3. May create vertical sight issues.	<u> </u>

Analysis Year:		2018			
Asset / Location	n:	I-25 at Missle Dr , ML25 at 10.59, Bri	dge ID =ABC		
Ownership:		WYDOT		Criticality Rank:	2 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3
Priority Rtg:		Low		Issue Type:	Infrastructural
Issues:		Underclearance is 14.76 ft. Fairly hig	h truck traffic. 3 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
Possible moder (unkikely). Bridge carries		oth bridges (ABB & ABC) damaged r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as Minimize user, agency and societal costs. Minimize truck delays. Maintain safety and mobility in the region.	s possible.
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year: 2018					
Asset / Location: I-25 at WY-94, ML25 at 139.76, Br		I-25 at WY-94, ML25 at 139.76, Bridg	ge ID =AGC		
Ownership: WYDOT		WYDOT		Criticality Rank:	2 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 16.67 ft. Fairly hig	h truck traffic. 2 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
Bridge carries 1	1016 trucks pe	r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	possible.
				Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year: 2018		2018			
Asset / Location: I-25 at WY-96, ML25 at 146, Bridge		I-25 at WY-96, ML25 at 146, Bridge I	D =AGH, AGI		
Ownership: WYDOT		WYDOT		Criticality Rank:	2 of 46
Risk Probability	/ Rtg:	5		Risk Consequence Rtg:	3
Priority Rtg:		Medium		Issue Type:	Infrastructural
Issues:		Underclearance is 12.99 ft. Fairly hig	h truck traffic. 15 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
Bridge carries 1	1016 trucks per	r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	possible.
				Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform	Hardan				
Action Before,	<u>H</u> arden, <u>R</u> edundant,				Detential Table Involving
<u>D</u> uring or <u>A</u> fter the Event	<u>O</u> perational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
				1. Expensive.	
		Replace with a higher clearance		2. Requires temporary rerouting solution.	
_		bridge. Upgrade approaches		3. May create long-term hardships for users,	
В	H	accordingly.	1. Permanent fix. Shouldn't have to address later.	businesses and residents.	
В	H	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
					1. Establish procedures with WH
		Repair the bridge following each	1. Fast recovery of facility function.	1. Multiple closures may be cumbersome to users,	and local transportation
		incident. Establish and enact	2. Short-term lower agency cost compared to bridge	businesses and residents.	departments along the redundant
D, A	R, O	reroute procedures in the event the bridge is closed.	replacement. 3. Fairly low user cost during repair.	2. Damage may be extensive requiring bridge replacement.	route. 2. Inform WTA.
D, A	I, U			1. May not be feasible given the current	
				conditions.	
			1. Likely to be a lower cost than bridge	2. May be drainage issues.	
	Н	Lower the grade under the bridge.	replacement.	3. May create vertical sight issues.	

Analysis Year:		2018					
Asset / Location:		I-25 at WY-255 , ML25 at 188.19, Bridge ID =AIH					
Ownership:		WYDOT		Criticality Rank:	2 of 46		
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3		
Priority Rtg:		Medium		Issue Type:	Infrastructural		
Issues:		Underclearance is 14.17 ft. Fairly hig	h truck traffic. 3 bridge strikes since 1994.				
Vulnerabilities			Strengths	Objectives			
Bridge carries	1016 trucks pe	r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	s possible.		
				Minimize user, agency and societal costs.			
				Minimize truck delays.			
				Maintain safety and mobility in the region.			
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,	Actions	Pros	Com	Potential Tasks Involving Stakeholders		
the Event	<u>P</u> lan	Actions	PIOS	Cons	Stakenoiders		
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 			
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.			
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA. 		
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 			

Analysis Year: 2018		2018			
Asset / Location:		I-25 at I-80, ML25 at 8.84, Bridge ID	=AAS, AAR		
Ownership:		WYDOT		Criticality Rank:	2 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3
Priority Rtg:		Low		Issue Type:	Infrastructural
Issues:		Underclearance is 16.93 ft for AAS a	nd 18.5 ft for AAR. Very high truck traffic. 3 bridge strike	es since 1994 (2 on AAS).	
Vulnerabilities			Strengths	Objectives	
Bridges carries	s 2314 trucks p	er day per bridge.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	possible.
				Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,	A	2		Potential Tasks Involving
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018					
Asset / Location:		I-25 at County Road 1 , ML25 at 137.56, Bridge ID = AFY					
Ownership:		WYDOT		Criticality Rank:	2 of 46		
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3		
Priority Rtg:		Low		Issue Type:	Infrastructural		
Issues:		2 bridge strikes since 1994.					
Vulnerabilities			Strengths	Objectives			
Bridge carries	1016 trucks pe	er day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	s possible.		
				Minimize user, agency and societal costs.			
				Minimize truck delays.			
				Maintain safety and mobility in the region.			
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,				Potential Tasks Involving		
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders		
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 			
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.			
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA. 		
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 			

Analysis Year: 2018		2018			
Asset / Location:		I-25 at WY-321 , ML25 at 57.65, Brid	ge ID =ADD		
Ownership: WYDOT		WYDOT		Criticality Rank:	2 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3
Priority Rtg:		Low		Issue Type:	Infrastructural
Issues:		Underclearance is 14.24 ft. Fairly hig	h truck traffic. 2 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
Bridge carries	1044 trucks pe	r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	s possible.
				Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational,	Astions	Deep	0	Potential Tasks Involving
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, 0	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA.
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Analysis Year:		2018					
Asset / Location	n:	I-25 at Bixby Rd, ML25 at 156.18, Bridge ID = AGV, AGW					
Ownership:		WYDOT		Criticality Rank:	2 of 46		
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3		
Priority Rtg:		Low		Issue Type:	Infrastructural		
Issues:		Underclearance is 15.26 ft. Fairly hig	h truck traffic. 2 bridge strikes since 1994.				
Vulnerabilities			Strengths	Objectives			
Bridge carries 2	1016 trucks pe	r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	possible.		
				Minimize user, agency and societal costs.			
				Minimize truck delays.			
				Maintain safety and mobility in the region.			
Perform Action Before, During or After	<u>H</u> arden, <u>R</u> edundant, O perational,				Potential Tasks Involving		
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders		
В	H	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 			
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.			
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHP and local transportation departments along the redundant route. Inform WTA. 		
В	Н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 			

Analysis Year: 2018		2018			
Asset / Location	n:	I-25 at Unknown, ML25 at 175.59, Br	idge ID = AHO, AHP		
Ownership: WYDOT		WYDOT		Criticality Rank:	2 of 46
Risk Probability	y Rtg:	4		Risk Consequence Rtg:	3
Priority Rtg:		Low		Issue Type:	Infrastructural
Issues:		Underclearance is 17.49 ft. Fairly hig	h truck traffic. 2 bridge strikes since 1994.		
Vulnerabilities			Strengths	Objectives	
Bridge carries 1	1016 trucks pe	r day.	Parallel bridge is available if not damaged also.	Return I-25 traffic to normal conditions as quickly as	possible.
				Minimize user, agency and societal costs.	
				Minimize truck delays.	
				Maintain safety and mobility in the region.	
<u>Perform</u> <u>Action B</u> efore, <u>D</u> uring or <u>A</u> fter	<u>H</u> arden, <u>R</u> edundant, O perational,				Potential Tasks Involving
the Event	<u>P</u> lan	Actions	Pros	Cons	Stakeholders
В	Н	Replace with a higher clearance bridge. Upgrade approaches accordingly.	1. Permanent fix. Shouldn't have to address later.	 Expensive. Requires temporary rerouting solution. May create long-term hardships for users, businesses and residents. 	
В	Н	Increase warning signage.	1. Lowest cost alternative.	1. May not be adequate to stop bridge strikes.	
D, A	R, O	Repair the bridge following each incident. Establish and enact reroute procedures in the event the bridge is closed.	 Fast recovery of facility function. Short-term lower agency cost compared to bridge replacement. Fairly low user cost during repair. 	 Multiple closures may be cumbersome to users, businesses and residents. Damage may be extensive requiring bridge replacement. 	 Establish procedures with WHF and local transportation departments along the redundant route. Inform WTA.
В	н	Lower the grade under the bridge.	1. Likely to be a lower cost than bridge replacement.	 May not be feasible given the current conditions. May be drainage issues. May create vertical sight issues. 	

Wyoming Department of Transportation Risk and Resilience Plan for Freight

Appendix C

Winter Weather Closure and Delay Action Plans

Analysis Year:	01	2018			
Asset / Location	n:	I-80 from Happy Jack Rd to Buford, N	/L80 from 322.74 to 334.86		
Ownership:		WYDOT	C	riticality Rank: 1 o	46
Risk Probability	/ Rtg:	5	R	tisk Consequence Rtg: 5	
Priority Rtg:		High	ls	ssue Type: Per	formance
Issues:		Very high truck traffic, 7,553 trucks p	er day. Estimated truck delay cost approximately \$1,457,81	3 per mile per year.	
Vulnerabilities			Strengths	Objectives	
		le on the stretch of road.		Return I-80 traffic to normal conditions as quickly as possible	
		en has the same issues.		Minimize user, agency and societal costs.	
Route carries 7				Maintain safety and mobility in the region.	
High elevation		worse weather.			
Perform Action	<u>H</u> arden, <u>R</u> edundant,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
And the Event		Assess and modify current snow	1. Fairly low cost fix.		
		removal and roadway management	2. WYDOT already has much of this implemented and	1. Probably little improvement remaining to be gained since	
D	0	procedures as needed.	likely would not require many changes.	WYDOT is already assessing and improving procedures.	
В	H	Build snow fences	 Fairly low cost alternative which reduces operational costs. Can improve visibility along with minimizing snow accumulation on the road. 	1. WYDOT is nearing effective saturation of snow fences along Interstate highways.	
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	1. A very few modifications may be easily accomplished low cost.	at 1. Can be very expensive. 2. Safety issues need to be carefully assessed.	
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with importan information compared to prior methods. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with importan information compared to prior methods. 	 Requires cooperation and acceptance from the trucking industry. Judgment of information received by individual truckers may be inconsistent. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
B,D	R,O	Establish alternative routing procedures to implement during extreme weather events.	 Low agency cost. Fairly easily implemented. 	 Alternative routes may also be experiencing similar weather conditions. WYDOT maintenance personnel have already addressed most alternative routing procedures (may not be fully assessed and formalized). Some WYDOT Districts report that detouring trucks during weather-related crash closures often result in crashes on the detour route, causing emergency services to be split. 	1. Organize winter weather emergency routing procedures with local jurisdictions.

Analysis Year: Asset / Locatior	 -	2018 I-80 from Elk Mountain to Arlington, N			
Ownership:	1.	WYDOT		riticality Rank: 1 of	46
Risk Probability	(Rta:	5		isk Consequence Rtg: 5	10
Priority Rtg:	rug.	High			ormance
Issues:		-	er day. Estimated truck delay cost approximately \$823,417		ormanoo
Vulnerabilities			Strengths	Objectives	
	nvices availa	ble on the stretch of road.	Ottonguis	Return I-80 traffic to normal conditions as quickly as possible	
		en has the same issues.		Minimize user, agency and societal costs.	
Route carries 5				Maintain safety and mobility in the region.	
	Harden,				
Perform Action	Redundant,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or After the Event	<u>O</u> perational, P lan	Actions	Pros	Cons	Involving Stakeholders
l		Assess and modify current snow	1. Fairly low cost fix.		
5	•	removal and roadway management	2. WYDOT already has much of this implemented and	1. Probably little improvement remaining to be gained since	
D	0	procedures as needed.	likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces operational		
			costs.		
5			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	H	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,	A A		
р	Ц	cuts, slopes and other geometrics	1. A very few modifications may be easily accomplished a	at 1. Can be very expensive.	
В	H	that cause snow drifting.	low cost.	2. Safety issues need to be carefully assessed. 1. The technology is new and not fully tested. Issues may	
			1. CV technology promises a new method to mitigate trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with important		encourage use of the
В	Н	Vehicle technology.	information compared to prior methods.	industry.	technology.
		venicie technology.	1. CV technology promises a new method to mitigate		teonnology.
			trucking delays and crashes.	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	industry.	WTA to advertise and
		roadway condition communication	3. Can better saturate the trucking industry with importan		encourage use of the
В	Н	technology.	information compared to prior methods.	may be inconsistent.	technology.
		toormology.		1. Alternative routes may also be experiencing similar	toormology.
				weather conditions.	
				2. WYDOT maintenance personnel have already addressed	
				most alternative routing procedures (may not be fully	
				assessed and formalized).	1. Organize winter
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during	weather emergency
		procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	routing procedures with
B,D	R,0	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.

Analysis Year:		2018			
Asset / Location:		I-80 from Arlington to Laramie, ML80			
Ownership:		WYDOT		riticality Rank: 1 of	46
Risk Probability Rtg):	5		isk Consequence Rtg: 4	
Priority Rtg:		High Vany high truck traffin 5 617 trucks n	ا er day. Estimated truck delay cost approximately \$59		ormance
Issues: Vulnerabilities		very high truck trailic, 5,617 trucks p	Strengths	Objectives	
Very limited service	e available on t	he stratch of road	Stieligtis	Return I-80 traffic to normal conditions as quickly as possible	
Nearest alternative				Minimize user, agency and societal costs.	
Route carries 5,617				Maintain safety and mobility in the region.	
	Harden,			Maintain salety and mobility in the region.	
Perform Action	Redundant,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>O</u> perational, P lan	Actions	Pros	Cons	Involving Stakeholders
		Assess and modify current snow	1100		
		removal and roadway	1. Fairly low cost fix.		
		management procedures as	2. WYDOT already has much of this implemented	1. Probably little improvement remaining to be gained since	
D	0	needed.	and likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces		
			operational costs.		
			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	н	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,			
		cuts, slopes and other geometrics	1. A very few modifications may be easily	1. Can be very expensive.	
В	Н	that cause snow drifting.	accomplished at low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to	1. The technology is new and not fully tested. Issues may	
			mitigate trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	Н	Vehicle technology.	important information compared to prior methods.	industry.	technology.
			1. CV technology promises a new method to		
			mitigate trucking delays and crashes.		
			2. Technology can reduce some risk taking	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	behaviors.	industry.	WTA to advertise and
		roadway condition communication	3. Can better saturate the trucking industry with	2. Judgment of information received by individual truckers	encourage use of the
В	H	technology.	important information compared to prior methods.	may be inconsistent.	technology.
				1. Alternative routes may also be experiencing similar	
				weather conditions.	
				2. WYDOT maintenance personnel have already addressed most alternative routing procedures (may not be fully	
				assessed and formalized).	1. Organize winter
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during	
		procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	
B.D	R.0	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.
0,0	1,0	over only would be overlig.		action route, outging energency services to be split.	

Analysis Year:	•	2018	-		
Asset / Location:		I-80 from Buford to I-25 in Cheyenne			
Ownership:		WYDOT		ticality Rank: 1 of 4	16
Risk Probability Rtg	j:	5		k Consequence Rtg: 5	
Priority Rtg:		High			rmance
Issues:		Very high truck traffic, 7,708 trucks p	er day. Estimated truck delay cost approximately \$832		
Vulnerabilities			Strengths	Objectives	
Very limited service				Return I-80 traffic to normal conditions as quickly as possible.	
Nearest alternative				Minimize user, agency and societal costs.	
Route carries 7,708				Maintain safety and mobility in the region.	
High elevation route		weather.			
Perform Action	<u>H</u> arden, <u>R</u> edundant,				
Before, During or After	Operational,				Potential Tasks
the Event	<u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
		Assess and modify current snow			
		removal and roadway	1. Fairly low cost fix.		
_		management procedures as	2. WYDOT already has much of this implemented	1. Probably little improvement remaining to be gained since	
D	0	needed.	and likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces		
			operational costs.		
			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	Н	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,	A A	1. Our have a second second	
П		cuts, slopes and other geometrics	1. A very few modifications may be easily	1. Can be very expensive.	
В	H	that cause snow drifting.	accomplished at low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to	1. The technology is new and not fully tested. Issues may	
			mitigate trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
_		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	Н	Vehicle technology.	important information compared to prior methods.	industry.	technology.
			1. CV technology promises a new method to		
			mitigate trucking delays and crashes.	1. Describes economics and economics from the two-	1 Contrat shinnens and
		Implement Connected Vehicle	2. Technology can reduce some risk taking	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and WTA to advertise and
		roadway condition communication	behaviors. 3. Can better saturate the trucking industry with	industry. 2. Judgment of information received by individual truckers	encourage use of the
В	Н	technology.	important information compared to prior methods.	and the maximum received by individual truckers may be inconsistent.	technology.
D	П			1. Alternative routes may also be experiencing similar	
					1 Organize winter
		Establish alternative routing			weather emergency
			1 Low agency cost		routing procedures with
BD	RO				local jurisdictions.
B,D	R,O	Establish alternative routing procedures to implement during extreme weather events.	1. Low agency cost. 2. Fairly easily implemented.	 weather conditions. Only one nearby alternative route. 2. WYDOT maintenance personnel have already addressed most alternative routing procedures (may not be fully assessed and formalized). 3. Some WYDOT Districts report that detouring trucks during weather-related crash closures often result in crashes on the detour route, causing emergency services to be split. 	routing proce

Analysis Year:	-	2018			
Asset / Location:		I-80 from Laramie to Happy Jack Rd			
Ownership:		WYDOT		riticality Rank: 1 of 4	46
Risk Probability Rtg:		5		isk Consequence Rtg: 5	
Priority Rtg:		High		sue Type: Perfo	ormance
Issues:		Very high truck traffic, 7,759 trucks p	er day. Estimated truck delay cost approximately \$1,4	28,845 per mile per year.	
Vulnerabilities			Strengths	Objectives	
	ces available on th			Return I-80 traffic to normal conditions as quickly as possible	
	ve route often has	the same issues.		Minimize user, agency and societal costs.	
	59 trucks per day			Maintain safety and mobility in the region.	
		te causes worse weather.			
Perform Action Before, During or	<u>H</u> arden, <u>R</u> edundant,				Potential Tasks
After the Event	<u>R</u> edundant, Operational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
		Assess and modify current snow			
		removal and roadway	1. Fairly low cost fix.		
		management procedures as	2. WYDOT already has much of this implemented	1. Probably little improvement remaining to be gained since	
D	0	needed.	and likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces	1. WYDOT is nearing effective saturation of snow fences	
			operational costs.	along Interstate highways.	
			2. Can improve visibility along with minimizing snow		
В	Н	Build snow fences	accumulation on the road.	fence locations are very limited.	
		Assess and modify safety barriers,			
		cuts, slopes and other geometrics	1. A very few modifications may be easily	1. Can be very expensive.	
В	н	that cause snow drifting.	accomplished at low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to	1. The technology is new and not fully tested. Issues may	
			mitigate trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	н	Vehicle technology.	important information compared to prior methods.	industry.	technology.
_			1. CV technology promises a new method to		
			mitigate trucking delays and crashes.		
			2. Technology can reduce some risk taking	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	behaviors.	industry.	WTA to advertise and
		roadway condition communication	3. Can better saturate the trucking industry with	2. Judgment of information received by individual truckers	encourage use of the
В	Н	technology.	important information compared to prior methods.	may be inconsistent.	technology.
2				1. Alternative routes may also be experiencing similar	
				weather conditions.	
				2. WYDOT maintenance personnel have already addressed	
				most alternative routing procedures (may not be fully	
				assessed and formalized).	1. Organize winter
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during	
		procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	routing procedures with
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.
0,0	, N,O	התוכוווט שכמנווטו בעכוונט.		i detour route, causing emergency services to be split.	

Analysis Year:		2018	5			
Asset / Location		I-80 from Walcott Jct to Elk Mountair	n, ML80 from 234.79 to 255.27			
Ownership:		WYDOT		Criticality Rank: 1 of	46	
Risk Probability Rtg:		5	F	Risk Consequence Rtg: 4	4	
		High	I	ssue Type: Perf	ormance	
Issues:		Very high truck traffic, 5,508 trucks p	er day. Estimated truck delay cost approximately \$5	32.268 per mile per year.		
Vulnerabilities			Strengths	Objectives		
		the stretch of road.		Return I-80 traffic to normal conditions as quickly as possible		
	ive route often has	the same issues.	Minimize user, agency and societal costs.			
	508 trucks per day			Maintain safety and mobility in the region.		
Perform Action Before, During or	<u>H</u> arden, R edundant,				Potential Tasks	
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders	
		Assess and modify current snow				
		removal and roadway	1. Fairly low cost fix.			
		management procedures as	2. WYDOT already has much of this implemented	1. Probably little improvement remaining to be gained since		
D	0	needed.	and likely would not require many changes.	WYDOT is already assessing and improving procedures.		
			1. Fairly low cost alternative which reduces			
			operational costs.			
			2. Can improve visibility along with minimizing sno			
В	H	Build snow fences	accumulation on the road.	along Interstate highways.		
		Assess and modify safety barriers,				
		cuts, slopes and other geometrics	1. A very few modifications may be easily	1. Can be very expensive.		
В	H	that cause snow drifting.	accomplished at low cost.	2. Safety issues need to be carefully assessed.		
			1. CV technology promises a new method to	1. The technology is new and not fully tested. Issues may		
			mitigate trucking delays and crashes.	arise.	1. Contact shippers and	
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and	
P		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the	
В	Н	Vehicle technology.	important information compared to prior methods.	industry.	technology.	
			 CV technology promises a new method to mitigate trucking delays and crashes. 			
			2. Technology can reduce some risk taking	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and	
		Implement Connected Vehicle	behaviors.	industry.	WTA to advertise and	
		roadway condition communication	3. Can better saturate the trucking industry with	2. Judgment of information received by individual truckers	encourage use of the	
В	Н	technology.	important information compared to prior methods.	may be inconsistent.	technology.	
U				1. Alternative routes may also be experiencing similar	toormology.	
				weather conditions.		
				2. WYDOT maintenance personnel have already addressed		
				most alternative routing procedures (may not be fully		
				assessed and formalized).	1. Organize winter	
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during		
		procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	routing procedures with	
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.	

Analysis Year:	2018				
Asset / Location:	I-80 WYE	from Evanston to US 189, ML80 from 6		Criticality Banky	of 46
Ownership:		J01		Criticality Rank: 1 Risk Consequence Rtg: 5	0140
Risk Probability R	tg: 4 High				orformanaa
					erformance
Issues: Vulnerabilities	very	nigh truck tranic, 6,091 trucks per day.	Strengths	Objectives	
	es available on the	atratab of road	Strengths	Return I-80 traffic to normal conditions as quickly as possible	
Steep grades.	es available on the	stretch of road.		Minimize user, agency and societal costs.	
Route carries 6,09	1 trucko por dov			Minimize dsel, agency and societal costs. Minimize truck delays.	
Roule carries 0,09	or trucks per day.			Maintain safety and mobility in the region.	
Perform Action Before, During or	<u>H</u> arden, <u>R</u> edundant,				Potential Tasks Involving
After the Event	Operational, Plan	Actions	Pros	Cons	Stakeholders
		Assess and modify current snow			
		removal and roadway	1. Fairly low cost fix.		
l		management procedures as	2. WYDOT already has much of this implemented and	1. Probably little improvement remaining to be gained since	
D	0	needed.	likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces operational		
			costs.		
			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	Н	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,			
		cuts, slopes and other geometrics	1. A very few modifications may be easily accomplished	1. Can be very expensive.	
В	Н	that cause snow drifting.	at low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to mitigate	1. The technology is new and not fully tested. Issues may	
			trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	Technology can reduce risk taking behaviors.	Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	Н	Vehicle technology.	important information compared to prior methods.	industry.	technology.
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	industry.	WTA to advertise and
		roadway condition communication	3. Can better saturate the trucking industry with	2. Judgment of information received by individual truckers	encourage use of the
В	Н	technology.	important information compared to prior methods.	may be inconsistent.	technology.
				1. Alternative routes may also be experiencing similar	
				weather conditions. Only one nearby alternative route that	
				doesn't detour entire problem section. Other routes are fairly	
				distant.	
				2. WYDOT maintenance personnel have already addressed	
			-	most alternative routing procedures (may not be fully	
				assessed and formalized).	1. Organize winter
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during	weather emergency
	5.0	procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	routing procedures with
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.

Analysis Year:	2018				
Asset / Location:		rom Sinclair to Walcott Jct, ML80 from 2			
Ownership:	WYD	OT		ticality Rank: 1 of	46
Risk Probability Rt				sk Consequence Rtg: 4	
Priority Rtg:	Mediu				ormance
Issues:	Very	high truck traffic, 6,495 trucks per day. I	Estimated truck delay cost approximately \$489,924 per	· · ·	
Vulnerabilities		· · · ·	Strengths	Objectives	
Fairly limited servi				Return I-80 traffic to normal conditions as quickly as possibl	е.
Nearest alternative		he same issues.		Minimize user, agency and societal costs.	
Route carries 6,49				Maintain safety and mobility in the region.	
Perform Action Before, During or	<u>H</u> arden, <u>R</u> edundant,				Potential Tasks Involving
After the Event	Operational, Plan	Actions	Pros	Cons	Stakeholders
		Assess and modify current snow			
		removal and roadway	1. Fairly low cost fix.		
		management procedures as	2. WYDOT already has much of this implemented and		
D	0	needed.	likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces operationa	1	
			costs.		
			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	Н	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,			
		cuts, slopes and other geometrics	1. A very few modifications may be easily accomplished	d 1. Can be very expensive.	
В	Н	that cause snow drifting.	at low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to mitigate	1. The technology is new and not fully tested. Issues may	
			trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	Н	Vehicle technology.	important information compared to prior methods.	industry.	technology.
		×	1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	industry.	WTA to advertise and
		roadway condition communication	3. Can better saturate the trucking industry with	2. Judgment of information received by individual truckers	encourage use of the
В	Н	technology.	important information compared to prior methods.	may be inconsistent.	technology.
				1. Alternative routes may also be experiencing similar	797. 7
				weather conditions.	
				2. WYDOT maintenance personnel have already addressed	
				most alternative routing procedures (may not be fully	
				assessed and formalized).	1. Organize winter
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during	g weather emergency
		procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.

Analysis Year:	-	2018	-		
Asset / Location:		I-80 from US 189 to Ft Bridger, ML80	from 18.1 to 34.43		
Ownership:		WYDOT	Criticalit	y Rank: 1 of 46	
Risk Probability F	Rtg:	4	Risk Cor	nsequence Rtg: 4	
Priority Rtg:		Medium	Issue Ty		nce
Issues:		Very high truck traffic, 5,426 trucks pe	er day. Estimated truck delay cost approximately \$537,517 p	per mile per year.	
Vulnerabilities			Strengths	Objectives	
Very limited servi	ices available on th	ne stretch of road.	Nearest alternative route does not have grade issues.	Return I-80 traffic to normal conditions as quickly as possible	
Steep grades.				Minimize user, agency and societal costs.	
Route carries 5,4	26 trucks per day.			Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform Action Before, During or	<u>H</u> arden, <u>R</u> edundant,				Potential Tasks Involving
After the Event	<u>Operational</u> , <u>Plan</u>	Actions	Pros	Cons	Stakeholders
		Assess and modify current snow	1. Fairly low cost fix.		
		removal and roadway management	2. WYDOT already has much of this implemented and	1. Probably little improvement remaining to be gained since	
D	0	procedures as needed.	likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces operational		
			costs.		
			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	H	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,			
		cuts, slopes and other geometrics	1. A very few modifications may be easily accomplished	1. Can be very expensive.	
В	H	that cause snow drifting.	at low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to mitigate	1. The technology is new and not fully tested. Issues may	
			trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	H	Vehicle technology.	important information compared to prior methods.	industry.	technology.
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	industry.	WTA to advertise and
_		roadway condition communication	3. Can better saturate the trucking industry with	2. Judgment of information received by individual truckers	encourage use of the
В	H	technology.	important information compared to prior methods.	may be inconsistent.	technology.
				1. Alternative routes may also be experiencing similar	
				weather conditions. Only one nearby alternative route that	
				doesn't detour entire problem section. Other routes are fairly	
				distant.	
				2. WYDOT maintenance personnel have already addressed	
				most alternative routing procedures (may not be fully	
				assessed and formalized).	1. Organize winter
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during	weather emergency
		procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	routing procedures with
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.

Analysis Year:		2018	8		
Asset / Location	:	I-80 from Point of Rocks to Bitter Cree	ek, ML80 from 122.05 to 142.01		
Ownership:		WYDOT		ity Rank: 1 of 46	
Risk Probability	Rtg:	4		onsequence Rtg: 3	
Priority Rtg:	5	Medium	Issue T		nce
Issues:			er day. Estimated truck delay cost approximately \$362,237		
Vulnerabilities			Strengths	Objectives	
	vices available on th		Few steep grades.	Return I-80 traffic to normal conditions as quickly as possible.	
	ive route is very di	stant.		Minimize user, agency and societal costs.	
Route carries 5,	523 trucks per day			Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform Action	<u>H</u> arden,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
		Assess and modify current snow	1. Fairly low cost fix.		
		removal and roadway management	2. WYDOT already has much of this implemented and	1. Probably little improvement remaining to be gained since	
D	0	procedures as needed.	likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces operational	X	
			costs.		
			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	Н	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,			
		cuts, slopes and other geometrics	1. A very few modifications may be easily accomplished	1. Can be very expensive.	
В	Н	that cause snow drifting.	at low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to mitigate	1. The technology is new and not fully tested. Issues may	
			trucking delays and crashes.	arise.	1. Contact shippers an
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	H	Vehicle technology.	important information compared to prior methods.	industry.	technology.
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. Requires cooperation and acceptance from the trucking	1. Contact shippers an
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	industry.	WTA to advertise and
		roadway condition communication	3. Can better saturate the trucking industry with	2. Judgment of information received by individual truckers	encourage use of the
В	H	technology.	important information compared to prior methods.	may be inconsistent.	technology.
				1. Alternative routes may also be experiencing similar	
				weather conditions. Only one nearby alternative route that	
				doesn't detour entire problem section. Other routes are fairly	
				distant.	
				2. WYDOT maintenance personnel have already addressed	
				most alternative routing procedures (may not be fully	
				assessed and formalized).	1. Organize winter
		Establish alternative routing		3. Some WYDOT Districts report that detouring trucks during	weather emergency
		procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	routing procedures with
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.

Analysis Year: Asset / Location:	2018	3 from Bitter Creek to Wamsutter, ML80 fi			
Ownership:	1-60 WY[lity Rank: 1 of 46	
Risk Probability F				Consequence Rtg: 3	
Priority Rtg:	Med	ium	Issue		ance
Issues:			Estimated truck delay cost approximately \$296,090 per mile		
Vulnerabilities	- 1		Strengths	Objectives	
Very limited servi	ices available on th	he stretch of road.	Few steep grades.	Return I-80 traffic to normal conditions as quickly as possible	
Nearest alternativ	ve route is very di	stant.		Minimize user, agency and societal costs.	
Route carries 5,2	76 trucks per day			Minimize truck delays.	
				Maintain safety and mobility in the region.	
Perform Action Before, During or	<u>H</u> arden, <u>R</u> edundant,				Potential Tasks
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders
		Assess and modify current snow	1. Fairly low cost fix.		
		removal and roadway management	2. WYDOT already has much of this implemented and	1. Probably little improvement remaining to be gained since	
D	0	procedures as needed.	likely would not require many changes.	WYDOT is already assessing and improving procedures.	
			1. Fairly low cost alternative which reduces operational		
			costs.		
-			2. Can improve visibility along with minimizing snow	1. WYDOT is nearing effective saturation of snow fences	
В	Н	Build snow fences	accumulation on the road.	along Interstate highways.	
		Assess and modify safety barriers,			
Р	Н	cuts, slopes and other geometrics	1. A very few modifications may be easily accomplished a		
В	П	that cause snow drifting.	low cost.	 2. Safety issues need to be carefully assessed. 1. The technology is new and not fully tested. Issues may 	
			1. CV technology promises a new method to mitigate trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with important		encourage use of the
В	Н	Vehicle technology.	information compared to prior methods.	industry.	technology.
_	··		1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	industry.	WTA to advertise and
		roadway condition communication	3. Can better saturate the trucking industry with important	2. Judgment of information received by individual truckers	encourage use of the
В	H	technology.	information compared to prior methods.	may be inconsistent.	technology.
				1. Alternative routes may also be experiencing similar	
				weather conditions. Only one nearby alternative route that	
				doesn't detour entire problem section. Other routes are fairly	
				distant.	
				2. WYDOT maintenance personnel have already addressed	
				most alternative routing procedures (may not be fully	
		Fatabliah alternative sections		assessed and formalized).	1. Organize winter
		Establish alternative routing	1 Lour aganay and	3. Some WYDOT Districts report that detouring trucks during	
	P O	procedures to implement during	1. Low agency cost.	weather-related crash closures often result in crashes on the	J J
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	detour route, causing emergency services to be split.	local jurisdictions.

Analysis Year:		018					
Asset / Location:		25 from Pershing Ave to Central Ave, M					
Ownership:						icality Rank: 2 of 46	
Risk Probability F				k Consequence Rtg: 4			
Priority Rtg:		ligh		Je Type: Performa	ince		
Issues:	ŀ	ligh truck traffic, 3,407 trucks per day. E	stimated truck delay cost approximately \$584,384 per mile p				
Vulnerabilities			Strengths	Objectives			
	es are urban surf		No steep grades.	Return I-25 traffic to normal conditions as quickly as possib	le.		
	07 trucks per day			Minimize user, agency and societal costs.			
Significant urban	route			Minimize truck delays.			
				Maintain safety and mobility in the region.			
Perform Action Before, During or	<u>H</u> arden, R edundant,				Potential Tasks		
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders		
		Assess and modify current snow					
		removal and roadway	1. Fairly low cost fix.	1. Probably little improvement remaining to be gained			
		management procedures as	2. WYDOT already has much of this implemented and like	ely since WYDOT is already assessing and improving			
D	0	needed.	would not require many changes.	procedures.			
			1. Fairly low cost alternative which reduces operational co	sts. 1. WYDOT already has much snow fence along I-25.			
			2. Can improve visibility along with minimizing snow	2. In an urban area where snow fence locations are			
В	Н	Build snow fences	accumulation on the road.	limited.			
		Assess and modify safety barriers,					
		cuts, slopes and other geometrics	1. A very few modifications may be easily accomplished a				
В	H	that cause snow drifting.	cost.	Safety issues need to be carefully assessed.			
			1. CV technology promises a new method to mitigate truck	king 1. The technology is new and not fully tested. Issues may			
			delays and crashes.	arise.	1. Contact shippers		
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	Implementation costs may be fairly high.	and WTA to advertise		
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with important		and encourage use of		
В	Н	Vehicle technology.	information compared to prior methods.	industry.	the technology.		
			1. CV technology promises a new method to mitigate truck				
			delays and crashes.	1. Requires cooperation and acceptance from the trucking	1. Contact shippers		
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	industry.	and WTA to advertise		
_		roadway condition communication	3. Can better saturate the trucking industry with important		and encourage use of		
В	H	technology.	information compared to prior methods.	may be inconsistent.	the technology.		
				1. Alternative routes can experience similar weather			
				conditions. Nearby routes are fairly distant.			
				2. WYDOT maintenance personnel have already			
				addressed most alternative routing procedures (may not			
				be fully assessed and formalized).			
				3. Some WYDOT Districts report that detouring trucks	1. Organize winter		
		Establish alternative routing		during weather-related crash closures often result in	weather emergency		
		procedures to implement during	1. Low agency cost.	crashes on the detour route, causing split of emergency	routing procedures		
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	services.	with local jurisdictions.		

Analysis Year: Asset / Location:	2018 	rom Exit 25 to Nimmo Rd, ML80 from 2	5 44 to 34 45			
Ownership: Risk Probability	WYD Rtg: 5	ОТ	Critical Risk Co	ty Rank: onsequence Rtg:	2 of 46 3	
Priority Rtg:	Medi		Issue T	уре:	Performance	
Issues:	2,276	5 trucks per day. Estimated truck delay	cost approximately \$236,938 per mile per year.	Objectives		
Vulnerabilities	rices available on th	a stratch of road	Strengths	Objectives	l conditions as quickly as possible	
Nearest alternati Route carries 2,2 Very high wind lo	ve often has the sa 276 trucks per day ocation.		No steep grades.	Minimize user, agency and Minimize truck delays. Maintain safety and mobility	societal costs.	
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons		Potential Tasks Involving Stakeholder
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and like would not require many changes. 	ly 1. Probably little improveme WYDOT is already assessir	ent remaining to be gained since ng and improving procedures.	
В	Н	Build snow fences Assess and modify safety barriers,	 Fairly low cost alternative which reduces operational co 2. Can improve visibility along with minimizing snow accumulation on the road. 	sts. 1. WYDOT already has mu	ch snow fence along I-25.	
В	Н	cuts, slopes and other geometrics that cause snow drifting.	1. A very few modifications may be easily accomplished a low cost.	t 1. Can be very expensive. 2. Safety issues need to be	carefully assessed.	
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate truc delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	arise. 2. Implementation costs ma 3. Requires cooperation and industry.	nd not fully tested. Issues may ay be fairly high. d acceptance from the trucking	1. Contact shippers and WTA to advertise and encourage use o the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate truct delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 Requires cooperation and industry. Judgment of information may be inconsistent. 	d acceptance from the trucking received by individual truckers	1. Contact shippers and WTA to advertise and encourage use o the technology.
B.D	R,O	Establish alternative routing procedures to implement during extreme weather events.	 Low agency cost. Fairly easily implemented. 	fully assessed and formalize 3. Some WYDOT Districts r during weather-related cras	ne nearby alternative route. nt. ersonnel have already routing procedures (may not be ed). report that detouring trucks	1. Organize winter weather emergency routing procedures with local jurisdictions

Analysis Year: Asset / Location:	- 2018	3 from Nimmo Rd to Chugwater, ML80 fr	om 34 45 to 54 50		
Ownership:	WYE			ticality Rank: 20	of 46
Risk Probability R				sk Consequence Rtg: 3	
Priority Rtg:	Medi	ium			erformance
Issues:			cost approximately \$183,794 per mile per year.		
Vulnerabilities		· · · · · · · · · · · · · · · · · · ·	Strengths	Objectives	
Verv limited servi	ces available on th	ne stretch of road.	No steep grades.	Return I-25 traffic to normal conditions as quickly as	possible.
Nearest alternativ				Minimize user, agency and societal costs.	
Route carries 2,2	34 trucks per day			Minimize truck delays.	
Very high wind lo	cation.			Maintain safety and mobility in the region.	
Perform Action	<u>H</u> arden,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, Operational, Plan	Actions	Pros	Cons	Involving Stakeholders
		Assess and modify current snow			
		removal and roadway	1. Fairly low cost fix.		
		management procedures as	2. WYDOT already has much of this implemented and	likely 1. Probably little improvement remaining to be gained	d since
D	0	needed.	would not require many changes.	WYDOT is already assessing and improving procedu	ires.
			1. Fairly low cost alternative which reduces operational	l costs.	
			2. Can improve visibility along with minimizing snow		
В	Н	Build snow fences	accumulation on the road.	 WYDOT already has much snow fence along I-25. 	
		Assess and modify safety barriers,			
_		cuts, slopes and other geometrics	1. A very few modifications may be easily accomplishe		
В	Н	that cause snow drifting.	low cost.	2. Safety issues need to be carefully assessed.	
			1. CV technology promises a new method to mitigate to		
			delays and crashes.	arise.	1. Contact shippers
		Implement vehicle to vehicle and vehicle to infrastructure Connected	 Technology can reduce risk taking behaviors. Can better saturate the trucking industry with importance 	 Implementation costs may be fairly high. Requires cooperation and acceptance from the tru 	and WTA to advertise cking and encourage use of
В	н	Vehicle technology.	information compared to prior methods.	industry.	the technology.
D		venicie technology.	1. CV technology promises a new method to mitigate to		the technology.
			delays and crashes.	1. Requires cooperation and acceptance from the tru	cking 1. Contact shippers
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.		and WTA to advertise
		roadway condition communication	3. Can better saturate the trucking industry with import		
В	н	technology.	information compared to prior methods.	may be inconsistent.	the technology.
				1. Alternative routes may also be experiencing simila	
				weather conditions. Only one nearby alternative rout	
				Other routes are fairly distant.	
				2. WYDOT maintenance personnel have already add	
				most alternative routing procedures (may not be fully	,
				assessed and formalized).	
				Some WYDOT Districts report that detouring truck	
		Establish alternative routing		during weather-related crash closures often result in	
		procedures to implement during	1. Low agency cost.	crashes on the detour route, causing emergency ser	
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	be split.	local jurisdictions.

Analysis Year: Asset / Location:	20	18 0 from Evanston Marginal, ML80 from 3	24 to 6 03		
Ownership:		YDOT		ity Rank:	1 of 46
Risk Probability R	tg: 3			onsequence Rtg:	5
Priority Rtg:		edium	Issue T		Performance
ssues:	Ve	ry high truck traffic, 6,819 trucks per day	y. Estimated truck delay cost approximately \$802,032 per mile p		
ulnerabilities			Strengths	Objectives	
	are busy urban su 19 trucks per day.	rface streets.	Several available services adjacent to route.	Return I-80 traffic to normal conditions as quick Minimize user, agency and societal costs.	kly as possible.
				Minimize truck delays. Maintain safety and mobility in the region.	
Perform Action Before, <u>D</u> uring or Infter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholder
ter the Event	Operational, Plan	1			
		Assess and modify current snow	1. Fairly low cost fix.	1. Probably little improvement remaining to be	
5		removal and roadway management	2. WYDOT already has much of this implemented and likely w		/ing
D	0	procedures as needed.	not require many changes.	procedures.	
			1. Fairly low cost alternative which reduces operational costs.		ow
P		Duild an an fan an a	2. Can improve visibility along with minimizing snow accumula		L 224 .
В	H	Build snow fences	on the road.	2. Urban area limits snow fence location availa	
		Assess and modify safety barriers,			
Р	11	cuts, slopes and other geometrics		1. Can be very expensive.	
В	Н	that cause snow drifting.	1. A very few modifications may be easily accomplished at low		
			1. CV technology promises a new method to mitigate trucking		
		Implement vehicle to vehicle and	delays and crashes. 2. Technology can reduce risk taking behaviors.	may arise. 2. Implementation costs may be fairly high.	and WTA to advertise and
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with important	3. Requires cooperation and acceptance from	
В	Н	Vehicle technology.	information compared to prior methods.	trucking industry.	the technology.
D	11		1. CV technology promises a new method to mitigate trucking		1. Contact shipper
			delays and crashes.	1. Requires cooperation and acceptance from	
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	trucking industry.	advertise and
		roadway condition communication	3. Can better saturate the trucking industry with important	2. Judgment of information received by individu	
В	Н	technology.	information compared to prior methods.	truckers may be inconsistent.	the technology.
6		loomology.		1. Alternative routes may also be experiencing	
				weather conditions. Only one nearby alternativ	
				that doesn't detour entire problem section. Oth	
				routes are fairly distant.	
				2. WYDOT maintenance personnel have alrea	dv
				addressed most alternative routing procedures	
				not be fully assessed and formalized).	1. Organize winter
				3. Some WYDOT Districts report that detouring	
		Establish alternative routing		during weather-related crash closures often re	
		procedures to implement during	1. Low agency cost.	crashes on the detour route, causing emergen	
B,D	R.O	extreme weather events.	2. Fairly easily implemented.	services to be split.	jurisdictions.

Analysis Year:	2018				
Asset / Location:		rom Wamsutter to Johnson Rd, ML80 fro			
Ownership:			Criticality		46
Risk Probability R				sequence Rtg: 3	
Priority Rtg:	Mediu		Issue Typ		formance
Issues:	Very	high truck traffic, 5,590 trucks per day. E	stimated truck delay cost approximately \$330,966 per mile per		
Vulnerabilities			Strengths	Objectives	
		on the stretch of road.		Return I-80 traffic to normal conditions as quic	kly as possible.
	e route is very dis	tant.		Minimize user, agency and societal costs. Minimize truck delays.	
Route carries 5,59	so trucks per day			Maintain safety and mobility in the region.	
Perform Action	Harden,			Maintain salety and mobility in the region.	
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, Operational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
<u>A</u> iter the Event	<u>Operational, Plan</u>	Assess and modify current snow	1. Fairly low cost fix.	1. Probably little improvement remaining to be	
		removal and roadway management	2. WYDOT already has much of this implemented and likely		
D	0	procedures as needed.	not require many changes.	improving procedures.	~
			1. Fairly low cost alternative which reduces operational costs		
			2. Can improve visibility along with minimizing snow accumul		IOW
В	Н	Build snow fences	on the road.	fences along Interstate highways.	
		Assess and modify safety barriers,			
		cuts, slopes and other geometrics		1. Can be very expensive.	
В	H	that cause snow drifting.	1. A very few modifications may be easily accomplished at lo		
			1. CV technology promises a new method to mitigate trucking		
			delays and crashes.	may arise.	1. Contact shippers
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	and WTA to advertise
		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with important	3. Requires cooperation and acceptance from	
В	H	Vehicle technology.	information compared to prior methods.	trucking industry.	the technology.
			 CV technology promises a new method to mitigate trucking delays and crashes. 		the 1 Contact chinners
		Implement Connected Vehicle	2. Technology can reduce some risk taking behaviors.	 Requires cooperation and acceptance from trucking industry. 	the 1. Contact shippers and WTA to advertise
		roadway condition communication	3. Can better saturate the trucking industry with important	2. Judgment of information received by individ	
В	Н	technology.	information compared to prior methods.	truckers may be inconsistent.	the technology.
L .				1. Alternative routes may also be experiencing	
				similar weather conditions. Only one nearby	
				alternative route that doesn't detour entire pro	blem
				section. Other routes are fairly distant.	
				WYDOT maintenance personnel have alread	
				addressed most alternative routing procedure	s (may
				not be fully assessed and formalized).	
				3. Some WYDOT Districts report that detourin	
		Establish alternative routing		trucks during weather-related crash closures of	
		procedures to implement during	1. Low agency cost.	result in crashes on the detour route, causing	routing procedures
B,D	R,O	extreme weather events.	2. Fairly easily implemented.	emergency services to be split.	with local jurisdictions.

Analysis Year: Asset / Location:	2018	Rawlins Marginal, ML80 from 211.28	to 215.3		
Ownership: Risk Probability F Priority Rtg:	WYD		Criticality	sequence Rtg: 4	100
Issues:		high truck traffic, 7,119 trucks per da	y. Estimated truck delay cost approximately \$667,354 per mile p		
Vulnerabilities			Strengths	Objectives	
Route carries 7,1	are urban surface 19 trucks per day	streets.	Nearby services available.	Return I-80 traffic to normal conditions as quickly as possible Minimize user, agency and societal costs. Minimize truck delays. Maintain safety and mobility in the region.	9.
<u>Perform Action</u> <u>B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. 	
В	Н	Build snow fences	 Fairly low cost alternative which reduces operational costs. Can improve visibility along with minimizing snow accumulation on the road. 	 WYDOT is nearing effective saturation of snow fences along Interstate highways. Urban area limits snow fence location availability. 	
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	1. A very few modifications may be easily accomplished at low cost.		
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use o the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 Requires cooperation and acceptance from the trucking industry. Judgment of information received by individual truckers may be inconsistent. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
B,D	R,O	Establish alternative routing procedures to implement during extreme weather events.	 Low agency cost. Fairly easily implemented. 	 Alternative routes may also be experiencing similar weather conditions. Only one nearby alternative. Other routes are fairly distant. WYDOT maintenance personnel have already addressed most alternative routing procedures (may not be fully assessed and formalized). Some WYDOT Districts report that detouring trucks during weather-related crash closures often result in crashes on the detour route, causing emergency services to be split. 	1. Organize winter weather emergency

Analysis Year: Asset / Location: Ownership: Risk Probability R Priority Rtg: Issues:	WYD tg: 3 Low	rom College Dr to I-80, ML80 from 7 OT	Critic Risk	cality Rank: Consequence Rtg: e Type: e per year.	2 of 46 5 Performance	
Vulnerabilities			Strengths	Objectives		
Route carries 5,53 Significant urban	route	ce streets.	Several trucking services available.	Return I-25 traffic to normal condition Minimize user, agency and societal Minimize truck delays. Maintain safety and mobility in the u	costs.	
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons		Potential Tasks Involving Stakeholders
<u>Anter the Event</u>	Operational, <u>P</u> ian	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and lik would not require many changes. 			
В	Н	Build snow fences	 Fairly low cost alternative which reduces operational of 2. Can improve visibility along with minimizing snow accumulation on the road. 			
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 A very few modifications may be easily accomplished cost. CV technology promises a new method to mitigate tru delays and crashes. 	2. Safety issues need to be careful		1. Contact shippers and WTA to
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 Technology can reduce risk taking behaviors. Can better saturate the trucking industry with importar information compared to prior methods. 	 Implementation costs may be fai Requires cooperation and accep industry. 		advertise and encourage use of the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate tru delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with importar information compared to prior methods. 	 Requires cooperation and accep industry. Judgment of information received may be inconsistent. 	d by individual truckers	1. Contact shippers and WTA to advertise and encourage use of the technology.
B.D	R,O	Establish alternative routing procedures to implement during extreme weather events.	1. Low agency cost. 2. Fairly easily implemented.	 Alternative routes may also be exweather conditions. Only urban alter routes are fairly distant. WYDOT maintenance personnel most alternative routing procedures assessed and formalized). Some WYDOT Districts report th weather-related crash closures ofter detour route, causing emergency set assessed and set and set as a set of the set	have already addressed (may not be fully at detouring trucks during en result in crashes on the	1. Organize winter weather emergency routing procedures with local iurisdictions.

Analysis Year: Asset / Location: Ownership: Risk Probability Priority Rtg: Issues:	WYD0 Rtg: 4 Low		Cri Ris	ticality Rank: sk Consequence Rtg: ue Type:	2 of 46 3 Performance	
Vulnerabilities			Strengths	Objectives		
Route carries 2,4 Very high wind lo	ive route often has th 426 trucks per day ocation.	ne same issues.	No steep grades.	Return I-25 traffic to normal Minimize user, agency and s Minimize truck delays. Maintain safety and mobility		
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons		Potential Tasks Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and would not require many changes. 		nt remaining to be gained since and improving procedures.	
В	Н	Build snow fences	 Fairly low cost alternative which reduces operational Can improve visibility along with minimizing snow accumulation on the road. 	costs. 1. WYDOT already has muc	ch snow fence along I-25.	
В	н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	1. A very few modifications may be easily accomplishe cost.	d at low 1. Can be very expensive. 2. Safety issues need to be	carefully assessed.	
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate tr delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with importa information compared to prior methods. 	arise. 2. Implementation costs may	nd not fully tested. Issues may y be fairly high. d acceptance from the trucking	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate tr delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with importa information compared to prior methods. 	ucking 1. Requires cooperation and industry.	d acceptance from the trucking received by individual truckers	1. Contact shippers and WTA to advertise and encourage use of the technology.
B,D	R,O	Establish alternative routing procedures to implement during extreme weather events.	1. Low agency cost. 2. Fairly easily implemented.	 Alternative routes may als weather conditions. No near WYDOT maintenance per most alternative routing proc assessed and formalized). Some WYDOT Districts re 	rby alternative. rsonnel have already addressed cedures (may not be fully eport that detouring trucks during res often result in crashes on the	1. Organize winter weather emergency routing procedures with local jurisdictions.

Analysis Year: Asset / Location Ownership: Risk Probability Priority Rtg: Issues:	WYE Rtg: 4 Low	220 in Casper, ML21 from113.38 to OOT	Cri Ris	icality Rank: k Consequence Rtg: ue Type:	5 of 46 3 Performance	9
Vulnerabilities			Strengths	Objectives		
	,069 trucks per day		Many trucking services available.	Return WY-220 traffic to no Minimize user, agency and Minimize truck delays. Maintain safety and mobilit		ible.
<u>Perform Action</u> <u>Before, During or</u> <u>After the Event</u>	<u>H</u> arden, <u>R</u> edundant, Operational, Plan	Actions	Pros	Cons		Potential Tasks Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and would not require many changes. 	ikely 1. Probably little improvem WYDOT is already assessi	ent remaining to be gained since ing and improving procedures.	
В	н	Build snow fences	 Fairly low cost alternative which reduces operational Can improve visibility along with minimizing snow accumulation on the road. Not much snow fence already built. 	costs. 1. Urban area severely limi availability.	ts snow fance location	
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	1. A very few modifications may be easily accomplished cost.	d at low 1. Can be very expensive. 2. Safety issues need to be	e carefully assessed.	
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate tr delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with importa information compared to prior methods. 	ucking arise. 2. Implementation costs ma 3. Requires cooperation ar	d acceptance from the trucking	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate tr delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with importa information compared to prior methods. 	 Requires cooperation ar industry. Judgment of information may be inconsistent. 	nd acceptance from the trucking received by individual truckers	1. Contact shippers and WTA to advertise and encourage use of the technology.
B,D	R,O	Establish alternative routing procedures to implement during extreme weather events.	 Low agency cost. Fairly easily implemented. 	 Alternative routes likely weather conditions. WYDOT maintenance pr most alternative routing pro assessed and formalized). 	ersonnel have already addressed	1. Organize winter weather emergency routing procedures with local jurisdictions.

Analysis Year: Asset / Location: Ownership: Risk Probability I Priority Rtg: Issues:	WY Rtg: 3 Low	from Terry Ranch Rd to College Dr, DOT	Criticalit	nsequence Rtg: 4 pe: Per	46 formance
Vulnerabilities			Strengths	Objectives	
	79 trucks per day		Several trucking services available at College Dr.	Return I-25 traffic to normal conditions as quickly as Minimize user, agency and societal costs. Minimize truck delays. Maintain safety and mobility in the region.	possible.
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. 	 Probably little improvement remaining to be gaine since WYDOT is already assessing and improving procedures. 	
В	Н	Build snow fences	 Fairly low cost alternative which reduces operational costs Can improve visibility along with minimizing snow accumulation on the road. 		5.
В	н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	1. A very few modifications may be easily accomplished at lo cost.	 A transformed as a second se	
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate truckin delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 g 1. The technology is new and not fully tested. Issue arise. 2. Implementation costs may be fairly high. 3. Requires cooperation and acceptance from the tr industry. 	and WTA to advertise and
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate truckin delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 		ucking 1. Contact shippers and WTA to advertise and
B,D	R,O	Establish alternative routing procedures to implement during extreme weather events.	 Low agency cost. Fairly easily implemented. 	 Alternative routes may also be experiencing simil weather conditions. Only urban alternative routes. 2 WYDOT maintenance personnel have already addr most alternative routing procedures (may not be full assessed and formalized). Some WYDOT Districts report that detouring truc during weather-related crash closures often result in crashes on the detour route, causing splitting of emergency services. 	essed y 1. Organize winter ks weather emergency

Wyoming Department of Transportation Risk and Resilience Plan for Freight

Appendix D

Light High-Profile Vehicle Blowover Risk Action Plans

Analysis Year:		2018	-		
Asset / Location	n:	I-25 from Colorado State Line to I-80	, ML25 from 0 to 9		
Ownership: WYDOT		Criticality Rank:	2 of 46		
Risk Probability	/ Rtg:	4		Risk Consequence Rtg:	5
Priority Rtg:		High		Issue Type:	Performance
lssues:		Very high truck traffic, 4629 trucks pe	er day. Averages 25 closures per year at 5 hours per c	osure.	
/ulnerabilities			Strengths	Objectives	
Route carries 4	629 trucks pe	er day		Return I-25 traffic to normal conditions as quickly as possible.	
				Minimize user, agency and societal costs.	
				Minimize truck delays and closures.	
				Maintain safety and mobility in the region.	
	<u>H</u> arden,				
Perform Action Before, During or	<u>R</u> edundant, Operational,				Potential Tasks
After the Event	<u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
D	0	Establish alternative routing procedures to implement during extreme wind events.	1. Fairly low cost fix.	1. Wind events can sometimes last a very short time, are difficult to predict the duration and can vary considerably over a short time period. Rerouting could increase truck delay as a result.	
D	0	Significantly reduce truck speed limits during wind events.	1. Improves safety while maintaining a portion of mobility.	 May require installing variable speed limit signs for trucks. Could create high speed variability between cars and trucks. 	1. Inform shippers and WTA.
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause high wind gust areas.	 A very few modifications may be easily accomplished at low cost. High wind gust locations are well established. 	 Can be very expensive. Other safety issues need to be carefully assessed. 	
В	н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers an WTA to advertise and encourage use of the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 Requires cooperation and acceptance from the trucking industry. Judgment of information received by individual truckers may be inconsistent. 	1. Contact shippers ar WTA to advertise and encourage use of the technology.

Analysis Year:		2018			
Asset / Location: I-25 from I-80 to N of Wheatland, ML25 from			25 from 9 to 81	Criticality Bank	2 of 46
Ownership:	Dia	WYDOT 5		Criticality Rank:	2 01 40 4
Risk Probability	/ Rig:	-		Risk Consequence Rtg:	•
Priority Rtg:		High		Issue Type:	Performance
Issues:		Fairly high truck traffic, 2206 trucks p	er day. Averages 34 closures per year at 5 hours per o		
Vulnerabilities			Strengths	Objectives	
Route carries 2	206 trucks pe	er day		Return I-25 traffic to normal conditions as quickly as possible.	
				Minimize user, agency and societal costs.	
				Minimize truck delays and closures.	
				Maintain safety and mobility in the region.	
	<u>H</u> arden,				
Perform Action Before, During or	<u>R</u> edundant, Operational,				Potential Tasks
After the Event	<u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
				1. Wind events can sometimes last a very short time, are	
		Establish alternative routing		difficult to predict the duration and can vary considerably	
D	0	procedures to implement during extreme wind events.	1. Fairly low cost fix.	over a short time period. Rerouting could increase truck delay as a result.	
	Ŭ				
				1. May require installing variable speed limit signs for trucks.	
D	0	Significantly reduce truck speed	1. Improves safety while maintaining a portion of	2. Could create high speed variability between cars and	1. Inform shippers and WTA.
U	U	limits during wind events.	mobility.	trucks.	WIA.
		Assess and modify safety barriers,	1. A very few modifications may be easily		
_		cuts, slopes and other geometrics	accomplished at low cost.	1. Can be very expensive.	
В	Н	that cause high wind gust areas.	2. High wind gust locations are well established.	2. Other safety issues need to be carefully assessed.	
			1. CV technology promises a new method to	1. The technology is new and not fully tested. Issues may	
			mitigate trucking delays and crashes.	arise.	1. Contact shippers and
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
P		vehicle to infrastructure Connected	3. Can better saturate the trucking industry with	3. Requires cooperation and acceptance from the trucking	encourage use of the
В	Н	Vehicle technology.	important information compared to prior methods. 1. CV technology promises a new method to	industry.	technology.
			mitigate trucking delays and crashes.		
			2. Technology can reduce some risk taking	1. Requires cooperation and acceptance from the trucking	1. Contact shippers and
		Implement Connected Vehicle	behaviors.	industry.	WTA to advertise and
В	Н	roadway condition communication technology.	3. Can better saturate the trucking industry with important information compared to prior methods.	2. Judgment of information received by individual truckers may be inconsistent.	encourage use of the technology.
D	П	technology.			technology.

Analysis Year:	2018		
Asset / Location:	I-80 from Walcott Jct to Laramie, ML80 from 224 to 317		
Ownership:	WYDOT	Criticality Rank:	2 of 46
Risk Probability Rtg:	2	Risk Consequence Rtg:	3
Priority Rtg:	Medium	Issue Type:	Performance
Issues:	Very high truck traffic, 5967 trucks per day. Averages 8 closures per year	at 3 hours per closure.	
Vulnerabilities	Strengths	Objectives	
Route carries 5967 trucks	s per day	Return I-80 traffic to normal conditions as qu	ickly as possible.
		Minimize user, agency and societal costs.	
		Minimize truck delays and closures.	
		Maintain safety and mobility in the region.	

Perform Action Before, During or	<u>R</u> edundant, <u>O</u> perational,				Potential Tasks
After the Event	<u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
D	0	Establish alternative routing procedures to implement during extreme wind events.	1. Fairly low cost fix.	1. Wind events can sometimes last a very short time, are difficult to predict the duration and can vary considerably over a short time period. Rerouting could increase truck delay as a result.	
D	0	Significantly reduce truck speed limits during wind events.	1. Improves safety while maintaining a portion of mobility.	 May require installing variable speed limit signs for trucks. Could create high speed variability between cars and trucks. 	1. Inform shippers and WTA.
В	н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause high wind gust areas.	 A very few modifications may be easily accomplished at low cost. High wind gust locations are well established. 	 Can be very expensive. Other safety issues need to be carefully assessed. 	
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 Requires cooperation and acceptance from the trucking industry. Judgment of information received by individual truckers may be inconsistent. 	1. Contact shippers and WTA to advertise and encourage use of the technology.

Analysis Year:		2018				
Asset / Location:		I-25 from N of Wheatland to S of Douglas, ML25 from 81 to 132				
Ownership: WYDOT		WYDOT		Criticality Rank:	2 of 46	
Risk Probability	y Rtg:	3		Risk Consequence Rtg:	1	
Priority Rtg:		Low		Issue Type:	Performance	
lssues:		Fairly high truck traffic, 1622 trucks p	er day. Averages 15 closures per year at 1 hour per cl	osure.		
/ulnerabilities			Strengths	Objectives		
Route carries 1	1622 trucks p	er day		Return I-25 traffic to normal conditions as quickly as possible.		
				Minimize user, agency and societal costs.		
				Minimize truck delays and closures.		
				Maintain safety and mobility in the region.		
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders	
D	0	Establish alternative routing procedures to implement during extreme wind events.	1. Fairly low cost fix.	1. Wind events can sometimes last a very short time, are difficult to predict the duration and can vary considerably over a short time period. Rerouting could increase truck delay as a result.		
D	0	Significantly reduce truck speed limits during wind events using variable speed limit signage.	 Improves safety while maintaining a portion of mobility. 	 May require installing variable speed limit signs for trucks. Could create high speed variability between cars and trucks. 	1. Inform shippers and WTA.	
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause high wind gust areas.	 A very few modifications may be easily accomplished at low cost. High wind gust locations are well established. 	 Can be very expensive. Other safety issues need to be carefully assessed. 		
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.	
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 Requires cooperation and acceptance from the trucking industry. Judgment of information received by individual truckers may be inconsistent. 	1. Contact shippers an WTA to advertise and encourage use of the technology.	

Analysis Year:	2018		
Asset / Location:	I-80 from Laramie to Cheyenne, ML80 from 317 to 370		
Ownership:	WYDOT	Criticality Rank:	1 of 46
Risk Probability Rtg:	1	Risk Consequence Rtg:	2
Priority Rtg:	Low	Issue Type:	Performance
Issues:	Very high truck traffic, 7114 trucks per day. Averages 8 closures per yea	ar at 3 hours per closure.	
Vulnerabilities	Strengths	Objectives	
Route carries 7114 trucks	s per day	Return I-80 traffic to normal conditions as qu	ickly as possible.
		Minimize user, agency and societal costs.	
		Minimize truck delays and closures.	

				Maintain safety and mobility in the region.	
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
D	0	Establish alternative routing procedures to implement during extreme wind events.	1. Fairly low cost fix.	1. Wind events can sometimes last a very short time, are difficult to predict the duration and can vary considerably over a short time period. Rerouting could increase truck delay as a result.	
D	0	Significantly reduce truck speed limits during wind events using variable speed limit signage.	1. Improves safety while maintaining a portion of mobility.	 May require installing variable speed limit signs for trucks. Could create high speed variability between cars and trucks. 	1. Inform shippers and WTA.
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause high wind gust areas.	 A very few modifications may be easily accomplished at low cost. High wind gust locations are well established. 	 Can be very expensive. Other safety issues need to be carefully assessed. 	
В	Н	Implement vehicle to vehicle and vehicle to infrastructure Connected Vehicle technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Implement Connected Vehicle roadway condition communication technology.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce some risk taking behaviors. Can better saturate the trucking industry with important information compared to prior methods. 	 Requires cooperation and acceptance from the trucking industry. Judgment of information received by individual truckers may be inconsistent. 	1. Contact shippers and WTA to advertise and encourage use of the technology.

Analysis Year:		2018			
Asset / Location: I-80 from W of Rawlins to Walcott Jct, ML80 from 206 to 224					
Ownership:		WYDOT		Criticality Rank:	1 of 46
Risk Probability	Rtg:	1		Risk Consequence Rtg:	1
Priority Rtg:		Low		Issue Type:	Performance
Issues:		Very high truck traffic, 6968 trucks pe	er day. Averages 8 closures per year at 3 hours per clos		
Vulnerabilities			Strengths	Objectives	
Route carries 6	968 trucks pe	er day		Return I-80 traffic to normal conditions as quickly as possible.	
				Minimize user, agency and societal costs.	
				Minimize truck delays and closures.	
				Maintain safety and mobility in the region.	
Perform Action	<u>H</u> arden, R edundant,				
Before, During or	O perational,	Actiona	Pros	Cons	Potential Tasks Involving Stakeholders
After the Event	<u>P</u> lan	Actions	P105		Involving Stakenoiders
		Establish alternative routing		1. Wind events can sometimes last a very short time, are difficult to predict the duration and can vary considerably	
		procedures to implement during		over a short time period. Rerouting could increase truck	
D	0	extreme wind events.	1. Fairly low cost fix.	delay as a result.	
		Significantly reduce truck speed		1. May require installing variable speed limit signs for trucks.	
		limits during wind events using	1. Improves safety while maintaining a portion of	2. Could create high speed variability between cars and	1. Inform shippers and
D	0	variable speed limit signage.	mobility.	trucks.	WTA.
		Assess and modify safety barriers,	1. A very few modifications may be easily		
		cuts, slopes and other geometrics	accomplished at low cost.	1. Can be very expensive.	
В	Н	that cause high wind gust areas.	2. High wind gust locations are well established.	2. Other safety issues need to be carefully assessed.	
			1. CV technology promises a new method to	1. The technology is new and not fully tested. Issues may	
			mitigate trucking delays and crashes.	arise.	1. Contact shippers an
		Implement vehicle to vehicle and	2. Technology can reduce risk taking behaviors.	2. Implementation costs may be fairly high.	WTA to advertise and
В	Н	vehicle to infrastructure Connected Vehicle technology.	3. Can better saturate the trucking industry with important information compared to prior methods.	3. Requires cooperation and acceptance from the trucking industry.	encourage use of the technology.
			1. CV technology promises a new method to		
			mitigate trucking delays and crashes.		
			2. Technology can reduce some risk taking	1. Requires cooperation and acceptance from the trucking	1. Contact shippers an
		Implement Connected Vehicle	behaviors.	industry.	WTA to advertise and
В	н	roadway condition communication technology.	3. Can better saturate the trucking industry with important information compared to prior methods.	2. Judgment of information received by individual truckers may be inconsistent.	encourage use of the technology.
D	i n	i technology.	important mormation compared to phot methods.	i may be inconsistent.	lecillology.

Appendix E

Environmental – Nonattainment Area Creation Risk Action Plans

Analysis Year: Asset / Locatio Ownership: Risk Probability Priority Rtg: Issues:	n: I- W y Rtg: 5 H	018 80 Buford to East of Cheyenne, ML /YDOT igh izone level is about 90% of exceeda		Criticality Rank: Risk Consequence Rtg: Issue Type:	1 of 46 5 Environmental
Vulnerabilities			Strengths	Objectives	
		d in Laramie County.	<u> </u>	Reduce delays and subsequent pollutant emissions on I-80.	
		5,700 hours per mile.		Provide alternatives to truck idling.	
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. Could reduce inefficient slowing of trucks thereby improving emissions reductions. Fairly low cost and reduces operational costs. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. Not effective at reducing pollutants in summer months. 	
В	н	Build snow fences	 Can improve visibility and minimize snow accumulatio on the road. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 WYDOT is nearing effective saturation of snow fences alor Interstate highways. Not effective at reducing pollutants in summer months. 	g
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 Could reduce inefficient slowing of trucks thereby improving emissions reductions. A very few modifications may be easily accomplished low cost. 	 Can be very expensive. Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 	
В	Н	Implement Connected Vehicle technology on the road.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can optimize truck movement efficiencies and dissuad truckers from approaching conditions that create increased emissions thereby reducing emissions. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Provide diesel retrofit incentives to the trucking industry.	 Reduces emissions. Effective year round rather than just in winter months. 	 Could become very expensive. Most of the trucks on I-80 are from out of state likely causing the effectiveness of retrofits to be minimal. It would require retrofitting a very large number of trucks to see significant results. As trucking fleet is replaced action will loses effectiveness. 	1. Contact shippers and WTA to advertise and encourage retrofitting their trucks.
В	Н	Provide electrified truck parking areas to reduce truck idling.	 Reduces truck idling during winter weather events thus reducing emissions. Provides additional safety features to the road. 		1. Inform shippers and WTA of electrification availability.

Analysis Year: Asset / Locatio		018 80 East of Cheyenne, ML80 from 33	70 to 377		
Ownership:		VYDOT		Criticality Rank:	1 of 46
Risk Probability	ility Rtg: 5			Risk Consequence Rtg:	5
Priority Rtg:	Rtg: High			Issue Type:	Environmental
Issues:	C	Dzone level is about 90% of exceeda	ance level and PM10 is at 78%.		
Vulnerabilities			Strengths	Objectives	
Over 100,000 p	Over 100,000 population affected in Laramie County.			Reduce delays and subsequent pollutant emissions on I-80.	
Annual truck delay estimate at 12,883 hours per mile.				Provide alternatives to truck idling.	
Perform Action					Potential Tasks
<u>B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
<u>Man the Event</u>	<u>o</u> portatoritai, <u>r</u> iari		1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and other	improving emissions reductions.	Safety issues need to be carefully assessed.	
		geometrics that cause snow	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	H	drifting.	at low cost.	Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	
			2. Technology can reduce risk taking behaviors.	arise.	1. Contact shippers
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	and WTA to advertise
_		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		and encourage use
В	H	technology on the road.	increased emissions thereby reducing emissions.	industry.	of the technology.
				1. Could become very expensive.	
				2. Most of the trucks on I-80 are from out of state likely	1. Contact shippers
				causing the effectiveness of retrofits to be minimal. It would	and WTA to advertise
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	and encourage
Р		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
			1. Deduces truck idling during winter weather sweets there	1. Deguires trucks to be equipped with applicable equipment	1. Inform shippers and WTA of
		Provide electrified truck parking	1. Reduces truck idling during winter weather events thus reducing emissions.	1. Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines.	electrification
В	H	areas to reduce truck idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.
Ď		areas to reduce truck luting.		2. Less ellective at reducing pollutants in summer months.	avaliauliity.

Analysis Year: Asset / Location		018 -80 Fast of Chevenne to Nebraska S	State Line, ML80 from 377.37 to 402.78		
Ownership:		VYDOT		Criticality Rank:	1 of 46
Risk Probability				Risk Consequence Rtg:	5
Priority Rtg:		ligh		1 0	Environmental
Issues:			ance level and PM10 is at 78%. Port of entry west of Cheyen		
Vulnerabilities			Strengths	Objectives	
		ed in Laramie County.		Reduce delays and subsequent pollutant emissions on I-80.	
	elay estimate at 9	,100 hours per mile.		Provide alternatives to truck idling.	
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, O perational, P lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
	, <u>_</u>		1. Fairly low cost fix.		Ŭ
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	H	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and other	improving emissions reductions.	 Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. 	
В	Н	geometrics that cause snow drifting.	2. A very few modifications may be easily accomplished at low cost.	 Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 	
D		dinting.	1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of the
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	technology.
			A	1. Could become very expensive.	
				2. Most of the trucks on I-80 are from out of state likely	1. Contact shippers
				causing the effectiveness of retrofits to be minimal. It would	and WTA to
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	advertise and
		incentives to the trucking	1. Reduces emissions.	significant results.	encourage retrofitting
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	their trucks.
		Increase the use of PrePass at	1. Reduces truck idling at the port of entry.		1. Promote with WTA
В	H,O	the port of entry.	2. Effective year round rather than just in winter months.	1. Requires buy-in from truckers.	and truckers.
					1. Inform shippers
			1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
P		Provide electrified truck parking	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	H	areas to reduce truck idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year:	2	018			
Asset / Location		25 from Colorado State Line to I-80	, ML25 from 0 to 8.84		
Ownership:	ship: WYDOT			Criticality Rank:	2 of 46
Risk Probability	/Rtg: 5	i		Risk Consequence Rtg:	5
Priority Rtg:		ligh			Environmental
Issues:		Dzone level is about 90% of exceeda	ance level and PM10 is at 78%		
Vulnerabilities			Strengths	Objectives	
	population affecte	d in Laramie County.	- a angana	Reduce delays and subsequent pollutant emissions on I-25.	
		1,400 hours per mile.		Provide alternatives to truck idling.	
Perform Action	Harden,	,			
Before, During or	Redundant,	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
After the Event	Operational, Plan		1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
	+		1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
_	1	Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and other	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		geometrics that cause snow	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create	3. Requires cooperation and acceptance from the trucking	encourage use of
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
		Increase the use of PrePass at	1. Reduces truck idling at the port of entry.		1. Promote with
В	H,O	the port of entry.	2. Effective year round rather than just in winter months.	1. Requires buy-in from truckers.	WTA and truckers.
					1. Inform shippers
			1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
_		Provide electrified truck parking	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	I H	areas to reduce truck idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year: Asset / Locatio		018 -80 from Rock Springs to Creston Jo	t MI 80 from 105.1 to 187.25		
Ownership:		WIDOT		Criticality Rank:	1 of 46
Risk Probability Rtg: 5				Risk Consequence Rtg:	10140
					4 Environmental
Priority Rtg:		Dzone level is about 96% of exceeda	upper level and DM10 is at 620/	issue rype.	Environmental
Issues:	(DZONE level is about 96% of exceeda			
Vulnerabilities				Objectives	
About 44,000 population affected in Sweetwater County. Annual truck delay estimate at 20,500 hours per mile.				Reduce delays and subsequent pollutant emissions on I-80. Provide alternatives to truck idling.	
Perform Action	n Action Harden,				
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
_		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and other	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		geometrics that cause snow	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
	11	Ginang.	1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of the
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	technology.
	11			1. Could become very expensive.	toormology.
				2. Most of the trucks on I-80 are from out of state likely	1. Contact shippers
				causing the effectiveness of retrofits to be minimal. It would	and WTA to
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	advertise and
		incentives to the trucking	1. Reduces emissions.	significant results.	encourage retrofittin
В	н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	their trucks.
D	П	muusuy.		J. AS trucking need is replaced action will loses effectiveness.	
			1. Doducco truck idling during winter weather events thus	1. Paguiros trugka to be aguinned with applicable aguinment	1. Inform shippers and WTA of
		Provide electrified truck activity	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	1
В	L	Provide electrified truck parking	reducing emissions.	to be able to shut down their diesel engines.	electrification
D	H	areas to reduce truck idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year: Asset / Location:		from Creston Jct to W of Rawlins, MI			
Ownership:	WYE	DOT			1 of 46
Risk Probability R	Rtg: 5 High			Risk Consequence Rtg: Issue Type:	4 Environmental
Priority Rtg: Issues:		ne level is about 96% of exceedance		issue Type.	LIIVIIOIIIIeillai
Vulnerabilities	0201		Strengths	Objectives	
	oulation affected in S	weetwater County.	e d'engane	Reduce delays and subsequent pollutant emissions on I-80.	
Annual truck dela	y estimate at 22,000	hours per mile.		Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,			· · · · · · · · · · · · · · · · · · ·	Potential Tasks
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
<u>A</u> iter the Event			1. Fairly low cost fix.	00113	Involving Stakeholders
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences alor	a
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	9
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
D		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished at		
В	н	snow drifting.	low cost.	4. Not effective at reducing pollutants in summer months.	
D	11	Show dritting.	1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
		Implement Connected	3. Can optimize truck movement efficiencies and dissuade		advertise and
		Vehicle technology on the	truckers from approaching conditions that create increased		encourage use of the
В	н	road.	emissions thereby reducing emissions.	industry.	technology.
				1. Could become very expensive.	toormology.
				2. Most of the trucks on I-80 are from out of state likely	1. Contact shippers
				causing the effectiveness of retrofits to be minimal. It would	and WTA to
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	advertise and
		incentives to the trucking	1. Reduces emissions.	significant results.	encourage retrofitting
В	Н	industry.	2. Effective year round rather than just in winter months.	 As trucking fleet is replaced action will loses effectiveness. 	their trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
		parking areas to reduce	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	н	truck idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.
	1 11	i udok lulling.			availability.

Analysis Year: Asset / Locatio)18 25 from I-80 to N of Cheyenne, ML2	25 from 9 to 25		
Ownership: WYDOT			Criticality Rank:	2 of 46	
Risk Probability	y Rtg: 4			Risk Consequence Rtg:	5
Priority Rtg:		gh		Issue Type:	Environmental
Issues:	0:	zone level is about 90% of exceeda	nce level and PM10 is at 78%.		
Vulnerabilities			Strengths	Objectives	
		I in Laramie County.		Reduce delays and subsequent pollutant emissions on I-25.	
		500 hours per mile.		Provide alternatives to truck idling.	
Perform Action Before, During or	<u>H</u> arden, R edundant,				Potential Tasks
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders
			1. Fairly low cost fix.		J
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.	-	
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	H	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	H	snow drifting.	at low cost.	Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
_		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	H	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
P		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
		Drovido algorithm truels	1. Deduces truck idling during winter weather sugate thus	1. Dequires trucks to be equipped with applies be equipment	1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus reducing emissions.	1. Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines.	and WTA of electrification
В	н	parking areas to reduce truck			availability.
В	i Π	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	avallability.

Analysis Year: Asset / Locatic	on: I-8	118 30 Uinta County Line to Rock Spring	gs, ML80 from 57.04 to 105.1	Criticality Bank:	1 of 46
Ownership: WYDOT Risk Probability Rtg: 4			Criticality Rank: Risk Consequence Rtg:	1 01 40	
Priority Rtg:				Issue Type:	Environmental
Issues:		zone level is about 96% of exceeda	nce level and PM10 is at 63%.		Environmontal
Vulnerabilities				Objectives	
		in Sweetwater County.		Reduce delays and subsequent pollutant emissions on I-80.	
Annual truck delay estimate at 10,100 hours per mile.				Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,	· · · · · · · · · · · · · · · · · · ·			Potential Tasks
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
And the Event			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	1
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
		-	1. CV technology promises a new method to mitigate	-	
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	H	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	 Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
_		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
-		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	Н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year: Asset / Locatio		018 80 West of Laramie, ML80 from 280) 9 to 316 71		·
Ownership: WYDOT			Criticality Rank:	1 of 46	
Risk Probability					3
Priority Rtg:	Н	igh		Issue Type:	Environmental
ssues:	C	zone level is about 87% of exceeda	ince level and PM10 is at 65%.		
Vulnerabilities				Objectives	
		in Albany County.		Reduce delays and subsequent pollutant emissions on I-80.	
	lay estimate at 81,000 hours per mile.			Provide alternatives to truck idling.	
Perform Action Before, During or	<u>H</u> arden, R edundant,				Potential Tasks
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	H	Build snow fences	improving emissions reductions.	Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
_		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit	4 Daduara aminina	require retrofitting a very large number of trucks to see	encourage
Р		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
		Drovido electrificat truck	1. Deduces truck idling during winter weather suggets the	1. Deguines trucks to be equipped with explicitly equipment	1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
В	п.	parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	H	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year: Asset / Locatio		018 80 East of Laramie, ML80 from 316	.71 to 336.6		
Ownership: WYDOT				1 of 46	
Risk Probability				Risk Consequence Rtg:	3
Priority Rtg:		ligh		Issue Type:	Environmental
Issues:	C	zone level is about 87% of exceeda			
Vulnerabilities			Strengths	Objectives	
Annual truck de	elay estimate at 7	in Albany County. 5,000 hours per mile.		Reduce delays and subsequent pollutant emissions on I-80. Provide alternatives to truck idling.	
Perform Action Before, During or After the Event	<u>H</u> arden, <u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
And the Event			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			 Fairly low cost and reduces operational costs. 		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	H	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and other geometrics that cause	improving emissions reductions. 2. A very few modifications may be easily accomplished	 Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. 	
В	н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
D		snow dritting.	1. CV technology promises a new method to mitigate	4. Not ellective at reducing polititants in summer months.	
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
		Provide electrified truck	1. Deduces truck idling during winter weather sweets thus	1. Descriptions trucks to be equipmed with employed a subsection	1. Inform shippers
		Provide electrified truck parking areas to reduce truck	1. Reduces truck idling during winter weather events thus reducing emissions.	1. Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines.	and WTA of electrification
В	н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.
D	11	iuiing.	$\frac{1}{2}$ 2. I TOMUES AUUIIIONAL SALELY LEALULES TO THE TOAU.	2. Less encouve at reducing pollutarits in summer modulins.	avaliavility.

Analysis Year: Asset / Locatior)18 30 Evanston to Ft Bridger, ML80 fro	m 3.45 to 33.39		
Ownership: WYDOT			Criticality Rank:	1 of 46	
Risk Probability	/ Rtg: 5			Risk Consequence Rtg:	3
Priority Rtg:				Issue Type:	Environmental
Issues:	0	zone level is about 89% of exceeda	ince level.		
Vulnerabilities				Objectives	
	opulation affected			Reduce delays and subsequent pollutant emissions on I-80.	
Perform Action	ck delay estimate at 23,300 hours per mile.			Provide alternatives to truck idling.	
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, Operational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			 Fairly low cost and reduces operational costs. 		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
_			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	H	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate	1. The technology is new and not fully tested leaves new	1 Contrat chimners
			trucking delays and crashes. 2. Technology can reduce risk taking behaviors.	1. The technology is new and not fully tested. Issues may arise.	1. Contact shippers and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
2				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus		and WTA of
		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	Н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year: Asset / Location		18 00 through Gillette, ML90 from 119.	2 to 132 94		
Ownership: WYDOT			Criticality Rank:	3 of 46	
Risk Probability				Risk Consequence Rtg:	4
Priority Rtg:				Issue Type:	Environmental
Issues:					
Vulnerabilities	Vulnerabilities Strengths Over 49,000 population affected in Campbell County.			Objectives	
				Reduce delays and subsequent pollutant emissions on I-90.	
Annual truck de <u>Perform Action</u>	elay estimate at 6, Harden,	estimate at 6,600 hours per mile.		Provide alternatives to truck idling.	
Before, During or	Redundant,	A 1'	2		Potential Tasks
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. Not effective at reducing pollutants in summer months. 	
В	Н	Build snow fences	 Fairly low cost and reduces operational costs. Can improve visibility and minimize snow accumulation on the road. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 WYDOT is nearing effective saturation of snow fences along Interstate highways. Not effective at reducing pollutants in summer months.)
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 Could reduce inefficient slowing of trucks thereby improving emissions reductions. A very few modifications may be easily accomplished at low cost. 	 Can be very expensive. Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 	
В	н	Implement Connected Vehicle technology on the road.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can optimize truck movement efficiencies and dissuade truckers from approaching conditions that create increased emissions thereby reducing emissions. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Provide diesel retrofit incentives to the trucking industry.	 Reduces emissions. Effective year round rather than just in winter months. 	 Could become very expensive. Most of the trucks on I-80 are from out of state likely causing the effectiveness of retrofits to be minimal. It would require retrofitting a very large number of trucks to see significant results. As trucking fleet is replaced action will loses effectiveness. 	1. Contact shippers and WTA to advertise and encourage retrofitting their trucks.
В	Н	Provide electrified truck parking areas to reduce truck idling.	 Reduces truck idling during winter weather events thus reducing emissions. Provides additional safety features to the road. 	 Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines. Less effective at reducing pollutants in summer months. 	1. Inform shippers and WTA of electrification availability.

Analysis Year:		2018			
Asset / Location	1:	I-90 Gillette to Crook County Lin	e, ML90 from 132.94 to 147.45		0.440
Ownership:	D'	WYDOT		Criticality Rank:	3 of 46
Risk Probability	Rtg:	4		Risk Consequence Rtg:	4
Priority Rtg:		Medium		Issue Type:	Environmental
Issues:		Ozone is near 90% of exceedan			
/ulnerabilities Strengths			Strengths	Objectives	
		l in Campbell County.		Reduce delays and subsequent pollutant emissions on I-90.	
		100 hours per mile.		Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden, R edundant,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, Operational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
_	U		1. Fairly low cost and reduces operational costs.		+
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
2		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
2			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create	3. Requires cooperation and acceptance from the trucking	encourage use of
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
_				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
_					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
			, reasoning on looid loo		0.0001110000011

Risk Probability Rtg: 4 Risk Consequence Rtg: 3	of 46 hvironmental Potential Tasks Involving Stakeholders
Risk Probability Rtg: 4 Risk Consequence Rtg: 3 Priority Rtg: Medium Issue: Type: En Issue: PM2.5 is near 100% of exceedance and ozone is at 80%. Objectives En Vulnerabilities Objectives Reduce delays and subsequent pollutant emissions on 1-90. Provide alternatives to truck idling. Perform Action Harden, Berlon, Burg or Reducant, Cons Reducant, Cons Antual truck delay estimate at 1,900 hours per mile. Pros Cons Perform Action Harden, Seewas and modify current snow removal and roadway management procedures as new method to mitigate 1. Fraing low cost fix. 1. Probably little improvement remaining to be gained since WYDOT is nearing effective at reducing pollutants in summer months. D O needed. 1. Fairly low cost and reduces operational costs. 2. Coal indeuce inefficient slowing of trucks thereby improving emissions reductions. 1. WYDOT is nearing effective saturation of snow fences along Interstate highways. B H Build snow fences 1. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 2. Not effective at reducing pollutants in summer months. B H Build snow fences and other geometrics that cause snow drifting. 2. Avery few modifications may be easily accomplished at low cost.	Potential Tasks
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Issues: PM2.5 is near 100% of exceedance and ozone is at 80%. Objectives Vulnerabilities Strengths Objectives Over 31,000 population affected in Campbell County. Reduce delays and subsequent pollutant emissions on 1-90. Annual truck delay estimate at 1,900 hours per mile. Provide alternatives to truck idling. Perform Action Before, During or After the Event Harden, Redundant, Deverational, Pan Actions Pros Cons Atter the Event Assess and modify current snow removal and roadway management procedures as needed. 1. Fairly low cost fix. D O needed. 1. Fairly low cost and reduces operational costs. 2. Can improve visibility and minimize snow accumulation on the road. 1. Call reduce inefficient slowing of trucks thereby improving emissions reductions. 1. WYDOT is nearing effective saturation of snow fences along Interstate highways. B H Build snow fences 1. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 1. Could reduce inefficient slowing of trucks thereby improving emissions reductions. B H Build snow fences 1. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 1. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 2. Safety issues need to be carefully assessed.	Potential Tasks
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trucking delays and crashes.	
	1. Contact shippers
2. Technology can reduce risk taking behaviors. arise.	and WTA to
3. Can optimize truck movement efficiencies and 2. Implementation costs may be fairly high.	advertise and
Implement Connected Vehicle dissuade truckers from approaching conditions that create 3. Requires cooperation and acceptance from the trucking	encourage use of
B H technology on the road. increased emissions thereby reducing emissions. industry.	the technology.
1. Could become very expensive.	1. Contact shippers and WTA to
2. Most of the trucks on I-80 are from out of state likely	and with to advertise and
causing the effectiveness of retrofits to be minimal. It would Provide diesel retrofit Provide diesel retrofit	i de la constante de
Provide diesel retrofit incentives to the trucking 1. Reduces emissions. require retrofitting a very large number of trucks to see significant results.	encourage retrofitting their
B H industry. 2. Effective year round rather than just in winter months. 3. As trucking fleet is replaced action will loses effectiveness.	trucks.
	1. Inform shippers
Provide electrified truck 1. Reduces truck idling during winter weather events thus 1. Requires trucks to be equipped with applicable equipment	
parking areas to reduce truck reducing emissions.	
B H idling. 2. Provides additional safety features to the road. 2. Less effective at reducing pollutants in summer months.	and WTA of electrification

Analysis Year:	20	• 018	U	•	
Asset / Location	n: I-9	90 South of Montana State Line to S	Sheridan, ML90 from 9.92 to 23.07		
Ownership:	W	YDOT		Criticality Rank:	3 of 46
Risk Probability	Rtg: 4			Risk Consequence Rtg:	3
Priority Rtg:	M	edium		Issue Type:	Environmental
Issues:	PI	M2.5 is near 100% of exceedance a	and ozone is at 80%. Port of entry may cause some of the de		
Vulnerabilities			Strengths	Objectives	
		in Campbell County.		Reduce delays and subsequent pollutant emissions on I-90.	
		500 hours per mile.		Provide alternatives to truck idling.	
Perform Action Before, During or	<u>H</u> arden, Redundant,				Potential Tasks
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	1
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
_		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate	4. The technology is new and estimated because man	1. O anto at altimation
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
		Implement Connected Vahiolo	3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
В	Н	Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
D	Π	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				 Could become very expensive. Most of the trucks on I-80 are from out of state likely 	1. Contact shippers and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
2		Increase the use of PrePass	1. Reduces truck idling at the port of entry.		1. Promote with
В	H,O	at the port of entry.	2. Effective year round rather than just in winter months.	1. Requires buy-in from truckers.	WTA and truckers.
_	,•				1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	Н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year:	2	018			
Asset / Locatio	on: I-	90 South of Sheridan, ML90 from 2	3.07 to 41.96		
Ownership: WYDOT		/YDOT		Criticality Rank:	3 of 46
Risk Probabilit	y Rtg: 4			Risk Consequence Rtg:	3
Priority Rtg:	N	ledium		Issue Type:	Environmental
Issues:	Р	M2.5 is near 100% of exceedance a	and ozone is at 80%.		
Vulnerabilities			Strengths	Objectives	
		in Sheridan County.		Reduce delays and subsequent pollutant emissions on I-90.	
		,600 hours per mile.		Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,				Potential Tasks
Before, During or After the Event	<u>R</u> edundant, Operational, P lan	Actions	Pros	Cons	Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	1
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
P	11	other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
_		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	Н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year:		18 V 220 in Cooper, MI 21 from 112 2	Q to 117		-
		Y-220 in Casper, ML21 from 113.3 YDOT		Criticality Rank:	5 of 46
Risk Probability		IBOI		Risk Consequence Rtg:	J 01 40 A
Priority Rtg:		edium		Issue Type:	Environmental
Issues:		zone is at about 90% of exceedanc		issue Type.	LINIOIIIIeillai
Vulnerabilities			Strengths	Objectives	
	nulation affected i	n Natrona County.	Ouoliguis	Reduce delays and subsequent pollutant emissions on WY-2	20
		800 hours per mile.		Provide alternatives to truck idling.	20.
Perform Action	Harden.				
Before, During or	Redundant,	Actions	Drop	Conc	Potential Tasks
After the Event	Operational, Plan	Actions	Pros 1. Fairly low cost fix.	Cons	Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Painy low cost fix. WYDOT already has much of this implemented and likely would not require many changes. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. Not effective at reducing pollutants in summer months. 	
В	Н	Build snow fences	 Fairly low cost and reduces operational costs. Can improve visibility and minimize snow accumulation on the road. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	1. Since this is mostly in an urban area, snow fence may not be practical.	
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 Could reduce inefficient slowing of trucks thereby improving emissions reductions. A very few modifications may be easily accomplished at low cost. 	 Can be very expensive. Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 	
В	н	Implement Connected Vehicle technology on the road.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can optimize truck movement efficiencies and dissuade truckers from approaching conditions that create increased emissions thereby reducing emissions. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Provide diesel retrofit incentives to the trucking industry.	 Reduces emissions. Effective year round rather than just in winter months. 	 Could become very expensive. Most of the trucks on I-80 are from out of state likely causing the effectiveness of retrofits to be minimal. It would require retrofitting a very large number of trucks to see significant results. As trucking fleet is replaced action will loses effectiveness. 	
В	Н	Provide electrified truck parking areas to reduce truck idling.	 Reduces truck idling during winter weather events thus reducing emissions. Provides additional safety features to the road. 	 Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines. Less effective at reducing pollutants in summer months. 	1. Inform shippers and WTA of electrification availability.

Analysis Year:	20)18		·	,
Asset / Locatio		30 Utah State Line to Evanston, ML			
Ownership:	W	YDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg: 4			Risk Consequence Rtg:	3
Priority Rtg:		W		Issue Type:	Environmental
Issues:	0	zone level is about 89% of exceeda	ance level. Port of entry may cause some of the delay.		
Vulnerabilities			Strengths	Objectives	
	opulation affected			Reduce delays and subsequent pollutant emissions on I-80.	
		1,400 hours per mile.		Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,				Potential Tasks
Before, During or After the Event	<u>R</u> edundant, <u>O</u> perational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
	<u>oporatoriai, rian</u>		1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	H	snow drifting.	at low cost.	Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	H	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
_		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
_		Increase the use of PrePass	1. Reduces truck idling at the port of entry.		1. Promote with
В	H,O	at the port of entry.	2. Effective year round rather than just in winter months.	1. Requires buy-in from truckers.	WTA and truckers.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
-		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	H	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year:		D18	5	•	
Asset / Location		80 Ft Bridger to Lyman, ML80 from	33 to 48		
Ownership:		/YDOT			1 of 46
Risk Probability	y Rtg: 4			r den eeneequenee r dg.	3
Priority Rtg:	L	w		Issue Type:	Environmental
Issues:	C	zone level is about 89% of exceeda			
Vulnerabilities			Strengths	Objectives	
About 21,000 p	opulation affected	d in Uinta County.		Reduce delays and subsequent pollutant emissions on I-80.	
	elay estimate at 9	,000 hours per mile.		Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,				Potential Tasks
Before, During or After the Event	<u>R</u> edundant, Operational, <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
		7100010	1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
_			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate	Managara and Andrew Andrew	
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create	3. Requires cooperation and acceptance from the trucking	encourage use of
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
_		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
-		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	H	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year:	20	18			
Asset / Location: I-80 East of Lyman, ML80 from 48		0 East of Lyman, ML80 from 48.33	s to 57.04		
Ownership: WY		YDOT		Criticality Rank:	1 of 46
Risk Probability	y Rtg: 4			Risk Consequence Rtg:	3
Priority Rtg:	Lo	w		Issue Type:	Environmental
Issues:	Oz	one level is about 89% of exceeda	ince level.		
Vulnerabilities			Strengths	Objectives	
About 21,000 p	opulation affected	in Uinta County.		Reduce delays and subsequent pollutant emissions on I-80.	
Annual truck de	elay estimate at 14	,000 hours per mile.		Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or After the Event	<u>R</u> edundant, Operational, Plan	Actions	Pros	Cons	Involving Stakeholders
AILEI LIE LVEIIL			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
		-	1. CV technology promises a new method to mitigate		
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	H	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
_		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
_		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	<u> </u> H	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year:		2018 -90 West of Gillette, ML90 from 96 to	110.2	•	
Asset / Location: I-90 West of Gillette, ML90 from 96 f Ownership: WYDOT		-) 119.2	Criticality Rank:	3 of 46
Risk Probability	-			Risk Consequence Rtg:	1
Priority Rtg:		_OW			Environmental
Issues:		Dzone is near 90% of exceedance a	nd PM10 is near 75%	issue Type.	Environmental
Vulnerabilities			Strengths	Objectives	
	population affecte	ed in Campbell County	Caongaio	Reduce delays and subsequent pollutant emissions on I-90.	
Nearly 50,000 population affected in Campbell County. Annual truck delay estimate at 1,500 hours per mile.				Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,				
Before, During or	Redundant,	Actions	Pros	Cana	Potential Tasks
After the Event	Operational, Plan	Actions		Cons	Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. Not effective at reducing pollutants in summer months. 	
В	H	Build snow fences	 Fairly low cost and reduces operational costs. Can improve visibility and minimize snow accumulation on the road. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 WYDOT is nearing effective saturation of snow fences along Interstate highways. Not effective at reducing pollutants in summer months. 	3
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 Could reduce inefficient slowing of trucks thereby improving emissions reductions. A very few modifications may be easily accomplished at low cost. 	 Can be very expensive. Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 	
В	н	Implement Connected Vehicle technology on the road.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can optimize truck movement efficiencies and dissuade truckers from approaching conditions that create increased emissions thereby reducing emissions. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	н	Provide diesel retrofit incentives to the trucking industry.	 Reduces emissions. Effective year round rather than just in winter months. 	 Could become very expensive. Most of the trucks on I-80 are from out of state likely causing the effectiveness of retrofits to be minimal. It would require retrofitting a very large number of trucks to see significant results. As trucking fleet is replaced action will loses effectiveness. 	1. Contact shippers and WTA to advertise and encourage retrofitting their trucks.
В	Н	Provide electrified truck parking areas to reduce truck idling.	 Reduces truck idling during winter weather events thus reducing emissions. Provides additional safety features to the road. 	 Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines. Less effective at reducing pollutants in summer months. 	1. Inform shippers and WTA of electrification availability.

Analysis Year:	20)18			
Asset / Locatio	on: I-2	25 through Casper, ML25 from 175	.1 to 191.62		
Ownership: WYDOT		YDOT		Criticality Rank:	2 of 46
Risk Probabilit	y Rtg: 3			Risk Consequence Rtg:	4
Priority Rtg:	Lc	W		Issue Type:	Environmental
Issues:	Issues: Ozone level is about 90% of exceedance level.		ance level.		
Vulnerabilities			Strengths	Objectives	
Over 83,000 p	opulation affected	in Natrona County.		Reduce delays and subsequent pollutant emissions on I-25.	
Annual truck d	elay estimate at 3,	000 hours per mile.		Provide alternatives to truck idling.	
Perform Action	<u>H</u> arden,				Potential Tasks
<u>B</u> efore, <u>D</u> uring or <u>A</u> fter the Event	<u>R</u> edundant, Operational, P lan	Actions	Pros	Cons	Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
_			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	1
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	Н	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
		-	1. CV technology promises a new method to mitigate	•	
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to
			3. Can optimize truck movement efficiencies and	Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create	3. Requires cooperation and acceptance from the trucking	encourage use of
В	H	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
				1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
-		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
-		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	H	idling.	2. Provides additional safety features to the road.	Less effective at reducing pollutants in summer months.	availability.

Analysis Year:)18 DE N - 6 October - MI OF from 101 60 /			-
		I-25 N of Casper, ML25 from 191.62 to 228.25 WYDOT Criticality Rank:			0 - 6 40
Ownership:		YDOT			2 of 46
Risk Probability	•			Risk Consequence Rtg:	4 F araiana antat
Priority Rtg:)W		Issue Type:	Environmental
Issues:	0	zone level is about 90% of exceeda		Obiasticas	
Vulnerabilities	and attack affected	in National Occurto	Strengths	Objectives	
		in Natrona County.		Reduce delays and subsequent pollutant emissions on I-25.	
Annual truck de Perform Action	Harden.	500 hours per mile.		Provide alternatives to truck idling.	
<u>Before</u> , <u>D</u> uring or After the Event	<u>H</u> arden, <u>R</u> edundant, Operational, Plan	Actions	Pros	Cons	Potential Tasks Involving Stakeholders
			1. Fairly low cost fix.		
		Assess and modify current	2. WYDOT already has much of this implemented and		
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since	
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.	
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
			1. Fairly low cost and reduces operational costs.		
			2. Can improve visibility and minimize snow accumulation		
			on the road.	1. WYDOT is nearing effective saturation of snow fences along	
			3. Could reduce inefficient slowing of trucks thereby	Interstate highways.	
В	H	Build snow fences	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.	
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.	
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.	
_		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.	
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.	
			1. CV technology promises a new method to mitigate	4. The technology is new and not fully tested leaves may	1 Contrat abin and
			trucking delays and crashes. 2. Technology can reduce risk taking behaviors.	1. The technology is new and not fully tested. Issues may arise.	1. Contact shippers and WTA to
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of
В	н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.
D	11			1. Could become very expensive.	1. Contact shippers
				2. Most of the trucks on I-80 are from out of state likely	and WTA to
				causing the effectiveness of retrofits to be minimal. It would	advertise and
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their
В	Н	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.
					1. Inform shippers
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of
		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification
В	Н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.

Analysis Year:	2018		
Asset / Location:	US-191 from Rock Springs to N of Farson, ML13B from 0 to 51.62		
Ownership:	WYDOT	Criticality Rank:	12 of 46
Risk Probability Rtg:	3	Risk Consequence Rtg:	4
Priority Rtg:	Low	Issue Type:	Environmental
Issues:	Ozone is at about 96% of exceedance level.		
Vulnerabilities	Strengths	Objectives	
About 44,000 population a	affected in Sweetwater County.	Reduce delays and subsequent pollutant	temissions on US-191.

Provide alternatives to truck idling.

About 44,000 population affected in Sweetwater County. Annual truck delay estimate at 1,100 hours per mile.

Perform Action Before, During or	<u>H</u> arden, Redundant,			· · · · · · · · · · · · · · · · · · ·	Potential Tasks
After the Event	<u>Operational</u> , <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. Not effective at reducing pollutants in summer months. 	
В	Н	Build snow fences	 Fairly low cost and reduces operational costs. Can improve visibility and minimize snow accumulation on the road. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	1. Not effective at reducing pollutants in summer months.	
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 Could reduce inefficient slowing of trucks thereby improving emissions reductions. A very few modifications may be easily accomplished at low cost. 	 Can be very expensive. Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 	
В	Н	Implement Connected Vehicle technology on the road.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can optimize truck movement efficiencies and dissuade truckers from approaching conditions that create increased emissions thereby reducing emissions. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.
В	Н	Provide diesel retrofit incentives to the trucking industry.	 Reduces emissions. Effective year round rather than just in winter months. 	 Could become very expensive. Most of the trucks on I-80 are from out of state likely causing the effectiveness of retrofits to be minimal. It would require retrofitting a very large number of trucks to see significant results. As trucking fleet is replaced action will loses effectiveness. 	1. Contact shippers and WTA to advertise and encourage retrofitting their trucks.
В	Н	Provide electrified truck parking areas to reduce truck idling.	 Reduces truck idling during winter weather events thus reducing emissions. Provides additional safety features to the road. 	 Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines. Less effective at reducing pollutants in summer months. 	1. Inform shippers and WTA of electrification availability.

Analysis Year:	20					
Asset / Location		(-220 N of Muddy Gap to Casper,		Criticality Deale	E ={ 40	
Ownership: WYDOT		rD01		Criticality Rank:	5 of 46	
Risk Probability Rtg: 3				Risk Consequence Rtg:		
	Priority Rtg: Low			Issue Type:	Environmental	
Issues:	Oz	one is at about 90% of exceedanc		.		
Vulnerabilities			Strengths	Objectives		
		n Natrona County.		Reduce delays and subsequent pollutant emissions on WY-220.		
		700 hours per mile.		Provide alternatives to truck idling.		
Perform Action Before, During or	<u>H</u> arden, R edundant,				Potential Tasks	
After the Event	<u>Operational</u> , <u>P</u> lan	Actions	Pros	Cons	Involving Stakeholders	
			1. Fairly low cost fix.			
		Assess and modify current	2. WYDOT already has much of this implemented and			
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since		
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.		
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.		
			1. Fairly low cost and reduces operational costs.			
			2. Can improve visibility and minimize snow accumulation			
			on the road.			
			3. Could reduce inefficient slowing of trucks thereby			
В	Н	Build snow fences	improving emissions reductions.	1. Not effective at reducing pollutants in summer months.		
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.		
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.		
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.		
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.		
		9	1. CV technology promises a new method to mitigate			
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers	
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to	
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and	
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of	
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.	
	1	77.7	••••_•_••••••••••••••••••	1. Could become very expensive.	1. Contact shippers	
				2. Most of the trucks on I-80 are from out of state likely	and WTA to	
				causing the effectiveness of retrofits to be minimal. It would	advertise and	
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage	
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their	
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	trucks.	
	1				1. Inform shippers	
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment	and WTA of	
		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification	
В	Н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.	

Analysis Year:		2018				
Asset / Locatio		WY-59 south of Gillette, ML43 from 6				
Ownership:		WYDOT			8 of 46	
Risk Probability Rtg: 3 Priority Rtg: Low			Risk Consequence Rtg:		4	
			Issue Type:	Environmental		
Issues:	(Ozone is at about 90% of exceedance				
Vulnerabilities			Strengths	Objectives	-	
Nearly 50,000 population affected in Campbell County.				Reduce delays and subsequent pollutant emissions on WY-59.		
		2,700 hours per mile.		Provide alternatives to truck idling.		
Perform Action Before, During or	<u>H</u> arden, R edundant,				Potential Tasks	
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders	
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. Not effective at reducing pollutants in summer months. 		
В	н	Build snow fences	 Fairly low cost and reduces operational costs. Can improve visibility and minimize snow accumulation on the road. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	1. Not effective at reducing pollutants in summer months.		
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 Could reduce inefficient slowing of trucks thereby improving emissions reductions. A very few modifications may be easily accomplished at low cost. 	 Can be very expensive. Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 		
В	н	Implement Connected Vehicle technology on the road.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can optimize truck movement efficiencies and dissuade truckers from approaching conditions that create increased emissions thereby reducing emissions. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.	
В	Н	Provide diesel retrofit incentives to the trucking industry.	 Reduces emissions. Effective year round rather than just in winter months. 	 Could become very expensive. Most of the trucks on I-80 are from out of state likely causing the effectiveness of retrofits to be minimal. It would require retrofitting a very large number of trucks to see significant results. As trucking fleet is replaced action will loses effectiveness. 	1. Contact shippers and WTA to advertise and encourage retrofitting their trucks.	
В	Н	Provide electrified truck parking areas to reduce truck idling.	 Reduces truck idling during winter weather events thus reducing emissions. Provides additional safety features to the road. 	 Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines. Less effective at reducing pollutants in summer months. 	1. Inform shippers and WTA of electrification availability.	

Analysis Year: Asset / Locatio		2018 VY-59 south of Gillette, ML43 from 6	i1 to 112	·	,	
Ownership:		VYDOT		Criticality Rank:	8 of 46	
Risk Probability Rtg: 3				Risk Consequence Rtg:	4	
Priority Rtg:		LOW		Issue Type:	Environmental	
Issues:	Ozone is at about 90% of exceedance level and PM10 is near 75%.			···· M.		
Vulnerabilities			Strengths	Objectives		
Nearly 50,000	population affected	ed in Campbell County.	×	Reduce delays and subsequent pollutant emissions on WY-5	9.	
Annual truck de	elay estimate at 2	2,700 hours per mile.		Provide alternatives to truck idling.		
Perform Action	Harden,			•	Potential Tasks	
Before, During or After the Event	<u>R</u> edundant, Operational, Plan	Actions	Pros	Cons	Involving Stakeholders	
AILEI LIE EVEIL			1. Fairly low cost fix.			
		Assess and modify current	2. WYDOT already has much of this implemented and			
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since		
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.		
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.		
			1. Fairly low cost and reduces operational costs.			
			2. Can improve visibility and minimize snow accumulation			
			on the road.			
			3. Could reduce inefficient slowing of trucks thereby			
В	Н	Build snow fences	improving emissions reductions.	1. Not effective at reducing pollutants in summer months.		
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.		
		barriers, cuts, slopes and	improving emissions reductions.	Safety issues need to be carefully assessed.		
		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.		
В	H	snow drifting.	at low cost.	Not effective at reducing pollutants in summer months.		
			1. CV technology promises a new method to mitigate			
			trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers	
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to	
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and	
_		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of	
В	H	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.	
				1. Could become very expensive.	1. Contact shippers	
				2. Most of the trucks on I-80 are from out of state likely	and WTA to	
		Drewide discel retrafit		causing the effectiveness of retrofits to be minimal. It would	advertise and	
		Provide diesel retrofit	1. Daduasa amiasiana	require retrofitting a very large number of trucks to see	encourage	
В	Н	incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their trucks.	
D	П	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.	1. Inform shippers	
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment		
		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification	
В	Н	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.	
U			$\frac{1}{1}$ 2. I TOVIDES dUULIONAL SALELY LEALULES TO THE TOAU.	\sim 2. Less eneouve at requoing pollutants in sufficient fitters.	availability.	

Analysis Year: Asset / Location		2018 US 26/WV 780 from Riverton to Sho	shani MI 20B from 104 to 127	•		
Ownership:		US-26/WY-789 from Riverton to Shoshoni, ML20B from 104 to 127 WYDOT		Criticality Rank:	9 of 46	
Risk Probability Rtg: 3			Risk Consequence Rtg:	4		
Priority Rtg:				Issue Type:	4 Environmental	
Issues:				loode Type.	Environmental	
Vulnerabilities			Strengths	Objectives		
	pulation affecte	d in Fremont County.	Ottonguio	Reduce delays and subsequent pollutant emissions on US-2	6/M/Y-789	
		2,700 hours per mile.		Provide alternatives to truck idling.		
Perform Action	Harden.					
Before, During or	Redundant,	A 11		<u>^</u>	Potential Tasks	
After the Event	Operational, Plan	Actions	Pros	Cons	Involving Stakeholders	
D	0	Assess and modify current snow removal and roadway management procedures as needed.	 Fairly low cost fix. WYDOT already has much of this implemented and likely would not require many changes. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	 Probably little improvement remaining to be gained since WYDOT is already assessing and improving procedures. Not effective at reducing pollutants in summer months. 		
В	н	Build snow fences	 Fairly low cost and reduces operational costs. Can improve visibility and minimize snow accumulation on the road. Could reduce inefficient slowing of trucks thereby improving emissions reductions. 	1. Not effective at reducing pollutants in summer months.		
В	Н	Assess and modify safety barriers, cuts, slopes and other geometrics that cause snow drifting.	 Could reduce inefficient slowing of trucks thereby improving emissions reductions. A very few modifications may be easily accomplished at low cost. 	 Can be very expensive. Safety issues need to be carefully assessed. Limited improvement locations limit emission reductions. Not effective at reducing pollutants in summer months. 		
В	н	Implement Connected Vehicle technology on the road.	 CV technology promises a new method to mitigate trucking delays and crashes. Technology can reduce risk taking behaviors. Can optimize truck movement efficiencies and dissuade truckers from approaching conditions that create increased emissions thereby reducing emissions. 	 The technology is new and not fully tested. Issues may arise. Implementation costs may be fairly high. Requires cooperation and acceptance from the trucking industry. 	1. Contact shippers and WTA to advertise and encourage use of the technology.	
В	Н	Provide diesel retrofit incentives to the trucking industry.	 Reduces emissions. Effective year round rather than just in winter months. 	 Could become very expensive. Most of the trucks on I-80 are from out of state likely causing the effectiveness of retrofits to be minimal. It would require retrofitting a very large number of trucks to see significant results. As trucking fleet is replaced action will loses effectiveness 		
В	Н	Provide electrified truck parking areas to reduce truck idling.	 Reduces truck idling during winter weather events thus reducing emissions. Provides additional safety features to the road. 	 Requires trucks to be equipped with applicable equipment to be able to shut down their diesel engines. Less effective at reducing pollutants in summer months. 	1. Inform shippers and WTA of electrification availability.	

Analysis Year:		2018 10. 20/20 in Cooner MI 24D from 0.t	- 10	·		
Asset / Location: Ownership:		US-20/26 in Casper, ML34B from 0 to 10		Criticality Rank:	6 of 46	
1				Risk Consequence Rtg:	0 01 40 A	
Risk Probability Rtg: 3 Priority Rtg: Low			Issue Type:	Environmental		
Issues:				issue rype.	Environmental	
Vulnerabilities			Strengths	Objectives		
	opulation affected	l in Natrona County.	o dongulo	Reduce delays and subsequent pollutant emissions on US-2	0/26.	
		,800 hours per mile.		Provide alternatives to truck idling.		
Perform Action	Harden,	, <u> </u>			Potential Tasks	
Before, During or After the Event	<u>R</u> edundant, Operational, Plan	Actions	Pros	Cons	Involving Stakeholders	
<u>A</u> itei the Event			1. Fairly low cost fix.			
		Assess and modify current	2. WYDOT already has much of this implemented and			
		snow removal and roadway	likely would not require many changes.	1. Probably little improvement remaining to be gained since		
		management procedures as	3. Could reduce inefficient slowing of trucks thereby	WYDOT is already assessing and improving procedures.		
D	0	needed.	improving emissions reductions.	2. Not effective at reducing pollutants in summer months.		
			1. Fairly low cost and reduces operational costs.	*		
			2. Can improve visibility and minimize snow accumulation			
			on the road.			
			3. Could reduce inefficient slowing of trucks thereby	1. Since this is mostly in an urban area, snow fence may not		
В	Н	Build snow fences	improving emissions reductions.	be practical.		
		Assess and modify safety	1. Could reduce inefficient slowing of trucks thereby	1. Can be very expensive.		
		barriers, cuts, slopes and	improving emissions reductions.	2. Safety issues need to be carefully assessed.		
P		other geometrics that cause	2. A very few modifications may be easily accomplished	3. Limited improvement locations limit emission reductions.		
В	Н	snow drifting.	at low cost.	4. Not effective at reducing pollutants in summer months.		
			1. CV technology promises a new method to mitigate trucking delays and crashes.	1. The technology is new and not fully tested. Issues may	1. Contact shippers	
			2. Technology can reduce risk taking behaviors.	arise.	and WTA to	
			3. Can optimize truck movement efficiencies and	2. Implementation costs may be fairly high.	advertise and	
		Implement Connected Vehicle	dissuade truckers from approaching conditions that create		encourage use of	
В	Н	technology on the road.	increased emissions thereby reducing emissions.	industry.	the technology.	
				1. Could become very expensive.	1. Contact shippers	
				2. Most of the trucks on I-80 are from out of state likely	and WTA to	
				causing the effectiveness of retrofits to be minimal. It would	advertise and	
		Provide diesel retrofit		require retrofitting a very large number of trucks to see	encourage	
		incentives to the trucking	1. Reduces emissions.	significant results.	retrofitting their	
В	H	industry.	2. Effective year round rather than just in winter months.	3. As trucking fleet is replaced action will loses effectiveness.		
					1. Inform shippers	
		Provide electrified truck	1. Reduces truck idling during winter weather events thus	1. Requires trucks to be equipped with applicable equipment		
P		parking areas to reduce truck	reducing emissions.	to be able to shut down their diesel engines.	electrification	
В	H	idling.	2. Provides additional safety features to the road.	2. Less effective at reducing pollutants in summer months.	availability.	