Little Missouri Road Crisis Mitigation Project
Benefit Cost Analysis
By Otto D. Schlosser and Chester M. Schlosser

Introduction
The goal of this project is to bring about sound management practices which take into
consideration the cost to all stakeholders so we can work toward an optimal socially responsible
solution to the poor condition of the Little Missouri Road. The author would like to begin this
analysis by frankly stating that accurate, comprehensive documentation on the condition and
accident records for the Little Missouri Road do not exist and that the author of this analysis is
not an objective observer. Resource and time limitations did not permit a more typical study.
The author is a bentonite industry insider who wants the other bentonite companies to clean up
their act and he will be taking the same medicine he is prescribing to the other members of the
industry. That being said the author made the best effort possible to fairly and accurately
account for missing and unreported data and studies and to conduct this analysis in an objective
manner. The contributions made by the community should serve to verify the information
regarding the desperate situation presented here.

Single vehicle accidents are seldom if ever reported unless there is a serious injury and even
serious single vehicle accidents are often not reported. No serious studies on the environmental
impact of this road have taken place since the 1970’s. It is understood that to you the reader who
lives in the first world part of the country that may seem improbable, but it is true. People here
are so numb to the significant haul truck activity and dust, mud and accidents that it is seen the
same way as the sun rising and setting; people say it is just the way it is and there is nothing they
can do about it. The culture of acceptance of these third world conditions is a greater threat to
this community than the road itself.

Narrative
This analysis will compare the current practices of road maintenance (the no-build scenario) to
the proposed project to align, build up and pave the Little Missouri Road. The current
maintenance practice results in an unsafe and unusable road at a very high cost. The most
concerning portion of these costs are negative externalities borne by the public which by their
nature are an unjust, unwilling subsidization of the bentonite hauling costs. The antiquated
attitudes harbored by bentonite company management cause them to give little if any concern to
the good of the public and the environment. Additionally that attitude will not let them progress
beyond the outdated maintenance practices that are costly to their companies. The current
practice is wasteful, senseless and dangerous. Paving will be a much lower cost solution and all
users will be better off under this system.
Baseline Costs

Gravel Road Maintenance Costs
To ensure objective verifiable accounting of no build costs we will use data from the 2006 study, “Paving Decisions for Laramie County Roads”, by BenchMark Engineers, P.C. This study was conducted for Laramie County, Wyoming and the BenchMark study references studies in nearby states with similar transportation challenges. All calculations are in short tons. After completion of the build we can assume these services are no longer required.

Watering and Grading Costs
The BenchMark Study indicates the cost per mile to grade and water a typical high maintenance county road comes out to about $520 per mile per week. That number is for a typical, heavily-used county road for watering and grading. The study notes that as traffic volume and weight increase the maintenance cost increases significantly. Additionally most county roads are considerably narrower, the speed would be 10 mph slower and there is probably not another unpaved public road that receives this kind of traffic. The study’s estimate assumes a motor grader at $70 per hour and a water truck at $60 per hour each dedicating 4 hours per mile of road per week. Those rates seem too low, more like county-owned equipment costs rather than market-based contractor rates. The amount of grading seems excessive so for convenience we will assume these two discrepancies would cancel each other out.

As you can see in the production report spreadsheet the average haul on the proposed paved segment is 13.2 miles and in a year these trucks must haul 560,260.33 tons of bentonite. Due to weather conditions hauling is typically limited to 40 weeks per year. Which is approximately the number of trucks that haul on this segment. Watering requirements vary throughout the year but due to this road being wider and more heavily used than a typical heavily-used county road we will assume the high summer demand periods average with the low winter demand periods to get to the BenchMark average. Therefore with our average 13.2 mile haul and the BenchMark cost of $520 per week per mile for watering and grading on our 40 week haul we can assume a watering and grading cost of $274,560 per year.

Gravel Costs
We would need a 6” base course 30 foot wide this year to make the 15.5 miles of improved road passable which would be 45,467 yards total. Empirical observation indicates gravel is worn at an average rate of 1” per year on this road segment due to the heavy traffic. To keep a surface on this road would require 7,574 yards of gravel per year for the next 20 years. Gravel weighs approximately 2,600 pounds per yard. The first year we would need 59,107 tons of gravel. Every year for the next 20 years we would need 9,847 tons of gravel. Per the engineering cost estimates for the paving project gravel suitable for road base hauled and laid would cost $30 per ton. The first year gravel cost would be $1,773,200. The annual gravel cost for the next 20 years would be $295,415. These gravel costs might seem extreme, but the incredible tons of

vehicles and bentonite that move down this road combined with constant grading results in a very short service life.

**Analysis Period**

The proposed project will begin permitting in 2018. Construction will begin in the spring of 2020 and will be completed by the fall of 2020. The standard life cycle design for a paved surface is 20 years therefore our BCA analysis will run through 2040.

**Commercial Benefits**

**Haul Truck Reduced Operating Cost**

The BenchMark study mentions considerable research has shown that the operational costs for a truck like those used to haul bentonite is 1.5 times higher driving on gravel at approximately 45 mph as compared to driving on pavement. The going rate in this area to hire a contractor is 15 cents per ton mile for belly dump doubles on a mostly paved road surface haul. Per the BenchMark adjustment the bentonite haul costs on this unpaved road would be 22.5 cents per ton mile, which is very close to the actual short haul bentonite hauling costs. On the proposed segment the total yearly ton miles would be 7,394,251.70 as seen on the attached production report spreadsheet. See Appendix G. Under normal paved hauling conditions the cost would be $1,109,137.76 per year, per the BenchMark study this type of haul on unpaved gravel will cost $1,663,706.63. If this became a paved road haul the savings would be $554,568.88 per year.

**Haul Truck Efficiency Gains**

The haul trucks average 5 rounds per day with a 40 ton payload an average of 5 days per week. Hauling that quantity of material over the specified amount of time would require 14 trucks to accomplish this task. The 14 trucks have an average haul of 13.2 miles on this road 40 weeks per year 5 days per week 5 rounds per day. That brings the total to 369,600 miles round trip. At the current 45 mph speed limit on the current road that is 8,213 hours. The proposed project will straighten, build up and pave the road which will allow the speed limit to be raised from 45 mph to 65 mph. We will also be adding a traffic sensing stoplight that will virtually eliminate haul trucks having to stop at the intersection with Wyoming 112 as well as a sweeping on ramp onto US 212 with a yield sign for eastbound trucks headed towards the bentonite plants in Colony, Wyoming which will eliminate stopping at that intersection. Those changes will result in a total haul truck travel time of 5,686 hours, which is a total time saving of at least 2,527 hours of driving for haul trucks alone. This is a 30.77% efficiency gain. The same amount of trucks can haul more clay.

The 13.2 mile average haul of the paved section is 44% of the industry average 30 mile haul to the plants in Colony, Wyoming. The 13.2 mile average haul at the higher speed would boost overall hauling efficiency on the $1,109,137.76 job by 13.54% because the increased efficiency of 30.77% will be applicable to 44% of the total haul. That would give the contractor the ability perform an additional $150,160.19 of work per year. Another consideration is that this increased efficiency would give the bentonite companies more flexibility to manage their inventory levels.
In a crisis situation every truck would be moving 13.54% more bentonite because of the paved segment as compared to hauling on it a gravel segment.

The paved surface will also allow for increased payloads. Currently the bentonite haul trucks carry an average of 1,000 pounds of extra mud that is built up on each truck and trailer unit. This corresponds to a 1,000 pound per load reduction in payloads per round. The total rounds per year is 14,000. That equates to 7,000 tons in reduced hauling because of the road mud build up on the trucks. Assuming the average 30 mile haul that would be 210,000 ton miles. At the going rate of 15 cents per ton mile the savings from increased payload would be $31,500 per year once the road is paved.

Nearly all of the bentonite truck drivers and the foremen live at least 60 miles away from where the bentonite is hauled. Often times the weather varies significantly between where they live and where the bentonite haul begins. Approximately 15 times per year this variance in weather patterns results in all 14 trucks driving out to the bentonite pits to discover they cannot get a load because it is too wet. The remotely viewable weather station we will install will give crews advanced notice of such weather conditions. Even in the event of a dry run (coming back empty without a load) the full rate is billed. Each of the 14 trucks would haul 40 tons for 30 miles which would be 1,200 ton miles per truck for a total of 16,800 ton miles. At the going rate of 15 cents per ton mile that would be $2,520 each instance. As that occurs approximately 15 times per year this remotely viewable weather station will prevent $37,800 per year of dry runs.

**Truck Wash Requirements**

Trucks need to be washed twice per week under current operating conditions. The road watering employed to attempt to control fugitive dust causes road spray that obscures lights and mud builds up on the entire underside of the truck and both trailers. These 14 trucks operate 40 weeks per year; that requires 1,120 washes. These trucks pull two trailers; the cost to wash each unit would be $150 ($50 for the truck and $50 for each trailer)² for a total of $168,000 per year. The high cost was chosen because the level of cleaning required for these trucks is on the extreme end of what most truck washes would see. Six times per year these 14 trucks require extreme washes that would be three times the standard $150 cost. At times over a ton of mud has to be washed off these trucks which costs $37,800 per year.

If the road was paved typical washing could be reduced to once per month which would be a savings of $142,800 per year in regular washes and extreme washing costs of $37,800 would be eliminated for a total truck wash savings of $180,600 per year.

**Eliminating Cancellation Fees**

During the 12 weeks per year that the road is not passable business owners reported approximately 30 trucks being cancelled or delayed each year at an average cost of $500 per incident, for a total of $15,000 per year.

² [http://www.truckwashtechnologies.com/the_industry.php](http://www.truckwashtechnologies.com/the_industry.php)
Delayed Delivery of Essential Commercial Goods
Wyoming Sunmade reported non delivery of essential commercial goods results in approximately $16,500 in production delays per year.

Losing Critical Transportation Partners and Vendors Who Refuse to Travel on This Road.
Postal Mail, UPS, and Fedex regularly delay deliveries due to road conditions. Many vendors refuse to make deliveries due to the road conditions. Wyoming Sunmade LLC. has incurred $22,727.27 per year in increased carrier fees because of the condition of the Little Missouri Road.

Community Benefits

Fugitive Dust
The most notable negative externality is the dust caused by the wear of the road surface. It is difficult to quantify what percentage of the 9,847 tons of annual road wear is entering the air as fugitive dust and what percentage is entering the watershed as runoff. As noted earlier no serious environmental studies have been conducted since the 1970’s. No significant sedimentation has been observed in the ditches so the author believes that assuming 75% of this wear, 7,385 tons, is entering the air as fugitive dust is a conservative estimate. 50% of this fugitive dust is PM10 according to the California EPA\(^3\) which means this road currently emits 3,692.7 tons per year of PM10 dust. 15% of PM10 dust emission off of an unpaved road are PM2.5 according to a study sponsored by NSSGA.\(^4\) Therefore this 15.5 miles of unpaved road surface is emitting 553.9 tons of PM2.5 emissions. Common road materials exhibit high levels of silica. The fugitive dust harbors finely ground silica. Silica dust is considered a hazardous material.\(^5\) As you can see from one of the cover photos, workers, the general public, residents and livestock have significant respiratory exposure to silica dust. Respiratory exposure to silica dust causes silicosis which has similar effects on the respiratory system as asbestos.\(^6\) Paving the road would virtually eliminate this exposure.

Monetizing the value of this dust in a reasonable manner is not an easy task. While the BCA guidance document assigns a value of $343,442 to particulate matter that seems to be in consideration of automobile emissions. Additionally the author would like to note the cost given in the guidance seems more like a national number, meaning particulate matter impact would be much greater in Los Angeles, California than on a rural road in Crook County, Wyoming.
Whereas there is a significant amount of dangerous dust produced by this road the high particulate matter costs might be appropriate particularly for PM2.5 road dust.

In an effort to be objective the author consulted various sources to locate the most relevant widespread cost possible for dust emissions. Across various government permitting entities in

\(^3\) [https://www.arb.ca.gov/pm/fugitivedust_large.pdf](https://www.arb.ca.gov/pm/fugitivedust_large.pdf)

\(^4\) [https://www3.epa.gov/ttnchie1/conference/ei14/session7/hayden.pdf](https://www3.epa.gov/ttnchie1/conference/ei14/session7/hayden.pdf)


several states the cost for fugitive dust is $49 per ton\(^7\). Therefore the monetary value of the 7,385 tons of fugitive dust would be $361,883 per year.

**Watershed Degradation**

As per the assumption in the previous section we can assume approximately 2,462 tons of runoff are entering wetlands. This runoff is contaminating and destroying wetlands. As the wetlands become saturated with road material this road material then is able to enter the Little Missouri and Belle Fourche Rivers. Wetlands are valued at $5,582 per acre\(^8\) for their contribution to the environment. Based upon an initial review there are approximately 50 acres of wetlands threatened by runoff from this road. Over the next 20 years the amount of road sediment that will enter wetlands as runoff will be 49,236 tons which is approximately 37,873 yards. Assuming an average wetland depth of three feet the yards of runoff would fill 7.8 acres of wetlands at a value of $43,679. If we annualize that over the next 20 years that would be $2,184 per year. Since this area has so few wetlands and the disturbance is so close to the river the true value of wetlands for this watershed is likely significantly higher than the national average.

**Towing Costs**

Approximately 75 vehicles per year get stuck in the bentonite mud or slide off this road and require some form of assistance. A typical towing bill in this remote area on this muddy road is $1,200, see Appendix A. Paving should lower towing to instances of unrecoverable driver error which would should not be more than 5 instances per year. That will represent 70 less instances of towing per year, which is $84,000 per year.

**Reduced Instances of Accidents**

As mentioned in the introduction accurate comprehensive documentation of the accident records for the Little Missouri Road do not exist. The conditions of this road are so bad the road has been assumed to be a no man’s land where it is every man for himself for the last 70 years. Single vehicle accidents are seldom if ever reported unless there is a serious injury and even serious single vehicle accidents are often not reported.

Whereas accurate crash data is not available this analysis has relied upon the records available as well as historical knowledge gathered from an informal survey of long residing community members. Multiple accounts of verbal history confirm that between 1960 and 2000 there was one fatal accident related to bentonite hauling. It was linked to reduced visibility in the dust on the Little Missouri Road. Since 2000 there have been three fatal accidents related to the bentonite hauling activity. The first was the 2001 fatal accident near the bridge where a vehicle slid on the ice created by watering the road. The vehicle flipped and crushed the driver. The second was on a private feeder road that led to the Little Missouri Road where two trucks hit head-on at a cattle guard. The third and most recent occurred just weeks before this application was submitted, near the bentonite plants in Colony, Wyoming. A motorcycle passenger was killed when the motorcycle she was riding encountered bentonite mud tracked on the road by the bentonite haul trucks.

\(^7\) [https://www.cabq.gov/airquality/air-quality-permits/annual-permit-fees](https://www.cabq.gov/airquality/air-quality-permits/annual-permit-fees)

\(^8\) [http://forestandrange.org/new_wetlands/economics_and_recreation.htm](http://forestandrange.org/new_wetlands/economics_and_recreation.htm)
It is understood that typically only the crash data for the road segment itself is evaluated, but the two other fatal crashes are presented for two reasons:

a. The current condition of the Little Missouri Road presents both of the conditions that caused these other accidents: the narrow bridge and the mud being tracked onto two paved highways.

b. Both accidents represent a culture of disregard for human safety by the bentonite industry. Otto Schlosser as an up-and-coming bentonite producer was concerned about the condition of the Little Missouri Road and mud being tracked on the highway. When he voiced his concern to the local Halliburton Mine Manager that manager told Schlosser, “We have a difference of opinion about what constitutes a good road.” Less than a year later a fatal accident occurred because of mud being tracked on the highway. Colloid’s position has always been that they do not need the road when it is wet. If we are awarded this grant it will give us a mandate to change that culture. This road is the heart of the problem of no regard for human safety. Once the Little Missouri Road is brought up to reasonable standards it will raise the bar for all bentonite hauling activity in this area. Essentially we will experience spillover safety benefits that will be greater than those enjoyed on this road itself.

Below are the list of relevant crash events from Appendices B and C from 1997-2017

- 1 fatal rollover attributed to slick road
- 3 Serious injuries
- 6 Collisions at the intersection of Little Missouri and Wyoming State Highway 112
- 6 Rollovers
- 3 Rollovers attributed to wet conditions
- 1 Rollover at 5 mph where vehicle slid off the muddy road
- 2 Collisions
- 3 deer/property accidents

The author would like to note this list and records are severely inaccurate when it comes to minor accidents as well as bentonite truck accidents which occur on a regular basis. The underreported single passenger vehicle accidents is a result of no perceived need to report because it is so common and so long standing. As you can see there are only four bentonite truck accidents that can be found in these reports for the 20 year period. It is not uncommon for there to be more than four single truck accidents every year. Unless a driver is seriously hurt these accidents are cleaned up and not reported unless there is a serious injury as is the historical standard. These 20 years of reports show only 3 minor accidents. One weekend this spring alone three vehicles slid into the ditch and had to be pulled out. These official reports clearly do not show the whole history.

Future projections are based upon the terrible condition of the Little Missouri Road combined with the increasing disregard and carelessness by both the bentonite industry management and haul truck drivers as well as the increased number of inexperienced noncommercial drivers, both children growing up here and ownership transfers of ranches to people not accustomed to the
road culture, which have and will continue to increase instances of traffic accidents.

Due to the extraordinary nature of the improvement this project would provide we are unable to locate a CMF estimate that fit this situation particularly well, but we feel a value of 0.4 is safe to assume for an unpaved road. Our expectation is that unless we are successful in attaining this grant, over the next 20 years we will reasonably expect to experience the following types and numbers of fatalities and injuries on the MAIS Level in Table A-1 in the guidance document:

1. Fatal
   a. No build: 2 - $19.2 million
   b. Build: 0.8 - $7.68 million
2. MAIS 5
   a. No build: 1 - $5.69 million
   b. Build: 0.4 - $2.28 million
3. MAIS 4
   a. No build: 2 - $5.11 million
   b. Build: 0.8 - $2.04 million
4. MAIS 3
   a. No build: 0
   b. Build: 0
5. MAIS 2
   a. No build: 3 - $1.35 million
   b. Build: 1.2 - $541,440
6. MAIS 1
   a. No build: 20 - $576,000
   b. Build: 8 - $230,400
7. Residents have indicated the incidence of single vehicle accidents on the Little Missouri Road involving deer are twice that of normal highway travel. It is assumed the mowable shoulders this project will put in place will reduce the instances of deer accidents from 30 per year to 15 per year. Per table A-2 in the guidance document, there will be a savings of $64,905 per year in PDO wildlife crashes.
8. Of the 75 towable instances mentioned above 50% of these accidents result in vehicle damage and fence damage. Therefore by paving we will eliminate 35 PDO accidents each year valued at $162,262.50.

Below are some of the present safety risks and how we will address them.

- Dangerous highway crossing at Wyoming State Highway 112
  - Traffic sensing stop light raising awareness.
- Unsafe merging and turning with highway traffic on US Highway 212 where trucks have rolled over.
  - Sweeping merge lane
- Inability of bentonite haul trucks to have advance notice of conditions that may cause mud tracking.
  - Weather station to warn of mud tracking conditions
- Insufficient visibility because of the lack of mowable side slopes is hazardous for vehicles and wildlife.
○ Gradual mowable slopes and adequate clear zones.
• Reduced visibility because of fugitive dust emissions.
  ○ If the road is paved it will not generate dust
• Old narrow one lane bridge that is a congestion point and a point of potential collision hazard.
  ○ A new wider bridge sufficient for two way traffic.
• Trucks from feeder roads packing mud onto the Little Missouri Road.
  ○ Paving these roads 1,000 feet back will greatly reduce mud being tracked onto the public road.
• Vehicles including feed trucks and cattle trucks rolling over after sliding off the road.
  ○ A gradual traversable side slope will nearly eliminate this problem.
• Mud and rocks falling off vehicles on the highway. Flying rocks bedded in mud built up on vehicles are potentially damaging to highway traffic and create dust problems and runoff on paved roads.
  ○ Paving will nearly eliminate this problem
• Large amounts of mud being tracked onto two highways create dangerous and potentially fatal conditions for highway traffic, including both slick conditions and chunks the size of footballs. Sometimes it is so bad the highway looks like a dirt road.
  ○ Paving the Little Missouri Road will keep truck tires clean and prevent mud from being tracked onto the highway.
• Slick mud falling off in business parking lots creating a slip hazard.
  ○ The paved surface will prevent mud build-up on vehicles
• Vehicles driving through fences because there is no clear zone.
  ○ Widening the right of way and building gradual traversable slopes will nearly eliminate this problem.

Passenger Vehicle Damages
Actual vehicle operating cost are higher than on a typical gravel road because of the density of the traffic and the bentonite mud on this road. This assumption is backed up by visitors who live on gravel roads in other areas consistently commenting that the condition and traffic on this road is unbelievable. The relatively higher vehicle operating costs are reflected in empirically observed windshield replacements, higher maintenance costs and shorter vehicle life. Some of the most noted extraordinary impacts can be seen immediately below.

• Vehicle shaking because of mud being packed in the wheels.
• Excessive mud accumulation on tires causing damage to vehicle fender liners
• Excessive Windshields broken by gravel thrown by truck tires, because the gravel road custom of slowing down when meeting another vehicle is not observed by haul trucks.
• Two trips through the $12 car wash not getting the car clean

Based upon the author’s personal knowledge of this road there are approximately 50 resident passenger vehicles and approximately 50 bentonite company light vehicles that travel down this road segment. Residents estimate $300 in damage per year per vehicle and paving would prevent $30,000 of damage each year to the 100 vehicles that regularly use this road. This damage amount does not include standard vehicle operating costs. Again the reader may find these conditions unfathomable, but the author would like the reader to consider that few residents
go a year without replacing a windshield, because of the bentonite haul trucks’ failure to observe the gravel road custom of slowing down when meeting another vehicle. Each time a passenger vehicle drives by a bentonite haul truck there is an average of 34 tires throwing rocks which is 8.5 times higher than the average vehicle and the speed on this gravel road is 28.57% higher than an average county road.

**Car Wash Requirements**
A degree of road dust is to be expected on a gravel road, but the Little Missouri Road presents a very unique set of circumstances. Residents with mud-covered vehicles have been approached by “Mud Bog” enthusiasts enquiring where they can find mud like that. It should go without saying users of the Little Missouri Road experience higher than average car wash expenses and at times extraordinary car wash expenses during periods of moisture.

The average person washes their car once per month\(^9\) The average vehicle traveling the Little Missouri Road will typically need to be washed once per week and twice a week during 16 weeks of increased mud. This is not for aesthetic reasons, but to ensure tail lights can be seen and that vehicle operation is not impaired. As mentioned earlier the bentonite mud will fill up wheels and build up on tires so much so that the vehicle is not operational.

The 100 passenger vehicles that normally operate on this road would perform 6800 total yearly washes at a cost of $81,600. Assuming a $12 per wash cost and 1200 yearly washes with a paved road, the total cost reduction in car washes after paving the road would be $67,200 per year.

Again the author realizes that seems extreme to someone who has not been here, but when resident John Pierce was speaking of his $10,000 donation to the project he said that was less than he planned to spend on car washes in the next 15-20 years. At the carwash the piles of mud make it evident where cars traveling down the Little Missouri Road have been washed.

**Quality of Life**
Below are some direct quality of life costs.
- Stressing about family members and friends being run over.
- Stressful driving environment
- Getting mud on your clothes when you get out of your muddy vehicle.
- Wanting to speak up about the road but being unable to because of a business relationship with the bentonite companies.
- Having to load and unload kids by hand so they don’t get covered in mud.
- The residents and businesses are unable or have great difficulty traveling whenever there is moisture.
- Vehicles looking like they’ve gone through an ice storm but it is mud.
- Bentonite truck drivers do not get regular paychecks because they cannot work when it is wet.

● Bentonite truck drivers have to work Saturdays and Sundays to make up for the road being impassable during the regular week.
● The community losing the normally quiet and safe weekend relief from the heavy industrial activity in this area.
● Some people prefer to only drive down this road when the bentonite trucks are not hauling and the road is not muddy. During wet periods that might not happen for weeks on end. As a result some people have difficulty getting groceries, going to doctor visits, conducting their business and often miss special events like birthday parties.
● US Mail, UPS and Fedex not being able to deliver packages on a regular basis.

There are approximately 100 people in the bentonite industry whose jobs are directly related to field work on this road. There are approximately 50 residents who are decision makers and 30 vendors (the number of vendors is larger, but it was reduced to reflect this road being a portion of their business) who depend on this road. Monetizing the impact of paving this road on the quality of life is not an easy task. The closest representation we could find is that average employee stress cost is $2,770 per person\(^{10}\) in 1987 dollars ($6,277.06 in 2018 dollars\(^{11}\).) As seen in this analysis and the grant application stress levels are considerably higher for those who depend on the Little Missouri Road. A safe assumption is that users would experience twice the national average amount of stress. The cost for the 180 people under consideration dealing with the road in its current state is $1,129,870.80 per year. Again that might seem high, but that is why residents are willing to donate. Most of them are business owners and have considerable amounts of friends and family members who use this road. Bentonite industry employees experience economic uncertainty and the related stress and anxiety. Sometimes for weeks on end during wet periods they are only able to work intermittently, potentially causing them to fall behind on their bills. Paving the road would reduce the stress level to a normal level for road users which would be a $1,129,870.80 per year savings.


\(^{11}\) [https://www.bls.gov/data/inflation_calculator.htm](https://www.bls.gov/data/inflation_calculator.htm)
Build Costs

Construction Costs
- Permitting $187,000 (See Appendix F)
- Construction costs $26,858,525 (See Appendix E)
- Additional Right-of-Way $562,464 (Wyoming Office of State Lands and Investment value)
- Total $27,607,989

Maintenance Costs
Through consultation with the Wyoming Department of Transportation discussing empirical data for the adjoining highway US 212 in Appendix D and current highway life expectancies we were able to develop real world maintenance costs for our 20 year analysis that verified the expected life cycle project by Interstate Engineering. Both DOT personnel and our engineering firm indicate we will not experience any costs other than minor maintenance over the analysis period.

The biennial cost for traffic striping is $560.88 per mile which is equal to $280.44 per mile per year. Annual surface maintenance costs are $228.28 per mile per year yielding a yearly cost of $508.72 per mile. Which brings the total annual cost of maintenance for this 15.5 miles of paved road to $7,885.16.

Residual Value
For the consideration of residual value all costs will be considered as contributing to a permanent improvement except for the following.
- The asphalt has an initial value of $6,492,640 and has an expected service life of 20 years. At that point an S-3 overlay at a cost of $3,748,472 would extend the life by an additional 20 years. Therefore that overlay will fully restore the road to new condition so we can assume the residual value is the initial value minus the overlay to arrive a residual value of $2,744,168.
- Signs have an initial value of $200,000 and are considered to have no value at the end of 20 years.
- Culverts have an initial value of $312,000 and the Bridge has an initial value of $1,000,000. These both have a service life of 75 years resulting in a combined value of $909,653 at the end of the analysis period

After deducting the initial cost of items subject to service life $8,004,640 from the total construction costs listed above $27,607,989 we are left with a permanent asset value of $19,603,349. After adding the remaining permanent assets, residual value of bridge/culvert, and asphalt the total end of service life value is $23,257,170.
## Appendices

### Appendix A - Towing Bill

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<th>SUBMITTED</th>
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**Customer:** Affordable Trucking  
**Address:**  
**Phone:**  
**Signature:**

**Services:**  
**Type:** HV 1000, VC, PO/AUTH/REF

**From:** Sturgis, SD 57775  
**To:** Alvarado, TX  
**Notes:** Little Missouri River Rd

**Start:** AM  
**Arrive:** AM  
**Depart:** AM  
**Stop:** AM

**Vehicle:**  
**Year:** 2013  
**Make:** Freightliner  
**Model:** Cascadia  
**State:** TX  
**Plate:** 3876  
**Unit:** 204  
**Color:** White  
**Keys:** Hold  
**Mileage:** 3,104,000

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<td>$350</td>
<td>$1,050</td>
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<tr>
<td>Dolly Fee</td>
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<td>$100</td>
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<td>$1.50</td>
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<tr>
<td>Other</td>
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</table>

**Total:** $1,200  
**Tax:** 6.5%  
**Cash:** $0  
**Check:** $0  
**Credit Card:** $0  

*Thank you for your business!*
Appendix B - Crook County Sheriff Accident Reports

**COMPLAINT CARD**

**CROOK COUNTY SHERIFFS OFFICE**

**DATE:** 06/25/2018
**TIME:** 10:09:03 AM

**C.F.S. #:** 20123758

**LOCATION:** LITTLE MISSOURI ROAD

**INTERSECTION:**

**ZONE:** 3
**ESN:** 1223
**FIRE:** Notified EMS/Fire:

**RECEIVED:** 1223
**Dispatched/Enroute:** 1337
**Arrived:** 1337
**Transport Start:** Completed
**Transport End:** 1500

**DISPATCHER:** PPAT-PATTERSON, PATRICE
**Closed By:** PATTERSON, PATRICE - PPAT

**UNIT ASSIGNED:** 806
**PRIMARY OFFICER:** ESTE - STEVENS, ERIC
**BACK-UP OFFICER:**

**DISPOSITION:**

**SHIFT:** 1

**Department:**

CARTER COUNTY CALLED AND GOT A 911 FROM [REDACTED] ON LITTLE MISSOURI ROAD, CAME UPON A SEMI ROLLOVER, DRIVER IS OUT OF THE VEHICLE HE DOESNT NEED AN AMB BUT RP ISNT SURE ABOUT THAT

Unit: 806-ERIC STEVENS - Dispatched @ 13:37:06

1.1 OR 1.2 MILES EAST OF GOVT CANYON INTERSECTION ON LITTLE MISSOURI

Unit: 806 - Arrived On Scene @ 1337

**THE DAMAGED FENCE BELONGS TO BUSENITZ**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>License Plate</th>
<th>Unit</th>
<th>Traffic</th>
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</thead>
<tbody>
<tr>
<td>11/26/2012</td>
<td>1223</td>
<td>SO</td>
<td>806</td>
<td>10-50 - By: PATTERSON, PATRICE</td>
</tr>
<tr>
<td>11/26/2012</td>
<td>128</td>
<td></td>
<td>806</td>
<td>10-8 - IN SERVICE</td>
</tr>
<tr>
<td>11/26/2012</td>
<td>1337</td>
<td></td>
<td>806</td>
<td>10-76 - EN ROUTE</td>
</tr>
<tr>
<td>11/26/2012</td>
<td>1337</td>
<td></td>
<td>806</td>
<td>10-50 - By: PATTERSON, PATRICE</td>
</tr>
<tr>
<td>11/26/2012</td>
<td>1337</td>
<td></td>
<td>806</td>
<td>10-23 - ON SCENE</td>
</tr>
<tr>
<td>11/26/2012</td>
<td>1342</td>
<td></td>
<td>806</td>
<td>10-43 - INFORMATION</td>
</tr>
<tr>
<td>11/26/2012</td>
<td>1429</td>
<td></td>
<td>806</td>
<td></td>
</tr>
<tr>
<td>11/26/2012</td>
<td>1500</td>
<td></td>
<td>806</td>
<td>10-24 - ASSIGNMENT COMPLETED</td>
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</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Dis</th>
<th>ETS</th>
<th>Arr</th>
<th>Eur</th>
<th>Com</th>
<th>Miles Disp</th>
<th>Miles Arr</th>
<th>Tracking #</th>
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<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Unit</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>11/26/2012</td>
<td>13:37:00</td>
<td>806</td>
<td>[REDACTED]</td>
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**Fire Traffic**

<table>
<thead>
<tr>
<th>Unit #</th>
<th>Unit Name</th>
<th>Dispatched</th>
<th>Arrived</th>
<th>Transport Start</th>
<th>Transport End</th>
<th>Completed</th>
</tr>
</thead>
</table>
# Complaint Card

**CROOK COUNTY SHERIFFS OFFICE**

**DATE:** 06/25/2018  
**TIME:** 10:07:44AM  
**C.F.S. #:** 20113515  
**LOCATION:** LITTLE MISSOURI RD OFF HWY 112  
**DATE:** 12/07/2011  
**O.C.A. #:** 20113515  
**LOCATION:** LITTLE MISSOURI RD OFF HWY 112  
**INTERSECTION:**

**ZONE:** 3  
**ESN:**  
**FIRE:**  
**How Received:**

**RECEIVED:** 0812  
**Notified EMS/Fire:**  
**Dispatched/Enroute:** 0828  
**Arived:** 0917  
**Transport Start:**  
**Completed:** 0936

**DISPATCHER:** PBOA-BOARDMAN, PEGGY  
**UNIT ASSIGNED:** 804  
**PRIMARY OFFICER:** JHOD - HODGE, JEFFREY  
**BACK-UP OFFICER:**

**DISPOSITION:**  
**SHIFT:** 1

**Department:**

GREG WATSON W/TRI STATE CONSTRUCTION ONE OF OUR DRIVERS SWERVED TO MISS A DEER AND TIPPED THE TRUCK ON ITS SIDE LITTLE MISSOURI RD OFF HWY 112 TO THE W APPROX 2 MI UNKNOWN INJURIES/PAGED HULETT EMS & FIRE

Unit - 804 - Arrived On Scene @ 0917

5 Mls of Hwy 112

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>License Plate</th>
<th>Unit</th>
<th>Traffic</th>
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</thead>
<tbody>
<tr>
<td>12/07/2011</td>
<td>0812</td>
<td>SO</td>
<td>80</td>
<td>10-50- By: BOARDMAN, PEGGY</td>
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<tr>
<td>12/07/2011</td>
<td>0828</td>
<td>SO</td>
<td>804</td>
<td>10-50- By: BOARDMAN, PEGGY</td>
</tr>
<tr>
<td>12/07/2011</td>
<td>0828</td>
<td>804</td>
<td>804</td>
<td>10-50- By: BOARDMAN, PEGGY</td>
</tr>
<tr>
<td>12/07/2011</td>
<td>085</td>
<td></td>
<td>804</td>
<td>10-8 - IN SERVICE</td>
</tr>
<tr>
<td>12/07/2011</td>
<td>0917</td>
<td>804</td>
<td>804</td>
<td>10-23 - ON SCENE</td>
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<tr>
<td>12/07/2011</td>
<td>0922</td>
<td>804</td>
<td>10-27 - DRIVERS LICENSE CK</td>
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</tr>
<tr>
<td>12/07/2011</td>
<td>0936</td>
<td>804</td>
<td>10-24 - ASSIGNMENT COMPLETED</td>
<td></td>
</tr>
</tbody>
</table>

**Date** | **Description** | **Dist** | **ETS** | **Arr** | **Enr** | **Com** | **Miles Disp** | **Miles Arr** | **Tracking #** |
|----------|-----------------|----------|---------|---------|---------|---------|----------------|---------------|----------------|

**Fire Traffic**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Unit</th>
<th>Comment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Unit #</th>
<th>Unit Name</th>
<th>Dispatched</th>
<th>Arrived</th>
<th>Transport Start</th>
<th>Transport End</th>
<th>Completed</th>
</tr>
</thead>
</table>

*Form_SingleCard_Public***
TRAVELING NORTH ON NEW HAVEN ROAD DRIVING APPROXIMATELY 40-45 MPH, CRASH OFF THE ROAD TO THE RIGHT ABOUT A FOOT. HE STEERED BACK ONTO THE ROADWAY BUT OVER STEERED TO THE LEFT CAUSING HER TO OVER CORRECT BACK TO THE RIGHT. DUE TO THE OVER CORRECTION, SHE LOST CONTROL OF THE VEHICLE. THE VEHICLE FRONT END WENT LEFT TOWARD THE DITCH WHILE THE REAR END CONTINUED TO PASS THE FRONT END. AS THE FRONT OF THE VEHICLE IMPACTED THE DITCH, THE MOMENTUM FORCED THE VEHICLE TO COMPLETE A 180 DEGREE ROTATION WITH THE PASSENGER SIDE OF THE VEHICLE IMPACTING THE DITCH BANK. THE VEHICLE CONTINUED TO SLIDE AN ADDITIONAL 50 FEET COMING TO REST ON ALL 4 WHEELS. EVIDENCE AT THE SCENE SUPPORT THIS NARRATIVE.

VEHICLE WESTBOUND ON CR200 ENTERED A WIDE CURVE TO THE LEFT. DRIVER CORRECTED AND WHILE DOING SO, CALF SHIFTED THE LOAD. THIS CAUSED VEHICLE TO PULL TO THE RIGHT ONTO SHOULDER AND BORROW PIT WHERE TRAILER AND TRACTOR TIPPPED OVER ONTO ITS SIDE. 18 FEEDER STEERS WERE KILLED AT THE TIME OF THE REPORT.

A CRASHED AND ABANDONED VEHICLE WAS REPORTED BY A PASSERBY AT 1744 HOURS. WHILE ENROUTE TO THE CRASH SCENE I RECEIVED INFORMATION THAT THE OCCUPANTS OF THE VEHICLE WERE AT A LOCAL RANCH BUT HAD STILL NOT REPORTED THE CRASH. I CONTACTED THE OCCUPANTS AT THE RANCH. DRIVER STATED THAT HE WAS TRAVELING APPROXIMATELY 50-55 MPH WHEN HE SWERED TO MISS A DEER. HE LOST CONTROL OF THE VEHICLE AND IT ROLLED ON TO ITS SIDE. THEY HAD GOTTEN IT BACK ON ITS WHEELS BUT IT COULD NOT BE DRIVEN. THE CRASH OCCURRED AT APPROXIMATELY 1600 HOURS. THE PASSENGER STATED THAT SHE HIT HER
HEAD DURING THE CRASH AND HAD NUMBNESS OF HER RIGHT ARM. AN EMT CHECKED HER OUT AND THE PASSENGER REFUSED TRANSPORT TO A HOSPITAL. I ISSUED CITATION 090209F TO THE DRIVER FOR NO VALID DRIVERS LICENSE. I GAVE A VERBAL WARNING FOR FAILING TO REPORT THE CRASH.

AT THE CRASH SCENE I OBSERVED NO EVIDENCE OF A DEER. TIRE TRACKS INDICATED THAT THE VEHICLE HAD BEEN TRAVELING TOO QUICKLY AS IT ENTERED A CURVE IN THE ROAD. THE DRIVER LOST CONTROL AS THE VEHICLE WENT INTO A SKID AND ROLLED.

**THE CRASH APPEARED TO HAVE BEEN CAUSED ENTIRELY BY DRIVING TOO FAST FOR CONDITIONS.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Speed</th>
<th>Distance</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>20111199</td>
<td>LITTLE MISSOURI</td>
<td>6.7 MILES W OF HWY 112</td>
<td></td>
<td>VEHICLE #1 WAS TRAVELING SOUTH ON HAUL ROAD #3, VEHICLE #2 WAS TRAVELING WEST ON THE LITTLE MISSOURI RD. EVIDENCE AT THE SCENE AND STATEMENTS FROM BOTH DRIVERS INDICATED VEHICLE #1 FAILED TO STOP AT A STOP SIGN. VEHICLE #1 TRAVELED ONTO LITTLE MISSOURI RD AND STRUCK VEHICLE #2 ON THE PASSENGER SIDE OF THE VEHICLE. AT THIS TIME BOTH VEHICLES WERE DRIVEN TO THE SIDE OF THE ROAD FOR SAFETY REASONS AND PARKED.</td>
</tr>
<tr>
<td>20090678</td>
<td>HWY 112 LITTLE MISSOURI ROAD</td>
<td></td>
<td></td>
<td>DRIVER 1: G DOB/ 11TH AVE, BELLE FOURCHE SD</td>
</tr>
<tr>
<td>20090159</td>
<td>LITTLE MISSOURI RD (HAUL RD)</td>
<td>2.2 MILE OF D</td>
<td></td>
<td>VEHICLE #1 WAS WESTBOUND ON THE LITTLE MISSOURI/HAUL ROAD. DRIVER OF VEHICLE #1 FAILED TO STOP AT POSTED STOP SIGN AND CONTINUED INTO THE INTERSECTION OF WYOMING STATE HWY 112 WHERE IT STRUCK VEHICLE #2. VEHICLE #1'S DRIVER CLAIMED TO BE TRAVELING AT APPROXIMATELY 25 MPH. VEHICLE #2 WAS SOUTHBOUND ON WYOMING STATE HWY 1112 AND IT'S DRIVER CLAIMED TO BE TRAVELING AT APPROXIMATELY 65 MPH. POSTED SPEED LIMIT ON HWY 112 AT THIS INTERSECTION IS 65 MPH. PHOTOS WERE TAKEN AT THE SCENE. BOTH DRIVERS AND ON PASSENGER IN VEHICLE #2 CLAIMED NO INJURIES. VEHICLE WAS INOPERABLE AND WERE TOWED FROM THE SCENE.</td>
</tr>
</tbody>
</table>
LUNDBORG, DOUGLAS 809 20,070,596.00 538 538 0.00
DRIVER WEST BOND ON LITTLE MISSOURI RD, GOING MAYBE 5 MPH WHEN DUE TO MUD SLID TO THE SIDE OF THE ROAD, STOPPED AND THEN TIPPED OVER ONTO ITS RIGHT SIDE.
20070541 02/17/2007 LITTLE MISSOURI RD

JOHNSON, GREGORY 807 20,070,377.00 536 536 0.00
STATED THAT HE WAS TRAVELING EAST ON THE LITTLE MISSOURI ROAD ABOUT 1 MILE EAST OF THE BUSCH RANCH AT APPROX 40 MPH. HE STATED THAT WHEN HE CROSSED THE CATTLE GRATE HE WAS A HORSE IN THE ROAD AND ATTEMPTED TO STOP, HOWEVER THE ROAD WAS ICY AND HE WAS UNABLE TO STOP HITTING THE HORSE. HE IMMEDIATELY WENT TO THE BUSCH RANCH AND REPORTED THE ACCIDENT TO A RANCH HAND THERE LEAVING HIS INFORMATION. THE HORSE BELONGED TO LITTLE MISSOURI RD, HULETT, WY 002 447-5588.
20062326 06/30/2006 LITTLE MISSOURI RD .40 MILES SW OF 1334 LT ADAMS, THOMAS (TOM) 11,011,751.00 524 0.00 DRIVER #1 WAS HEADED WEST ON THE LITTLE MISSOURI RD. HE STRUCK VEHICLE #2 IN THE REAR. VEHICLE #2 STOPPED AND LOOKED AT HIS DAMAGE AND THEN LEFT THE SCENE. VEHICLE #2 CAME IN AND REPORTED HIS INVOLVEMENT ON 07/06/06. 20061574 05/14/2006 NEW HAVEN RD 105 FT E OF LITTLE MISSOURI RIVER D STEVENS, ERIC 804 11,011,750.00 523 523 VEHICLE WAS EAST-BOUND ON NEW HAVEN RD AT MILE POST 17 AT AN EXCESSIVE RATE OF SPEED. THE VEHICLE BEGAN TO SKID AS IT ENTERED A CURVE. THE VEHICLE SKIDDED THROUGH THE CURVE WITH THE REAR END OF THE VEHICLE OVER TAKING THE FRONT. THE VEHICLE SKIDDED OFF THE ROADWAY. THE VEHICLE ROLLED ONE-EIGHTH REVOLUTION AND CAME TO REST ON THE DRIVER'S SIDE.
20060437 02/05/2006 LITTLE MISSOURI RD 1.55 MILES E OF GOV CANYON

LUNDBORG, DOUGLAS 809 11,010,647.00 509 509 0.00 DRIVER CAME AROUND CURVE OVERCORRECTED ON SLIPPY SURFACE AND SKIDDED SIDEWAYS INTO BORROW DITCH OVERTURNING, GOING THROUGH FENCE ROLLING OVER AT LEAST A SECOND TIME ENDING UP ON PASSENGER SIDE. DRIVER WAS EJECTED FROM VEHICLE AND TRANSPORTED TO SPEARFISH HOSPITAL BY MS 209.
20041616 05/27/2004 LITTLE MISSOURI RD .65 MILES W OF HWY 112 L STEVENS, ERIC 804 11,006,194.00 446 446 0.00 VEHICLE DRIFTED ONTO RIGHT SHOULDER AS IT APPROACHED A CURNER. DRIVER OVERCORRECTED, CAUSING VEHICLE TO CROSS THE ONCOMING LANE. VEHICLE ROLLED ONE-EIGHTH REVOLUTION AFTER LEAVING ROADWAY. WHEN SHERIFF STAHLA MADE CONTACT WITH THE DRIVER, APPROX 9 HOURS AFTER THE ACCIDENT, HE DETECTED THE ODOR OF AN ALCOHOLIC BEVERAGE EMITTING FROM THE DRIVER'S PERSON. THE DRIVER STATED THAT THE CRASH OCCURRED WHILE HE WAS UNPLUGGING ON CELL PHONE FROM A CHARGER AND PLUGGING ANOTHER IN.
20022250 08/17/2002 LITTLE MISSOURI RD / 3.1 MILES W OF HWY 112 J COUCH, STEVEN 807 11,001,787.00 347 347 0.00 DRIVER TOLD ME THAT HE IS ON PRESCRIPTION MEDS THAT MAKE HIM DROWSY. HE SAW A DEER, STEERED TO MISS IT AND LOST CONTROL AND ROLLED THE CAR. IT ROLLED 1/2 REVOLUTIONS.
20012799 12/21/2001 LITTLE MISSOURI ROAD APPROX 3.3 MILES WEST OF HWY 112 ADAMS, THOMAS (TOM) 11,000,427.00 315 315 AT ABOUT 0918 ON 12-14-2001 I WAS ADVISED OF AN ACCIDENT ON THE LITTLE MISSOURI ROAD ABOUT FIVE MILES WEST OF HIGHWAY 112. I RESPONDED FROM THE SHERIFF'S OFFICE. I WAS ADVISED THAT UNDER SHERIFF BILL WALKER FROM CARTER COUNTY MONTANA WAS RESPONSING, AS WAS THE HULETT AMBULANCE.
Appendix C - CR 200 WY 112 Road Crash Data
<p>| Year | Action | Date | Time | Location | Precinct | Time of Occurrence | Collision | Type of Collision | Speed Limit | Speed | Speed Error | Impairment | Age | Gender | Injury | Fatality | Speed Error | Violation | Fleeing | License | Occupant | Notes |
|------|--------|------|------|----------|----------|-------------------|-----------|-------------------|------------|-------|------------|------------|-----|--------|--------|----------|------------|----------|--------|--------|---------|---------|------|
| 1996 |        |      |      |          |          |                   |           |                   |            |       |            |            |     |        |        |          |            |          |        |        |         |         |      |</p>
<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
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<tr>
<td>2019</td>
<td>1</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
</tr>
<tr>
<td>2017</td>
<td>1</td>
</tr>
<tr>
<td>2016</td>
<td>1</td>
</tr>
<tr>
<td>2015</td>
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**TOTAL RESPONSES:** 2

**TOTAL CONDUCTED:** 2

**TOTAL CONDUCTED IN THE REPORT:** 2
## US 212
**Colony Road**
**Crook County**

<table>
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<th>Dimensions</th>
<th>Width</th>
<th>Unit</th>
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<tr>
<td>Travel Lane</td>
<td>12 ft</td>
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</tr>
<tr>
<td>Shoulder</td>
<td>8 ft</td>
<td></td>
</tr>
<tr>
<td>Total Pavement</td>
<td>40 ft</td>
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<tr>
<td>Length</td>
<td>20.45 miles</td>
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<tr>
<td>Surface Area</td>
<td>473,893 scyd</td>
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### Construction Contracted Maintenance Work

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<th>FY</th>
<th>COST</th>
<th>$/MILE</th>
<th>$/SQYD</th>
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<tr>
<td>Overlay/Chip Seal</td>
<td>$4,011,000</td>
<td>$166,137</td>
<td>$6.36</td>
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<tr>
<td>FY 2017</td>
<td>Chip Seal (24' width)</td>
<td>$500,157</td>
<td>$24,458</td>
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<tr>
<td>FY 2008</td>
<td>Crack Seal</td>
<td>$20,995</td>
<td>$210</td>
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### TRAFFIC STRIPING

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<th>BIENNIAL (2 yr cycle)</th>
<th>EXPENDITURE</th>
<th>$/MILE</th>
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<tr>
<td>Centerline Stripe</td>
<td>$2,455</td>
<td>$120.06</td>
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<tr>
<td>Edge Lines (2)</td>
<td>$9,015</td>
<td>$440.82</td>
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<tr>
<td><strong>SUBTOTAL</strong></td>
<td><strong>$11,470</strong></td>
<td><strong>$560.88</strong></td>
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### MAINTENANCE SURFACING EXPENDITURES (12 Years)

<table>
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<tr>
<th>FY2006 - FY2018</th>
<th>EXPENDITURE</th>
<th>AVERAGE $/YEAR</th>
<th>ANNUAL $/MILE/YR</th>
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<tbody>
<tr>
<td>Hot Mix Asphalt Machine Patching</td>
<td>$50,503</td>
<td>$4,209</td>
<td>$205.80</td>
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<tr>
<td>Pothole Patching</td>
<td>$421</td>
<td>$35</td>
<td>$1.72</td>
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<tr>
<td>Crack Sealing</td>
<td>$2,485</td>
<td>$207</td>
<td>$10.13</td>
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<tr>
<td>Misc Surface Repair</td>
<td>$2,610</td>
<td>$218</td>
<td>$10.64</td>
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<tr>
<td><strong>SUBTOTAL COST</strong></td>
<td><strong>$56,019</strong></td>
<td><strong>$4,668</strong></td>
<td><strong>$228.28</strong></td>
</tr>
</tbody>
</table>

** Does not include cost for work area traffic control.
** All surfacing maintenance costs since last overlay.
** Please note maintenance costs can be accrued all in the same year and not necessarily spread over the 12 year span.
Appendix E - Interstate Engineering Construction Costs

### Little Missouri Road Expansion and Overlay
**Crook County, WY**

<table>
<thead>
<tr>
<th>Description</th>
<th>Units</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Extended Cost</th>
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<tr>
<td>Mobilization</td>
<td>LS</td>
<td>1</td>
<td>$300,000.00</td>
<td>$300,000.00</td>
</tr>
<tr>
<td>Culvert Removal</td>
<td>Each</td>
<td>52</td>
<td>$200.00</td>
<td>$10,400.00</td>
</tr>
<tr>
<td>Fence Remove &amp; Replace</td>
<td>Mile</td>
<td>15.5</td>
<td>$10,000.00</td>
<td>$155,000.00</td>
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<tr>
<td>Common Excavation</td>
<td>LS</td>
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<td>$3,000,000.00</td>
<td>$3,000,000.00</td>
</tr>
<tr>
<td>Remove, Salvage, and Place Topsoil</td>
<td>CY</td>
<td>182,000</td>
<td>$4.00</td>
<td>$728,000.00</td>
</tr>
<tr>
<td>Tack Coat</td>
<td>Ton</td>
<td>61</td>
<td>$520.00</td>
<td>$31,720.00</td>
</tr>
<tr>
<td>Type E1 Asphalt</td>
<td>Ton</td>
<td>76,384</td>
<td>$65.00</td>
<td>$4,964,960.00</td>
</tr>
<tr>
<td>Riprap</td>
<td>Ton</td>
<td>3,120</td>
<td>$35.00</td>
<td>$109,200.00</td>
</tr>
<tr>
<td>Base Course</td>
<td>Ton</td>
<td>318,258</td>
<td>$24.00</td>
<td>$7,638,180.00</td>
</tr>
<tr>
<td>Pavement Marking</td>
<td>Mile</td>
<td>16</td>
<td>$510.00</td>
<td>$7,905.00</td>
</tr>
<tr>
<td>Traffic Control</td>
<td>LS</td>
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<td>$250,000.00</td>
<td>$250,000.00</td>
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<td>Compaction Testing</td>
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<td>$100,000.00</td>
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<tr>
<td>Culverts, Furnish &amp; Install</td>
<td>LF</td>
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<td>$200,000.00</td>
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$26,858,325.00
July 12, 2019

Otto Schlosser
Wyoming Sunmade
2577 Little Missouri Road
Hulett, Wyoming 82720

Re: Little Missouri Road Environmental Services Proposal

Dear Mr. Schlosser:

SWCA Environmental Consultants (SWCA) is pleased to provide this proposal for environmental permitting and compliance services for the Little Missouri Road Project. We understand that the proposed project will involve improving and widening approximately 15.5 miles of Little Missouri Road, a high-traffic county road in Crook County, Wyoming. The project will also include the replacement of a bridge.

SWCA has maintained an established presence in Wyoming since 2004, and our Sheridan office will complete this project with its combined staff of more than 30 planning, natural resource, cultural resource, and paleontological resource professionals. We provide a full spectrum of services focused on planning, natural, cultural, and water resource management, air quality, permitting, and regulatory compliance.

We handle all of the National Environmental Policy Act (NEPA) tasks this project requires, including process management, resource analysis, public involvement, agency coordination, mitigation planning, and natural and human resource impact analysis. Our team of NEPA writers has collectively completed hundreds of environmental assessments, findings of no significant impact, and categorical exclusions, including developing proposed actions and alternatives, impact analyses, public comment analyses and responses, and administrative records. We are experienced in conducting public meetings for projects involving intense public scrutiny and/or controversy. Our staff are highly experienced with Clean Water Act permitting and have prepared, submitted, and shepherded hundreds of applications through these permitting processes. SWCA’s compliance services include environmental inspection; the preparation of stormwater pollution prevention plans and spill prevention, control, and countermeasure plans; and compliance training. Our long-standing relationships with local and federal agencies, such as the Wyoming Game and Fish Department, U.S. Army Corps of Engineers, Wyoming State Historic Preservation Office, and Wyoming Department of Environmental Quality enable us to efficiently focus our impact analyses and compliance processes on the resource issues that are of most concern for each agency.

We look forward to working with you on this project. Please let me know if you have any questions. You can reach me at 307.673.4303 or kip@swca.com.

Sincerely,

Kimberly Ip
Project Manager/Biologist
COST ESTIMATES

Table 1 details SWCA’s proposed cost to complete the scope of work outlined for this project. The proposed cost for the project is $187,000 on a not-to-exceed basis.

Table 1. Summary of Costs.

<table>
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<th>TASK</th>
<th>COST</th>
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<tbody>
<tr>
<td>NEPA Compliance</td>
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<tr>
<td>BA and Section 7 Consultation Support</td>
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<td>NHPA Section 106 Compliance</td>
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<td>CWA Section 404 Permitting</td>
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<td>Environmental Compliance (Federal and State)</td>
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<td><strong>TOTAL</strong></td>
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### Appendix G - Tonnage By Road And Toll Amount

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<th></th>
<th>HWY 112</th>
<th>Maupin</th>
<th>Road 2</th>
<th>Road 3</th>
<th>Road 4</th>
<th>Road 5</th>
<th>Road 6</th>
<th>McDonald</th>
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<tr>
<td>tons</td>
<td>53,649.00</td>
<td>41,652.00</td>
<td>72,794.67</td>
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<td>15,542.33</td>
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<td>Miles</td>
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<td>6.30</td>
<td>11.30</td>
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<td>15.50</td>
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<td>Ton miles</td>
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<td>262,407.60</td>
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<td>Revenue @ 6 cents</td>
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<td>$15,744.46</td>
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Average Haul 13.20